

**REPORT OF STRESSOR/SOURCE IDENTIFICATION
STUDIES IN DRY CREEK AND GRAYSON CREEK
PART A**

December 3, 2014

CONTRA COSTA CLEAN WATER PROGRAM



Submitted to:



255 Glacier Drive
Martinez, CA 94553

Submitted By:



3065 Porter Street, Suite 101
Soquel, CA 95073

In association with
Armand Ruby Consulting

Table of Contents

Table of Contents	i
List of Figures	ii
List of Tables	ii
List of Acronyms	iii
1.0 Introduction.....	1
2.0 SSID Studies – Overview	4
2.1 Study Objectives	5
2.2 Study Personnel	5
2.3 Monitoring Locations.....	5
2.3.1 Dry Creek.....	6
2.3.2 Grayson Creek	6
3.0 Field Monitoring Methods	8
3.1 Wet Weather (Stormwater) Sample Collection	8
3.2 Sediment Sample Collection.....	8
3.3 Field Water Quality Measurements and Observations	9
3.4 Sample Handling and Chain of Custody Procedure	9
4.0 Testing and Analytical Methods	11
4.1 Wet Weather (Stormwater) Aquatic Analytical Methods and Tests	11
4.2 Dry Season Bedded Sediment Analytical Methods and Tests.....	13
4.3 Reference Toxicant Tests.....	15
4.4 Toxicity Identification Evaluations.....	15
5.0 Data Quality Objectives and Quality Assurance / Quality Control	16
6.0 Results	17
7.0 Data Analysis.....	20
7.1 Spatial and Temporal Analysis	20
7.1.1 Water Quality.....	20
7.1.2 Sediment Quality	21
7.2 Toxic Unit Equivalents	22
7.3 Toxicity Identification Evaluations (TIEs).....	24
8.0 Conclusions.....	25
9.0 References.....	26

Appendix A. Permit Provision C.8.d.i., Monitoring Projects (Stressor/Source Identification)..... A

Appendix B. Permit Attachment H/D: Status and Long-Term Monitoring Follow-Up Analysis and
 Actions for Biological Assessment, Bedded Sediment Toxicity, and Bedded Sediment
 Pollutants B

Appendix C. Summary of Creek Status Monitoring in Dry Creek and Grayson Creek, Water Years
 2012 and 2013..... C

Appendix D. CCCWP SSID Study Concept Plan D

Appendix E. CCCWP SSID Part A Work Plan.....E

Appendix F. SSID Monitoring - Quality Assurance / Quality Control Results F

Appendix G. Laboratory Analytical Results Tables for SSID Samples G

Appendix H. Laboratory Reports – SSID Samples H

Appendix I. Field Measurements and Data Sheets I

Appendix J. TIE Laboratory Reports J

List of Figures

Figure 1. SSID Study Area 4

Figure 2. Dry Creek Monitoring Locations, Brentwood, CA 6

Figure 3. Grayson Creek Monitoring Locations, Pleasant Hill, CA 7

List of Tables

Table 1. Personnel Names, Affiliation, and Responsibilities 5

Table 2. CCCWP Part A SSID Study Monitoring Site Location Descriptions for WY 2014..... 7

Table 3. Monitored Storm Events 8

Table 4. Containers and Handling for Wet Weather Aquatic Toxicity and Chemistry Samples 9

Table 5. Containers and Handling for Dry Season Bedded Sediment Toxicity and Chemistry Samples
 10

Table 6. Analytical Constituents, Methods, MDLs and RLs or Test Type for CCCWP SSID Study Wet
 Weather Aquatic Monitoring..... 11

Table 7. Analytical Constituents, Methods, MDLs and RLs or Test Type for CCCWP SSID Study Dry
 Season Bedded Sediment Monitoring 13

Table 8. Results for Detected Constituents, Wet Weather Water Samples 18

Table 9. Results for Detected Constituents, Dry Weather Sediment Samples 19

Table 10. Spatial and Temporal Analysis of Wet Weather Water Quality Data 21

Table 11. Calculation of Pyrethroid Toxic Unit Equivalents for Wet Weather Water Quality Data 23

Table 12. Calculation of Pyrethroid Toxic Unit Equivalents for Dry Weather Sediment Quality Data . 24

List of Acronyms

ADH	ADH Environmental
AMEC	AMEC, Inc.
ARC	Armand Ruby Consulting
ASTM	American Society for Testing and Materials
BASMAA	Bay Area Stormwater Management Agencies Association
BSA	Bovine Serum Albumin
°C	Degrees Celsius
CAL	Caltest Laboratories
CCCWP	Contra Costa Clean Water Program
CVRWQCB	Central Valley Regional Water Quality Control Board
DO	Dissolved oxygen
DQO	Data quality objective
EC	Electrical conductivity
EDD	Electronic Data Deliverable
EOA	EOA, Inc.,
EPA	U.S. Environmental Protection Agency
MDL	Method Detection Limit
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MRP	Municipal Regional Permit
mS/cm	Microsiemens per centimeter
ng/L	Nanograms per liter
NPDES	National Pollution Discharge Elimination System
LC ₅₀	Lethal Concentration to at least 50 percent of the population
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
PBO	Piperonyl butoxide
PEC	Probable Effects Concentration
PER	Pacific EcoRisk
PR	Percent recovery
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QPF	Quantity of Precipitation Forecast
RMC	Regional Monitoring Coalition
RLs	Reporting Limits
RPD	Relative percent difference
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SM	Standard Methods
SOPs	Standard Operating Procedures
SSID	Stressor/Source Identification
SWAMP	Storm Water Ambient Monitoring Program
TEC	Threshold Effects Concentration
TIE	Toxicity Identification Evaluation
TU	Toxic Unit
USGS	United States Geological Survey
ng/g	Nanogram per gram
µg/L	Microgram per liter
WY	Water Year

1.0 Introduction

The Contra Costa Clean Water Program (CCCWP) is responsible for complying with two National Pollutant Discharge Elimination System (NPDES) permits for urban stormwater discharges:

- Order No. R2-2009-0074, the Municipal Regional Permit (MRP), issued by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), Region 2
- Order No. R5-2010-0102 (Central Valley Permit), issued by the Central Valley Regional Water Quality Control Board (CVRWQCB), Region 5

To promote a coordinated countywide program of water quality management, the two permits have nearly identical provisions.

CCCWP entered into a regional collaborative with other Bay Area Stormwater Management Agencies Association (BASMAA) members, known as the Regional Monitoring Coalition (RMC), to plan and conduct Creek Status Monitoring required by provision C.8.c of the permits, to evaluate the monitoring results, and to perform related follow-up studies. The RMC also works cooperatively with staff of both the SFBRWQCB and the CVRWQCB to implement the coordinated monitoring. The Creek Status Monitoring conducted by CCCWP includes monitoring in both West County (Region 2) and East County (Region 5) jurisdictions.

Provision C.8.d.i of both permits (see Appendix A) requires follow-up monitoring projects when creek status monitoring conducted per Provision C.8.c produces results that exceed triggers defined in permit Table 8.1. The follow-up actions may include Stressor/Source Identification (SSID) Studies. MRP Attachment H and Central Valley Permit Attachment D (see Appendix B) also require Permittees to “Identify cause(s) of impacts and spatial extent” when sediment toxicity, chemistry, and bioassessment results meet certain thresholds. Per MRP Provision C.8.d.i, when the creek status monitoring is performed under a regional collaborative (such as the RMC), a maximum of ten SSID studies must be initiated during the permit term; two of those studies must be related to toxicity. By agreement within the RMC, Contra Costa Permittees are responsible for two SSID Studies during the permit term. The Central Valley Permit also caps the SSID studies required of East County Permittees to one study during the permit term. The current SSID studies as reported herein fulfill Contra Costa Permittees’ obligations under both permits.

CCCWP’s Creek Status Monitoring triggered exceedances under NPDES permit Provision C.8.c, Table 8.1 and Attachment H/D, for water and sediment toxicity parameters in both Water Year (WY) 2012 and WY 2013. Both Dry Creek (site 544R00025; Region 5) and Grayson Creek (site 207R00011; Region 2) exhibited water toxicity to *Hyalella azteca* (*H. azteca*) in creek samples collected during wet weather in WY 2012. Retests confirmed water toxicity to *H. azteca* in wet weather samples collected from both creeks in WY 2013. Other test species were not adversely affected in the water toxicity testing. In July 2012, sediment toxicity testing also revealed toxicity to *H. azteca* in sediment samples from both creeks.

In addition to the toxicity testing results, sediment chemistry testing of the dry weather samples in WY 2012 indicated elevated levels of sediment contaminants, including pyrethroid pesticides, in both creeks. Bioassessment monitoring of Dry Creek and Grayson Creek in spring, 2012 also yielded benthic macroinvertebrate index of biological integrity (IBI) scores in the “Very Low” range for both creeks. Taken together, the WY 2012 sediment toxicity, chemistry, and bioassessment results triggered follow-up

actions required in NPDES permit Attachment H/D for Dry Creek and Grayson Creek. See Appendix C for a summary of the pertinent WY 2012 and WY 2013 creek status monitoring results.

A recent statewide survey also provides extensive evidence linking the presence of pyrethroid pesticides to aquatic toxicity in both waters and sediments of urban creeks throughout the state of California (Ruby, 2013). That report cites numerous instances where toxicity to *H. Azteca* co-occurs with elevated pyrethroid pesticide concentrations in both water and sediment samples, and references several toxicity identification evaluation studies (TIEs) in which the observed toxicity was found to be likely attributable to the presence of pyrethroid pesticide contamination. Pyrethroids were commonly found in water and sediment samples from urban creeks, typically at levels sufficient to cause toxicity in water and sediment samples. Fipronil, an increasingly common replacement for pyrethroid pesticides, was also frequently found in urban creek water and sediment samples, at potentially toxic levels.

To address the CCCWP WY 2012 and 2013 creek status monitoring results, and in fulfillment of permit requirements pertaining to SSID studies as described above, CCCWP developed a Stressor/Source ID Study Concept Plan (see Appendix D). The Concept Plan includes four parts, corresponding to the four steps required per permit provision C.8.d.i. for SSID Studies. Provision C.8.d.i requires SSID projects to include the following first step:

“(1) Conduct a site specific study (or non-site specific if the problem is wide-spread) in a stepwise process to identify and isolate the cause(s) of the trigger stressor/source. This study should follow guidance for Toxicity Reduction Evaluations (TRE) or Toxicity Identification Evaluations (TIE).”

Part A of the CCCWP SSID studies, described in this report, involve site-specific studies and TIEs to identify the trigger/stressor as required by permit provision C.8.d.i., and also address causes of sediment quality impacts and spatial extent as required by permit Attachment H/D. As described in the SSID Concept Plan (Appendix D), subsequent phases of the SSID studies will involve identification of potential sources of the pollutant(s) or stressor(s) (Part B), identification and evaluation of potential abatement measures (Part C), and evaluation of the effectiveness of the implemented abatement measures (Part D).

The CCCWP Part A SSID investigations focus on current-use pesticides (pyrethroids and possibly fipronil) as the probable causes of the water and sediment toxicity based on the following factors:

- *H. azteca* is the common affected organism in the water and sediment toxicity at both Contra Costa County creek sites (per WY 2012 and 2013 data, see Appendix C)
- The presence of elevated levels of pyrethroids in sediment samples from those creeks (per WY 2012 data, see Appendix C)
- The preponderance of other evidence linking *H. azteca* toxicity to the presence of pyrethroid pesticides in urban surface waters (Ruby, 2013)

Toxicity SSID studies first require positive identification of the stressor(s). Although pyrethroid pesticides are targeted due to their use in residential areas, and it is presumed that the stressors in the subject creeks are pesticides, additional water and sediment chemistry and toxicity testing are necessary to confirm this supposition. In particular, it is necessary to determine which pesticides are causing toxicity, and whether there are spatial patterns that may pinpoint more specific source areas or land uses.

The SSID Part A studies were conducted by CCCWP during 2014 to evaluate and investigate the extent and causes of the observed creek toxicity to *H. azteca* in Dry Creek and Grayson Creek watersheds. Dry Creek is located in Eastern Contra Costa County in the City of Brentwood (Water Board Region 5). Grayson Creek is in Central Contra Costa County in the City of Pleasant Hill (Water Board Region 2).

The SSID Part A studies involved both wet weather monitoring for aquatic (water column) chemistry and toxicity, and dry weather monitoring for sediment chemistry and toxicity. These projects serve both to fulfill the requirements of MRP Table H-1 and Central Valley Permit Table D-1 with respect to follow-up actions pertinent to the sediment triad results, and also the requirements to conduct the SSID toxicity studies called for in Provision C.8.d.i. in both Regional Permits. This report provides the methods and results of Part A of the two SSID studies, and an analysis of the results.

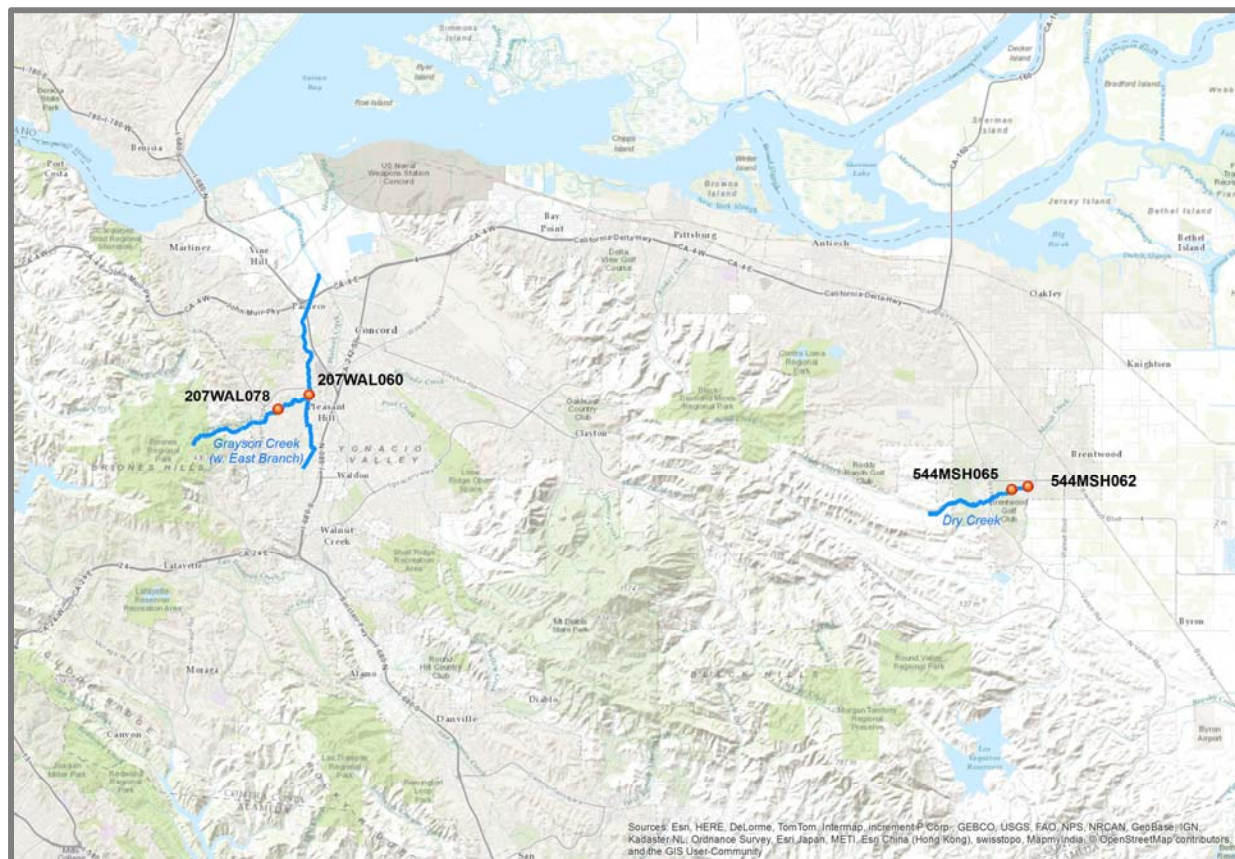
2.0 SSID Studies – Overview

CCCWP performed the Part A SSID studies during 2014 in the Dry Creek and Grayson Creek watersheds, involving the following parameters:

- Two wet weather monitoring events in each creek, at sites upstream and downstream of the WY 2012 and 2013 Creek Status Monitoring sites in each watershed, with analysis of water samples for pyrethroid pesticides, fipronil and degradates, organochlorine pesticides, organic carbon and suspended sediment, plus field parameters, and toxicity testing for acute and chronic effects on *H. Azteca*.
- One dry weather monitoring event in each creek, at the same set of upstream and downstream sites in each watershed, with analysis of sediment samples for pyrethroid pesticides, fipronil and degradates, organochlorine pesticides, organic carbon and percent solids, plus field parameters, and toxicity testing for acute and chronic effects on *H. Azteca*.

An overview of the area covered by the SSID studies is provided in Figure 1. The Part A SSID Work Plan is included as Appendix E to this report.

Figure 1. SSID Study Area



2.1 Study Objectives

The SSID studies are expected to be performed in four parts over four years. The goals of Part A of the SSID studies are to:

- Identify the causes of the observed water and sediment toxicity to *H. azteca* in Dry Creek and Grayson Creek (i.e., the stressor[s])
- Identify temporal (seasonal) and spatial patterns in toxicity and stressors, and better characterize the spatial extent of sediment toxicity impacts

2.2 Study Personnel

The CCCWP provides contract administration as needed to ensure compliance with the Permit requirements and ensure the work is performed to professional standards of quality. Personnel involved with the SSID study, their respective roles and responsibilities are listed in Table 1.

Name	Affiliation	Responsibility
Janet O'Hara	SFBRWQCB	Regulatory Agency
Lucile Paquette	CCCWP	Program Coordinator
Kristine Corneillie	LWA	Technical Advisor
Armand Ruby	ARC	Toxicity Identification Evaluations
Alessandro Hnatt	ADH	Project Manager
Peter Wilde	ADH	Quality Assurance Manager
Kevin Lewis	ADH	Field Sampling
Calvin Sandlin	ADH	Field Sampling

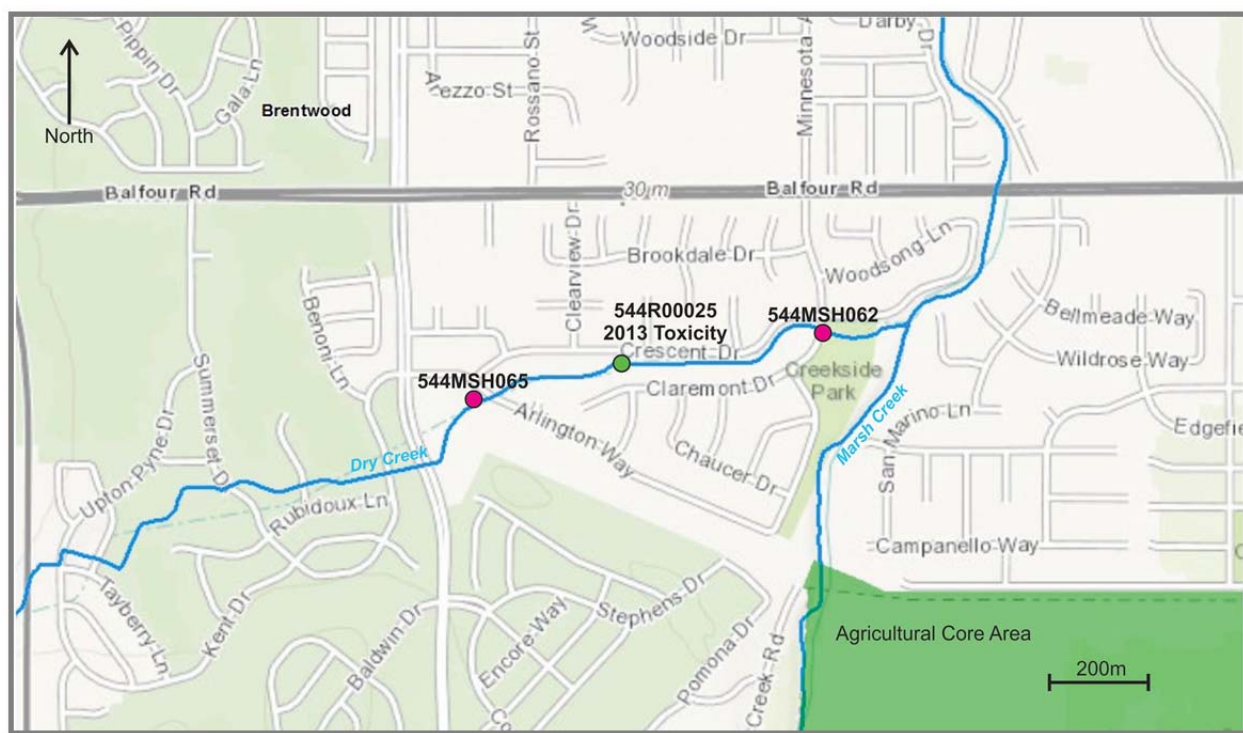
2.3 Monitoring Locations

The WY 2012 Creek Status toxicity sampling locations on Dry Creek and Grayson Creek are shown in Figures 2 and 3, respectively. The original site identification numbers are Site 544R00025 in Dry Creek and Site 207R00011 in Grayson Creek. For these SSID studies, two additional sites were selected for monitoring in each creek: one upstream (“US”) and one downstream (“DS”) of each of the previously-monitored sites to better characterize spatial extent of the toxicity impacts at those sites. The upstream and downstream sites were selected in coordination with the CCCWP Program Coordinator, and reconnaissance of these selected sites was performed in the 2013-2014 winter season in conjunction with CCCWP Creek Status bioassessment site reconnaissance. The following subsections provide brief descriptions of the target watersheds. Locations of upstream and downstream SSID monitoring sites for Dry Creek and Grayson Creek are also shown in Figures 2 and 3, respectively, and are detailed in Table 2.

2.3.1 Dry Creek

Dry Creek is a tributary to Marsh Creek in eastern Contra Costa County in the City of Brentwood. The creek channel in this area has undergone hydromodification due to urbanization and is mostly conveyed through underground pipeline. The reach sampled in this study is one of the reaches where the creek is above-ground. The creek flows through a culvert from the Brentwood Golf Club west of Arlington Way (upstream sampling site), approximately 350 meters along Crescent Drive (south of Balfour Drive), in a grassed flood control channel. It then enters another culvert just downstream of the downstream sampling location, and flows under Creekside Park to its confluence at Marsh Creek. This reach receives runoff from the neighboring urban development as well as from the golf course. The WY 2012 and 2013 creek status sampling location (Site 544R00025) was approximately halfway between the upstream and downstream SSID sampling sites, as shown in Figure 2.

Figure 2. Dry Creek Monitoring Locations, Brentwood, CA



2.3.2 Grayson Creek

Grayson Creek is a tributary to Walnut Creek in central Contra Costa County in the City of Pleasant Hill. Grayson Creek and the two tributaries sampled in this watershed are concrete flood control channels surrounded by residential land use. The upstream sampling location is sited approximately 30 meters up Tributary to Grayson Creek from the confluence with Grayson Creek, immediately upstream of the walking bridge between Mercury Way and Vineyard Court. This tributary drains a parcel of agricultural land to the northwest as well as residential areas. The downstream sampling location is located on East

Branch of Grayson Creek, upstream of the confluence with Grayson Creek, at the terminus of Ardith Drive. During WY 2012 and 2013, the creek status monitoring site (Site 207R00011) was located in the concrete channel where it crosses the Contra Costa Canal Trail in Pleasant Hill (see Figure 3).

Figure 3. Grayson Creek Monitoring Locations, Pleasant Hill, CA

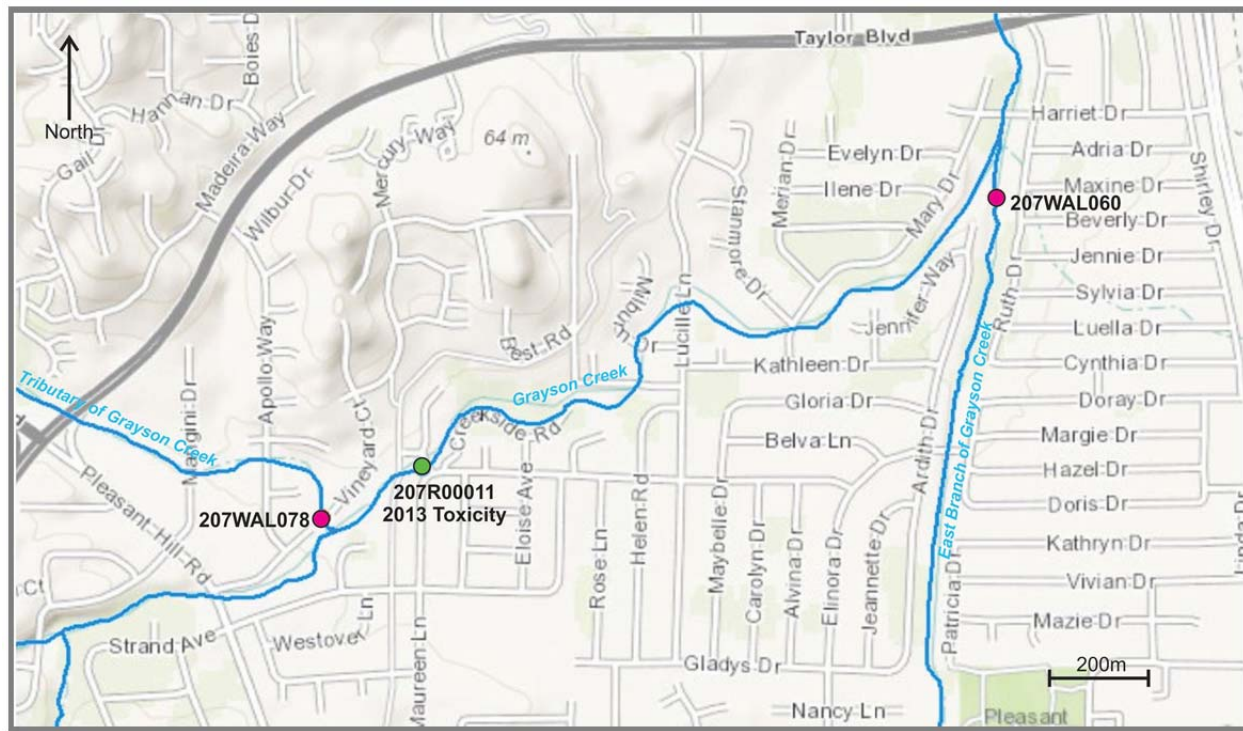


Table 2. CCCWP Part A SSID Study Monitoring Site Location Descriptions for WY 2014				
Creek Name / SSID Study Site	Site Code*	Latitude	Longitude	Monitoring Site Access
Dry Creek / Downstream	544R00025DS /544MSH062	37.923034	-121.714538	Public access. Park on road next to creek. Monitoring site is located upstream of culvert at Claremont Way.
Dry Creek / Upstream	544R00025US /544MSH065	37.921722	-121.721855	Public access. Park on road next to creek. Monitoring site is located upstream of culvert at Arlington Way.
Grayson Creek/ Downstream	207R00011DS /207WAL060	37.954271	-122.07869	Enter through Flood Control Corp yard. Sampling location is at the bottom of the channel access ramp. DO NOT ENTER CHANNEL DURING STORM SEASON
Grayson Creek/ Upstream	207R00011US /207WAL078	37.95141	-122.08396	Enter Flood Control access gate from walking bridge between Mercury Way and Vineyard Court, above channel. Monitoring location is upstream of the bridge. Storm season sampling requires use of sampling pole and transfer container from the top of the channel bank.

*Site codes are shown as original (as submitted to lab)/new (as assigned by SFBRWQCB).

3.0 Field Monitoring Methods

In 2014, monitoring was performed at two sites for each of the two SSID projects (upstream and downstream sites in Dry Creek and Grayson Creek) during two wet weather events, with analysis for water chemistry and toxicity, and at the same four sites during one dry weather event, with analysis for sediment chemistry and toxicity. Monitoring preparation and logistics, laboratory arrangements, weather tracking, mobilization, sample collection, field measurements, sample delivery and shipping, and demobilization followed standard CCCWP and RMC protocols. The following subsections describe the field sampling methods employed for the collection of wet weather water samples and dry weather bedded sediment samples. Sample collection followed protocols described in the RMC Quality Assurance Project Plan (QAPP; EOA et al., 2012) and Standard Operating Procedures (SOPs; EOA et al., 2014a).

To minimize upstream influence on downstream water quality, in each creek and for every monitoring event, the downstream site was always sampled prior to collection of samples at the upstream monitoring site. Additionally, all sampling was conducted during daylight hours in the interest of health and safety.

3.1 Wet Weather (Stormwater) Sample Collection

Wet weather aquatic toxicity and chemistry sample collection techniques and health and safety considerations adhered to all relevant protocols specified in the RMC's SOP FS-2, *Manual Collection of Water Samples for Chemical Analysis, Bacteriological Analysis, and Toxicity Testing* (EOA et al., 2014a).

The characteristics of the monitored wet weather events for the SSID Part projects are shown in Table 3.

Stream/Stations	Event Date	Total Rainfall (in)	Maximum Intensity (in/hr)	Start of Rainfall	End of Rainfall	Duration of Rainfall (hours)	Antecedent Dry Period (days)
Dry Creek 544MSH065 and 544 MSH062 ¹	02/06/14	0.53	0.17	02/05/14 23:00	02/06/14 08:20	9.3	3.2
	02/28/14	1.08	0.56	02/28/14 01:45	02/28/14 15:30	13.8	1.2
Grayson Creek 207WAL078 and 207WAL060 ²	02/28/14	1.22	0.28	02/28/14 01:40	02/28/14 16:22	14.7	1.1
	03/26/14	0.47	0.16	03/26/14 06:45	03/26/14 20:19	13.6	20.3

Explanation:

¹ Weather statistics from station KCABRENT7 (37.933N, -121.721W):
<http://www.wunderground.com/personal-weather-station/dashboard?ID=KCABRENT7>

² Weather statistics from station KCAPLEAS20 (37.945N, -122.082W):
<http://www.wunderground.com/personal-weather-station/dashboard?ID=KCAPLEAS20>

3.2 Sediment Sample Collection

Bedded sediment toxicity and chemistry sampling collection techniques, and health and safety considerations for this SSID Study adhered to all relevant protocols specified in the RMC's SOP FS-6,

Collection of Bedded Sediment Samples for Chemistry Analysis and Toxicity (EOA et al., 2014a). In accordance with the MRP and Central Valley Permits, dry season sampling was conducted on July 22nd, during the prescribed July – September timeframe.

3.3 Field Water Quality Measurements and Observations

Field water quality measurements and associated equipment preparation and calibration were performed in conformance with all relevant water and sediment toxicity and chemistry monitoring protocols specified in the RMC's SOP FS-3, *Manual Field Measurements* (EOA et al., 2014a).

Water quality measurements were performed using a YSI 556 handheld multi-parameter probe to measure temperature, pH, dissolved oxygen (DO) and specific conductance. Measurements of these parameters as well as the field crew names, standard observations of water quality (e.g., odor, clarity, color, etc.), and site information (e.g., GPS coordinates, stream width and depth, approximate flow rate, etc.) were recorded on a SWAMP field data sheet during all sampling events.

3.4 Sample Handling and Chain of Custody Procedure

Sample containers and handling adhered to all relevant protocols specified in the RMC's FS-9, *Sample Container, Handling, and Chain of Custody Procedures* (EOA et al., 2014a). A summary of the respective analytes or tests, sample volumes, containers, and preservatives is presented for wet weather water sample collection and dry-season bedded sediment sample collection in Tables 4 and 5, respectively.

Sample/Test	Container	Handling Requirements
Pyrethroid pesticides	2 @ 1 L amber glass	Place on wet ice, cool to <6° C, 7 day hold time
Fipronil and degradates	1 @ 2 L amber glass	Place on wet ice, cool to <6° C, 7 day hold time ¹
Organochlorine pesticides	1 @ 2 L amber glass	Place on wet ice, cool to <6° C, 7 day hold time
Total Organic Carbon	3 @ 40 ml x VOA	HCL, place on wet ice, cool to <6° C, 28 day hold time
Suspended Sediment Concentration	1 @ 250 ml HDPE	Place on wet ice, cool to <6° C, 7 day hold time
Aquatic toxicity	10 @ 3.75 L amber glass	Place on wet ice, cool to <6° C, 36 hour hold time

Explanation:

¹ Holding time for Fipronil is 7 days, but certain degradates are 3 days.

Sample/Test	Container	Handling Requirements
Pyrethroid pesticides, Fipronil and degradates	1 @ 8 ounces amber glass ¹	Place on wet ice, cool to <6° C, 14 day ² hold time
Organochlorine pesticides	1 @ 8 ounces clear or amber glass soil jar. ¹	Place on wet ice, cool to <6° C, 14 day hold time
Percent Solids	1 @ 8 ounces clear soil jar.	Place on wet ice, cool to <6° C, 7 day hold time
Total Organic Carbon	1 @ 8 ounce clear soil jar	Place on wet ice, cool to <6° C, 28 day hold time
Sediment toxicity	3 @ 4 L ³ amber glass	Place on wet ice, cool to <6° C, 14 day hold time

Explanation:

¹ 2 jars recommended for back-up

² 1 year if frozen

³ The 10-day *Hyaella azteca* sediment toxicity test requires a total of 2 L of sediment. This does not account for additional volume for a follow-up request or for TIEs. The total for TIEs is dependent on the number of treatments, and can be as much as an additional 2-10 L. In summation, the volume should be ≥ 3 gallons (~12 L on the high end) to cover all possibilities.

4.0 Testing and Analytical Methods

Monitoring was performed at each of the four sites for water chemistry and toxicity during two wet weather events, and during one dry weather event for sediment chemistry and toxicity.

Constituents for water quality analysis included:

- Field parameters [DO, specific conductance, pH, Temperature]
- Pyrethroid pesticides
- Fipronil and degradates
- Organochlorine pesticides
- Total organic carbon
- Suspended sediment concentration
- *Hyalella azteca* – chronic toxicity

Constituents for sediment quality analysis included:

- Field parameters (DO, specific conductance, pH, Temperature) in overlying water
- Pyrethroid pesticides
- Fipronil and degradates
- Organochlorine pesticides
- Percent solids
- Total organic carbon
- *Hyalella azteca* – chronic toxicity

4.1 Wet Weather (Stormwater) Aquatic Analytical Methods and Tests

Analytical methods and tests, method detection limits (MDLs) and reporting limits (RLs) for the 2014 CCCWP SSID Study wet weather monitoring are presented in Table 6. Field water quality parameters were measured in the field. Laboratory chemical analyses were performed by Caltest Analytical Laboratory in Napa. Toxicity testing was performed by Pacific EcoRisk in Fairfield, using *H. azteca* as the test species.

Table 6. Analytical Constituents, Methods, MDLs and RLs or Test Type for CCCWP SSID Study Wet Weather Aquatic Monitoring			
Analyte	Analytical Method	Method Detection Limit or Test Duration	Reporting Limit Or Test Type
Water Quality Parameters			
Dissolved Oxygen	YSI 556 field meter	0.01 mg/L	0 - 50 mg/L
Conductivity	YSI 556 field meter	0.001 mS/cm	0 – 200 mS/cm
pH	YSI 556 field meter	0.01 units	0.00 – 14.00 units
Temperature	YSI 556 field meter	-5 – 45°C	0.1°C
Total Organic Carbon	SM20-5310 B	0.50 mg/L	1 mg/L
Suspended Sediment Concentration	ASTM D 3977-97 B-Filtration	2 mg/L	3 mg/L

Table 6. Analytical Constituents, Methods, MDLs and RLs or Test Type for CCCWP SSID Study Wet Weather Aquatic Monitoring			
Analyte	Analytical Method	Method Detection Limit or Test Duration	Reporting Limit Or Test Type
Pyrethroid Pesticides			
Allethrin	EPA 8270Mod (NCI SIM)	0.1 ng/L	1.5 ng/L
Bifenthrin	EPA 8270Mod (NCI SIM)	0.1 ng/L	1.5 ng/L
Cyfluthrin	EPA 8270Mod (NCI SIM)	0.2 ng/L	1.5 ng/L
Cypermethrin	EPA 8270Mod (NCI SIM)	0.3 ng/L	1.5 ng/L
Deltamethrin: Tralomethrin	EPA 8270Mod (NCI SIM)	0.2 ng/L	3.0 ng/L
Esfenvalerate: Fenvalerate	EPA 8270Mod (NCI SIM)	0.2 ng/L	3.0 ng/L
Fenpropathrin	EPA 8270Mod (NCI SIM)	0.3 ng/L	1.5 ng/L
Lambda-Cyhalothrin	EPA 8270Mod (NCI SIM)	0.2 ng/L	1.5 ng/L
Tau-Fluvalinate	EPA 8270Mod (NCI SIM)	0.2 ng/L	1.5 ng/L
Tetramethrin	EPA 8270Mod (NCI SIM)	0.2 ng/L	1.5 ng/L
Permethrin	EPA 8270Mod (NCI SIM)	2 ng/L	15 ng/L
Fipronil (Degradates Listed Below)			
Fipronil Desulfanyl	EPA 8270Mod (NCI SIM)	0.002 µg/L	0.01 µg/L
Fipronil Sulfide	EPA 8270Mod (NCI SIM)	0.002 µg/L	0.01 µg/L
Fipronil Sulfone	EPA 8270Mod (NCI SIM)	0.002 µg/L	0.01 µg/L
Organochlorine Pesticides			
Aldrin	EPA 608	0.0040 µg/L	0.05 µg/L
alpha-BHC	EPA 608	0.0050 µg/L	0.010 µg/L
beta-BHC	EPA 608	0.0040 µg/L	0.005 µg/L
delta-BHC	EPA 608	0.0040 µg/L	0.005 µg/L
gamma-BHC (Lindane)	EPA 608	0.0040 µg/L	0.010 µg/L
Chlordane	EPA 608	0.020 µg/L	0.010 µg/L
4,4'-DDD	EPA 608	0.0040 µg/L	0.010 µg/L
4,4'-DDE	EPA 608	0.0040 µg/L	0.010 µg/L
4,4'-DDT	EPA 608	0.0040 µg/L	0.010 µg/L
Dieldrin	EPA 608	0.0040 µg/L	0.010 µg/L
Endosulfan I	EPA 608	0.0050 µg/L	0.010 µg/L
Endosulfan II	EPA 608	0.0050 µg/L	0.010 µg/L
Endosulfan sulfate	EPA 608	0.0050 µg/L	0.010 µg/L
Endrin	EPA 608	0.0050 µg/L	0.010 µg/L
Endrin aldehyde	EPA 608	0.0050 µg/L	0.010 µg/L
Endrin ketone	EPA 608	0.0050 µg/L	0.010 µg/L
Heptachlor	EPA 608	0.0050 µg/L	0.010 µg/L
Heptachlor epoxide	EPA 608	0.0040 µg/L	0.010 µg/L
Methoxychlor	EPA 608	0.0050 µg/L	0.01 µg/L
Toxaphene	EPA 608	0.30 µg/L	0.5 µg/L

Table 6. Analytical Constituents, Methods, MDLs and RLs or Test Type for CCCWP SSID Study Wet Weather Aquatic Monitoring			
Analyte	Analytical Method	Method Detection Limit or Test Duration	Reporting Limit Or Test Type
Aquatic Toxicity	EPA/600/R-99/064	10-day	Survival

Explanation:

mg/L	Milligram per liter	ng/L	Nanograms per liter
mS/cm	Microsiemens per centimeter	µg/L	Microgram per liter
°C	Degrees Celsius	SM	Standard Methods
EPA	U.S. Environmental Protection Agency	ASTM	American Society for Testing and Materials

4.2 Dry Season Bedded Sediment Analytical Methods and Tests

Analytical constituent methods and tests, MDLs and RLs, or test type for the CCCWP SSID Study dry season bedded sediment toxicity monitoring are presented in Table 7. Field water quality parameters were measured in the field. Laboratory chemical analyses were performed by Caltest Analytical Laboratory in Napa. Toxicity testing was performed by Pacific EcoRisk in Fairfield, using *H. azteca* as the test species.

Table 7. Analytical Constituents, Methods, MDLs and RLs or Test Type for CCCWP SSID Study Dry Season Bedded Sediment Monitoring			
Analyte	Analytical Method	Method Detection Limit or Test Duration	Reporting Limit or Test Type
Water Quality Parameters			
Dissolved Oxygen	YSI 556 field meter	0.01 mg/L	0 - 50 mg/L
Conductivity	YSI 556 field meter	0.001 mS/cm	0 – 200 mS/cm
pH	YSI 556 field meter	0.01 units	0.00 – 14.00 units
Temperature	YSI 556 field meter	-5 – 45°C	0.1°C
Total Organic Carbon	SM20-5310 B	0.30 mg/kg	1 mg/kg
Percent Solids	EPA 9060	0.5 mg/kg	1 mg/kg
Pyrethroid Pesticides			
Allethrin	EPA 8270Mod (NCI SIM)	0.05 ng/g	0.33 ng/g
Bifenthrin	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Cyfluthrin	EPA 8270Mod (NCI SIM)	0.11 ng/g	0.33 ng/g
Cypermethrin	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Deltamethrin: Tralomethrin	EPA 8270Mod (NCI SIM)	0.12 ng/g	0.33 ng/g
Esfenvalerate: Fenvalerate	EPA 8270Mod (NCI SIM)	0.13 ng/g	0.33 ng/g
Fenpropathrin	EPA 8270Mod (NCI SIM)	0.07 ng/g	0.33 ng/g
Lambda-Cyhalothrin	EPA 8270Mod (NCI SIM)	0.06 ng/g	0.33 ng/g
Tau-Fluvalinate	EPA 8270Mod (NCI SIM)	0.04 ng/g	0.33 ng/g
Tetramethrin	EPA 8270Mod (NCI SIM)	0.06 ng/g	0.33 ng/g
Permethrin	EPA 8270Mod (NCI SIM)	0.11 ng/g	0.33 ng/g

Table 7. Analytical Constituents, Methods, MDLs and RLs or Test Type for CCCWP SSID Study Dry Season Bedded Sediment Monitoring

Analyte	Analytical Method	Method Detection Limit or Test Duration	Reporting Limit or Test Type
Fipronil (Degradates Listed Below)	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Fipronil Desulfinyl	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Fipronil Sulfide	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Fipronil Sulfone	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Organochlorine Pesticides¹			
Aldrin	EPA 8081	0.9 ng/g	2 ng/g
alpha-HCH	EPA 8081	0.9 ng/g	2 ng/g
beta-HCH	EPA 8081	0.9 ng/g	2 ng/g
delta-HHC	EPA 8081	0.7 ng/g	2 ng/g
gamma-HCH	EPA 8081	0.7 ng/g	2 ng/g
cis-Chlordane	EPA 8081	1 ng/g	2 ng/g
trans-Chlordane	EPA 8081	1 ng/g	2 ng/g
4,4'-DDD	EPA 8081	0.8 ng/g	2 ng/g
2, 4'-DDD	EPA 8081	2 ng/g	2 ng/g
4,4'-DDE	EPA 8081	1.2 ng/g	2 ng/g
2, 4'-DDE	EPA 8081	2 ng/g	2 ng/g
4,4'-DDT	EPA 8081	1 ng/g	2 ng/g
2, 4'-DDT	EPA 8081	2 ng/g	2 ng/g
Dieldrin	EPA 8081	1.2 ng/g	2 ng/g
Endosulfan I	EPA 8081	0.9 ng/g	2 ng/g
Endosulfan II	EPA 8081	0.7 ng/g	10 ng/g
Endosulfan sulfate	EPA 8081	0.9 ng/g	10 ng/g
Endrin	EPA 8081	1 ng/g	2 ng/g
Endrin aldehyde	EPA 8081	0.9 ng/g	2 ng/g
Endrin ketone	EPA 8081	0.9 ng/g	2 ng/g
Heptachlor	EPA 8081	0.6 ng/g	2 ng/g
Heptachlorepoxide	EPA 8081	1.1 ng/g	2 ng/g
Methoxychlor	EPA 8081	0.9 ng/g	2 ng/g
Toxaphene	EPA 8081	20 ng/g	40 ng/g
Mirex	EPA 8081	0.5 ng/g	20 ng/g
Sediment Toxicity	EPA/600/R-99/064	10-day	Survival

Explanation:

¹ Does not include all analytes listed in Storm Water Ambient Monitoring Program QAPP (SWAMP 2008)

mg/kg = Milligram per kilogram

ng/g = Nanogram per gram

4.3 Reference Toxicant Tests

Per the RMC Creek Status Monitoring Program QAPP (EOA et al., 2012), reference toxicant tests:

... must be conducted monthly for species that are raised within a laboratory. Reference Toxicant Tests must be conducted per analytical batch for species from commercial supplier settings. Reference Toxicant Tests must be conducted concurrently for test species or broodstocks that are field collected.

H. azteca are purchased by Pacific EcoRisk (PER) from commercial suppliers and therefore require reference toxicant tests per analytical batch.

4.4 Toxicity Identification Evaluations

One targeted toxicity identification evaluation (TIE) was performed at Pacific EcoRisk laboratory on a toxic sample for each matrix: water (wet weather) and sediment (dry weather). TIEs were conducted upon discovery of statistically-significant toxicity in water and sediment samples. For the water sample, the targeted TIE included testing of the Baseline Sample (100%), a PBO Treatment (in both 50% dilution and 100% sample) with sample spiking, a Carboxylesterase Treatment (100% sample) with sample spiking, and a Bovine Serum Albumin (BSA) Treatment (100% sample) with sample spiking. For the sediment sample, the targeted TIE included testing of the Baseline Sample (100%), an aeration control sample, a PBO Treatment (100% sample) with sample spiking, and a Carboxylesterase Treatment (100% sample) with sample spiking.

5.0 Data Quality Objectives and Quality Assurance / Quality Control

The data quality objective (DQO) process is implemented through a Quality Assurance/Quality Control (QA/QC) program. The elements of the QA/QC program including required levels of precision and accuracy, and tolerable levels of error are presented in detail in the RMC QAPP (EOA et al., 2012).

A summary of the QA/QC results for the 2014 SSID monitoring is provided in Appendix F.

6.0 Results

Summaries of the chemistry results for detected chemical constituents and toxicity testing results are provided in Table 8 for water samples and Table 9 for sediment samples. The full tables of analytes are provided in Appendix G, and laboratory reports are provided in Appendix H. Field measurements are summarized in Appendix I.

Because the effects of pyrethroid pesticides in sediments have been shown to be mitigated by the presence of organic carbon in the sediment, the Pyrethroid results are also shown normalized per gram of organic carbon, as $\mu\text{g/g}$ of organic carbon.

Table 8. Results for Detected Constituents, Wet Weather Water Samples									
	Dry Creek Upstream 544MSHO65		Dry Creek Downstream 544MSHO62		Tributary of Grayson Creek Upstream 207WAL078		East Branch of Grayson Creek Downstream 207WAL060		Mean Concentration ⁴
	Sample Collection Date								
	02/06/14	02/28/14	02/06/14	02/28/14	02/28/14	03/26/14	02/28/14	03/26/14	
<i>Fipronil and Degradates (ng/L)</i>									
Fipronil	6.2	4.5	ND	4.3	19	15	23	12	11
Fipronil Desulfinyl	2.2	2.2	ND	1.9	2.9	6.5	2.2	3.5	2.7
Fipronil Sulfide	0.5 ^J	ND	ND	ND	1.3 ^J	1.4 ^J	1.6	2.6	1.0
Fipronil Sulfone	3.8	5.5	0.8 ^J	5.2	14	11	9.5	6.8	7.1
<i>Organochlorine Pesticides (µg/L)</i>									
None detected									
<i>Pyrethroid Pesticides (ng/L)</i>									
Bifenthrin	5.3	8.5	5.9	8.6	7.3	11	6.5	4.2	7.2
Cyfluthrin	0.7 ^J	1.5 ^J	0.7 ^J	1.7	ND	1.1 ^J	6.4	0.9 ^J	1.6
Cypermethrin	ND	ND	ND	ND	ND	ND	ND	0.7 ^J	0.19
Deltamethrin: Tralomethrin	ND	ND	ND	ND	4.7	ND	ND	ND	.70
Lambda- Cyhalothrin	0.386 ^{BJ}	ND	0.394 ^{BJ}	ND	ND	1.1 ^J	ND	ND	0.31
Permethrin	ND	ND	ND	ND	ND	ND	ND	12 ^J	1.6
Suspended Sediment Conc. (mg/L)	7.5	13	9.4	37	37	13	173	14	38
Total Organic Carbon (mg/L)	16	14	15	15	11	11	10	13	13
<i>Hyalella Toxicity</i>									
Average Percent Survival ¹	12	6	18 ²	18	48	0 ³	48	0 ³	

Explanation:

ND Non-detect; indicates analytical result has not been detected

J Reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detecting Limit (MDL). The J flag is equivalent to the DNQ Estimated Concentration flag.

B Indicates the analyte has been detected in the blank associated with the sample.

¹ All results significantly lower than control samples averages. Samples deemed toxic are shaded.

² TIE indicated that toxicity was persistent; results are consistent with Type I and Type II pyrethroids.

³ Complete mortality after 48 hours.

⁴ Mean concentration calculated by substituting 1/2 MDL for ND data points.

Table 9. Results for Detected Constituents, Dry Weather Sediment Samples					
	Dry Creek Upstream 544MSH065	Dry Creek Downstream 544MSH062	Tributary of Grayson Creek Upstream 207WAL078	East Branch of Grayson Creek Downstream 207WAL060	Mean Concentration ⁴
	Sample Collection Date				
	07/22/14	07/22/14	07/22/14	07/22/14	
<i>Fipronil and Degradates (µg/kg)</i>					
Fipronil Desulfinyl	0.56	0.27 ^J	ND	ND	0.24
Fipronil Sulfone	3	ND	ND	0.14 ^J	0.81
<i>Organochlorine pesticides (mg/kg)</i>					
2,4'-DDD	0.012	0.034	ND	ND	0.012
2,4'-DDE	0.0058	0.019	ND	ND	0.0068
4,4'-DDD	0.0036	0.023	ND	ND	0.0069
4,4'-DDE	0.028	0.076	ND	ND	0.026
<i>Pyrethroid pesticides (µg/kg)</i>					
Bifenthrin	99	40	5.6	3.6	37
Cyfluthrin	6.2	3.4	0.8	0.41	2.7
Cypermethrin	0.30 ^J	0.35	0.28 ^J	0.21 ^J	0.29
Lambda-Cyhalothrin	0.37	0.24 ^J	ND	ND	0.17
Permethrin	6	9.4	1.9	2.3	4.9
Total Organic Carbon (%)	4.6	1.9	3.6	1	2.8
<i>Pyrethroid pesticides (µg/g organic carbon)</i>					
Bifenthrin	2.2	2.1	0.16	0.36	1.2
Cyfluthrin	0.13	0.18	0.022	0.041	0.094
Cypermethrin	0.0065	0.018	0.0078	0.021	0.013
Lambda-Cyhalothrin	0.0080	0.013	ND	ND	0.0062
Permethrin	0.13	0.49	0.053	0.23	0.23
<i>Hyaella Toxicity</i>					
Average Percent Survival	3.75 ^{1,3}	48.8 ¹	97.1 ²	90 ²	
Average Weight (mg/individual)	0.00625 ¹	0.0352 ¹	0.0699 ²	0.0875	

Explanation:

ND Non-detect; indicates analytical result has not been detected

J Estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detecting Limit (MDL). The J flag is equivalent to the DNQ Estimated Concentration flag.

¹ Result was significantly lower than control sample average. Samples deemed toxic are shaded.

² Result was significantly higher than control sample average.

³ TIE indicated baseline toxicity was persistent; addition of PBO increased toxicity; addition of carboxylesterase removed most of toxicity. Weight of evidence suggests toxicity was likely due to pyrethroid pesticides.

⁴ Mean concentration calculated by substituting 1/2 MDL for ND data points.

7.0 Data Analysis

As hypothesized in the SSID Conceptual Work Plan (Appendix D), current-use pesticides were commonly detected in both water and sediment samples of both creeks:

- Fipronil and three of its common degradate compounds were detected in most of the water samples
- Six pyrethroids were detected at least once in the set of eight water samples; bifenthrin (8 of 8 samples) and cyfluthrin (7 of 8 samples) were detected in nearly all of the samples.
- Two fipronil degradates were detected, each in two of the four sediment samples.
- Four pyrethroids (bifenthrin, cyfluthrin, cypermethrin, and permethrin) were detected in all four of the sediment samples.
- Four DDT breakdown products were detected in both the upstream and downstream sediment samples from Dry Creek.

Toxicity was observed to the test species *Hyalella azteca* in all eight of the water samples, and in both of the Dry Creek sediment samples. Toxicity testing results for the Grayson Creek sediment samples were anomalous.

The concentrations of pyrethroid pesticides measured were sufficient to account for the toxicity observed in all eight toxic water samples and the two (Dry Creek) toxic sediment samples (see detail below and in Appendix J).

TIE analyses performed on one toxic wet weather water sample and one toxic dry weather sediment sample provided evidentiary support for the idea that pyrethroid pesticides were likely to be the principal cause of the observed toxicity in both water and sediment samples.

7.1 Spatial and Temporal Analysis

The NPDES permits (Attachment H/MRP, Attachment D/Central Valley Permit) require the Permittees to further investigate sediment quality/toxicity issues and “Identify cause(s) of impacts and spatial extent.” The water and sediment quality data were both evaluated for potential evidence of spatial differences. Because there were three wet weather aquatic monitoring events (two per site), it is also possible to investigate to a limited degree the temporal variability in the water chemistry data. Wet weather water quality and dry weather sediment quality are discussed separately below.

7.1.1 Water Quality

Table 10 shows the results of spatial and temporal comparisons for the water chemistry data. Given that the comparisons involved sample sizes (“n”) consisting of from two to four data points, these data are not sufficiently numerous to permit statistical analysis, and the analysis should be considered to provide only indications of possible differences or trends.

Across the board, pesticide concentrations were higher on average in Grayson Creek than in Dry Creek. Suspended sediment concentrations also were substantially higher on average in Grayson Creek, indicating that flows, streambed scour, and sediment mobilization may have been higher in Grayson Creek, leading to higher water column pollutant concentrations.

No clear or consistent patterns are observed in either the upstream/downstream spatial comparisons, or the three-event temporal comparisons for the 2014 SSID study water quality data.

Table 10. Spatial and Temporal Analysis of Wet Weather Water Quality Data							
	Dry Creek (mean)	Grayson Creek (mean)	Upstream (mean)	Downstream (mean)	02/06/14 (mean)	02/28/14 (mean)	03/26/14 (mean)
	n=4	n=4	n=4	n=4	n=2	n=4	n=2
<i>Fipronil and Degradates (ng/L)</i>							
Fipronil	3.8	17	11	10	3.2	13	14
Fipronil Desulfinyl	1.6	3.8	3.5	2.0	1.2	2.3	5.0
Fipronil Sulfide	0.3	1.7	0.9	1.2	0.38	0.85	2.0
Fipronil Sulfone	3.8	10	8.6	5.6	2.3	8.6	8.9
<i>Pyrethroid pesticides (ng/L)</i>							
Bifenthrin	7.1	7.3	8.0	6.3	5.6	7.7	7.6
Cyfluthrin	1.2	2.1	0.85	2.4	0.70	2.4	1.0
Cypermethrin	0.10	0.28	0.13	0.25	0.10	0.10	0.45
Deltamethrin:Tralomethrin	0.10	1.3	1.3	0.13	0.10	1.3	0.20
Lambda-Cyhalothrin	0.25	0.38	0.42	0.20	0.39	0.10	0.65
Permethrin	0.10	3.1	0.13	3.1	0.10	0.10	6.1
Suspended Sediment Conc. (mg/L)	17	59	18	58	8.5	65	14
Total Organic Carbon (mg/L)	15	11	13	13	16	13	12

Mean concentrations were calculated by substituting 1/2 MDL for ND data points.

For the wet weather (water matrix) toxicity testing results, as shown in Table 8, there are no clear or consistent patterns in comparisons of Dry Creek vs. Grayson Creek watersheds, upstream vs. downstream sites, or in comparisons of results for the three monitored events. The Grayson Creek samples collected on 3/26/2014 exhibited the highest degree of toxicity, with 0% survival (complete mortality to all test organisms) within three days.

7.1.2 Sediment Quality

For the sediment data, there was only one dry-weather monitoring event during 2014, and therefore limited data analysis can be performed. Visual inspection of the results shown in Table 8 provides no clear indication of substantial or consistent differences between upstream and downstream sites on either of the two creeks studied.

7.1.2.1 DDT Metabolites

However, there are notable differences in the sediment chemistry between the two creek watersheds, principally with respect to detections of four DDT metabolites (breakdown products): 2,4'-DDD, 2,4'-DDE, 4,4'-DDD, and 4,4'-DDE. These four compounds were detected in both the upstream and downstream samples from Dry Creek, and there were no detections in the Grayson Creek watershed

samples. Use of DDT, an organochlorine pesticide, has been banned in the United States for over 40 years, but as a persistent organic pollutant, DDT and its breakdown products tend to persist in sediments near areas of prior use. For all four detected compounds, the concentrations were substantially higher in the Dry Creek downstream samples vs. upstream samples.

7.2 Toxic Unit Equivalents

Pyrethroid pesticides are generally toxic to the most sensitive aquatic arthropods (including *H. azteca*) at extremely low levels – generally at concentrations in the single-digit (or lower) nanograms per liter (ng/L) (parts per trillion) range. Toxicity studies typically identify the LC50, the concentration that is lethal on average to 50% of the test organisms, and/or the EC50, the concentration at which a sub-lethal effect is observed on average to 50% of the test organisms.

Chemical mixtures are often evaluated with respect to their potential to cause toxicity by determination of the toxic unit (TU) equivalents for specific compounds. One TU equivalent is the amount of a specific compound expected to produce a toxic effect in a specific organism in a specific matrix (water or sediment). The TU equivalents for known contaminants in a given sample are typically then summed to provide a TU equivalent sum for the sample. This is often done for a specific class of contaminants, such as pyrethroid pesticides, where there may exist toxicological data indicating the toxic levels of the specific contaminants as derived in laboratory studies.

The published water and sediment toxicity *H. azteca* LC50 values (see Ruby, 2013) were used for comparisons to the measured SSID Part A pyrethroids data and to calculate TU equivalents for those pyrethroids for which published LC50 values are available, based on detected pyrethroid concentrations.

USEPA has not developed recommended water quality criteria for the protection of aquatic life for pyrethroids (or for many other current-use pesticides, including fipronil), as it has for other common water pollutants. Therefore other, non-regulatory data are used as comparison values to evaluate the data compiled for this report and calculate TU equivalents. The available comparison values include water quality criteria values developed by UC Davis, as well as USEPA Aquatic Life Benchmark values (see Ruby, 2013 for discussion of available comparison values). For Lambda-Cyhalothrin, the UC Davis acute water column criterion was used, and for Deltamethrin:Tralomethrin, the average of the deltamethrin and tralomethrin USEPA benchmarks was used, due to lack of published water column *H. azteca* LC50s for those compounds.

As sediment toxicity to *H. azteca* is mitigated by the presence of organic carbon in the sediments, the literature sediment LC50s are derived as pyrethroid concentration per unit organic carbon ($\mu\text{g/g}$ organic carbon). The raw pyrethroid sediment concentrations were therefore converted to those units ($\mu\text{g/g}$ organic carbon) prior to computation of the TU equivalents for the sediment samples.

Because pyrethroid toxicity is generally considered to be additive (c.f., Trimble et al., 2009), the actual in-situ toxicity estimated from chemistry results must account for the mixtures of pyrethroids and other pesticides found.

The toxic unit equivalents attributable to each detected pyrethroid pesticide and the sums of the calculated TU equivalents for each sample for the detected pyrethroids are shown in Table 11 for the water samples and Table 12 for sediment samples.

When the TU equivalents are summed, each of the toxic water and sediment samples exhibit a sum of TU equivalents greater than 1.0, indicating that the measured pyrethroid concentrations were sufficient to cause the toxicity observed. It is notable that the two sediment samples from Grayson Creek watershed were the only samples with pyrethroid TU equivalents less than 1.0, and those were also the only two samples that were not acutely toxic to *H. azteca*.

Table 11. Calculation of Pyrethroid Toxic Unit Equivalents for Wet Weather Water Quality Data

	LC50 or Other Criterion* (ng/L)	Dry Creek Upstream 544MSH065		Dry Creek Downstream 544MSH062		Tributary of Grayson Creek Upstream 207WAL078		East Branch of Grayson Creek Downstream 207WAL060	
		Sample Collection Date							
		02/6/14	02/28/14	02/06/14	02/28/14	02/28/14	03/26/14	02/28/14	03/26/14
<i>Pyrethroid Pesticides: TU Equivalents</i>									
Bifenthrin	7.5	0.7	1.1	0.8	1.1	1.0	1.5	0.9	0.6
Cyfluthrin	2.4	0.3	0.6	0.3	0.7		0.5	2.7	0.4
Cypermethrin	2.5								0.3
Deltamethrin:Tralomethrin	4.3					1.1			
Lambda-Cyhalothrin	1.0	0.4		0.4			1.1		0.2
Permethrin	21.1								0.6
Sum (Pyrethroid TUs)		1.4	1.8	1.5	1.9	2.1	3.0	3.5	2.0

* Toxic Unit Equivalents (TUs) are calculated as ratios of measured pyrethroid concentrations to literature *Hyaella azteca* LC50 values, except for Lambda-Cyhalothrin, for which the UC Davis acute criterion was used, and Deltamethrin:Tralomethrin, for which the average of the deltamethrin and tralomethrin USEPA benchmarks were used, due to lack of published water column *Hyaella azteca* LC50s for those compounds. See: <http://www.tdcenvironmental.com/resources/Pyrethroids-Aquatic-Tox-Summary.pdf> for associated references.

Calculations are based on detected pyrethroids only.

Values in **Bold** indicate TU equivalent sum is greater than 1.0.

Table 12. Calculation of Pyrethroid Toxic Unit Equivalents for Dry Weather Sediment Quality Data					
	LC50 (µg/g organic carbon)	Dry Creek Upstream 544MSH065	Dry Creek Downstream 544MSH062	Tributary of Grayson Creek Upstream 207WAL078	E. Branch of Grayson Creek Downstream 207WAL060
Sample Collection Date					
07/22/14					
<i>Pyrethroid Pesticides: TU Equivalents</i>					
Bifenthrin	0.52	4.1	4.0	0.30	0.69
Cyfluthrin	1.08	0.12	0.17	0.021	0.038
Cypermethrin	0.38	0.017	0.048	0.020	0.055
Lambda-Cyhalothrin	0.45	0.018	0.028	0.002	0.007
Permethrin	10.83	0.012	0.046	0.005	0.021
Sum (Pyrethroid TUs)		4.3	4.3	0.3	0.8

Toxic Unit Equivalents (TUs) are calculated as ratios of measured pyrethroid concentrations to literature *Hyaella azteca* LC50 values. See: <http://www.tdcenvironmental.com/resources/Pyrethroids-Aquatic-Tox-Summary.pdf> for associated references.

Calculations are based on detected pyrethroids only.

Values in **Bold** indicate TU equivalent sum is greater than 1.0

7.3 Toxicity Identification Evaluations (TIEs)

The results of the TIEs for both water and sediment samples indicated that the most likely causes of the observed water and sediment toxicity are pyrethroid pesticides. The full TIE laboratory reports are included in Appendix J.

For the water sample TIE testing, the addition of PBO (a pyrethroid synergist) substantially increased the toxicity of the samples, the addition of carboxylesterase, which reduces pyrethroid toxicity, removed the statistically significant toxicity, and BSA, which has less effect on pyrethroids, had a minor effect on the measured toxicity levels. For the sediment TIE testing, the addition of PBO (a pyrethroid synergist) increased the toxicity of the samples, and the addition of carboxylesterase, which reduces pyrethroid toxicity, removed the statistically significant toxicity.

Taken together with the chemistry results and the toxic unit equivalents calculations as described above, the TIE test results confirm that pyrethroid pesticides are the most likely causes of the observed toxicity in the 2014 SSID water and sediment samples.

8.0 Conclusions

The analysis of data generated in the monitoring study conducted for Part A of the CCCWP SSID study provided the following conclusions:

- Current-use pesticides were commonly detected in both water and sediment samples of both creeks, including fipronil and its common degradate compounds, as well as several pyrethroid pesticides.
- Four DDT breakdown products (variants of DDE and DDD) were detected in both the upstream and downstream sediment samples from Dry Creek.
- Toxicity was observed to the test species *Hyaella azteca* in all eight of the 2014 SSID Study water samples (upstream and downstream samples for two wet weather events in both Dry Creek and Grayson Creek watersheds), and in both of the Dry Creek sediment samples. Toxicity testing results for the Grayson Creek sediment samples were anomalous.
- The concentrations of pyrethroid pesticides measured were sufficient to account for the toxicity observed in all eight toxic water samples (upstream and downstream samples for two wet weather events in both Dry Creek and Grayson Creek watersheds) and the two (Dry Creek) toxic sediment samples.
- TIE analyses performed on one toxic wet weather water sample and one toxic dry weather sediment sample provided evidentiary support for the idea that pyrethroid pesticides were likely to be the principal cause of the observed toxicity in both water and sediment samples.

9.0 References

- CVRWQCB, 2010. *California Regional Water Quality Control Board Central Valley Stormwater NPDES Waste Discharge Requirements Order R5-2010-0102 NPDES Permit No. CAS083313*. September 23, 2010.
- EOA, AMS, and ARC, 2012. *BASMAA Regional Monitoring Coalition Creek Status Monitoring Program Quality Assurance Project Plan*. Prepared for Bay Area Stormwater Management Agencies Association. Version 1, February 1, 2012.
- EOA, AMS, and ARC, 2014a. *BASMAA Regional Monitoring Coalition Creek Status Monitoring Program Standard Operating Procedures*. Prepared for Bay Area Stormwater Management Agencies Association. Final Version 2, January 2014.
- EOA, AMS, and ARC, 2014b. *BASMAA Regional Monitoring Coalition Creek Status Monitoring Program Quality Assurance Project Plan*. Prepared for Bay Area Stormwater Management Agencies Association. Final Version 2, January 2014.
- Macdonald et al., 2000. *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems*. 13 January 200.
- Ruby, A. (2013). "Review of Pyrethroid, Fipronil and Toxicity Monitoring Data from California Urban Watersheds". Prepared for the California Stormwater Quality Association (CASQA). Prepared by Armand Ruby, Armand Ruby Consulting. July 10.
- Trimble, A. J., D. P. Weston, J. B. Belden, M. J. Lydy. (2009). "Identification and Evaluation of Pyrethroid Insecticide Mixtures in Urban Sediments." *Environmental Toxicology and Chemistry* **28**(8): 1687-1695.
- SFBRWQCB, 2009. *California Regional Water Quality Control Board San Francisco Bay Region Municipal Regional Stormwater NPDES Permit, Order R2-2009-0074 NPDES Permit No. CAS612008*. October 14, 2009.
- SWAMP, 2008. *Storm Water Ambient Monitoring Program Quality Assurance Project Plan*. Prepared for The State of California's Storm Water Ambient Monitoring Program. Version 1.0. September 1, 2008.

Appendix A. Permit Provision C.8.d.i., Monitoring Projects (Stressor/Source Identification)

- v. Status Monitoring Results – When Status Monitoring produces results such as those described in the final column of Table 8.1, Permittees shall conduct Monitoring Project(s) as described in C.8.d.i.

C.8.d. Monitoring Projects – Permittees shall conduct the Monitoring Projects listed below.

- i. **Stressor/Source Identification** – When Status results trigger a follow-up action as indicated in Table 8.1, Permittees shall take the following actions, as also required by Provision C.1. If the trigger stressor or source is already known, proceed directly to step 2. The first follow-up action shall be initiated as soon as possible, and no later than the second fiscal year after the sampling event that triggered the Monitoring Project.
 - (1) Conduct a site specific study (or non-site specific if the problem is widespread) in a stepwise process to identify and isolate the cause(s) of the trigger stressor/source. This study should follow guidance for Toxicity Reduction Evaluations (TRE)⁴⁰ or Toxicity Identification Evaluations (TIE).⁴¹ A TRE, as adapted for urban stormwater data, allows Permittees to use other sources of information (such as industrial facility stormwater monitoring reports) in attempting to determine the trigger cause, potentially eliminating the need for a TIE. If a TRE does not result in identification of the stressor/source, Permittees shall conduct a TIE.
 - (2) Identify and evaluate the effectiveness of options for controlling the cause(s) of the trigger stressor/source.
 - (3) Implement one or more controls.
 - (4) Confirm the reduction of the cause(s) of trigger stressor/source.
 - (5) Stressor/Source Identification Project Cap: Permittees who conduct this monitoring through a regional collaborative shall be required to initiate no more than ten Stressor/Source Identification projects during the Permit term in total, and at least two must be toxicity follow-ups, unless monitoring results do not indicate the presence of toxicity. If conducted through a stormwater countywide program, the Santa Clara and Alameda

⁴⁰ USEPA. August 1999. *Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants*. EPA/833B-99/002. Office of Wastewater Management, Washington, D.C.

⁴¹ Select TIE methods from the following references after conferring with SWAMP personnel: For sediment: (1) Ho KT, Burgess R., Mount D, Norberg-King T, Hockett, RS. 2007. *Sediment toxicity identification evaluation: interstitial and whole methods for freshwater and marine sediments*. USEPA, Atlantic Ecology Division/Mid-Continental Ecology Division, Office of Research and Development, Narragansett, RI, or (2) Anderson, BS, Hunt, JW, Phillips, BM, Tjeerdema, RS. 2007. *Navigating the TMDL Process: Sediment Toxicity*. Final Report- 02-WSM-2. Water Environment Research Federation. 181 pp. For water column: (1) USEPA. 1991. *Methods for aquatic toxicity identification evaluations. Phase I Toxicity Characterization Procedures*. EPA 600/6-91/003. Office of Research and Development, Washington, DC., (2) USEPA. 1993. *Methods for aquatic toxicity identification evaluations. Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity*. EPA 600/R-92/080. Office of Research and Development, Washington, DC., or (3) USEPA. 1996. *Marine Toxicity Identification Evaluation (TIE), Phase I Guidance Document*. EPA/600/R-95/054. Office of Research and Development, Washington, DC.

Permittees each shall be required to initiate no more than five (two for toxicity); the Contra Costa and San Mateo Permittees each shall be required to initiate no more than three (one for toxicity); and the Fairfield-Suisun and Vallejo Permittees each shall be required to initiate no more than one Stressor/Source Identification project(s) during the Permit term.

(6) As long as Permittees have complied with the procedures set forth above, they do not have to repeat the same procedure for continuing or recurring exceedances of the same receiving water limitations unless directed to do so by the Water Board.

ii. BMP Effectiveness Investigation – Investigate the effectiveness of one BMP for stormwater treatment or hydrograph modification control. Permittees who do this project through a regional collaborative are required to initiate no more than one BMP Effectiveness Investigation during the Permit term. If conducted through a stormwater countywide program, the Santa Clara, Alameda, Contra Costa, and San Mateo Permittees shall be required to initiate one BMP Effectiveness Investigation each, and the Fairfield-Suisun and Vallejo Permittees shall be exempt from this requirement. The BMP(s) used to fulfill requirements of C.3.b.iii., C.11.e. and C.12.e. may be used to fulfill this requirement, provided the BMP Effectiveness Investigation includes the range of pollutants generally found in urban runoff. The BMP Effectiveness Investigation will not trigger a Stressor/Source Identification Project. Data from this Monitoring Project need not be SWAMP-comparable.

iii. Geomorphic Project – This monitoring is intended to answer the questions: How and where can our creeks be restored or protected to cost-effectively reduce the impacts of pollutants, increased flow rates, and increased flow durations of urban runoff?

Permittees shall select a waterbody/reach, preferably one that contains significant fish and wildlife resources, and conduct one of the following projects within each county, except that only one such project must be completed within the collective Fairfield-Suisun and Vallejo Permittees' jurisdictions:

- (1) Gather geomorphic data to support the efforts of a local watershed partnership⁴² to improve creek conditions; or
- (2) Inventory locations for potential retrofit projects in which decentralized, landscape-based stormwater retention units can be installed; or
- (3) Conduct a geomorphic study which will help in development of regional curves which help estimate equilibrium channel conditions for different-sized drainages. Select a waterbody/reach that is not undergoing changing land use. Collect and report the following data:
 - Formally surveyed channel dimensions (profile), planform, and cross-sections. Cross-sections shall include the topmost floodplain terrace and

⁴² A list of local watershed partnerships may be obtained from Water Board staff.

- iv. Status Monitoring Location – One location in Marsh Creek (Marsh Creek Reservoir to San Joaquin River, partly in Delta Waterways, western portion)
- v. Status Monitoring Results – When Status Monitoring produces results such as those described in the final column of Table 8.1, Permittees shall conduct Monitoring Project(s) as described in C.8.c.i.

C.8.d. Monitoring Projects – Permittees shall conduct the Monitoring Projects listed below.

- i. **Stressor/Source Identification** – When Status results trigger a follow-up action as indicated in Table 8.1, Permittees shall take the following actions, as also required by Provision C.1. If the trigger stressor or source is already known, proceed directly to step 2. The first follow-up action shall be initiated as soon as possible, and no later than the second fiscal year after the sampling event that triggered the Monitoring Project.
 - (1) Conduct a site specific study (or non-site specific if the problem is widespread) in a stepwise process to identify and isolate the cause(s) of the trigger stressor/source. This study should follow guidance for Toxicity Reduction Evaluations (TRE)³⁹ or Toxicity Identification Evaluations (TIE).⁴⁰ A TRE, as adapted for urban stormwater data, allows Permittees to use other sources of information (such as industrial facility stormwater monitoring reports) in attempting to determine the trigger cause, potentially eliminating the need for a TIE. If a TRE does not result in identification of the stressor/source, Permittees shall conduct a TIE.
 - (2) Identify and evaluate the effectiveness of options for controlling the cause(s) of the trigger stressor/source.
 - (3) Implement one or more controls.
 - (4) Confirm the reduction of the cause(s) of trigger stressor/source.
 - (5) Stressor/Source Identification Project Cap: Permittees who conduct this monitoring through a regional collaborative shall be required to initiate no

³⁹ USEPA. August 1999. *Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants*. EPA/833B-99/002. Office of Wastewater Management, Washington, D.C.

⁴⁰ Select TIE methods from the following references after conferring with SWAMP personnel: For sediment:
(1) Ho KT, Burgess R., Mount D, Norberg-King T, Hockett, RS. 2007. *Sediment toxicity identification evaluation: interstitial and whole methods for freshwater and marine sediments*. USEPA, Atlantic Ecology Division/Mid-Continental Ecology Division, Office of Research and Development, Narragansett, RI, or
(2) Anderson, BS, Hunt, JW, Phillips, BM, Tjeerdema, RS. 2007. *Navigating the TMDL Process: Sediment Toxicity*. Final Report- 02-WSM-2. Water Environment Research Federation. 181 pp. For water column:
(1) USEPA. 1991. *Methods for aquatic toxicity identification evaluations. Phase I Toxicity Characterization Procedures*. EPA 600/6-91/003. Office of Research and Development, Washington, DC., (2) USEPA. 1993. *Methods for aquatic toxicity identification evaluations. Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity*. EPA 600/R-92/080. Office of Research and Development, Washington, DC., or (3) USEPA. 1996. *Marine Toxicity Identification Evaluation (TIE), Phase I Guidance Document*. EPA/600/R-95/054. Office of Research and Development, Washington, DC.

more than one Stressor/Source Identification project during the Permit term.

- (6) As long as Permittees have complied with the procedures set forth above, they do not have to repeat the same procedure for continuing or recurring exceedances of the same receiving water limitations unless directed to do so by the Central Valley Water Board.

ii. BMP Effectiveness Investigation – Investigate the effectiveness of one BMP for stormwater treatment or hydrograph modification control. Permittees who do this project through a regional collaborative are required to initiate no more than one BMP Effectiveness Investigation during the Permit term. If conducted through a stormwater countywide program, the East Contra Costa Permittees in the Central Valley Water Board Region shall be required to participate in one BMP Effectiveness Investigation. The BMP(s) used to fulfill requirements of C.3.b.iii. (Green Street Pilot Project) may be used to fulfill this requirement, provided the BMP Effectiveness Investigation includes the range of pollutants generally found in urban runoff. The BMP Effectiveness Investigation will not trigger a Stressor/Source Identification Project. Data from this Monitoring Project need not be SWAMP-comparable.

iii. Geomorphic Project – This monitoring is intended to answer the questions: How and where can our creeks be restored or protected to cost-effectively reduce the impacts of pollutants, increased flow rates, and increased flow durations of urban runoff?

Permittees shall select a waterbody/reach, preferably one that contains significant fish and wildlife resources, and conduct one of the following projects within the county:

- (1) Gather geomorphic data to support the efforts of a local watershed partnership⁴¹ to improve creek conditions; or
- (2) Inventory locations for potential retrofit projects in which decentralized, landscape-based stormwater retention units can be installed; or
- (3) Conduct a geomorphic study which will help in development of regional curves which help estimate equilibrium channel conditions for different-sized drainages. Select a waterbody/reach that is not undergoing changing land use. Collect and report the following data:
 - Formally surveyed channel dimensions (profile), planform, and cross-sections. Cross-sections shall include the topmost floodplain terrace and be marked by a permanent, protruding (not flush with ground) monument.
 - Contributing drainage area.
 - Best available information on bankfull discharges and width and depth of channel formed by bankfull discharges.

⁴¹ A list of local watershed partnerships may be obtained from Central Valley Water Board staff.

Appendix B. Permit Attachment H/D: Status and Long-Term Monitoring Follow-Up Analysis and Actions for Biological Assessment, Bedded Sediment Toxicity, and Bedded Sediment Pollutants

ATTACHMENT H

Provision C.8. Status and Long-Term Monitoring Follow-up Analysis and Actions

Status and Long-Term Monitoring Follow-up Analysis and Actions for Biological Assessment, Bedded Sediment Toxicity, and Bedded Sediment Pollutants

When results from Biological Assessment, Bedded Sediment Toxicity, and/or Bedded Sediment Pollutants monitoring indicate impacts at a monitoring location, Permittees shall evaluate the extent and cause(s) of impacts to determine the potential role of urban runoff as indicated in Table H-1.

Table H-1. Sediment Triad Approach to Determining Follow-Up Actions

Chemistry Results ¹⁶¹	Toxicity Results ¹⁶²	Bioassessment Results ¹⁶³	Action
No chemicals exceed Threshold Effect Concentrations (TEC), mean Probable Effects Concentrations (PEC) quotient < 0.5 and pyrethroids < 1.0 Toxicity Unit (TU) ¹⁶⁴	No Toxicity	No indications of alterations	No action necessary
No chemicals exceed TECs, mean PEC quotient < 0.5 and pyrethroids < 1.0 TU	Toxicity	No indications of alterations	(1) Take confirmatory sample for toxicity. (2) If toxicity repeated, attempt to identify cause and spatial extent. (3) Where impacts are under Permittee's control, take management actions to minimize upstream sources causing toxicity; initiate no later than the second fiscal year following the sampling event.

¹⁶¹ TEC and PEC are found in MacDonald, D.D., G.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems. *Archives of Environ. Contamination and Toxicology* 39(1):20–31.

¹⁶² Toxicity is exhibited when *Hyallela* survival statistically different than and < 20 percent of control.

¹⁶³ Alterations are exhibited if metrics indicate substantially degraded community.

¹⁶⁴ Toxicity Units (TU) are calculated as follows: TU = Actual concentration (organic carbon normalized) ÷ Reported *H. azteca* LC₅₀ concentration (organic concentration normalized). Weston, D.P., R.W. Holmes, J. You, and M.J. Lydy, 2005. Aquatic Toxicity Due to Residential Use of Pyrethroid Insecticides. *Environ. Science and Technology* 39(24):9778–9784.

Chemistry Results ¹⁶¹	Toxicity Results ¹⁶²	Bioassessment Results ¹⁶³	Action
No chemicals exceed TECs, mean PEC quotient < 0.5 and pyrethroids < 1.0 TU	No Toxicity	Indications of alterations	Identify the most probable cause(s) of the alterations in biological community. Where impacts are under Permittee's control, take management actions to minimize the impacts causing physical habitat disturbance; initiate no later than the second fiscal year following the sampling event.
No chemicals exceed TECs, mean PEC quotient < 0.5 and pyrethroids < 1.0 TU	Toxicity	Indications of alterations	(1) Identify cause(s) of impacts and spatial extent. (2) Where impacts are under Permittee's control, take management actions to minimize impacts; initiate no later than the second fiscal year following the sampling event.
3 or more chemicals exceed PECs, the mean PEC quotient is > 0.5, or pyrethroids > 1.0 TU	No Toxicity	Indications of alterations	(1) Identify cause of impacts. (2) Where impacts are under Permittee's control, take management actions to minimize the impacts caused by urban runoff; initiate no later than the second fiscal year following the sampling event.
3 or more chemicals exceed PECs, the mean PEC quotient is > 0.5, or pyrethroids > 1.0 TU	Toxicity	No indications of alterations	(1) Take confirmatory sample for toxicity. (2) If toxicity repeated, attempt to identify cause and spatial extent. (3) Where impacts are under Permittee's control, take management actions to minimize upstream sources; initiate no later than the second fiscal year following the sampling event.
3 or more chemicals exceed PECs, the mean PEC quotient is > 0.5, or pyrethroids > 1.0 TU	No Toxicity	No Indications of alterations	If PEC exceedance is Hg or PCBs, address under TMDLs
3 or more chemicals exceed PECs, the mean PEC quotient is > 0.5, or pyrethroids > 1.0 TU	Toxicity	Indications of alterations	(1) Identify cause(s) of impacts and spatial extent. (2) Where impacts are under Permittee's control, take management actions to address impacts.

ATTACHMENT D

Provision C.8. Status and Long-Term Monitoring Follow-up Analysis and Actions

Status and Long-Term Monitoring Follow-up Analysis and Actions for Biological Assessment, Bedded Sediment Toxicity, and Bedded Sediment Pollutants

When results from Biological Assessment, Bedded Sediment Toxicity, and/or Bedded Sediment Pollutants monitoring indicate impacts at a monitoring location, Permittees shall evaluate the extent and cause(s) of impacts to determine the potential role of urban runoff as indicated in Table D-1.

Table D-1. Sediment Triad Approach to Determining Follow-Up Actions

Chemistry Results ¹¹³	Toxicity Results ¹¹⁴	Bioassessment Results ¹¹⁵	Action
No chemicals exceed Threshold Effect Concentrations (TEC), mean Probable Effects Concentrations (PEC) quotient < 0.5 and pyrethroids < 1.0 Toxicity Unit (TU) ¹¹⁶	No Toxicity	No indications of alterations	No action necessary
No chemicals exceed TECs, mean PEC quotient < 0.5 and pyrethroids < 1.0 TU	Toxicity	No indications of alterations	(1) Take confirmatory sample for toxicity. (2) If toxicity repeated, attempt to identify cause and spatial extent. (3) Where impacts are under Permittee’s control, take management actions to minimize upstream sources causing toxicity; initiate no later than the second fiscal year following the sampling event.

¹¹³ TEC and PEC are found in MacDonald, D.D., G.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-based Sediment Quality Guidelines for Freshwater Ecosystems. *Archives of Environ. Contamination and Toxicology* 39(1):20–31.

¹¹⁴ Toxicity is exhibited when *Hyallolela* survival statistically different than and < 20 percent of control.

¹¹⁵ Alterations are exhibited if metrics indicate substantially degraded community.

¹¹⁶ Toxicity Units (TU) are calculated as follows: TU = Actual concentration (organic carbon normalized) ÷ Reported *H. azteca* LC₅₀ concentration (organic concentration normalized). Weston, D.P., R.W. Holmes, J. You, and M.J. Lydy, 2005. Aquatic Toxicity Due to Residential Use of Pyrethroid Insecticides. *Environ. Science and Technology* 39(24):9778–9784.

Chemistry Results ¹¹³	Toxicity Results ¹¹⁴	Bioassessment Results ¹¹⁵	Action
No chemicals exceed TECs, mean PEC quotient < 0.5 and pyrethroids < 1.0 TU	No Toxicity	Indications of alterations	Identify the most probable cause(s) of the alterations in biological community. Where impacts are under Permittee's control, take management actions to minimize the impacts causing physical habitat disturbance; initiate no later than the second fiscal year following the sampling event.
No chemicals exceed TECs, mean PEC quotient < 0.5 and pyrethroids < 1.0 TU	Toxicity	Indications of alterations	(1) Identify cause(s) of impacts and spatial extent. (2) Where impacts are under Permittee's control, take management actions to minimize impacts; initiate no later than the second fiscal year following the sampling event.
3 or more chemicals exceed PECs, the mean PEC quotient is > 0.5, or pyrethroids > 1.0 TU	No Toxicity	Indications of alterations	(1) Identify cause of impacts. (2) Where impacts are under Permittee's control, take management actions to minimize the impacts caused by urban runoff; initiate no later than the second fiscal year following the sampling event.
3 or more chemicals exceed PECs, the mean PEC quotient is > 0.5, or pyrethroids > 1.0 TU	Toxicity	No indications of alterations	(1) Take confirmatory sample for toxicity. (2) If toxicity repeated, attempt to identify cause and spatial extent. (3) Where impacts are under Permittee's control, take management actions to minimize upstream sources; initiate no later than the second fiscal year following the sampling event.
3 or more chemicals exceed PECs, the mean PEC quotient is > 0.5, or pyrethroids > 1.0 TU	No Toxicity	No Indications of alterations	If PEC exceedance is Hg or PCBs, address under TMDLs
3 or more chemicals exceed PECs, the mean PEC quotient is > 0.5, or pyrethroids > 1.0 TU	Toxicity	Indications of alterations	(1) Identify cause(s) of impacts and spatial extent. (2) Where impacts are under Permittee's control, take management actions to address impacts.

Appendix C. Summary of Creek Status Monitoring in Dry Creek and Grayson Creek, Water Years 2012 and 2013

Samples were collected from Grayson Creek and Dry Creek, sites 207R00011 and 544R00025, respectively, during the Creek Status Monitoring for WY 2012 in Contra Costa County, as part of the RMC regional monitoring. Results relevant to the SSID Part A Study are summarized in the tables below.

The WY 2012 wet weather water samples were both toxic to *H. azteca* (Table C-1)

Table C-1. Comparison between laboratory control and receiving water sample toxicity results (*H. azteca*) for RMC samples collected in WY 2012 wet season, in the context of MRP trigger criteria

County/ Program	Test Initiation Date	Species Tested	Treatment/ Sample ID	10-Day Mean % Survival	Comparison to MRP Table 8.1 Trigger Criteria
CCCWP	3/15/12	<i>H. azteca</i>	Lab Control	100	NA
	3/15/12		207R00011 Grayson Creek	32*	<50% of Control
	3/15/12		Lab Control	94	NA
	3/15/12		544R00025 Dry Creek	0*	<50% of Control

* The response at this test treatment was significantly less than the Lab Control at $p < 0.05$.

Because these samples exceeded permit Table 8.1 trigger criteria, re-testing of these samples was required.

For the retests following up on 2012 triggers, samples from both sites were retested with *H. azteca*, the species exhibiting a toxic response, and both sites again showed an acute toxic response (Table C-2). The two samples identified with significant toxicity, 207R00011 and 544R00025, both again met MRP triggers.

Table C-2. Comparison between laboratory control and receiving water sample toxicity results (*H. azteca*) for RMC samples retested in WY 2013 wet season, in the context of MRP trigger criteria

County/ Program	Test Initiation Date (Time)	Species Tested	Treatment/ Sample ID	10-Day Mean % Survival	Comparison to MRP Table 8.1 Trigger Criteria
CCCWP	3/6/13	<i>H. azteca</i>	Lab Control	100	NA
	3/6/13		207R00011 Grayson Creek	4*	< 50% of control
	4/4/13		Lab Control	100	NA
	4/4/13		544R00025 Dry Creek	20*	< 50% of control

* The response at this test treatment was significantly less than the Lab Control at $p < 0.05$.

During WY 2012 dry weather monitoring, the sediment samples from both creeks also were toxic to *H. azteca* (Table C-3).

Table C-3. Detailed sediment toxicity results for dry-season samples exhibiting significant toxicity to *H. azteca* for sampling conducted in WY 2012

County/ Program	Test Initiation Date	Treatment/ Sample ID	Mean % Survival	Mean Dry Weight (mg)	Comparison to MRP Tables 8.1 and H-1 Trigger Criteria
CCCWP	7/28/12	Lab Control	96.3	0.23	NA
	7/28/12	207R00011 Grayson Creek	43.8*	0.09	More than 20% < Control
	7/28/12	Lab Control	96.3	0.23	NA
	7/28/12	544R00025 Dry Creek	60*	0.23	More than 20% < Control

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

Pyrethroid toxic unit equivalents were calculated for the WY 2012 dry weather sediment chemistry samples, and both creeks exhibited sum of TU equivalents > 1.0 (Table C-4), indicating likelihood of toxic conditions.

Table C-4. Calculated pyrethroid toxic unit equivalents, 2012 sediment chemistry data

Pyrethroid	LC50 (ng/g dw)	CCCWP 207R00011 Grayson Creek (2012)	CCCWP 544R00025 Dry Creek (2012)
Bifenthrin	0.52	1.469	3.302
Cyfluthrin	1.08	0.302	0.043
Cypermethrin	0.38	0.163	0.112
Deltamethrin	0.79	0.092	0.064
Esfenvalerate	1.54	0.051	0.036
Lambda-Cyhalothrin	0.45	0.081	0.056
Permethrin	10.83	0.012	0.009
Sum of Toxic Unit Equivalents Per Site		2.17	3.62

Yellow highlighted cells indicate sites where the sum of pyrethroid TU equivalents is > 1.0
 Values in **Bold** indicate individual pyrethroid TUs > 1.0.

The analysis of sediment triad data (bioassessment, sediment chemistry, sediment toxicity) from WY 2012 monitoring indicated that follow-up investigation would be needed (Table C-5).

Table C-5. Summary of sediment quality triad evaluation results, WY 2012 data								
Agency/ Program	Water Body	Site ID	B-IBI Condition Category	Sediment Toxicity	# TEC Quotients ≥ 1.0:	Mean PEC Quotient	Sum of TU Equiv.	Next Step Per MRP Table H-1
CCCWP	Grayson Creek	207R00011	Very Poor	Yes	10	0.14	2.17	C
CCCWP	Dry Creek	544R00025	Very Poor	Yes	11	0.51	3.62	C

Yellow highlighted cells indicate results above MRP trigger threshold

Key to Next Steps:

Action Code	Exceeds Bioassessment/ Toxicity/ Chemistry Threshold	Next Step Per MRP Table H-1
A	Yes/No/Yes	(1) Identify cause of impacts. (2) Where impacts are under Permittee’s control, take management actions to minimize the impacts caused by urban runoff; initiate no later than the second fiscal year following the sampling event.
B	No/No/Yes	If PEC exceedance is Hg or PCBs, address under TMDLs.
C	Yes/Yes/Yes	(1) Identify cause(s) of impacts and spatial extent. (2) Where impacts are under Permittee’s control, take management actions to address impacts.
D	No/Yes/Yes	(1) Take confirmatory sample for toxicity. (2) If toxicity repeated, attempt to identify cause and spatial extent. (3) Where impacts are under Permittee’s control, take management actions to minimize upstream sources.

Appendix D. CCCWP SSID Study Concept Plan

DRAFT
CONTRA COSTA CLEAN WATER PROGRAM
STRESSOR / SOURCE ID STUDY CONCEPT PLAN



Submitted to:
Contra Costa Clean Water Program
255 Glacier Drive
Martinez, California 94553

Submitted by:



AMEC Environment & Infrastructure, Inc.
San Diego, California

And

Armand Ruby Consulting

May 2013

AMEC Project No. 5025133001

TABLE OF CONTENTS

	Page
ACRONYMS AND ABBREVIATIONS.....	iii
1.0 PROBLEM STATEMENT.....	1-1
2.0 STUDY LOCATIONS.....	2-1
3.0 APPROACH OUTLINE.....	3-1
4.0 REFERENCES.....	4-1

LIST OF TABLES

Table 1. Details of Creek Status Monitoring Results Triggering Toxicity SSID Studies.....	1-2
---	-----

LIST OF FIGURES

Figure 1. Summary of Sediment Quality Triad Analysis Results, Monitoring Year 2012 Regional Monitoring Coalition Data.....	1-3
Figure 2. Locator Map of the Grayson Creek Watershed.....	2-1
Figure 3. Google Earth View of Lower Grayson Creek in Vicinity of Detected Toxicity.....	2-2
Figure 4. Locator Map of the Dry Creek Watershed.....	2-3
Figure 5. Google Earth View of Lower Grayson Creek in Vicinity of Detected Toxicity.....	2-3

This page intentionally left blank

ACRONYMS AND ABBREVIATIONS

BASMAA	Bay Area Stormwater Management Agencies Association
BMI	Benthic Macroinvertebrate Index
BMP	Best Management Practice
CASQA	California Association of Stormwater Quality Agencies
CCCWP	Contra Costa Clean Water Program
Central Valley Permit	California Regional Water Quality Control Board Central Valley Region, East Contra Costa County Municipal NPDES Permit Waste Discharge Requirements, Order No. R5-2010-0102.
CVRWQCB	California Regional Water Quality Control Board, Central Valley Region
DPR	California Department of Pesticide Regulation
FY	Fiscal Year
IPM	Integrated Pesticide Management
LID	Low Impact Development
MRP	California Regional Water Quality Control Board San Francisco Bay Region Municipal Regional Stormwater NPDES Permit, Order No. R2-2009-0074, adopted October 14, 2009, revised November 28, 2011
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
PEC	Probable Effects Concentration
RMC	Regional Monitoring Coalition
RWQCB	Regional Water Quality Control Board
SFBRWQCB	Regional Water Quality Control Board, San Francisco Bay Region
SSID	Source/Stressor Identification
TEC	Threshold Effect Concentration
TIEs	Toxicity Identification Evaluations
TU	Toxicity Unit
USEPA	United States Environmental Protection Agency

This page intentionally left blank

1.0 PROBLEM STATEMENT

Provision C.8.d.i of the Municipal Regional Permit (MRP), and a parallel provision in the Central Valley Permit, require that when Creek Status Monitoring conducted through Provision C.8.c produces measurements that exceed triggers defined in the respective permits, follow-up actions are required. The follow-up actions may include Stressor / Source ID (SSID) Studies. The MRP establishes a cap on the number of SSID studies, when the monitoring is performed under a regional collaborative, no more than two SSID Studies need to be initiated by CCCWP during the permit term. The Central Valley Permit also caps the SSID studies required of East County permittees (Antioch, Brentwood, Oakley, Unincorporated County, and the Flood Control District) to one such study during the permit term. Both permits allow for and encourage Creek Status Monitoring and SSID studies to be conducted regionally.

CCCWP has participated in a regional collaborative with Bay Area Stormwater Management Agencies (BASMAA) members, known as the Regional Monitoring Coalition (RMC), to design the Creek Status monitoring approach and to select SSID Studies. CCCWP also worked with staff of both the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) and the Central Valley Regional Water Quality Control Board (CVRWQCB) during permit negotiations to implement coordinated monitoring requirements. As a result, the Creek Status Monitoring conducted through the BASMAA program includes monitoring locations in East County jurisdictions. SSID studies at the two selected sites will fulfill CCCWP's requirement to conduct SSID studies for both permits for the permit term expiring in 2014 (MRP) and 2015 (Central Valley Permit).

The two selected SSID Studies in Contra Costa County are investigations of water and sediment toxicity to the indicator organism *Hyalella azteca* in samples collected from Dry Creek and Grayson Creek. Dry Creek is a tributary to Marsh Creek in eastern Contra Costa County; Grayson Creek is a tributary to Walnut Creek in central Contra Costa County. The evidence for toxicity and other monitoring results that triggered a SSID study is summarized in Table 1. During wet weather, toxicity to *Hyalella azteca* was observed in both Grayson Creek and Dry Creek. Significant toxicity to other test organisms (water fleas, green algae, and fathead minnows) was not observed. During dry weather, significant water column toxicity to *Hyalella Azteca* was not observed, but sediment toxicity was. In lower Marsh Creek, downstream of Dry Creek, wet weather toxicity to *Hyalella azteca* was observed for the two storms monitored during the 2012 monitoring year.

In addition to toxicity, sediment chemistry results and benthic macroinvertebrate index (BMI) scores from the 2012 RMC monitoring make the selected locations favorable locations for the RMC to consider as places to conduct toxicity-related SSID studies. The two locations have the highest concentrations of pollutant chemicals in sediments relative to thresholds of concern compared to all other Bay Area Creek Status locations sampled thus far (Figure 1). Detailed analysis of the data indicates that pyrethroid pesticides are likely, but not confirmed, causes of observed toxicity.

The goals of this SSID study is to determine what are causes of observed toxicity, identify potential sources, propose abatement measures, and evaluate the effectiveness of the abatement measures.

Table 1.

Details of Creek Status Monitoring Results Triggering Toxicity SSID Studies

Location	Date	Event / Media	Negative Observations	Benign Observations
Grayson Creek	March 2012	Wet Weather / Water Toxicity	Significant reductions in survival of <i>Hyalella azteca</i>	No significant toxicity to other test organisms observed
	July 2012	Dry Weather / Water Toxicity		No significant toxicity to <i>Hyallell azteca</i> or any other test organism observed
		Dry Weather / Water Toxicity		Ammonia, nitrate, chloride triggers not exceeded
		Dry Weather / Sediment Toxicity	Significant reductions in survival of <i>Hyalella azteca</i>	
		Dry Weather / Sediment Chemistry	Second highest concentration of sediment contaminants of all Creek Status stations in the Region	
	Spring 2012	BMI	Very Poor	
Dry Creek	March 2012	Wet Weather / Water Toxicity	Significant reductions in survival of <i>Hyalella azteca</i>	No toxicity to other test organisms observed
	July 2012	Dry Weather / Water Toxicity		No significant toxicity to <i>Hyallell azteca</i> or any other test organism observed
		Dry Weather / Water Toxicity		Ammonia, nitrate, chloride triggers not exceeded
		Dry Weather / Sediment Toxicity	Significant reductions in survival of <i>Hyalella azteca</i>	
		Dry Weather / Sediment Chemistry	Highest concentration of sediment contaminants of all Creek Status stations in the Region	
	Spring 2012	BMI	Very Poor	
Lower Marsh Creek (below Dry Creek)	January 2012 and February 2012	Wet Weather / Water Toxicity	Significant reductions in survival of <i>Hyalella azteca</i>	No significant toxicity to other test organisms observed

Agency/ Program	Waterbody	Site ID	B-IBI Condition Category	Sediment Toxicity	# TEC Quotients ≥ 1.0:	Mean PEC Quotient	Sum of TU Equiv.	Next Step per MRP Table H-1
ACCWP	Castro Valley	204R00047	Poor	No	16	0.57	2.38	A
ACCWP	Dublin Creek	204R00084	Very Poor	No	12	0.18	1.06	A
ACCWP	Arroyo Mocho	204R00100	Very Poor	No	4	0.16	3.16	A
CCCWP	Grayson	207R00011	Very Poor	Yes	17	0.28	3.16	C
CCCWP	Dry	544R00025	Very Poor	Yes	19	0.72	4.40	C
SCVURPPP	Los Gatos	205R00026	Poor	No	12	0.21	0.41	A
SCVURPPP	Upper Penitencia	205R00035	Poor	No	1	0.07	1.36	A
SCVURPPP	Coyote	205R00042	Very Poor	No	6	0.20	0.22	A
SMCWPPP	Milagra	202R00087	Good	No	12	0.46	1.26	B
SMCWPPP	Corte Madera	205R00088	Good	No	9	0.13	0.23	B

Key to Next Steps:		
Action Code	Exceeds Bioassessment/ Toxicity/ Chemistry Threshold	Next Step per MRP Table H-1
A	Yes/No/Yes	(1) Identify cause of impacts. (2) Where impacts are under Permittee's control, take management actions to minimize the impacts caused by urban runoff; initiate no later than the second fiscal year following the sampling event.
B	No/No/Yes	If PEC exceedance is Hg or PCBs, address under TMDLs.
C	Yes/Yes/Yes	(1) Identify cause(s) of impacts and spatial extent. (2) Where impacts are under Permittee's control, take management actions to address impacts.

Figure 1. Summary of Sediment Quality Triad Analysis Results, Monitoring Year 2012 Regional Monitoring Coalition Data.

Notes: Yellow Highlights Indicate Trigger Exceedances. Figure from BASMAA (2013).

- **Additional notes:** The terms TEC Quotient (Threshold Effect Quotient), PEC Quotient (Probable Effects Quotient) are defined in an established and accepted sediment quality guidelines publication (Macdonald, 2000) as follows:
- **Threshold Effect Concentration (TEC):** Represents the concentration below which adverse effects are expected to occur only rarely.
- **TEC Quotient:** ratio of measured concentration to TEC; a TEC Quotient > 1 indicates potential for effects, albeit infrequently. The sixth column in Figure 1 above indicates the number of different pollutants in sediments that have measured TEC quotients exceeding 1.
- **Probable Effects Concentration (PEC):** Represents the concentration above which adverse effects are expected to occur frequently.
- **PEC Quotient:** ratio of measured concentration to PEC; a higher PEC Quotients indicate greater potential for effects. The mean PEC quotients help evaluate the additive effect of multiple toxicants.
- **The Pyrethroid Toxicity Unit Equivalent (TU Equiv.)** The seventh column indicates the concentration relative to the lethal concentration that causes fifty percent mortality, based on literature data.

This page intentionally left blank

2.0 STUDY LOCATIONS

A map of Grayson Creek is presented in Figure 2. The area in Grayson Creek where toxicity to *Hyaella* was observed is provided in Figure 3. A map of Dry Creek is presented in Figure 4. The area in Dry Creek where toxicity was observed is provided in Figure 5. Toxicity to *Hyaella* was also observed in Marsh Creek, downstream of the Dry Creek confluence. Land uses common to both watersheds include suburban residential, agricultural, golf courses, and additional impervious and pervious areas including light commercial and public facilities such as schools and athletic fields.

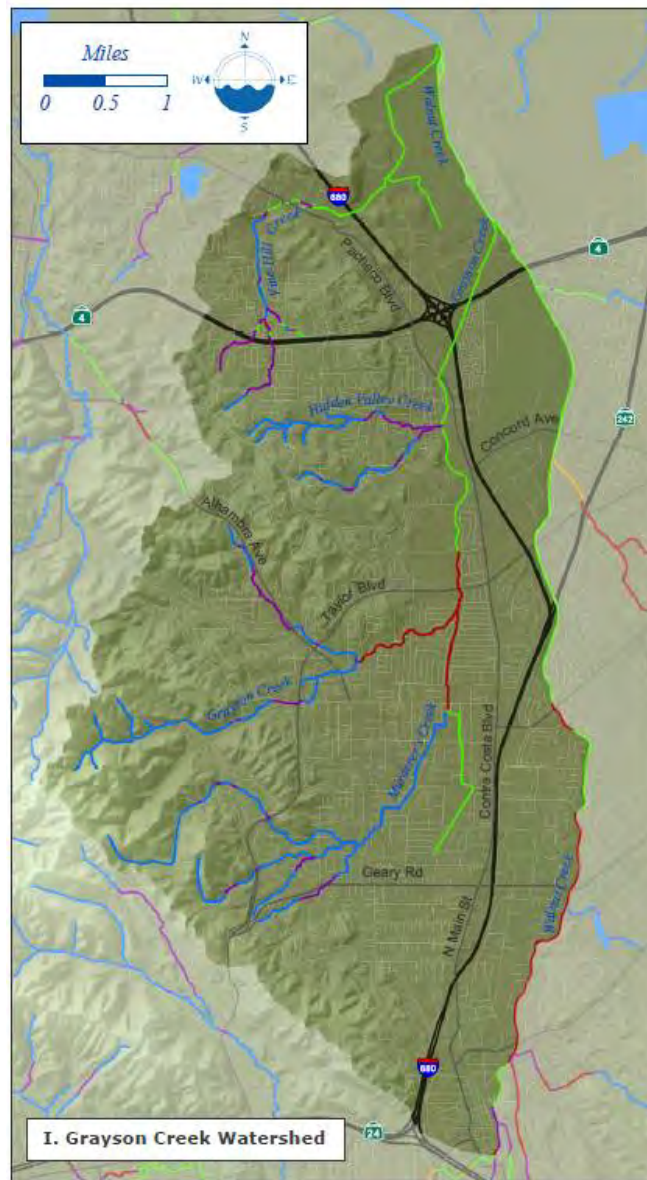


Figure 2. Locator Map of the Grayson Creek Watershed

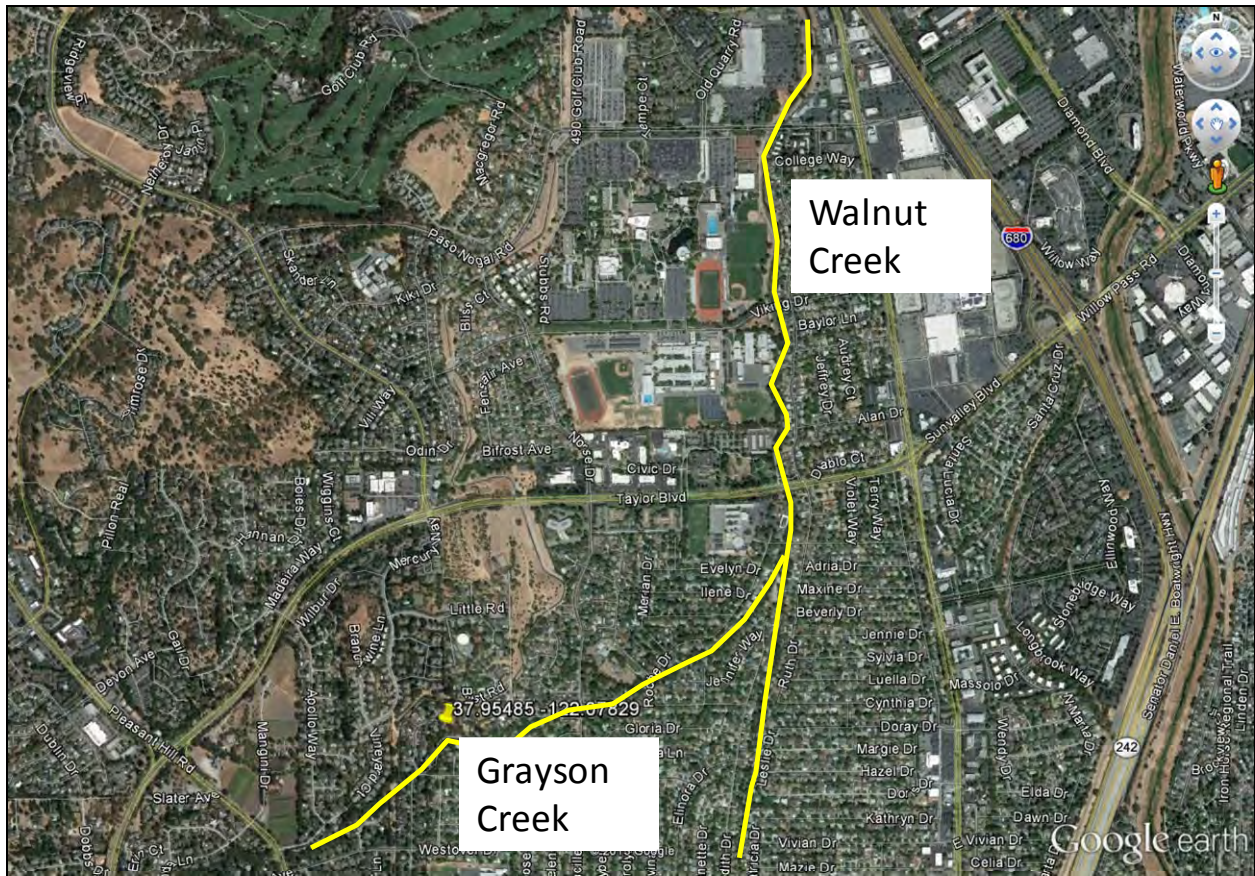


Figure 3. Google Earth View of Lower Grayson Creek in Vicinity of Detected Toxicity

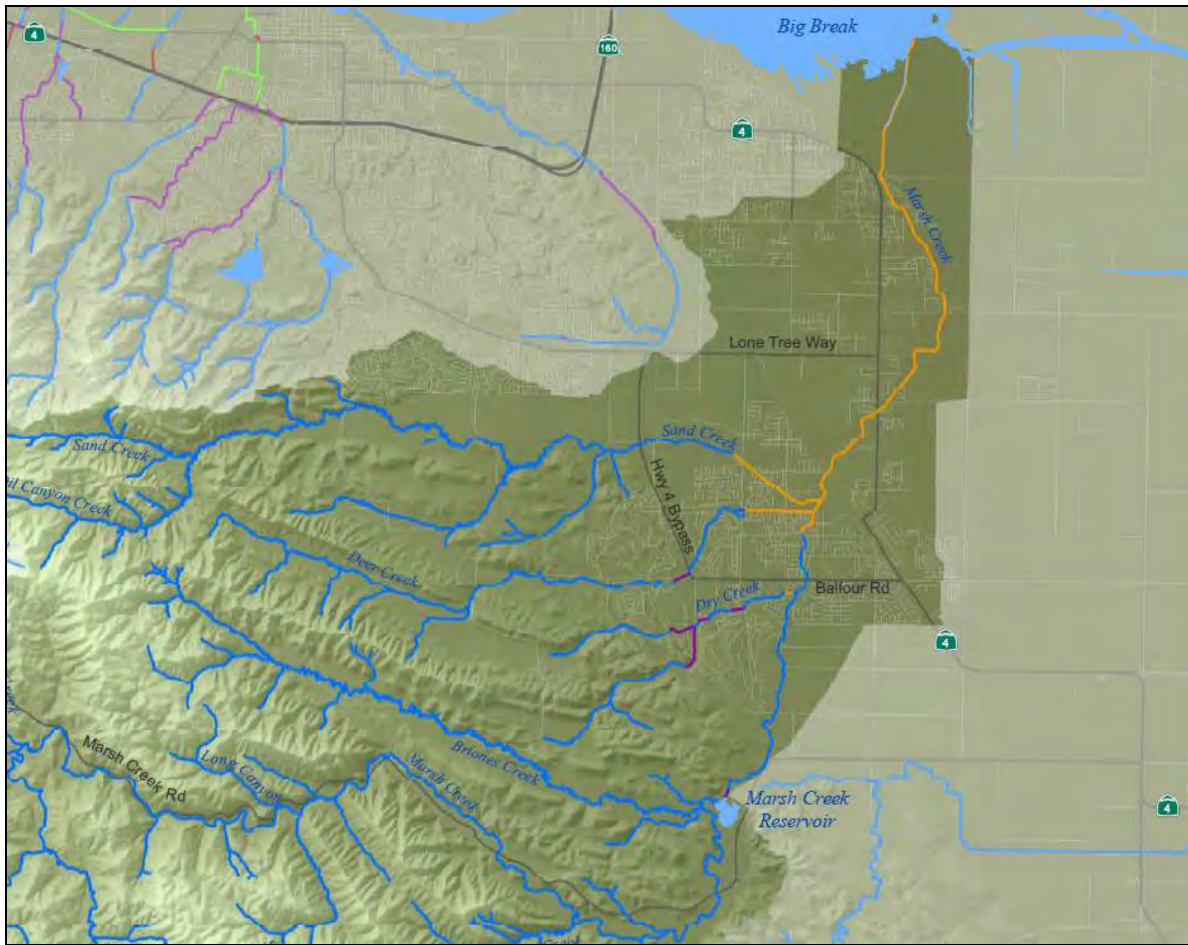


Figure 4. Locator Map of the Dry Creek Watershed



Figure 5. Google Earth View of Lower Grayson Creek in Vicinity of Detected Toxicity

This page intentionally left blank

3.0 APPROACH OUTLINE

MRP Provision C.8.d.i requires four steps for SSID projects; the four parts of the study approach outlined below encompass those four required steps

Part A:

Toxicity studies first require positive identification of the stressor(s). It is presumed in these cases that the stressors are pesticides; however, additional water and sediment chemistry and toxicity testing are necessary to confirm this. In particular, determination of which pesticides are causing toxicity, and whether there are spatial patterns that may pinpoint more specific source areas or land uses. This work would involve data review, initial watershed assessments, reconnaissance using Google Earth, and site visits prior to the chemistry and toxicity testing. The work performed during the site visits would be conducted as part of the required Stream Surveys for labor efficiency. Monitoring would involve instream toxicity testing as well as toxicity identification evaluations (TIEs), as needed. This work is anticipated for Fiscal Year (FY) 2013 – 2014.

Part B:

After confirming the stressors, sources need to be identified. Presuming that pesticide applications are determined to be the source(s) for the pesticides identified as stressors in Part A, the assessment would attempt to characterize the relative magnitudes of sources attributable to the following: Contra Costa County professional Pest Control Operators vs. homeowners, spatial and temporal characteristics of pesticide applications, the role of impervious surfaces, and any potential contribution from different land uses such as agriculture or golf courses. These activities are anticipated for FY 2014 - 2015.

Part C:

The next step is to identify controls to address the sources of the stressors identified in Parts A and B. CCCWP would coordinate with California Association of Stormwater Quality Agencies (CASQA) efforts to lobby the California Department of Pesticide Regulation (DPR), as well as federal (United States Environmental Protection Agency (USEPA)) efforts to control pesticide use. CCCWP would also support public education and municipal adoption of Integrated Pesticide Management (IPM) methods and related programs such as Our Water Our World. If specific source areas are identified, public education and outreach may be targeted at those source areas. These activities are anticipated for FY 2015 - 2016.

Part D:

Step 4 would include testing and analyzing effectiveness of controls. This would involve additional sample collection to determine whether conditions have improved following implementation of control measures. In order to give the program a few years to work, it is anticipated that follow-up assessments would begin in FY 2018 – 2019.

This page intentionally left blank

4.0 REFERENCES

- Bay Area Stormwater Management Agencies Association (BASMAA). March 2013. Regional Monitoring Coalition Urban Creeks Monitoring Report Water Year 2012. Menlo Park, California. Available at: http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/UC_Monitoring_Report_2012.pdf. April 2013.
- Contra Costa Clean Water Program. June 2011. Summary of Benthic Macroinvertebrate Monitoring Results 2006 – 2010. Prepared by Armand Ruby Consulting.
- Contra Costa Clean Water Program. February, 2012. Stormwater C.3 Guidebook - Stormwater Quality Requirements for Development Applications. Available at: www.cccleanwater.org/Publications/Guidebook/Stormwater_C3_Guidebook_6th_Edition.pdf. April 2013.
- Contra Costa Clean Water Program. February 2013. Local Urban Creeks Status Monitoring Report Water Year 2012 (Oct 2011 – Sept 2012). Prepared by ADH Environmental, Santa Cruz, CA. Available at: http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/UC_Monitoring_Report_2012.pdf. April 2013.
- MacDonald, Donald D., C. G. Ingersoll, and T. A. Berger. "Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems." Archives of Environmental Contamination and Toxicology 39.1 (2000): 20-31.

This page intentionally left blank

Appendix E. CCCWP SSID Part A Work Plan

Work Plan

Draft

CONTRA COSTA CLEAN WATER PROGRAM CREEK STATUS MONITORING PART A STRESSOR/SOURCE IDENTIFICATION IN DRY CREEK AND GRAYSON CREEK

January – September 2014



Submitted to:



255 Glacier Drive
Martinez, CA 94553

Submitted By:



3065 Porter Street, Suite 101
Soquel, CA 95073

List of Acronyms

ADH	ADH Environmental
ARC	Armand Ruby Consultants
AMEC	AMEC, Inc.
ASTM	American Society for Testing and Materials
BASMAA	Bay Area Stormwater Management Agencies Association
BSA	Bovine serum albumin
°C	Degrees Celsius
CCCWP	Contra Costa Clean Water Program
CVRWQCB	Central Valley Regional Water Quality Control Board
DQO	Data quality objective
DO	Dissolved oxygen
EC	Electrical conductivity
EOA	EOA, Inc.,
EPA	U.S. Environmental Protection Agency
MDL	Method detection limit
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MRP	Municipal Regional Permit
mS/cm	Microsiemens per centimeter
ng/L	Nanograms per liter
NPDES	National Pollution Discharge Elimination System
LC ₅₀	Lethal concentration to at least 50 percent of the population
PBO	Piperonyl butoxide
PEC	Probable effects concentration
PER	Pacific EcoRisk
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QPF	Quantity of precipitation forecast
RMC	Regional Monitoring Coalition
RLs	Reporting limits
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SM	Standard Methods
SOPs	Standard operating procedures
SSID	Stressor/source identification
SWAMP	Storm Water Ambient Monitoring Program
TEC	Threshold effects concentration
TIE	Toxicity identification evaluation
TU	Toxic unit
ng/g	Nanogram per gram
µg/L	Microgram per liter
WY	Water year

1.0 Introduction

The Contra Costa Clean Water Program (CCCWP) is governed under two National Pollution Discharge Elimination System (NPDES) stormwater permits: the Municipal Regional Permit (MRP) issued by the SFBRWQCB (2009) and the Central Valley Permit issued by the CVRWQCB (2010). The CCCWP participated in a regional collaborative with Bay Area Stormwater Management Agencies Association (BASMAA) members, known as the Regional Monitoring Coalition (RMC), to design and conduct the Creek Status monitoring required by the permits, evaluate the monitoring results, and perform related studies. CCCWP also worked with staff of both the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) and the Central Valley Regional Water Quality Control Board (CVRWQCB) to implement coordinated monitoring requirements. The Creek Status Monitoring conducted by CCCWP includes monitoring locations in both West County and East County jurisdictions.

Provision C.8.d.i of the MRP and a parallel provision in the Central Valley Permit require follow-up actions (“monitoring projects”) when Creek Status Monitoring conducted through Provision C.8.c produces measurements that exceed triggers defined in the permits. The follow-up actions may include Stressor/Source Identification (SSID) Studies. The MRP establishes a cap on the number of SSID studies, such that when the monitoring is performed under a regional collaborative (such as the RMC), no more than two SSID Studies need to be initiated by CCCWP during the permit term. The Central Valley Permit also caps the SSID studies required of East County permittees to one such study during the permit term. Both permits allow for and encourage Creek Status Monitoring and SSID studies to be conducted regionally.

Exceedances were triggered for water and sediment toxicity parameters under Provision C.8.c, Table 8.1 of the MRP in CCCWP’s Creek Status Monitoring in both water year (WY) 2012 and WY 2013. Both Dry Creek (site 544R00025) and Grayson Creek (site 207R00011) exhibited water toxicity to *Hyalella azteca* (*H. azteca*) in samples collected during wet weather in WY 2012, with confirmed retests for water toxicity to *H. azteca* in wet weather samples collected in WY 2013. Given that *H. azteca* is the common affected organism in the water and sediment toxicity at both sites, and given the preponderance of evidence linking *H. azteca* toxicity to the presence of pyrethroid pesticides in urban surface waters, this SSID investigation will focus on pyrethroid pesticides as the probable cause of the water and sediment toxicity as detailed in the SSID Draft Scope of Work¹ (ARC, 2013).

Toxicity studies first require positive identification of the stressor(s). Although pyrethroid pesticides are targeted due to their use in residential areas, and it is presumed in these cases that the stressors are pesticides; additional water and sediment chemistry and toxicity testing are necessary to confirm this supposition. In particular, it is necessary to determine which pesticides are causing toxicity, and whether there are spatial patterns that may pinpoint more specific source areas or land uses.

Two SSID studies will be conducted to evaluate and investigate this problem, one each in Dry Creek and Grayson Creek. Dry Creek is located in Eastern Contra Costa County in the City of Brentwood. Grayson Creek is in Central Contra Costa County in the City of Pleasant Hill.

¹ Relevant portions or sections of the SSID Draft Scope of Work have been incorporated into this Work Plan as appropriate.

1.1 Objectives

The SSID studies are expected to be performed in four parts over four years. The goals of Part A of the SSID studies are to:

- 1) Identify the causes of the observed water and sediment toxicity to *H. azteca* in Dry Creek and Grayson Creek (i.e., the stressor(s)); and
- 2) Identify temporal (seasonal) and spatial patterns in toxicity, and better characterize the spatial extent of sediment impacts.

Subsequent phases of the SSID studies will involve identification of potential sources of the pollutant(s) or stressor(s), identification and evaluation of potential abatement measures, and evaluation of the effectiveness of the implemented abatement measures. These projects will serve to fulfill the requirements of MRP Table H-1 with respect to follow-up actions pertinent to the sediment triad, as well as CCCWP's requirements to conduct two SSID studies per MRP Provision C.8.d.i.

1.2 Responsible Agency

The CCCWP will provide contract administration as needed to ensure compliance with the contractual agreement and ensure the work is performed to professional standards of quality.

1.3 Personnel

Personnel involved with the SSID Study, their respective roles and responsibilities are listed in Table 1.

Table 1. Personnel Names, Affiliation, and Responsibilities

Name	Affiliation	Responsibility
Jan O'Hara	SFBRWQCB	Regulatory Agency
Lucile Paquette	CCCWP	Program Coordinator
Dr. Khalil Abusaba	AMEC	Technical Advisor
Armand Ruby	ARC	Toxicity Identification Evaluations
Alessandro Hnatt	ADH	Project Manager
Peter Wilde	ADH	Quality Assurance Manager
Kevin Lewis	ADH	Field Sampling
Calvin Sandlin	ADH	Field Sampling

The following sections briefly describe the monitoring sites, field sampling methods, laboratory analytical testing and chemical analyses methods, data quality objectives, quality assurance/quality control (QA/QC) approach, and data analytical approach for Part A of the SSID projects to be performed in Dry Creek and Grayson Creek.

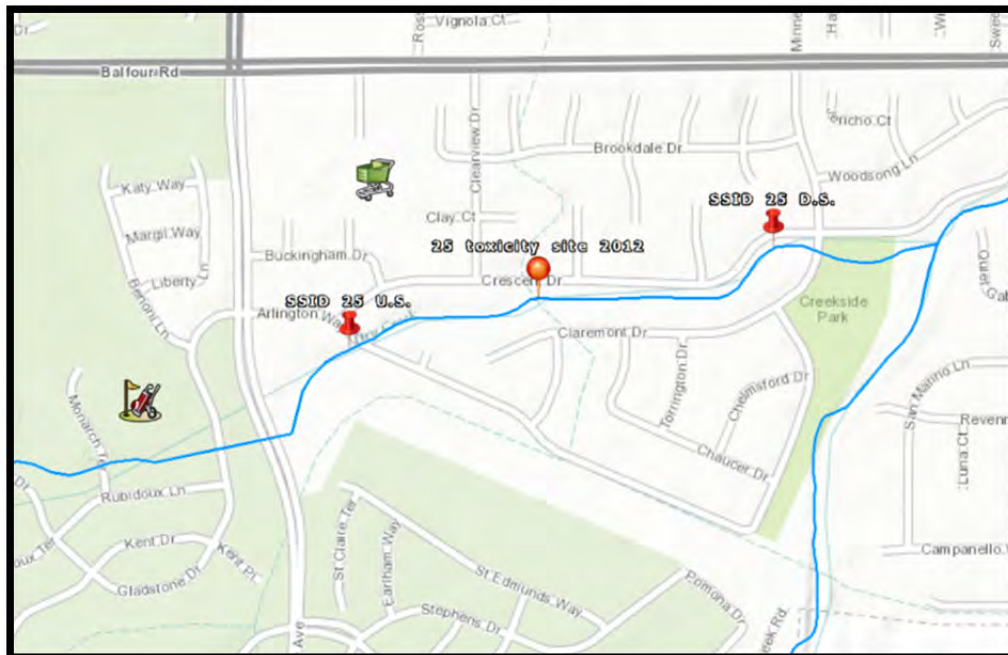
2.0 Monitoring Site and Sampling Area Description

The WY 2012 Creek Status Dry Creek and Grayson Creek toxicity sampling locations are shown on Figures 1 and 2, respectively. For these SSID studies, two additional sites were selected for monitoring in each creek; one each upstream and downstream of the previously-monitored sites (site 544R00025 in Dry Creek and site 207R00011 in Grayson Creek) to better characterize spatial extent of the toxicity impacts. The upstream and downstream sampling sites were selected in coordination with the CCCWP Program Coordinator, and reconnaissance of these selected sites was performed in the 2013-14 winter season in conjunction with CCCWP Creek Status bioassessment site reconnaissance. The following subsections provide brief descriptions of the localized creek watershed, habitat and physical surroundings. Locations of upstream and downstream SSID monitoring sites for Dry Creek and Grayson Creek are shown in Figures 1 and 2, respectively, and are detailed in Table 2.

2.1 Dry Creek

Dry Creek is a tributary to Marsh Creek in eastern Contra Costa County in the City of Brentwood, California (Figure 1). The creek channel in this area has undergone tremendous hydromodification due to urbanization. The reach that has been and will be sampled as part of this study is one of the reaches where the creek is above-ground. At the upstream end of the reach, west of Arlington Way, water is conveyed through a culvert from the Brentwood Golf Club and surrounding neighborhoods into the engineered flood control channel. The creek flows along Crescent Drive receiving runoff from the neighboring urban development south of Balfour Drive where it reaches a culvert. The downstream site is approximately 350 meters upstream of that culvert, after which it flows underneath Creekside Park until its confluence at Marsh Creek.

Figure 1. Dry Creek Site 25 sampling locations, Brentwood, CA



2.2 Grayson Creek

Grayson Creek is a tributary to Walnut Creek in central Contra Costa County in the City of Pleasant Hill (Figure 2). The upstream sampling location for this site is located about 30 meters up tributary to Grayson Creek, between Mercury Way and Vineyard Court. The downstream sampling location is located on East Branch of Grayson Creek, just upstream of the Grayson Creek/East Branch Grayson Creek confluence, at the terminus of Ardith Drive. Both Grayson Creek and Tributary to Grayson Creek are concrete flood control channels. Diazinon is a known pollutant of concern in Grayson Creek Watershed. Water and sediment toxicity sampling were conducted in the concrete channel where it crosses the Contra Costa Canal Trail in Pleasant Hill.

Figure 2. Grayson Creek Site 11 sampling locations, Pleasant Hill, CA

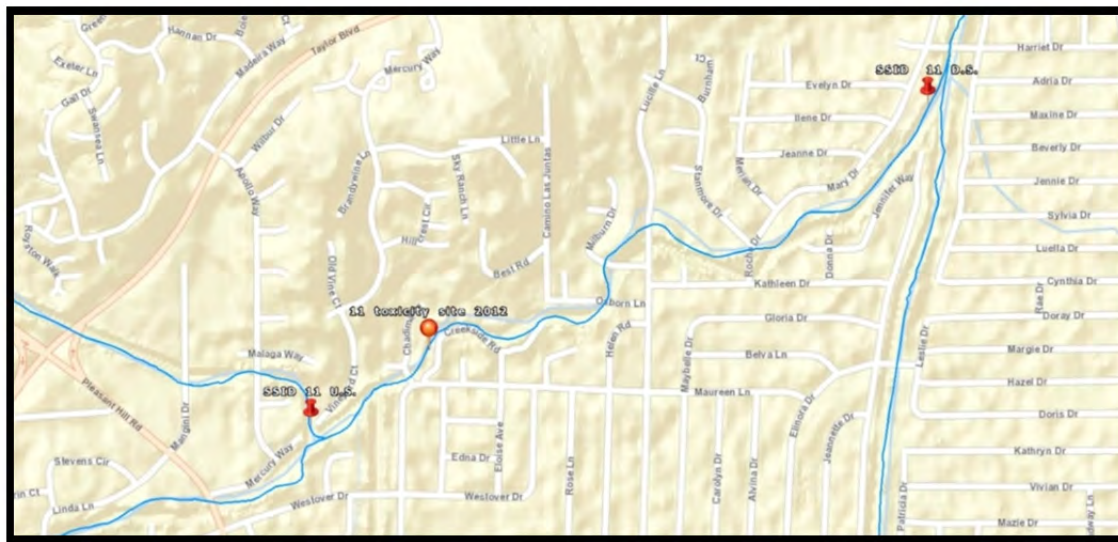


Table 2. Contra Costa County SSID Site Locations for WY 2013 - 2014

Creek Name / SSID Study Site	Site Code*	Latitude	Longitude	Monitoring Site Access
Dry Creek / Downstream	544R00025DS	37.923034	-121.714538	Public Access, park on road next to creek. Monitoring site is located upstream of drop structure at Claremont Way.
Dry Creek / Upstream	544R00025US	37.921722	-121.721855	Public Access, park on road next to creek. Monitoring site is located upstream of culvert at Arlington Way
Grayson Creek/ Downstream	207R00011DS	37.954271	-122.07869	Flood Control Channel, at CC Canal Trail. Monitoring site is located above channel, over fence; requires use of sampling pole and transfer container.
Grayson Creek/ Downstream	207R00011US	37.95141	-122.08396	Flood Control Channel between Mercury Way and Vineyard Court. Monitoring location is on other side of flood control access gate; require use of sampling pole and transfer container from above channel.

*Site codes will change when SWRCB designates new codes.

3.0 Field Monitoring Methods

Monitoring will be performed at each of the four sites during two wet weather events for water chemistry and toxicity, and at each of the same four sites during one dry weather event for sediment chemistry and toxicity. Monitoring preparation and logistics, laboratory arrangements, weather tracking, mobilization, sample collection and field measurements, sample delivery/shipping, demobilization and travel to monitoring sites shall be included as needed. The following subsections describe the field sampling methods that will be employed for the collection of stormwater and dry weather bedded sediment samples for chemical analyses and toxicity testing as well as site observations and water quality measurements taken during all sampling. Sampling methods and procedures will follow the RMC Quality Assurance Project Plan (QAPP; EOA et al., 2012) and Standard Operating Procedures (SOPs; EOA et al., 2014a).

3.1 Stormwater Sampling

Stormwater aquatic toxicity and chemistry sample collection techniques and health and safety considerations will adhere to all relevant protocols specified in the RMC's SOP FS-2, *Manual Collection of Water Samples for Chemical Analysis, Bacteriological Analysis, and Toxicity Testing* (EOA et al., 2014a).

As feasible, ADH Environmental (ADH) will also adhere to RMC guidance in selection of storm events to monitor:

Recommended protocols: a) track storms that are likely to produce runoff; 0.5" Quantity of Precipitation Forecast (QPF) is good rule of thumb; b) when feasible observe 72 hour antecedent dry period (i.e., <0.1" rain in prior 72 hours); c) collect sample on rising limb of hydrograph, near peak flow; d) coordinate sample collection when possible to sample multiple sites during same event; e) coordinate events with labs in advance.

Due to the abnormally low precipitation experienced during the WY 2013 - 2014, ADH, in communication with the CCCWP Program Coordinator, may elect to sample a precipitation event that does not fully meet all above criteria, or may sample fewer sites in any given event, depending on distribution of rainfall across target sampling sites. Every attempt will be made to coordinate sampling efforts with other RMC participants' toxicity sampling efforts. To minimize upstream influence on downstream water quality, the downstream site will always be sampled prior to collection of samples at the upstream monitoring site. Additionally, all sampling will be conducted during daylight hours in the interest of health and safety.

3.2 Sediment Sampling

Bedded sediment toxicity and chemistry sampling collection techniques, and health and safety considerations for this SSID Study will adhere to all relevant protocols specified in the RMC's SOP FS-6, *Collection of Bedded Sediment Samples for Chemistry Analysis and Toxicity* (EOA et al., 2014a). In accordance with the MRP and Central Valley Permit, sampling will be conducted during dry weather in the July – September timeframe.

Every attempt will be made to coordinate the sampling efforts with other CCCWP and RMC participant's dry season Creek Status toxicity sampling efforts however priority will be given to what individual site logistics and conditions require. However, due to the abnormally low precipitation experienced during the

WY 2013, ADH, in communication with the CCCWP Program Coordinator, may elect to sample independent of the RMC participant's WY 2014 Creek Status sampling efforts.. To minimize upstream influence on downstream water and sediment quality, the downstream site will always be sampled prior to collection of samples at the upstream monitoring site. Additionally, all sampling will be conducted during daylight hours in the interest of health and safety.

3.3 Field Water Quality Measurements and Observations

Field water quality measurements methods and procedures and health and safety considerations for this SSID Study will be performed in conjunction with all water and sediment toxicity and chemistry monitoring, and will adhere to all relevant protocols specified in the RMC's SOP FS-3, *Manual Field Measurements* (EOA et al., 2014a).

Water quality measurements will be performed using a YSI 556 handheld multiparameter probe to measure temperature, pH, dissolved oxygen and specific conductance. Measurements of these parameters as well as the field crew names, standard observations of water quality (e.g., odor, clarity, color, etc.), site information (e.g., GIS coordinates, stream width and depth, approximate flow rate, etc.) will be recorded on a SWAMP field data sheet during all sampling events.

3.4 Sample Handling and Chain of Custody Procedure

Sample containers and handling will adhere to all relevant protocols specified in the RMC's FS-9, *Sample Container, Handling, and Chain of Custody Procedures* (EOA et al., 2014a). A summary of the respective analytes or tests, sample volumes, containers, and preservatives are presented for stormwater aquatic toxicity and dry season bedded sediment monitoring in Tables 3 and 4, respectively.

Table 3. Containers and Handling for CCCWP SSID Aquatic Toxicity Monitoring

Sample/Test	Container	Handling Requirements
Pyrethroid pesticides	1 @ 2 L amber glass	Place on wet ice, cool to <6° C, 7 day hold time
Fipronil and degradates	1 @ 2 L amber glass	Place on wet ice, cool to <6° C, 7 day hold time ¹
Organochlorine pesticides	1 @ 2 L amber glass	Place on wet ice, cool to <6° C, 7 day hold time
Total Organic Carbon	3 @ 40 ml x VOA	HCL, place on wet ice, cool to <6° C, 28 day hold time
Suspended Sediment Concentration	1 @ 250ml HDPE	Place on wet ice, cool to <6° C, 7 day hold time
Aquatic toxicity	2 @ 1L amber glass	Place on wet ice, cool to <6° C, 36 hour hold time

Explanation:

1. Fipronil's holding time is 7 days, but certain degradates are 3 days.

Table 4. Containers and Handling for CCCWP SSID Dry Season Bedded Sediment Toxicity Monitoring

Sample/Test	Container	Handling Requirements
Pyrethroid pesticides, Fipronil and degradates	1 @ 8 ounces amber glass ¹	Place on wet ice, cool to <6° C, 14 day ² hold time
Organochlorine pesticides	1 @ 8 ounces clear or amber glass soil jar. ¹	Place on wet ice, cool to <6° C, 14 day hold time

Sample/Test	Container	Handling Requirements
Percent Solids	1 @ 8 ounces clear soil jar.	Place on wet ice, cool to <6° C, 7 day hold time
Total Organic Carbon	1 @ 8 ounces clear soil jar.	Place on wet ice, cool to <6° C, 28 day hold time
Sediment toxicity	3 @ 4L ³ amber glass	Place on wet ice, cool to <6° C, 14 day hold time

Explanation:

1. 2 jars recommended for back-up
2. 1 year if frozen
3. The 10-day *Hyalella azteca* sediment toxicity test requires a total of 2-L of sediment. This does not account for additional volume for a follow-up request or for TIEs. The total for TIEs is dependent on the number of treatments, and can be as much as an additional 2-10 L. In summation, the volume should be ≥ 3 gallons (~12 L on the high end) to cover all possibilities.

3.5 Sample Labeling

The sample ID labeling system used for the RMC Creek Status Monitoring is described in the SOP FS-11, *Site and Sample ID Naming Conventions* (EOA et al., 2014a) and will be used with a modification to accommodate the upstream and downstream monitoring sites as summarized below:

XXXXXXXXXXYY

Where:

XXXXXXXXXX = Nine digit site code
YY = US (for upstream) or DS (for downstream)

4.0 Testing and Analyses

Monitoring will be performed at each of the four sites during two wet weather events for water chemistry and toxicity, and at each of the same four sites once during dry weather for sediment chemistry and toxicity.

Constituents for water quality monitoring will include:

- Field parameters [dissolved oxygen (DO), electrical conductivity (EC), pH, Temperature]
- Pyrethroid pesticides
- Fipronil and degradates
- Organochlorine pesticides
- Total organic carbon
- Suspended sediment concentration
- *Hyalella azteca* – chronic toxicity

Constituents for sediment quality monitoring will include:

- Field parameters (DO, EC, pH, Temperature) in overlying water
- Pyrethroid pesticides
- Fipronil and degradates
- Organochlorine pesticides
- Percent solids

- Total organic carbon
- *Hyalella azteca* – chronic toxicity

4.1 Stormwater Aquatic Analytical Methods and Tests

Analytical methods and tests, method detection limits (MDLs) and reporting limits (RLs), or test type for the CCCWP SSID Study stormwater aquatic monitoring are presented in Table 5.

Table 5. Analytical Constituent and Toxicity Testing Methods, MDLs, and RLs or Test Type for CCCWP SSID Study Stormwater Aquatic Monitoring

Analyte	Analytical Method	Method Detection Limit or Test Duration	Reporting Limit or Test Type
Water Quality Parameters			
Dissolved Oxygen	Field Meter	0.01 mg/L	0 - 50 mg/L
Conductivity	Field Meter	0.001 mS/cm	0 – 200 mS/cm
pH	Field Meter	0.01 units	0.00 – 14.00 units
Temperature	Field Meter	-5 – 45°C	0.1°C
Total Organic Carbon	SM20-5310 B	0.50 mg/L	1 mg/L
Suspended Sediment Concentration	ASTM D 3977-97 B-Filtration	2 mg/L	3 mg/L
Pyrethroid pesticides			
Allethrin	EPA 8270Mod (NCI SIM)	0.1 ng/L	1.5 ng/L
Bifenthrin	EPA 8270Mod (NCI SIM)	0.1 ng/L	1.5 ng/L
Cyfluthrin	EPA 8270Mod (NCI SIM)	0.2 ng/L	1.5 ng/L
Cypermethrin	EPA 8270Mod (NCI SIM)	0.3 ng/L	1.5 ng/L
Deltamethrin: Tralomethrin	EPA 8270Mod (NCI SIM)	0.2 ng/L	3.0 ng/L
Esfenvalerate: Fenvalerate	EPA 8270Mod (NCI SIM)	0.2 ng/L	3.0 ng/L
Fenpropathrin	EPA 8270Mod (NCI SIM)	0.3 ng/L	1.5 ng/L
Lambda-Cyhalothrin	EPA 8270Mod (NCI SIM)	0.2 ng/L	1.5 ng/L
Tau-Fluvalinate	EPA 8270Mod (NCI SIM)	0.2 ng/L	1.5 ng/L
Tetramethrin	EPA 8270Mod (NCI SIM)	0.2 ng/L	1.5 ng/L
Permethrin	EPA 8270Mod (NCI SIM)	2 ng/L	15 ng/L
Fipronil (Degradates Listed Below)	EPA 8270Mod (NCI SIM)	0.002 µg/L	0.01 µg/L
Fipronil Desulfinyl	EPA 8270Mod (NCI SIM)	0.002 µg/L	0.01 µg/L
Fipronil Sulfide	EPA 8270Mod (NCI SIM)	0.002 µg/L	0.01 µg/L
Fipronil Sulfone	EPA 8270Mod (NCI SIM)	0.002 µg/L	0.01 µg/L
Organochlorine pesticides			
Aldrin	EPA 608	0.0040 µg/L	0.05 µg/L
alpha-BHC	EPA 608	0.0050 µg/L	0.010 µg/L
beta-BHC	EPA 608	0.0040 µg/L	0.005 µg/L
delta-BHC	EPA 608	0.0040 µg/L	0.005 µg/L
gamma-BHC (Lindane)	EPA 608	0.0040 µg/L	0.010 µg/L
Chlordane	EPA 608	0.020 µg/L	0.010 µg/L

Analyte	Analytical Method	Method Detection Limit or Test Duration	Reporting Limit or Test Type
4,4'-DDD	EPA 608	0.0040 µg/L	0.010 µg/L
4,4'-DDE	EPA 608	0.0040 µg/L	0.010 µg/L
4,4'-DDT	EPA 608	0.0040 µg/L	0.010 µg/L
Dieldrin	EPA 608	0.0040 µg/L	0.010 µg/L
Endosulfan I	EPA 608	0.0050 µg/L	0.010 µg/L
Endosulfan II	EPA 608	0.0050 µg/L	0.010 µg/L
Endosulfan sulfate	EPA 608	0.0050 µg/L	0.010 µg/L
Endrin	EPA 608	0.0050 µg/L	0.010 µg/L
Endrin aldehyde	EPA 608	0.0050 µg/L	0.010 µg/L
Endrin ketone	EPA 608	0.0050 µg/L	0.010 µg/L
Heptachlor	EPA 608	0.0050 µg/L	0.010 µg/L
Heptachlor epoxide	EPA 608	0.0040 µg/L	0.010 µg/L
Methoxychlor	EPA 608	0.0050 µg/L	0.01 µg/L
Toxaphane	EPA 608	0.30 µg/L	0.5 µg/L
Aquatic Toxicity	EPA/600/R-99/064	10-day	Survival

Explanation:

mg/L = Milligram per liter	ng/L = Nanograms per liter
mS/cm = Microsiemens per centimeter	µg/L = Microgram per liter
°C = Degrees Celsius	SM = Standard Methods
EPA = U.S. Environmental Protection Agency	ASTM = American Society for Testing and Materials

4.2 Dry Season Bedded Sediment Analytical Methods and Tests

Analytical methods and tests, MDLs and RLs, or test type for the CCCWP SSID Study dry season bedded sediment toxicity monitoring is presented in Table 6.

Table 6. Analytical Constituent and Toxicity Testing Methods, MDLs and RLs or Test Type for CCCWP SSID Dry Season Bedded Sediment Monitoring

Analyte	Analytical Method	Method Detection Limit or Test Duration	Reporting Limit or Test Type
Water Quality Parameters			
Dissolved Oxygen	Field Meter	0.01 mg/L	0 - 50 mg/L
Conductivity	Field Meter	0.001 mS/cm	0 – 200 mS/cm
pH	Field Meter	0.01 units	0.00 – 14.00 units
Temperature	Field Meter	-5 – 45°C	0.1°C
Total Organic Carbon	EPA 9060	0.30 mg/kg	1 mg/kg
Percent Solids	SM20-2540B	0.5 mg/kg	1 mg/kg
Pyrethroid pesticides			

Analyte	Analytical Method	Method Detection Limit or Test Duration	Reporting Limit or Test Type
Allethrin	EPA 8270Mod (NCI SIM)	0.05 ng/g	0.33 ng/g
Bifenthrin	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Cyfluthrin	EPA 8270Mod (NCI SIM)	0.11 ng/g	0.33 ng/g
Cypermethrin	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Deltamethrin: Tralomethrin	EPA 8270Mod (NCI SIM)	0.12 ng/g	0.33 ng/g
Esfenvalerate: Fenvalerate	EPA 8270Mod (NCI SIM)	0.13 ng/g	0.33 ng/g
Fenpropathrin	EPA 8270Mod (NCI SIM)	0.07 ng/g	0.33 ng/g
Lambda-Cyhalothrin	EPA 8270Mod (NCI SIM)	0.06 ng/g	0.33 ng/g
Tau-Fluvalinate	EPA 8270Mod (NCI SIM)	0.04 ng/g	0.33 ng/g
Tetramethrin	EPA 8270Mod (NCI SIM)	0.06 ng/g	0.33 ng/g
Permethrin	EPA 8270Mod (NCI SIM)	0.11 ng/g	0.33 ng/g
Fipronil (Degradates Listed Below)	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Fipronil Desulfinyl	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Fipronil Sulfide	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Fipronil Sulfone	EPA 8270Mod (NCI SIM)	0.1 ng/g	0.33 ng/g
Organochlorine pesticides¹			
Aldrin	EPA 8081	0.9 ng/g	2 ng/g
alpha-HCH	EPA 8081	0.9 ng/g	2 ng/g
beta-HCH	EPA 8081	0.9 ng/g	2 ng/g
delta-HHC	EPA 8081	0.7 ng/g	2 ng/g
gamma-HCH	EPA 8081	0.7 ng/g	2 ng/g
cis-Chlordane	EPA 8081	1 ng/g	2 ng/g
trans-Chlordane	EPA 8081	1 ng/g	2 ng/g
4,4'-DDD	EPA 8081	0.8 ng/g	2 ng/g
2, 4'-DDD	EPA 8081	2 ng/g	2 ng/g
4,4'-DDE	EPA 8081	1.2 ng/g	2 ng/g
2, 4'-DDE	EPA 8081	2 ng/g	2 ng/g
4,4'-DDT	EPA 8081	1 ng/g	2 ng/g
2, 4'-DDT	EPA 8081	2 ng/g	2 ng/g
Dieldrin	EPA 8081	1.2 ng/g	2 ng/g
Endosulfan I	EPA 8081	0.9 ng/g	2 ng/g
Endosulfan II	EPA 8081	0.7 ng/g	10 ng/g
Endosulfan sulfate	EPA 8081	0.9 ng/g	10 ng/g
Endrin	EPA 8081	1 ng/g	2 ng/g
Endrin aldehyde	EPA 8081	0.9 ng/g	2 ng/g
Endrin ketone	EPA 8081	0.9 ng/g	2 ng/g

Analyte	Analytical Method	Method Detection Limit or Test Duration	Reporting Limit or Test Type
Heptachlor	EPA 8081	0.6 ng/g	2 ng/g
Heptachlorepoxide	EPA 8081	1.1 ng/g	2 ng/g
Methoxychlor	EPA 8081	0.9 ng/g	2 ng/g
Toxaphene	EPA 8081	20 ng/g	40 ng/g
Mirex	EPA 8081	0.5 ng/g	20 ng/g
Sediment Toxicity	EPA/600/R-99/064	10-day	Survival

Explanation:

- Does not include all analytes listed in Storm Water Ambient Monitoring Program QAPP (SWAMP 2008).
 mg/kg = Milligram per kilogram
 ng/g = Nanogram per gram

4.3 Reference Toxicant Tests

Per the RMC Creek Status Monitoring Program QAPP (EOA et al., 2012), reference toxicant tests:

... must be conducted monthly for species that are raised within a laboratory. Reference Toxicant Tests must be conducted per analytical batch for species from commercial supplier settings. Reference Toxicant Tests must be conducted concurrently for test species or broodstocks that are field collected.

H. azteca are purchased by Pacific EcoRisk (PER) from commercial suppliers and therefore require reference toxicant tests per analytical batch. Whenever feasible, cooperating RMC programs will attempt to coordinate sampling in order to share the costs of reference toxicant testing among programs sampling the same event.

4.4 Toxicity Identification Evaluations

One targeted toxicity identification evaluation (TIE) is planned for each matrix: water (wet weather) and sediment (dry weather). TIEs will be conducted contingent upon discovery of statistically-significant toxicity in water and sediment samples. The targeted TIEs will include testing of the Baseline Sample (100%), a PBO Treatment (in both 50% dilution and 100% sample) with sample spiking, a Carboxylesterase Treatment (100% sample) with sample spiking, and a Bovine Serum Albumin (BSA) Treatment (100% sample) with sample spiking; these specifications may be modified upon further discussion with toxicity laboratory personnel.

4.5 Contacts

Laboratory contact information for toxicity testing and analytical chemistry is shown in Table 7.

Table 7. Laboratory Contact Information for 2014 CCCWP SSID Study

Laboratory	Contact	Phone
Pacific EcoRisk	Stephen Clark	(707) 207-7766
Pacific EcoRisk	Eddie Kalombo	(707) 207-7760 Ext. 794
Catest Analytical	Todd Albertson	(707) 258-4000

5.0 Data Quality Objectives and Quality Assurance / Quality Control Approach

The data quality objective (DQO) process is implemented through a Quality Assurance/Quality Control (QA/QC) program. The elements of the QA/QC program including required levels of precision and accuracy, and tolerable levels of error are presented in detail in the RMC QAPP (EOA et al., 2012).

6.0 Data Analysis and Reporting

After all data have been received, a brief draft report summarizing the monitoring performed and data analysis, listed below, will be produced. The report will perform the following data analysis tasks:

- Evaluate, summarize, and compare SSID Study toxicity test results to corresponding water and sediment chemistry results, and assess in relation to TIE results.
- Calculate toxic unit (TU) equivalents for all pyrethroids and any other detected pesticides for which LC₅₀ (lethal concentration to at least 50 percent of the population) values are available.
- Calculate threshold effects concentration (TEC) and probable effects concentration (PEC) quotients for monitored constituents that are listed in Macdonald et al., 2000.
- Assess TU equivalents, TEC quotients and PEC quotients per MRP Table H-1 criteria.
- Compile current project chemistry and toxicity testing data together with prior 2012/2013 data for evaluation of spatial and temporal differences/patterns; present results of these comparisons graphically.

7.0 References

- ARC, 2013. *Draft Scope of Work For Stressor/Source Identification Studies, Part A Contra Costa County - Creek Status*. December 2013.
- CVRWQCB, 2010. *California Regional Water Quality Control Board Central Valley Stormwater NPDES Waste Discharge Requirements Order R5-2010-0102 NPDES Permit No. CAS083313*. September 23, 2010.
- EOA, AMS, and ARC, 2012. *BASMAA Regional Monitoring Coalition Creek Status Monitoring Program Quality Assurance Project Plan*. Prepared for Bay Area Stormwater Management Agencies Association. Version 1, February 1, 2012.

- EOA, AMS, and ARC, 2014a. *BASMAA Regional Monitoring Coalition Creek Status Monitoring Program Standard Operating Procedures*. Prepared for Bay Area Stormwater Management Agencies Association. Final Version 2, January 2014.
- EOA, AMS, and ARC, 2014b. *BASMAA Regional Monitoring Coalition Creek Status Monitoring Program Quality Assurance Project Plan*. Prepared for Bay Area Stormwater Management Agencies Association. Final Version 2, January 2014.
- Macdonald et al., 2000. *Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems*. 13 January 200.
- SFRWQCB, 2009. *California Regional Water Quality Control Board San Francisco Bay Region Municipal Regional Stormwater NPDES Permit, Order R2-2009-0074 NPDES Permit No. CAS612008*. October 14, 2009.
- SWAMP, 2008. *Storm Water Ambient Monitoring Program Quality Assurance Project Plan*. Prepared for The State of California's Storm Water Ambient Monitoring Program. Version 1.0. September 1, 2008.

Appendix F. SSID Monitoring - Quality Assurance / Quality Control Results

Quality Assurance / Quality Control

Quality Assurance/Quality Control (QA/QC) analyses included required levels of precision and accuracy, and tolerable levels of error are presented in detail in the RMC QAPP (EOA et al., 2012) for chemical and toxicological analyses. This comprehensive and rigorous suite of Laboratory QA/QC procedures were ultimately successfully conducted in accord with Surface Water Ambient Monitoring Program (SWAMP, 2008).

Caltest Laboratories (CAL) performed all chemical analyses and Pacific EcoRisk (PER) performed all toxicology analyses for the CCCWP SSID Project in accordance with their quality assurance programs. These laboratories performed all appropriate internal QA/QC measures in order to provide information needed to assess analytical precision and accuracy, and serve as a check on laboratory procedures.

CAL and PER provided, as a result of this work, signed laboratory reports and accompanying electronic deliverables (EDDs). These reports and EDDs were initially compared by ADH personnel experienced in data review and verification to check completeness (all required samples were analyzed), agreement (values in one matched values in another), if project reporting limit (RL) goals were met, and if all toxicology required conditions were met. This initial screening produced satisfactory results.

Field QA/QC

No field QA/QC samples were taken or analyzed for this program. This was due to its small size and consequent budgetary constraints.

Field Determination of Conductivity, pH, and Temperature

Temperature, conductivity and pH were determined in the field at the time of collection with a YSI field meter. This instrument was calibrated per the manufacturer's specifications within 24 hours of use. Documentation of calibration is included on the field log sheets associated with each monitoring event (Appendix I).

Laboratory QA/QC

Following is a list of Laboratory QA/QC analyses performed by CAL in conjunction with the CCCWP SSID project samples they analyzed:

- Method Blank Samples
- Laboratory Duplicate Samples (Replicate Samples)
- Laboratory Control Sample/Laboratory Control Sample Duplicates (LCS/LCSD)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- Surrogates

Overall, results of all laboratory QA/QC procedures show that, with several exceptions, there were no significant exceedances of control parameters, all analyses were performed under adequately controlled conditions, the data quality was not affected, and the reported results are acceptable for interpretation. These results illustrate that the integrity of the data integrity is strong, as detailed below.

Method Blank Samples

Laboratory blank samples were analyzed to assess the possibility of sample contamination introduced through analysis of samples by the analytical laboratory.

No analytes were detected in any method blank samples except for a single one associated with the February 6, 2014 sampling in which a low level of contamination was found for the pyrethroid λ -Cyhalothrin. This method blank sample for method SW846 8270 Mod (GCMS-NCI-SIM) analysis result was below the RL. As such, this level was an estimate as were the two associated batched field sample results that were also below the RL but of the same order of magnitude as the method blank result. Laboratory contamination of the two field samples almost certainly occurred. λ -Cyhalothrin was not detected in three other method blank samples associated with later season samplings.

Given the single low-level instance of contamination, the laboratory analytical procedures are deemed to have been of sufficiently high quality.

Laboratory Duplicates

Laboratory duplicates (also referred to as split samples) are field samples split and analyzed by the laboratory. They provide a measure of data precision (reproducibility) attributable to laboratory analytical procedures.

A single laboratory duplicate sample was performed for Percent Solids during the dry weather sampling. This sample had a result that was identical to the result of the associated field sample, indicating good precision for this analyte.

Matrix Spike and Laboratory Control Samples

MSs and LCSs are laboratory-created samples made by adding a known concentration of an impurity (i.e., spiking) to either field sample water (MS) or to laboratory water known to be free of the impurity (LCS). These manufactured samples are then analyzed for the impurity in question, and the amount recovered compared to the spiked amount determines the percent recovery (PR) of the analyte in the spiked sample, which is used as measure of accuracy. For both kinds of samples, PR is calculated as the ratio of the recovered amount to the spike amount, expressed as a percent. There are some slight quantitative differences between MS and LCS PR calculations - details are available in RMC QAPP (EOA et al., 2012).

Matrix spike duplicates (MSD) and laboratory control sample duplicates (LCSD) were analyzed as a measure of precision. This is calculated as the relative percent difference (RPD), which is the ratio of the absolute value of the difference of the main laboratory QA sample and its associated duplicate to their average, expressed as a percentage.

All PRs and RPDs for project LCS/LCSD samples were within control limits set either by the laboratory and/or the analytical method.

All PRs and RPDs for project MS/MSD samples were also within control limits set either by the laboratory and/or the analytical method, with these exceptions:

1. The PR (68%) of Bifenthrin for an MS sample with Lab ID 564487 was barely outside of acceptable control limits (70-165%). The LCS and LCSD sample PRs in the same sample batch

(3357) were in control as well as the RPD for the pair. Additionally, the RPD of the MS/MSD pair of the batch were within acceptance limits, indicating that the analytical batch was in control and the data results of its associated field samples are acceptable. This analytical batch was comprised of aquatic chemistry samples taken on February 6, 2014 .

2. The PRs of Allethrin for an MS sample (35%) with Lab ID 594647 paired with an MSD sample (36%) with Lab ID 594648 were outside of acceptable control limits (50-185%). These low PRs were due to possible matrix influences in the QA/QC samples. However, The LCS and LCSD sample PRs in the same sample batch (3515) were in control as well as the RPD for the pair. Additionally, the RPD of the MS/MSD pair of the batch was within acceptance limits. Due to these results, the analytical batch was accepted as in control and the data results of its associated field samples are acceptable. This analytical batch was comprised of sediment chemistry samples taken on July 23, 2014 .
3. The PR (255%) of Cyfluthrin for an MSD sample with Lab ID 594648 was outside of acceptable control limits (50-150%). Additionally, the RPD (77%) from the associated MS sample with Lab ID 594647 was above the acceptable control limit (30%). The LCS and LCSD sample PRs in the same sample batch (3515) were in control as well as the RPD for the pair. Additionally, Cyfluthrin was not found in a method blank from the same sample batch. Based on these latter results, the results the batch-associated field samples are acceptable. This analytical batch was comprised of sediment chemistry samples taken on July 23, 2014 .
4. The PRs for Fipronil, Fipronil Desulfinyl, Fipronil Sulfide, and Fipronil Sulfone for the MS sample with Lab ID 594647 paired with an MSD sample with Lab ID 594648 were not determined due to matrix interferences concealing added spike concentration. The LCS and LCSD sample PRs in the same sample batch (3515) were in control as well as the RPD for the pair. Additionally, none of these analytes were found in a method blank from the same sample batch. Based on these latter results, the results the batch-associated field samples are acceptable. This analytical batch was comprised of sediment chemistry samples taken on July 23, 2014 .
5. The PRs for Kepone for the MS sample with Lab ID 598129 paired with an MSD sample with Lab ID 598130 were not determined due to matrix interferences concealing added spike concentration. The LCS and LCSD sample PRs in the same sample batch (2176) were in control as well as the RPD for the pair. Additionally, this analyte was not found in a method blank from the same sample batch. Based on these latter results, the results the batch-associated field samples are acceptable. This analytical batch was comprised of sediment chemistry samples taken on July 23, 2014.

Three of the five exceptions listed above were due a single MS/MSD sample pair, indicating only three MS/MSD pairs were out of some control limits for a few analytes. Given these estimates of accuracy and precision, and with all of the field sample results being acceptable, all analyses were performed under adequately controlled conditions.

Surrogate Spikes

Surrogate spikes are pure organic compounds that are similar to the analytes of interest in chemical composition, extraction, and chromatography, but which are not normally found in environmental

samples. Surrogate spikes are added to every sample (including QA/QC samples) and their PR is used to examine the overall efficiency of the method from sample preparation through extraction and analysis.

Surrogate spike method blank, LCS/LCSD, and MS/MSD samples were analyzed for Decachlorobiphenyl, Esfenvalerate-d6;#1, Esfenvalerate-d6;#2, and Tetrachloro-m-xylene. All PRs were within acceptable QA/QC limits, except for those listed in Table F-1.

Table F-1. Surrogate Spike QA/QC Samples Failing to Meet Percent Recovery Control Limits

Analyte	Lab Number	Sample Type ¹	Date Received	Percent Recovery	PR Control Limits (%)
Decachlorobiphenyl	598129	MS	7/22/2014	5.3	10-200
	598130	MSD	7/22/2014	4.5	10-200
Esfenvalerate-d6;#1	564487	Matrix QC (MS)	2/7/2014	65	70-130
	564488	Matrix QC (MSD)	2/7/2014	67	70-130
	574094	MB	3/26/2014	68	70-130
Esfenvalerate-d6;#2	564487	Matrix QC (MS)	2/7/2014	64	70-130
	564488	Matrix QC (MSD)	2/7/2014	68	70-130
	574094	MB	3/26/2014	68	70-130
Tetrachloro-m-xylene	594791	MB	7/22/2014	39	64-114
	594792	LCS	7/22/2014	50	64-114
	594793	LCSD	7/22/2014	51	64-114
	598129	MS	7/22/2014	750	10-200
	598130	MSD	7/22/2014	750	10-200

¹ MB = method blank; MS = matrix spike; MSD = matrix spike duplicate; LCS = laboratory control sample; LCSD = laboratory control duplicate sample

Toxicity

Four QA/QC measures were assessed by PER during the toxicity testing on *Hyallela azteca*:

- Maintenance of acceptable test conditions
- Negative Control testing
- Positive Control (reference toxicant) testing
- Concentration Response Relationship assessment

Maintenance of Acceptable Test Conditions

All test conditions (e.g., pH, D.O., temperature, etc.) were within acceptable limits for these tests, except for the July 22, 2014 sediment toxicity test. During that test, as the dissolved oxygen measurements were below the QA/QC limit of 2.5 mg/L immediately prior to test initiation, all of the samples except for the 544MSH062 sample were aerated during testing. All analyses were performed according to laboratory Standard Operating Procedures.

Negative Control Testing

The responses at the Lab Control treatments were acceptable.

Positive Control (reference toxicant) Testing

The February 6, 2014 reference toxicant toxicity test suggests that these organisms may have been slightly less sensitive to toxicant stress than is typical and that the survival responses in the accompanying stormwater tests should be interpreted judiciously.

The February 26, March 26, and July 22, 2014 reference toxicant test results were consistent with the “typical response” range established by the reference toxicant test database for this species, indicating that these organisms were responding to toxic stress in a typical fashion at those times.

Concentration Response Relationships

The concentration-response relationships for the reference toxicant tests were evaluated as per EPA guidelines (EPA-821-B-00-004), and were determined to be acceptable.

Sample Holding Times

The sample holding time refers to the maximum amount of time that can elapse between sample collection and sample analysis before the resulting data is considered to possibly be compromised. The holding time is driven by the properties of the constituent and how a sample is preserved and stored prior to analysis. Holding times were met for all constituents for all samples submitted to the laboratory, except in one case.

The organochlorine pesticide kepone sampled from sediment at the four stations on July 22, 2014 was also flagged by CAL as out of holding time. The samples for this analyte were delivered to the lab and extracted within 14 days as specified by the EPA method SW846 8081. After these samples were analyzed, the laboratory QA/QC sample results for kepone did not meet CAL QAQC criteria, and the kepone sample results were rejected. The original sample was reextracted and reanalyzed by CAL again after the 14 day holding time had elapsed in order to provide the most complete results, which were non-detected for all four stations. As a result, the July 22, 2014 kepone results were flagged as out of holding time by CAL.

References

- EOA, AMS, and ARC, 2012. *BASMAA Regional Monitoring Coalition Creek Status Monitoring Program Quality Assurance Project Plan*. Prepared for Bay Area Stormwater Management Agencies Association. Version 1, February 1, 2012.
- SWAMP, 2008. *SWAMP Quality Assurance Project Plan, Version 1.0*. Prepared for the California State Water Resources Control Board by the Surface Water Ambient Monitoring Program Quality Assurance Team. September 1, 2008.

SWAMP, 2013. *Quality Control and Sample Handling Guidelines*, Updated appendices to the SWAMP, 2008, Quality Assurance Project Plan, http://www.waterboards.ca.gov/water_issues/programs/swamp/mqo.shtml, April, 2013.

USGS, 2009. Hladik, M., Orlando J., and Kuivila, K., *Collection of Pyrethroids in Water and Sediment Matrices: Development and Validation of a Standard Operating Procedure*, Scientific Investigations Report 2009–5012, U.S. Department of the Interior, U.S. Geological Survey, 2009.

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
564956	MB for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil	ND	0.5	1.5	ng/L			
564957	LCS for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil	14		1.5	ng/L	20	70	
564958	LCSD for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil	14		1.5	ng/L	20	70	0
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil	ND	0.5	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil	18		1.5	ng/L	20	90	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil	15		1.5	ng/L	20	75	16
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil	ND	0.5	1.5	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil	16		1.5	ng/L	20	80	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil	16		1.5	ng/L	20	80	0
564956	MB for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil Desulfinyl	ND	0.5	1.5	ng/L			
564957	LCS for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil Desulfinyl	15		1.5	ng/L	20	75	
564958	LCSD for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil Desulfinyl	16		1.5	ng/L	20	80	6.5
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil Desulfinyl	ND	0.5	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil Desulfinyl	18		1.5	ng/L	20	90	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil Desulfinyl	16		1.5	ng/L	20	80	10
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil Desulfinyl	ND	0.5	1.5	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil Desulfinyl	16		1.5	ng/L	20	80	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil Desulfinyl	15		1.5	ng/L	20	75	6.5
564956	MB for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil Sulfide	ND	0.5	1.5	ng/L			
564957	LCS for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil Sulfide	14		1.5	ng/L	20	70	
564958	LCSD for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil Sulfide	16		1.5	ng/L	20	80	13
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil Sulfide	ND	0.5	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil Sulfide	17		1.5	ng/L	20	85	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil Sulfide	15		1.5	ng/L	20	75	13
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil Sulfide	ND	0.5	1.5	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil Sulfide	17		1.5	ng/L	20	85	

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil Sulfide	16		1.5	ng/L	20	80	6.1
564956	MB for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil Sulfone	ND	0.5	1.5	ng/L			
564957	LCS for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil Sulfone	14		1.5	ng/L	20	70	
564958	LCSD for HBN 508653 [SPR/6308]	2/7/2014	FIP	Fipronil Sulfone	14		1.5	ng/L	20	70	0
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil Sulfone	ND	0.5	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil Sulfone	16		1.5	ng/L	20	80	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	FIP	Fipronil Sulfone	15		1.5	ng/L	20	75	7.7
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil Sulfone	ND	0.5	1.5	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil Sulfone	16		1.5	ng/L	20	80	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	FIP	Fipronil Sulfone	14		1.5	ng/L	20	70	13
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	4,4'-DDD	ND	0.004	0.1	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	4,4'-DDD	0.21		0.1	µg/L	0.2	105	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	4,4'-DDD	0.2		0.1	µg/L	0.2	100	4.9
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	4,4'-DDD	ND	0.004	0.1	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	4,4'-DDD	0.16		0.1	µg/L	0.2	80	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	4,4'-DDD	0.17		0.1	µg/L	0.2	85	6.1
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	4,4'-DDD	ND	0.004	0.1	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	4,4'-DDD	0.15		0.1	µg/L	0.2	75	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	4,4'-DDD	0.16		0.1	µg/L	0.2	80	6.5
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	4,4'-DDE	ND	0.003	0.1	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	4,4'-DDE	0.19		0.1	µg/L	0.2	95	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	4,4'-DDE	0.18		0.1	µg/L	0.2	90	5.4
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	4,4'-DDE	ND	0.003	0.1	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	4,4'-DDE	0.16		0.1	µg/L	0.2	80	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	4,4'-DDE	0.16		0.1	µg/L	0.2	80	0
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	4,4'-DDE	ND	0.003	0.1	µg/L			

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	4,4'-DDE	0.15		0.1	µg/L	0.2	75	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	4,4'-DDE	0.15		0.1	µg/L	0.2	75	0
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	4,4'-DDT	ND	0.004	0.1	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	4,4'-DDT	0.22		0.1	µg/L	0.2	110	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	4,4'-DDT	0.2		0.1	µg/L	0.2	100	9.5
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	4,4'-DDT	ND	0.004	0.1	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	4,4'-DDT	0.19		0.1	µg/L	0.2	95	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	4,4'-DDT	0.19		0.1	µg/L	0.2	95	0
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	4,4'-DDT	ND	0.004	0.1	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	4,4'-DDT	0.16		0.1	µg/L	0.2	80	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	4,4'-DDT	0.17		0.1	µg/L	0.2	85	6.1
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Aldrin	ND	0.004	0.05	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	Aldrin	0.19		0.05	µg/L	0.2	95	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	Aldrin	0.18		0.05	µg/L	0.2	90	5.4
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Aldrin	ND	0.004	0.05	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	Aldrin	0.15		0.05	µg/L	0.2	75	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	Aldrin	0.16		0.05	µg/L	0.2	80	6.5
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Aldrin	ND	0.004	0.05	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	Aldrin	0.14		0.05	µg/L	0.2	70	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	Aldrin	0.15		0.05	µg/L	0.2	75	6.9
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	alpha-BHC	ND	0.005	0.05	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	alpha-BHC	0.19		0.05	µg/L	0.2	95	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	alpha-BHC	0.19		0.05	µg/L	0.2	95	0
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	alpha-BHC	ND	0.005	0.05	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	alpha-BHC	0.16		0.05	µg/L	0.2	80	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	alpha-BHC	0.16		0.05	µg/L	0.2	80	0

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	alpha-BHC	ND	0.005	0.05	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	alpha-BHC	0.14		0.05	µg/L	0.2	70	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	alpha-BHC	0.16		0.05	µg/L	0.2	80	13
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	beta-BHC	ND	0.004	0.05	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	beta-BHC	0.18		0.05	µg/L	0.2	90	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	beta-BHC	0.15		0.05	µg/L	0.2	75	18
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	beta-BHC	ND	0.004	0.05	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	beta-BHC	0.14		0.05	µg/L	0.2	70	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	beta-BHC	0.15		0.05	µg/L	0.2	75	6.9
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	beta-BHC	ND	0.004	0.05	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	beta-BHC	0.14		0.05	µg/L	0.2	70	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	beta-BHC	0.15		0.05	µg/L	0.2	75	6.9
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Chlordane	ND	0.02	0.5	µg/L			
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Chlordane	ND	0.02	0.5	µg/L			
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Chlordane	ND	0.02	0.5	µg/L			
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	delta-BHC	ND	0.004	0.05	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	delta-BHC	0.18		0.05	µg/L	0.2	90	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	delta-BHC	0.17		0.05	µg/L	0.2	85	5.7
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	delta-BHC	ND	0.004	0.05	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	delta-BHC	0.14		0.05	µg/L	0.2	70	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	delta-BHC	0.15		0.05	µg/L	0.2	75	6.9
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	delta-BHC	ND	0.004	0.05	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	delta-BHC	0.12		0.05	µg/L	0.2	60	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	delta-BHC	0.13		0.05	µg/L	0.2	65	8
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Dieldrin	ND	0.004	0.1	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	Dieldrin	0.22		0.1	µg/L	0.2	110	

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	Dieldrin	0.2		0.1	µg/L	0.2	100	9.5
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Dieldrin	ND	0.004	0.1	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	Dieldrin	0.17		0.1	µg/L	0.2	85	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	Dieldrin	0.17		0.1	µg/L	0.2	85	0
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Dieldrin	ND	0.004	0.1	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	Dieldrin	0.16		0.1	µg/L	0.2	80	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	Dieldrin	0.17		0.1	µg/L	0.2	85	6.1
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Endosulfan I	ND	0.004	0.05	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	Endosulfan I	0.2		0.05	µg/L	0.2	98	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	Endosulfan I	0.18		0.05	µg/L	0.2	90	8
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Endosulfan I	ND	0.004	0.05	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	Endosulfan I	0.16		0.05	µg/L	0.2	80	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	Endosulfan I	0.17		0.05	µg/L	0.2	85	6.1
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Endosulfan I	ND	0.004	0.05	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	Endosulfan I	0.15		0.05	µg/L	0.2	75	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	Endosulfan I	0.16		0.05	µg/L	0.2	80	6.5
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Endosulfan II	ND	0.005	0.1	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	Endosulfan II	0.19		0.1	µg/L	0.2	95	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	Endosulfan II	0.18		0.1	µg/L	0.2	90	5.4
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Endosulfan II	ND	0.005	0.1	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	Endosulfan II	0.17		0.1	µg/L	0.2	85	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	Endosulfan II	0.17		0.1	µg/L	0.2	85	0
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Endosulfan II	ND	0.005	0.1	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	Endosulfan II	0.16		0.1	µg/L	0.2	80	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	Endosulfan II	0.17		0.1	µg/L	0.2	85	6.1
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Endosulfan sulfate	ND	0.005	0.1	µg/L			

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	Endosulfan sulfate	0.22		0.1	µg/L	0.2	110	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	Endosulfan sulfate	0.2		0.1	µg/L	0.2	100	9.5
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Endosulfan sulfate	ND	0.005	0.1	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	Endosulfan sulfate	0.18		0.1	µg/L	0.2	90	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	Endosulfan sulfate	0.18		0.1	µg/L	0.2	90	0
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Endosulfan sulfate	ND	0.005	0.1	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	Endosulfan sulfate	0.16		0.1	µg/L	0.2	80	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	Endosulfan sulfate	0.18		0.1	µg/L	0.2	90	12
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Endrin	ND	0.005	0.1	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	Endrin	0.18		0.1	µg/L	0.2	90	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	Endrin	0.17		0.1	µg/L	0.2	85	5.7
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Endrin	ND	0.005	0.1	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	Endrin	0.14		0.1	µg/L	0.2	70	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	Endrin	0.14		0.1	µg/L	0.2	70	0
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Endrin	ND	0.005	0.1	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	Endrin	0.15		0.1	µg/L	0.2	75	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	Endrin	0.16		0.1	µg/L	0.2	80	6.5
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Endrin aldehyde	ND	0.005	0.05	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	Endrin aldehyde	0.21		0.05	µg/L	0.2	105	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	Endrin aldehyde	0.2		0.05	µg/L	0.2	100	4.9
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Endrin aldehyde	ND	0.005	0.05	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	Endrin aldehyde	0.18		0.05	µg/L	0.2	90	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	Endrin aldehyde	0.19		0.05	µg/L	0.2	95	5.4
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Endrin aldehyde	ND	0.005	0.05	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	Endrin aldehyde	0.18		0.05	µg/L	0.2	90	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	Endrin aldehyde	0.2		0.05	µg/L	0.2	100	11

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Endrin ketone	ND	0.005	0.1	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	Endrin ketone	0.21		0.1	µg/L	0.2	105	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	Endrin ketone	0.2		0.1	µg/L	0.2	100	4.9
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Endrin ketone	ND	0.005	0.1	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	Endrin ketone	0.18		0.1	µg/L	0.2	90	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	Endrin ketone	0.18		0.1	µg/L	0.2	90	0
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Endrin ketone	ND	0.005	0.1	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	Endrin ketone	0.16		0.1	µg/L	0.2	80	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	Endrin ketone	0.17		0.1	µg/L	0.2	85	6.1
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	gamma-BHC (Lindane)	ND	0.004	0.05	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	gamma-BHC (Lindane)	0.18		0.05	µg/L	0.2	90	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	gamma-BHC (Lindane)	0.15		0.05	µg/L	0.2	75	18
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	gamma-BHC (Lindane)	ND	0.004	0.05	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	gamma-BHC (Lindane)	0.16		0.05	µg/L	0.2	80	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	gamma-BHC (Lindane)	0.16		0.05	µg/L	0.2	80	0
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	gamma-BHC (Lindane)	ND	0.004	0.05	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	gamma-BHC (Lindane)	0.14		0.05	µg/L	0.2	70	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	gamma-BHC (Lindane)	0.15		0.05	µg/L	0.2	75	6.9
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Heptachlor	ND	0.005	0.05	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	Heptachlor	0.2		0.05	µg/L	0.2	100	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	Heptachlor	0.18		0.05	µg/L	0.2	90	11
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Heptachlor	ND	0.005	0.05	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	Heptachlor	0.16		0.05	µg/L	0.2	80	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	Heptachlor	0.16		0.05	µg/L	0.2	80	0
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Heptachlor	ND	0.005	0.05	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	Heptachlor	0.14		0.05	µg/L	0.2	70	

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	Heptachlor	0.15		0.05	µg/L	0.2	75	6.9
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Heptachlor epoxide	ND	0.004	0.05	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	Heptachlor epoxide	0.2		0.05	µg/L	0.2	100	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	Heptachlor epoxide	0.19		0.05	µg/L	0.2	95	5.1
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Heptachlor epoxide	ND	0.004	0.05	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	Heptachlor epoxide	0.16		0.05	µg/L	0.2	80	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	Heptachlor epoxide	0.17		0.05	µg/L	0.2	85	6.1
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Heptachlor epoxide	ND	0.004	0.05	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	Heptachlor epoxide	0.15		0.05	µg/L	0.2	75	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	Heptachlor epoxide	0.17		0.05	µg/L	0.2	85	13
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Methoxychlor	ND	0.005	0.5	µg/L			
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	OP	Methoxychlor	0.22		0.5	µg/L	0.2	110	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	OP	Methoxychlor	0.2		0.5	µg/L	0.2	100	9.5
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Methoxychlor	ND	0.005	0.5	µg/L			
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	OP	Methoxychlor	0.18		0.5	µg/L	0.2	90	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	OP	Methoxychlor	0.18		0.5	µg/L	0.2	90	0
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Methoxychlor	ND	0.005	0.5	µg/L			
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	OP	Methoxychlor	0.15		0.5	µg/L	0.2	75	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	OP	Methoxychlor	0.17		0.5	µg/L	0.2	85	13
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	OP	Toxaphene	ND	0.3	1	µg/L			
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	OP	Toxaphene	ND	0.3	1	µg/L			
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	OP	Toxaphene	ND	0.3	1	µg/L			
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	PYR	Allethrin	ND	0.1	1.5	ng/L			
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	PYR	Allethrin	13		1.5	ng/L	20	65	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	PYR	Allethrin	14		1.5	ng/L	20	70	6.6
564487	Matrix QC (MS)	2/7/2014	PYR	Allethrin	14		1.5	ng/L	21	68	

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
564488	Matrix QC (MSD)	2/7/2014	PYR	Allethrin	15		1.5	ng/L	21	73	6.9
P020494001	Matrix QC (ORIG)	2/7/2014	PYR	Allethrin	ND	0.1	1.5	ng/L			
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	PYR	Allethrin	ND	0.1	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	PYR	Allethrin	16		1.5	ng/L	20	80	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	PYR	Allethrin	16		1.5	ng/L	20	80	1.9
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	PYR	Allethrin	ND	0.1	1.5	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	PYR	Allethrin	18		1.5	ng/L	20	90	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	PYR	Allethrin	19		1.5	ng/L	20	95	5.4
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	PYR	Bifenthrin	ND	0.1	1.5	ng/L			
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	PYR	Bifenthrin	18		1.5	ng/L	20	90	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	PYR	Bifenthrin	18		1.5	ng/L	20	90	1.1
564487	Matrix QC (MS)	2/7/2014	PYR	Bifenthrin	17		1.5	ng/L	24.1	68	
564488	Matrix QC (MSD)	2/7/2014	PYR	Bifenthrin	18		1.5	ng/L	24.1	72	5.7
P020494001	Matrix QC (ORIG)	2/7/2014	PYR	Bifenthrin	3.1	0.1	1.5	ng/L			
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	PYR	Bifenthrin	ND	0.1	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	PYR	Bifenthrin	18		1.5	ng/L	20	90	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	PYR	Bifenthrin	17		1.5	ng/L	20	85	3.5
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	PYR	Bifenthrin	ND	0.1	1.5	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	PYR	Bifenthrin	18		1.5	ng/L	20	90	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	PYR	Bifenthrin	19		1.5	ng/L	20	95	5.4
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	PYR	Cyfluthrin	ND	0.2	1.5	ng/L			
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	PYR	Cyfluthrin	16		1.5	ng/L	20	80	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	PYR	Cyfluthrin	17		1.5	ng/L	20	85	3.6
564487	Matrix QC (MS)	2/7/2014	PYR	Cyfluthrin	14		1.5	ng/L	21.3	66	
564488	Matrix QC (MSD)	2/7/2014	PYR	Cyfluthrin	15		1.5	ng/L	21.3	71	6.9
P020494001	Matrix QC (ORIG)	2/7/2014	PYR	Cyfluthrin	0.3 J	0.2	1.5	ng/L			

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	PYR	Cyfluthrin	ND	0.2	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	PYR	Cyfluthrin	18		1.5	ng/L	20	90	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	PYR	Cyfluthrin	17		1.5	ng/L	20	85	6.3
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	PYR	Cyfluthrin	ND	0.2	1.5	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	PYR	Cyfluthrin	17		1.5	ng/L	20	85	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	PYR	Cyfluthrin	18		1.5	ng/L	20	90	5.7
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	PYR	Cypermethrin	ND	0.2	1.5	ng/L			
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	PYR	Cypermethrin	17		1.5	ng/L	20	85	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	PYR	Cypermethrin	18		1.5	ng/L	20	90	4
564487	Matrix QC (MS)	2/7/2014	PYR	Cypermethrin	14		1.5	ng/L	21.6	65	
564488	Matrix QC (MSD)	2/7/2014	PYR	Cypermethrin	15		1.5	ng/L	21.6	70	6.9
P020494001	Matrix QC (ORIG)	2/7/2014	PYR	Cypermethrin	0.6 J	0.2	1.5	ng/L			
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	PYR	Cypermethrin	ND	0.2	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	PYR	Cypermethrin	19		1.5	ng/L	20	95	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	PYR	Cypermethrin	18		1.5	ng/L	20	90	5.9
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	PYR	Cypermethrin	ND	0.2	1.5	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	PYR	Cypermethrin	18		1.5	ng/L	20	90	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	PYR	Cypermethrin	19		1.5	ng/L	20	95	5.4
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	PYR	Deltamethrin:Tralomethrin	ND	0.2	3	ng/L			
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	PYR	Deltamethrin:Tralomethrin	28		3	ng/L	40	70	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	PYR	Deltamethrin:Tralomethrin	28		3	ng/L	40	70	1.4
564487	Matrix QC (MS)	2/7/2014	PYR	Deltamethrin:Tralomethrin	21		3	ng/L	41	51	
564488	Matrix QC (MSD)	2/7/2014	PYR	Deltamethrin:Tralomethrin	22		3	ng/L	41	53	4.7
P020494001	Matrix QC (ORIG)	2/7/2014	PYR	Deltamethrin:Tralomethrin	ND	0.2	3	ng/L			
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	PYR	Deltamethrin:Tralomethrin	ND	0.2	3	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	PYR	Deltamethrin:Tralomethrin	33		3	ng/L	40	83	

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	PYR	Deltamethrin:Tralomethrin	32		3	ng/L	40	80	3.1
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	PYR	Deltamethrin:Tralomethrin	ND	0.2	3	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	PYR	Deltamethrin:Tralomethrin	31		3	ng/L	40	78	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	PYR	Deltamethrin:Tralomethrin	33		3	ng/L	40	83	6.3
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	PYR	Esfenvalerate:Fenvalerate	ND	0.2	3	ng/L			
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	PYR	Esfenvalerate:Fenvalerate	31		3	ng/L	40	78	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	PYR	Esfenvalerate:Fenvalerate	32		3	ng/L	40	80	4.1
564487	Matrix QC (MS)	2/7/2014	PYR	Esfenvalerate:Fenvalerate	24		3	ng/L	41	58	
564488	Matrix QC (MSD)	2/7/2014	PYR	Esfenvalerate:Fenvalerate	26		3	ng/L	41	63	8
P020494001	Matrix QC (ORIG)	2/7/2014	PYR	Esfenvalerate:Fenvalerate	ND	0.2	3	ng/L			
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	PYR	Esfenvalerate:Fenvalerate	ND	0.2	3	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	PYR	Esfenvalerate:Fenvalerate	34		3	ng/L	40	85	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	PYR	Esfenvalerate:Fenvalerate	32		3	ng/L	40	80	7.2
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	PYR	Esfenvalerate:Fenvalerate	ND	0.2	3	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	PYR	Esfenvalerate:Fenvalerate	34		3	ng/L	40	85	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	PYR	Esfenvalerate:Fenvalerate	35		3	ng/L	40	88	2.9
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	PYR	Fenprothrin	ND	0.2	1.5	ng/L			
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	PYR	Fenprothrin	20		1.5	ng/L	20	100	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	PYR	Fenprothrin	20		1.5	ng/L	20	100	2
564487	Matrix QC (MS)	2/7/2014	PYR	Fenprothrin	15		1.5	ng/L	21	73	
564488	Matrix QC (MSD)	2/7/2014	PYR	Fenprothrin	15		1.5	ng/L	21	73	0
P020494001	Matrix QC (ORIG)	2/7/2014	PYR	Fenprothrin	ND	0.2	1.5	ng/L			
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	PYR	Fenprothrin	ND	0.2	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	PYR	Fenprothrin	27		1.5	ng/L	20	135	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	PYR	Fenprothrin	21		1.5	ng/L	20	105	26
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	PYR	Fenprothrin	ND	0.2	1.5	ng/L			

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	PYR	Fenprothrin	21		1.5	ng/L	20	105	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	PYR	Fenprothrin	23		1.5	ng/L	20	115	9.1
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	PYR	Lambda-Cyhalothrin	0.3 J	0.2	1.5	ng/L			
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	PYR	Lambda-Cyhalothrin	14		1.5	ng/L	20	70	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	PYR	Lambda-Cyhalothrin	15		1.5	ng/L	20	75	6.9
564487	Matrix QC (MS)	2/7/2014	PYR	Lambda-Cyhalothrin	12		1.5	ng/L	21.5	56	
564488	Matrix QC (MSD)	2/7/2014	PYR	Lambda-Cyhalothrin	12		1.5	ng/L	21.5	56	0
P020494001	Matrix QC (ORIG)	2/7/2014	PYR	Lambda-Cyhalothrin	0.5 J,B	0.2	1.5	ng/L			
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	PYR	Lambda-Cyhalothrin	ND	0.2	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	PYR	Lambda-Cyhalothrin	20		1.5	ng/L	20	100	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	PYR	Lambda-Cyhalothrin	18		1.5	ng/L	20	90	8.5
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	PYR	Lambda-Cyhalothrin	ND	0.2	1.5	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	PYR	Lambda-Cyhalothrin	16		1.5	ng/L	20	80	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	PYR	Lambda-Cyhalothrin	17		1.5	ng/L	20	85	6.1
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	PYR	Permethrin	ND	2	15	ng/L			
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	PYR	Permethrin	85		15	ng/L	100	85	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	PYR	Permethrin	92		15	ng/L	100	92	7.9
564487	Matrix QC (MS)	2/7/2014	PYR	Permethrin	69		15	ng/L	100	67	
564488	Matrix QC (MSD)	2/7/2014	PYR	Permethrin	73		15	ng/L	100	71	5.6
P020494001	Matrix QC (ORIG)	2/7/2014	PYR	Permethrin	ND	2	15	ng/L			
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	PYR	Permethrin	ND	2	15	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	PYR	Permethrin	110		15	ng/L	100	110	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	PYR	Permethrin	110		15	ng/L	100	110	0.9
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	PYR	Permethrin	ND	2	15	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	PYR	Permethrin	75		15	ng/L	100	75	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	PYR	Permethrin	84		15	ng/L	100	84	11

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	PYR	Tau-Fluvalinate	ND	0.2	1.5	ng/L			
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	PYR	Tau-Fluvalinate	14		1.5	ng/L	20	70	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	PYR	Tau-Fluvalinate	15		1.5	ng/L	20	75	6.2
564487	Matrix QC (MS)	2/7/2014	PYR	Tau-Fluvalinate	12		1.5	ng/L	21	58	
564488	Matrix QC (MSD)	2/7/2014	PYR	Tau-Fluvalinate	12		1.5	ng/L	21	58	0
P020494001	Matrix QC (ORIG)	2/7/2014	PYR	Tau-Fluvalinate	ND	0.2	1.5	ng/L			
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	PYR	Tau-Fluvalinate	ND	0.2	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	PYR	Tau-Fluvalinate	14		1.5	ng/L	20	70	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	PYR	Tau-Fluvalinate	13		1.5	ng/L	20	65	6
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	PYR	Tau-Fluvalinate	ND	0.2	1.5	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	PYR	Tau-Fluvalinate	13		1.5	ng/L	20	65	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	PYR	Tau-Fluvalinate	13		1.5	ng/L	20	65	0
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	PYR	Tetramethrin	ND	0.2	1.5	ng/L			
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	PYR	Tetramethrin	14		1.5	ng/L	20	70	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	PYR	Tetramethrin	12		1.5	ng/L	20	60	14
564487	Matrix QC (MS)	2/7/2014	PYR	Tetramethrin	15		1.5	ng/L	21	73	
564488	Matrix QC (MSD)	2/7/2014	PYR	Tetramethrin	15		1.5	ng/L	21	73	0
P020494001	Matrix QC (ORIG)	2/7/2014	PYR	Tetramethrin	ND	0.2	1.5	ng/L			
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	PYR	Tetramethrin	ND	0.2	1.5	ng/L			
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	PYR	Tetramethrin	16		1.5	ng/L	20	80	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	PYR	Tetramethrin	15		1.5	ng/L	20	75	3.3
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	PYR	Tetramethrin	ND	0.2	1.5	ng/L			
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	PYR	Tetramethrin	16		1.5	ng/L	20	80	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	PYR	Tetramethrin	16		1.5	ng/L	20	80	0
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	SUR	Decachlorobiphenyl	93		30-190	%	0.2	93	
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	SUR	Decachlorobiphenyl	100		30-190	%	0.2	100	

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	SUR	Decachlorobiphenyl	95		30-190	%	0.2	95	5.1
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	SUR	Decachlorobiphenyl	42		30-190	%	0.2	42	
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	SUR	Decachlorobiphenyl	49		30-190	%	0.2	49	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	SUR	Decachlorobiphenyl	46		30-190	%	0.2	46	7.4
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	SUR	Decachlorobiphenyl	46		30-190	%	0.2	46	
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	SUR	Decachlorobiphenyl	49		30-190	%	0.2	49	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	SUR	Decachlorobiphenyl	55		30-190	%	0.2	55	13
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	SUR	Esfenvalerate-d6;#1	94		70-130	%	10	94	
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	SUR	Esfenvalerate-d6;#1	93		70-130	%	10	93	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	SUR	Esfenvalerate-d6;#1	100		70-130	%	20	100	73
564487	Matrix QC (MS)	2/7/2014	SUR	Esfenvalerate-d6;#1	65		70-130	%	10	65	
564488	Matrix QC (MSD)	2/7/2014	SUR	Esfenvalerate-d6;#1	67		70-130	%	10	67	3.1
564956	MB for HBN 508653 [SPR/6308]	2/7/2014	SUR	Esfenvalerate-d6;#1	80		70-130	%	10	80	
564957	LCS for HBN 508653 [SPR/6308]	2/7/2014	SUR	Esfenvalerate-d6;#1	84		70-130	%	10	84	
564958	LCSD for HBN 508653 [SPR/6308]	2/7/2014	SUR	Esfenvalerate-d6;#1	89		70-130	%	10	89	5.8
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	SUR	Esfenvalerate-d6;#1	90		70-130	%	10	90	
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	SUR	Esfenvalerate-d6;#1	85		70-130	%	10	85	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	SUR	Esfenvalerate-d6;#1	75		70-130	%	10	75	13
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	SUR	Esfenvalerate-d6;#1	68		70-130	%	10	68	
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	SUR	Esfenvalerate-d6;#1	79		70-130	%	10	79	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	SUR	Esfenvalerate-d6;#1	80		70-130	%	10	80	1.3
564069	MB for HBN 508501 [SPR/6300]	2/7/2014	SUR	Esfenvalerate-d6;#2	89		70-130	%	10	89	
564070	LCS for HBN 508501 [SPR/6300]	2/7/2014	SUR	Esfenvalerate-d6;#2	88		70-130	%	10	88	
564071	LCSD for HBN 508501 [SPR/6300]	2/7/2014	SUR	Esfenvalerate-d6;#2	95		70-130	%	20	95	73
564487	Matrix QC (MS)	2/7/2014	SUR	Esfenvalerate-d6;#2	64		70-130	%	10	64	
564488	Matrix QC (MSD)	2/7/2014	SUR	Esfenvalerate-d6;#2	68		70-130	%	10	68	6

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
564956	MB for HBN 508653 [SPR/6308]	2/7/2014	SUR	Esfenvalerate-d6;#2	81		70-130	%	10	81	
564957	LCS for HBN 508653 [SPR/6308]	2/7/2014	SUR	Esfenvalerate-d6;#2	83		70-130	%	10	83	
564958	LCSD for HBN 508653 [SPR/6308]	2/7/2014	SUR	Esfenvalerate-d6;#2	90		70-130	%	10	90	8.1
570428	MB for HBN 510076 [SPR/6351]	3/4/2014	SUR	Esfenvalerate-d6;#2	87		70-130	%	10	87	
570429	LCS for HBN 510076 [SPR/6351]	3/4/2014	SUR	Esfenvalerate-d6;#2	85		70-130	%	10	85	
570430	LCSD for HBN 510076 [SPR/6351]	3/4/2014	SUR	Esfenvalerate-d6;#2	75		70-130	%	10	75	13
574094	MB for HBN 511606 [SPR/6382]	3/26/2014	SUR	Esfenvalerate-d6;#2	68		70-130	%	10	68	
574095	LCS for HBN 511606 [SPR/6382]	3/26/2014	SUR	Esfenvalerate-d6;#2	79		70-130	%	10	79	
574096	LCSD for HBN 511606 [SPR/6382]	3/26/2014	SUR	Esfenvalerate-d6;#2	81		70-130	%	10	81	2.5
565093	MB for HBN 508664 [SPR/6309]	2/7/2014	SUR	Tetrachloro-m-xylene	75		25-105	%	0.2	75	
565094	LCS for HBN 508664 [SPR/6309]	2/7/2014	SUR	Tetrachloro-m-xylene	80		25-105	%	0.2	80	
565095	LCSD for HBN 508664 [SPR/6309]	2/7/2014	SUR	Tetrachloro-m-xylene	75		25-105	%	0.2	75	6.5
570101	MB for HBN 510007 [SPR/6346]	3/1/2014	SUR	Tetrachloro-m-xylene	78		25-105	%	0.2	78	
570102	LCS for HBN 510007 [SPR/6346]	3/1/2014	SUR	Tetrachloro-m-xylene	75		25-105	%	0.2	75	
570103	LCSD for HBN 510007 [SPR/6346]	3/1/2014	SUR	Tetrachloro-m-xylene	80		25-105	%	0.2	80	6.5
574847	MB for HBN 511879 [SPR/6386]	3/26/2014	SUR	Tetrachloro-m-xylene	62		25-105	%	0.2	62	
574848	LCS for HBN 511879 [SPR/6386]	3/26/2014	SUR	Tetrachloro-m-xylene	65		25-105	%	0.2	65	
574849	LCSD for HBN 511879 [SPR/6386]	3/26/2014	SUR	Tetrachloro-m-xylene	70		25-105	%	0.2	70	7.4
564892	MB for HBN 508630 [BIO/13477]	2/7/2014	PS	Sediment Concentration	ND	2	3	mg/L			
564893	LCS for HBN 508630 [BIO/13477]	2/7/2014	PS	Sediment Concentration	467		3	mg/L	500	93	
564894	LCSD for HBN 508630 [BIO/13477]	2/7/2014	PS	Sediment Concentration	489		3	mg/L	500	98	4.6
570093	MB for HBN 510004 [BIO/13574]	3/1/2014	PS	Sediment Concentration	ND	2	3	mg/L			
570094	LCS for HBN 510004 [BIO/13574]	3/1/2014	PS	Sediment Concentration	508		3	mg/L	500	102	
570095	LCSD for HBN 510004 [BIO/13574]	3/1/2014	PS	Sediment Concentration	506		3	mg/L	500	101	0.4
574708	MB for HBN 511837 [BIO/13669]	3/26/2014	PS	Sediment Concentration	ND	2	3	mg/L			
574709	LCS for HBN 511837 [BIO/13669]	3/26/2014	PS	Sediment Concentration	477		3	mg/L	500	95	

Table F-2: CCCWP SSID Study – Aquatic Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
574762	LCSD for HBN 511837 [BIO/13669]	4/1/2014	PS	Sediment Concentration	484		3	mg/L	500	97	1.5
566585	MB for HBN 508976 [WET/7444]	2/6/2014	TOC	Total Organic Carbon	ND	0.3	1	mg/L			
566586	LCS for HBN 508976 [WET/7444]	2/6/2014	TOC	Total Organic Carbon	10		1	mg/L	10	100	
566657	Matrix QC (MS)	2/7/2014	TOC	Total Organic Carbon	28		1	mg/L	26	116	
566658	Matrix QC (MSD)	2/7/2014	TOC	Total Organic Carbon	28		1	mg/L	26	116	0
566659	544MSH065-(566659MS)	2/7/2014	TOC	Total Organic Carbon	24		1	mg/L	26	84	
566660	544MSH065-(566659MSD)	2/7/2014	TOC	Total Organic Carbon	25		1	mg/L	26	94	4.1
P020479022	Matrix QC (ORIG)	2/7/2014	TOC	Total Organic Carbon	16	0.3	0.5	mg/L			
571219	MB for HBN 510359 [WET/7502]	3/4/2014	TOC	Total Organic Carbon	ND	0.3	1	mg/L			
571220	LCS for HBN 510359 [WET/7502]	3/4/2014	TOC	Total Organic Carbon	10		1	mg/L	10	100	
571221	Matrix QC (MS)	3/4/2014	TOC	Total Organic Carbon	18		1	mg/L	18.1	99	
571222	Matrix QC (MSD)	3/4/2014	TOC	Total Organic Carbon	18		1	mg/L	18.1	99	0
P030133001	Matrix QC (ORIG)	3/4/2014	TOC	Total Organic Carbon	8.1	0.3	1	mg/L			
574492	MB for HBN 511744 [WET/7533]	3/26/2014	TOC	Total Organic Carbon	ND	0.3	1	mg/L			
574493	LCS for HBN 511744 [WET/7533]	3/26/2014	TOC	Total Organic Carbon	10		1	mg/L	10	100	
574497	Matrix QC (MS)	3/26/2014	TOC	Total Organic Carbon	13		1	mg/L	13.6	94	
574498	Matrix QC (MSD)	3/26/2014	TOC	Total Organic Carbon	13		1	mg/L	13.6	94	0
P031026001	Matrix QC (ORIG)	3/26/2014	TOC	Total Organic Carbon	3.6	0.3	1	mg/L			

J Analyte detected below Reporting Limit. Result is an estimate.

B Analyte detected in method blank.

¹MB = Method Blank, LCS = Laboratory Control Sample, LCSD = Laboratory Control Duplicate Sample, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Laboratory Duplicate, ORIG = Original Field Sample Result

²FIP = Fipronils, OP = Organochlorine Pesticides, PYR = Pyrethroid Pesticides, SUR = Surrogates, PS = Particle Size, TOC = Total Organic Carbon

Table F-3: CCCWP SSID Study – Sediment Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil	ND	0.1	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil	2.2	0.5	1.2	µg/kg	2.5	89	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil	2.6	0.5	1.2	µg/kg	2.5	104	16
594647	Matrix QC (MS)	7/24/2014	FIP	Fipronil	1.7	0.2	0.5	µg/kg			
594648	Matrix QC (MSD)	7/24/2014	FIP	Fipronil	1.4	0.2	0.5	µg/kg			15
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil Desulfinyl	ND	0.1	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil Desulfinyl	2.1	0.5	1.2	µg/kg	2.5	86	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil Desulfinyl	2.6	0.5	1.2	µg/kg	2.5	104	19
594647	Matrix QC (MS)	7/24/2014	FIP	Fipronil Desulfinyl	1.9	0.2	0.5	µg/kg			
594648	Matrix QC (MSD)	7/24/2014	FIP	Fipronil Desulfinyl	1.7	0.2	0.5	µg/kg			12
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil Sulfide	ND	0.1	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil Sulfide	2.2	0.5	1.2	µg/kg	2.5	86	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil Sulfide	2.6	0.5	1.2	µg/kg	2.5	105	20
594647	Matrix QC (MS)	7/24/2014	FIP	Fipronil Sulfide	1.8	0.2	0.5	µg/kg			
594648	Matrix QC (MSD)	7/24/2014	FIP	Fipronil Sulfide	1.5	0.2	0.5	µg/kg			15
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil Sulfone	ND	0.1	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil Sulfone	2.2	0.5	1.2	µg/kg	2.5	87	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	FIP	Fipronil Sulfone	2.7	0.5	1.2	µg/kg	2.5	106	20
594647	Matrix QC (MS)	7/24/2014	FIP	Fipronil Sulfone	2	0.2	0.5	µg/kg			
594648	Matrix QC (MSD)	7/24/2014	FIP	Fipronil Sulfone	1.9	0.2	0.5	µg/kg			8.7
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	2,4'-DDD	ND	0.002	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	2,4'-DDE	ND	0.002	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	2,4'-DDT	ND	0.002	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	4,4'-DDD	ND	0.0008	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	4,4'-DDE	ND	0.0012	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	4,4'-DDT	ND	0.001	0.002	mg/kg			

Table F-3: CCCWP SSID Study – Sediment Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
594792	LCS for HBN 524561 [SPR/6556]	7/22/2014	OP	4,4'-DDT	0.0093	0.001	0.002	mg/kg	0.013	70	
594793	LCSD for HBN 524561 [SPR/6556]	7/22/2014	OP	4,4'-DDT	0.0092	0.001	0.002	mg/kg	0.013	69	0.9
594794	Matrix QC (MS)	7/24/2014	OP	4,4'-DDT	0.0081	0.001	0.002	mg/kg	0.013	61	
594795	Matrix QC (MSD)	7/24/2014	OP	4,4'-DDT	0.0075	0.001	0.002	mg/kg	0.013	56	7.4
P070963003	Matrix QC (ORIG)	7/24/2014	OP	4,4'-DDT	ND	0.42	3	ng/g			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Aldrin	ND	0.0009	0.002	mg/kg			
594792	LCS for HBN 524561 [SPR/6556]	7/22/2014	OP	Aldrin	0.0098	0.0009	0.002	mg/kg	0.013	73	
594793	LCSD for HBN 524561 [SPR/6556]	7/22/2014	OP	Aldrin	0.009	0.0009	0.002	mg/kg	0.013	68	7.9
594794	Matrix QC (MS)	7/24/2014	OP	Aldrin	0.012	0.0009	0.002	mg/kg	0.013	93	
594795	Matrix QC (MSD)	7/24/2014	OP	Aldrin	0.012	0.0009	0.002	mg/kg	0.013	93	0
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	alpha-BHC	ND	0.0009	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	alpha-Chlordane (cis)	ND	0.001	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	beta-BHC	ND	0.0009	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Chlordane	ND	0.003	0.004	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	delta-BHC	ND	0.0007	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Dieldrin	ND	0.0012	0.002	mg/kg			
594792	LCS for HBN 524561 [SPR/6556]	7/22/2014	OP	Dieldrin	0.01	0.0012	0.002	mg/kg	0.013	75	
594793	LCSD for HBN 524561 [SPR/6556]	7/22/2014	OP	Dieldrin	0.01	0.0012	0.002	mg/kg	0.013	76	1
594794	Matrix QC (MS)	7/24/2014	OP	Dieldrin	0.014	0.0012	0.002	mg/kg	0.013	101	
594795	Matrix QC (MSD)	7/24/2014	OP	Dieldrin	0.013	0.0012	0.002	mg/kg	0.013	101	0.7
P070963003	Matrix QC (ORIG)	7/24/2014	OP	Dieldrin	ND	0.74	3	ng/g			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Endosulfan I	ND	0.0009	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Endosulfan II	ND	0.0007	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Endosulfan sulfate	ND	0.0009	0.002	mg/kg			
594792	LCS for HBN 524561 [SPR/6556]	7/22/2014	OP	Endosulfan sulfate	0.01	0.0009	0.002	mg/kg	0.013	77	
594793	LCSD for HBN 524561 [SPR/6556]	7/22/2014	OP	Endosulfan sulfate	0.0099	0.0009	0.002	mg/kg	0.013	75	2.6

Table F-3: CCCWP SSID Study – Sediment Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
594794	Matrix QC (MS)	7/24/2014	OP	Endosulfan sulfate	0.013	0.0009	0.002	mg/kg	0.013	99	
594795	Matrix QC (MSD)	7/24/2014	OP	Endosulfan sulfate	0.013	0.0009	0.002	mg/kg	0.013	95	4.7
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Endrin	ND	0.001	0.002	mg/kg			
594792	LCS for HBN 524561 [SPR/6556]	7/22/2014	OP	Endrin	0.01	0.001	0.002	mg/kg	0.013	77	
594793	LCSD for HBN 524561 [SPR/6556]	7/22/2014	OP	Endrin	0.0099	0.001	0.002	mg/kg	0.013	74	3.2
594794	Matrix QC (MS)	7/24/2014	OP	Endrin	0.013	0.001	0.002	mg/kg	0.013	98	
594795	Matrix QC (MSD)	7/24/2014	OP	Endrin	0.013	0.001	0.002	mg/kg	0.013	95	3.1
P070963003	Matrix QC (ORIG)	7/24/2014	OP	Endrin	ND	0.78	3	ng/g			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Endrin aldehyde	ND	0.0009	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Endrin ketone	ND	0.0009	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	gamma-BHC (Lindane)	ND	0.0007	0.002	mg/kg			
594792	LCS for HBN 524561 [SPR/6556]	7/22/2014	OP	gamma-BHC (Lindane)	0.009	0.0007	0.002	mg/kg	0.013	67	
594793	LCSD for HBN 524561 [SPR/6556]	7/22/2014	OP	gamma-BHC (Lindane)	0.0086	0.0007	0.002	mg/kg	0.013	64	4.4
594794	Matrix QC (MS)	7/24/2014	OP	gamma-BHC (Lindane)	0.0099	0.0007	0.002	mg/kg	0.013	75	
594795	Matrix QC (MSD)	7/24/2014	OP	gamma-BHC (Lindane)	0.01	0.0007	0.002	mg/kg	0.013	76	1.6
P070963003	Matrix QC (ORIG)	7/24/2014	OP	gamma-BHC (Lindane)	ND	0.68	6	ng/g			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	gamma-Chlordane (trans)	ND	0.001	0.002	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Heptachlor	ND	0.0006	0.002	mg/kg			
594792	LCS for HBN 524561 [SPR/6556]	7/22/2014	OP	Heptachlor	0.0074	0.0006	0.002	mg/kg	0.013	55	
594793	LCSD for HBN 524561 [SPR/6556]	7/22/2014	OP	Heptachlor	0.0076	0.0006	0.002	mg/kg	0.013	57	2.7
594794	Matrix QC (MS)	7/24/2014	OP	Heptachlor	0.0072	0.0006	0.002	mg/kg	0.013	54	
594795	Matrix QC (MSD)	7/24/2014	OP	Heptachlor	0.0073	0.0006	0.002	mg/kg	0.013	55	2.2
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Heptachlor epoxide	ND	0.0011	0.002	mg/kg			
598126	MB for HBN 525999 [SPR/6584]	7/22/2014	OP	Kepone	ND	0.009	0.02	mg/kg			
598127	LCS for HBN 525999 [SPR/6584]	7/22/2014	OP	Kepone	0.04	0.009	0.02	mg/kg	0.2	22	
598128	LCSD for HBN 525999 [SPR/6584]	7/22/2014	OP	Kepone	0.05	0.009	0.02	mg/kg	0.2	23	1.8

Table F-3: CCCWP SSID Study – Sediment Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
598129	207WAL060-(598129MS)	7/22/2014	OP	Kepone	0	0.009	0.02	mg/kg	0.01	0	
598130	207WAL060-(598130MSD)	7/22/2014	OP	Kepone	0	0.009	0.02	mg/kg	0.01	0	0
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Methoxychlor	ND	0.0009	0.002	mg/kg			
594792	LCS for HBN 524561 [SPR/6556]	7/22/2014	OP	Methoxychlor	0.0078	0.0009	0.002	mg/kg	0.013	59	
594793	LCSD for HBN 524561 [SPR/6556]	7/22/2014	OP	Methoxychlor	0.0073	0.0009	0.002	mg/kg	0.013	55	6.6
594794	Matrix QC (MS)	7/24/2014	OP	Methoxychlor	0.0094	0.0009	0.002	mg/kg	0.013	70	
594795	Matrix QC (MSD)	7/24/2014	OP	Methoxychlor	0.0086	0.0009	0.002	mg/kg	0.013	64	8.8
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Mirex	ND	0.0005	0.02	mg/kg			
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	OP	Toxaphene	ND	0.02	0.04	mg/kg			
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	PYR	Allethrin	ND	0.05	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	PYR	Allethrin	2.6	0.25	1.2	µg/kg	2.5	106	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	PYR	Allethrin	3	0.25	1.2	µg/kg	2.5	119	12
594647	Matrix QC (MS)	7/24/2014	PYR	Allethrin	0.86	0.1	0.5	µg/kg	2.5	35	
594648	Matrix QC (MSD)	7/24/2014	PYR	Allethrin	0.89	0.1	0.5	µg/kg	2.5	36	3
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	PYR	Bifenthrin	ND	0.1	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	PYR	Bifenthrin	2.6	0.5	1.2	µg/kg	2.5	104	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	PYR	Bifenthrin	2.7	0.5	1.2	µg/kg	2.5	108	3.4
594647	Matrix QC (MS)	7/24/2014	PYR	Bifenthrin	3.3	0.2	0.5	µg/kg	2.86	119	
594648	Matrix QC (MSD)	7/24/2014	PYR	Bifenthrin	3.4	0.2	0.5	µg/kg	2.86	123	3.5
P070925001	Matrix QC (ORIG)	7/24/2014	PYR	Bifenthrin	0.38	0.21	0.33	ng/g			
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	PYR	Cyfluthrin	ND	0.11	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	PYR	Cyfluthrin	2.8	0.55	1.2	µg/kg	2.5	113	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	PYR	Cyfluthrin	2.8	0.55	1.2	µg/kg	2.5	113	0.4
594647	Matrix QC (MS)	7/24/2014	PYR	Cyfluthrin	2.8	0.22	0.5	µg/kg	2.5	113	
594648	Matrix QC (MSD)	7/24/2014	PYR	Cyfluthrin	6.4	0.22	0.5	µg/kg	2.5	255	77
P070925001	Matrix QC (ORIG)	7/24/2014	PYR	Cyfluthrin	ND	0.19	0.33	ng/g			

Table F-3: CCCWP SSID Study – Sediment Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	PYR	Cypermethrin	ND	0.1	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	PYR	Cypermethrin	2.7	0.5	1.2	µg/kg	2.5	108	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	PYR	Cypermethrin	2.7	0.5	1.2	µg/kg	2.5	109	1.1
594647	Matrix QC (MS)	7/24/2014	PYR	Cypermethrin	2.7	0.2	0.5	µg/kg	2.5	108	
594648	Matrix QC (MSD)	7/24/2014	PYR	Cypermethrin	2.7	0.2	0.5	µg/kg	2.5	110	1.5
P070925001	Matrix QC (ORIG)	7/24/2014	PYR	Cypermethrin	ND	0.19	0.33	ng/g			
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	PYR	Deltamethrin:Tralomethrin	ND	0.12	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	PYR	Deltamethrin:Tralomethrin	5.6	0.6	1.2	µg/kg	5	112	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	PYR	Deltamethrin:Tralomethrin	4.6	0.6	1.2	µg/kg	5	92	19
594647	Matrix QC (MS)	7/24/2014	PYR	Deltamethrin:Tralomethrin	6.4	0.24	0.5	µg/kg	5	127	
594648	Matrix QC (MSD)	7/24/2014	PYR	Deltamethrin:Tralomethrin	7.2	0.24	0.5	µg/kg	5	144	12
P070925001	Matrix QC (ORIG)	7/24/2014	PYR	Deltamethrin:Tralomethrin	ND	0.29	0.41	ng/g			
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	PYR	Esfenvalerate:Fenvalerate	ND	0.13	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	PYR	Esfenvalerate:Fenvalerate	5.7	0.65	1.2	µg/kg	5	114	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	PYR	Esfenvalerate:Fenvalerate	5.3	0.65	1.2	µg/kg	5	107	6.5
594647	Matrix QC (MS)	7/24/2014	PYR	Esfenvalerate:Fenvalerate	6	0.26	0.5	µg/kg	5	120	
594648	Matrix QC (MSD)	7/24/2014	PYR	Esfenvalerate:Fenvalerate	6.1	0.26	0.5	µg/kg	5	122	1.3
P070925001	Matrix QC (ORIG)	7/24/2014	PYR	Esfenvalerate:Fenvalerate	ND	0.17	0.33	ng/g			
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	PYR	Fenpropathrin	ND	0.07	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	PYR	Fenpropathrin	2.6	0.35	1.2	µg/kg	2.5	103	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	PYR	Fenpropathrin	2.8	0.35	1.2	µg/kg	2.5	110	6.4
594647	Matrix QC (MS)	7/24/2014	PYR	Fenpropathrin	2.6	0.14	0.5	µg/kg	2.5	104	
594648	Matrix QC (MSD)	7/24/2014	PYR	Fenpropathrin	2.6	0.14	0.5	µg/kg	2.5	105	1.2
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	PYR	Lambda-Cyhalothrin	ND	0.06	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	PYR	Lambda-Cyhalothrin	2.4	0.3	1.2	µg/kg	2.5	96	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	PYR	Lambda-Cyhalothrin	2.7	0.3	1.2	µg/kg	2.5	107	11

Table F-3: CCCWP SSID Study – Sediment Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
594647	Matrix QC (MS)	7/24/2014	PYR	Lambda-Cyhalothrin	1.4	0.12	0.5	µg/kg	2.5	55	
594648	Matrix QC (MSD)	7/24/2014	PYR	Lambda-Cyhalothrin	1.4	0.12	0.5	µg/kg	2.5	55	0.7
P070925001	Matrix QC (ORIG)	7/24/2014	PYR	Lambda-Cyhalothrin	ND	0.23	0.33	ng/g			
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	PYR	Permethrin	ND	0.11	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	PYR	Permethrin	72	0.55	1.2	µg/kg	50	144	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	PYR	Permethrin	68	0.55	1.2	µg/kg	50	137	4.7
594647	Matrix QC (MS)	7/24/2014	PYR	Permethrin	82	0.22	0.5	µg/kg	50.42	162	
594648	Matrix QC (MSD)	7/24/2014	PYR	Permethrin	81	0.22	0.5	µg/kg	50.42	160	1.2
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	PYR	Tau-Fluvalinate	ND	0.04	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	PYR	Tau-Fluvalinate	1.9	0.2	1.2	µg/kg	2.5	78	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	PYR	Tau-Fluvalinate	1.8	0.2	1.2	µg/kg	2.5	72	8
594647	Matrix QC (MS)	7/24/2014	PYR	Tau-Fluvalinate	1.2	0.08	0.5	µg/kg	2.5	49	
594648	Matrix QC (MSD)	7/24/2014	PYR	Tau-Fluvalinate	1.2	0.08	0.5	µg/kg	2.5	46	5.9
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	PYR	Tetramethrin	ND	0.06	0.25	µg/kg			
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	PYR	Tetramethrin	2.3	0.3	1.2	µg/kg	2.5	91	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	PYR	Tetramethrin	2.5	0.3	1.2	µg/kg	2.5	100	9.6
594647	Matrix QC (MS)	7/24/2014	PYR	Tetramethrin	1.6	0.12	0.5	µg/kg	2.5	62	
594648	Matrix QC (MSD)	7/24/2014	PYR	Tetramethrin	2	0.12	0.5	µg/kg	2.5	80	25
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	SUR	Decachlorobiphenyl	67		'45-188	%	0	67	
594792	LCS for HBN 524561 [SPR/6556]	7/22/2014	SUR	Decachlorobiphenyl	86		'45-188	%	0	86	
594793	LCSD for HBN 524561 [SPR/6556]	7/22/2014	SUR	Decachlorobiphenyl	76		'45-188	%	0	76	12
598126	MB for HBN 525999 [SPR/6584]	7/22/2014	SUR	Decachlorobiphenyl	110		'45-188	%	0	110	
598127	LCS for HBN 525999 [SPR/6584]	7/22/2014	SUR	Decachlorobiphenyl	118		'45-188	%	0	118	
598128	LCSD for HBN 525999 [SPR/6584]	7/22/2014	SUR	Decachlorobiphenyl	119		'45-188	%	0	119	0.6
598129	207WAL060(598129MS)	7/22/2014	SUR	Decachlorobiphenyl	5.3		'10-200	%	0	5.3	
598130	207WAL060(598130MSD)	7/22/2014	SUR	Decachlorobiphenyl	4.5		'10-200	%	0	4.5	15

Table F-3: CCCWP SSID Study – Sediment Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
594794	Matrix QC (MS)	7/24/2014	SUR	Decachlorobiphenyl	95		'10-200	%	0	95	
594795	Matrix QC (MSD)	7/24/2014	SUR	Decachlorobiphenyl	86		'10-200	%	0	86	10
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	SUR	Esfenvalerate-d6;#1	81		'70-130	%	1.3	81	
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	SUR	Esfenvalerate-d6;#1	112		'70-130	%	1.3	112	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	SUR	Esfenvalerate-d6;#1	107		'70-130	%	1.3	107	4.4
594647	Matrix QC (MS)	7/24/2014	SUR	Esfenvalerate-d6;#1	113		'70-130	%	1.3	113	
594648	Matrix QC (MSD)	7/24/2014	SUR	Esfenvalerate-d6;#1	113		'70-130	%	1.3	113	0.7
594644	MB for HBN 524523 [SPR/6555]	7/22/2014	SUR	Esfenvalerate-d6;#2	78		'70-130	%	1.3	78	
594645	LCS for HBN 524523 [SPR/6555]	7/22/2014	SUR	Esfenvalerate-d6;#2	120		'70-130	%	1.3	120	
594646	LCSD for HBN 524523 [SPR/6555]	7/22/2014	SUR	Esfenvalerate-d6;#2	105		'70-130	%	1.3	105	13
594647	Matrix QC (MS)	7/24/2014	SUR	Esfenvalerate-d6;#2	125		'70-130	%	1.3	125	
594648	Matrix QC (MSD)	7/24/2014	SUR	Esfenvalerate-d6;#2	125		'70-130	%	1.3	125	0
594791	MB for HBN 524561 [SPR/6556]	7/22/2014	SUR	Tetrachloro-m-xylene	39		'64-114	%	0	39	
594792	LCS for HBN 524561 [SPR/6556]	7/22/2014	SUR	Tetrachloro-m-xylene	50		'64-114	%	0	50	
594793	LCSD for HBN 524561 [SPR/6556]	7/22/2014	SUR	Tetrachloro-m-xylene	51		'64-114	%	0	51	0.7
598126	MB for HBN 525999 [SPR/6584]	7/22/2014	SUR	Tetrachloro-m-xylene	83		'64-114	%	0	83	
598127	LCS for HBN 525999 [SPR/6584]	7/22/2014	SUR	Tetrachloro-m-xylene	88		'64-114	%	0	88	
598128	LCSD for HBN 525999 [SPR/6584]	7/22/2014	SUR	Tetrachloro-m-xylene	95		'64-114	%	0	95	8.2
598129	207WAL060(598129MS)	7/22/2014	SUR	Tetrachloro-m-xylene	750		'10-200	%	0	750	
598130	207WAL060(598130MSD)	7/22/2014	SUR	Tetrachloro-m-xylene	750		'10-200	%	0	750	0
594794	Matrix QC (MS)	7/24/2014	SUR	Tetrachloro-m-xylene	59		'10-200	%	0	59	
594795	Matrix QC (MSD)	7/24/2014	SUR	Tetrachloro-m-xylene	56		'10-200	%	0	56	4.8
594819	MB for HBN 524575 [WGR/5525]	7/22/2014	PS	Solids, Percent	ND	0.1	0.1	%			
594820	Matrix QC (DUP)	7/30/2014	PS	Solids, Percent	8.8	0.1	0.1	%			0
P070024013	Matrix QC (ORIG)	7/30/2014	PS	Solids, Percent	8.8	0.1	0.1	%			
600437	MB for HBN 527207 [SUB/1666]	7/22/2014	TOC	Total Organic Carbon	ND	0.01	0.1	%			

Table F-3: CCCWP SSID Study – Sediment Chemistry QA/QC Samples

Lab Number	Sample Description ¹	Date Received	Analyte Group ²	Analyte Name	Result	MDL	Reporting Limit	Units	Expected Result	Percent Recovery	Relative Percent Difference
600438	LCS for HBN 527207 [SUB/1666]	7/22/2014	TOC	Total Organic Carbon	9.3	0.01	0.1	%	10	93	

¹ MB = Method Blank, LCS = Laboratory Control Sample, LCSD = Laboratory Control Duplicate Sample, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Laboratory Duplicate, ORIG = Original Field Sample Result

² FIP = Fipronils, OP = Organochlorine Pesticides, PYR = Pyrethroid Pesticides, SUR = Surrogates, PS = Particle Size, TOC = Total Organic Carbon

Appendix G. Laboratory Analytical Results Tables for SSID Samples

Table G-1: Aquatic Chemistry and Toxicity Results								
	Dry Creek Upstream 544MSH065		Dry Creek Downstream 544MSH062		Tributary of Grayson Creek (Upstream) 207WAL078		E. Branch of Grayson Creek (Downstream) 207WAL060	
	Sample Collection Date							
	02/06/14	02/28/14	02/06/14	02/28/14	02/28/14	03/26/14	02/28/14	03/26/14
<i>Fipronil and Degradates (ng/L)</i>								
Fipronil	6.2	4.5	ND	4.3	19	15	23	12
Fipronil Desulfinyl	2.2	2.2	ND	1.9	2.9	6.5	2.2	3.5
Fipronil Sulfide	0.5 ^J	ND	ND	ND	1.3 ^J	1.4 ^J	1.6	2.6
Fipronil Sulfone	3.8	5.5	0.8 ^J	5.2	14	11	9.5	6.8
<i>Organochlorine Pesticides (µg/L)</i>								
4,4'-DDD	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDT	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	ND	ND	ND	ND	ND	ND	ND	ND
beta-BHC	ND	ND	ND	ND	ND	ND	ND	ND
Chlordane	ND	ND	ND	ND	ND	ND	ND	ND
delta-BHC	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ND	ND	ND	ND	ND	ND	ND	ND
Endrin ketone	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ND	ND	ND	ND	ND	ND	ND	ND
<i>Pyrethroid Pesticides (ng/L)</i>								
Bifenthrin	5.3	8.5	5.9	8.6	7.3	11	6.5	4.2
Cyfluthrin	0.7 ^J	1.5 ^J	0.7 ^J	1.7	ND	1.1 ^J	6.4	0.9 ^J
Cypermethrin	ND	ND	ND	ND	ND	ND	ND	0.7 ^J
Deltamethrin:Tralomethrin	ND	ND	ND	ND	4.7	ND	ND	ND
Lambda-Cyhalothrin	0.386 ^{B,J}	ND	0.394 ^{B,J}	ND	ND	1.1 ^J	ND	ND
Permethrin	ND	ND	ND	ND	ND	ND	ND	12 ^J
<i>Total Organic Carbon (mg/L)</i>								
Sediment Concentration	7.5	13	9.4	37	37	13	173	14
Total Organic Carbon	16	14	15	15	11	11	10	13
<i>Hyallole Toxicity</i>								
Average Percent Survival ¹	12	6	18 ²	18	48	0 ³	48	0 ³

ND Not Detected - indicates analytical result has not been detected at or above the MDL.

J Reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detecting Limit (MDL). The J flag is equivalent to the DNQ Estimated Concentration flag.

B Indicates the analyte has been detected in the blank associated with the sample.

¹ All results significantly lower than control sample averages. Samples deemed toxic are shaded.

² TIE indicated that toxicity was persistent; results are consistent with Type I and Type II pyrethroids

³ Complete mortality after 48 hours

Table G-2: Sediment Chemistry and Toxicity Results				
	Dry Creek Upstream 544MSH065	Dry Creek Downstream 544MSH062	Tributary of Grayson Creek (Upstream) 207WAL078	E. Branch of Grayson Creek (Downstream) 207WAL060
All samples taken on 7/22/2014				
<i>Fipronil and Degradates (µg/kg)</i>				
Fipronil	ND	ND	ND	ND
Fipronil Desulfinyl	0.56	0.27 ^J	ND	ND
Fipronil Sulfide	ND	ND	ND	ND
Fipronil Sulfone	3	ND	ND	0.14 ^J
<i>Organochlorine Pesticides (mg/kg)</i>				
2,4'-DDD	0.012	0.034	ND	ND
2,4'-DDE	0.0058	0.019	ND	ND
2,4'-DDT	ND	ND	ND	ND
4,4'-DDD	0.0036	0.023	ND	ND
4,4'-DDE	0.028	0.076	ND	ND
4,4'-DDT	ND	ND	ND	ND
Aldrin	ND	ND	ND	ND
alpha-BHC	ND	ND	ND	ND
alpha-Chlordane (cis)	ND	ND	ND	ND
beta-BHC	ND	ND	ND	ND
Chlordane	ND	ND	ND	ND
delta-BHC	ND	ND	ND	ND
Dieldrin	ND	ND	ND	ND
Endosulfan I	ND	ND	ND	ND
Endosulfan II	ND	ND	ND	ND
Endosulfan sulfate	ND	ND	ND	ND
Endrin	ND	ND	ND	ND
Endrin aldehyde	ND	ND	ND	ND
Endrin ketone	ND	ND	ND	ND
gamma-BHC (Lindane)	ND	ND	ND	ND
gamma-Chlordane (trans)	ND	ND	ND	ND
Heptachlor	ND	ND	ND	ND
Heptachlor epoxide	ND	ND	ND	ND
Kepone	ND ^H	ND ^H	ND ^H	ND ^H
Methoxychlor	ND	ND	ND	ND
Mirex	ND	ND	ND	ND
Toxaphene	ND	ND	ND	ND
<i>Pyrethroid Pesticides (µg/kg)</i>				
Allethrin	ND	ND	ND	ND
Bifenthrin	99	40	5.6	3.6
Cyfluthrin	6.2	3.4	0.8	0.41
Cypermethrin	0.30 ^J	0.35	0.28 ^J	0.21 ^J
Deltamethrin:Tralomethrin	ND	ND	ND	ND
Esfenvalerate:Fenvalerate	ND	ND	ND	ND

Table G-2: Sediment Chemistry and Toxicity Results				
	Dry Creek Upstream 544MSH065	Dry Creek Downstream 544MSH062	Tributary of Grayson Creek (Upstream) 207WAL078	E. Branch of Grayson Creek (Downstream) 207WAL060
All samples taken on 7/22/2014				
Fenpropathrin	ND	ND	ND	ND
Lambda-Cyhalothrin	0.37	0.24 ^J	ND	ND
Permethrin	6	9.4	1.9	2.3
Tau-Fluvalinate	ND	ND	ND	ND
Tetramethrin	ND	ND	ND	ND
Total Organic Carbon (%)				
Solids	92	95	87	97
Total Organic Carbon	4.6	1.9	3.6	1
Hyallole Toxicity				
Average Percent Survival	3.75 ^{1,3}	48.8 ¹	97.1 ²	90 ²
Average Weight (mg/individual)	0.00625 ¹	0.0352 ¹	0.0699 ²	0.0875

ND Not Detected - indicates analytical result has not been detected at or above the MDL.
 J Reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detecting Limit (MDL) .
 The J flag is equivalent to the DNQ Estimated Concentration flag.
 H Analyzed out of holding time.
¹Result was significantly lower than control sample average. Samples deemed toxic are shaded.
²Result was significantly higher than control sample average.
³TIE indicated baseline toxicity was persistent; addition of PBO increased toxicity; addition of carboxylesterase removed most of toxicity.
 Weight of evidence suggest that toxicity was likely due to pyrethroid pesticides.

Appendix H. Laboratory Reports – SSID Samples



Wednesday, March 05, 2014

Alessandro Hnatt
ADH Environmental
3065 Porter Street, Suite 101
Soquel, CA 95073

RE: Lab Order: P020481
Project ID: CCCWP-SSID 030.001.0202

Collected By: Alessandro Hnatt
PO/Contract #:

Dear Alessandro Hnatt:

Enclosed are the analytical results for sample(s) received by the laboratory on Friday, February 07, 2014. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Enclosures

Project Manager: Todd Albertson



SAMPLE SUMMARY

Lab Order: P020481

Project ID: CCCWP-SSID 030.001.0202

Lab ID	Sample ID	Matrix	Date Collected	Date Received
P020481001	544R00025DS-	Water	2/6/2014 13:20	2/7/2014 18:14
P020481002	544R00025US-	Water	2/6/2014 12:50	2/7/2014 18:14
P020481003	544R00025DS-	Water	2/6/2014 13:20	2/7/2014 18:14
P020481004	544R00025US	Water	2/6/2014 12:50	2/7/2014 18:14



NARRATIVE

Lab Order: P020481

Project ID: CCCWP-SSID 030.001.0202

General Qualifiers and Notes

Caltest authorizes this report to be reproduced only in its entirety. Results are specific to the sample(s) as submitted and only to the parameter(s) reported.

Caltest certifies that all test results for wastewater and hazardous waste analyses meet all applicable NELAC requirements; all microbiology and drinking water testing meet applicable ELAP requirements, unless stated otherwise.

All analyses performed by EPA Methods or Standard Methods (SM) 20th Edition except where noted (SMOL=online edition).

Caltest collects samples in compliance with 40 CFR, EPA Methods, Cal. Title 22, and Standard Methods.

Dilution Factors (DF) reported greater than '1' have been used to adjust the result, Reporting Limit (RL), and Method Detection Limit (MDL).

All Solid, sludge, and/or biosolids data is reported in Wet Weight, unless otherwise specified.

Filtrations performed at Caltest for dissolved metals (excluding mercury) and/or pH analysis were not performed within the 15 minute holding time as specified by 40CFR 136.3 table II.

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

ND - Non Detect - indicates analytical result has not been detected.

RL - Reporting Limit is the quantitation limit at which the laboratory is able to detect an analyte. An analyte not detected at or above the RL is reported as ND unless otherwise noted or qualified. For analyses pertaining to the State Implementation Plan of the California Toxics Rule, the Caltest Reporting Limit (RL) is equivalent to the Minimum Level (ML). A standard is always run at or below the ML. Where Reporting Limits are elevated due to dilution, the ML calibration criteria has been met.

J - reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detection Limit (MDL). The 'J' flag is equivalent to the DNQ Estimated Concentration flag.

E - indicates an estimated analytical result value.

B - indicates the analyte has been detected in the blank associated with the sample.

NC - means not able to be calculated for RPD or Spike Recoveries.

SS - compound is a Surrogate Spike used per laboratory quality assurance manual.

NOTE: This document represents a complete Analytical Report for the samples referenced herein and should be retained as a permanent record thereof.

Qualifiers and Compound Notes

- 1 Analyte(s) reported as 'ND' means not detected at or above the listed Method Detection Limits (MDL).
- 2 This sample was run at a 2X dilution with similar results and surrogates failing low therefore the 1X run was reported.
- 3 This analysis is not covered under Caltest's NELAP/CAL-ELAP Accreditations.
- 4 Due to matrix interferences present in the sample, surrogate recoveries failed to meet the QA/QC acceptance criteria.



NARRATIVE

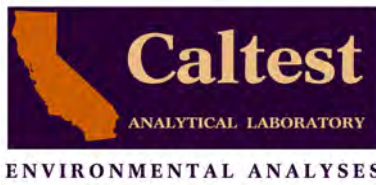
Lab Order: P020481

Project ID: CCCWP-SSID 030.001.0202

Qualifiers and Compound Notes

5 Ran 2x dilution with similar results.





ANALYTICAL RESULTS

Lab Order: P020481

Project ID CCCWP-SSID 030.001.0202

Lab ID: P020481001 Date Collected: 2/6/2014 13:20 Matrix: Water
Sample ID: 544R00025DS- Date Received: 2/7/2014 18:14

Parameters	Result	Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Total Organic Carbon Analysis		Analytical Method:		SM20-5310 B			Analyzed by: ATA			
Total Organic Carbon	15	mg/L	1	0.30	1			02/19/14 23:53	WET 7444	

Lab ID: P020481002 Date Collected: 2/6/2014 12:50 Matrix: Water
Sample ID: 544R00025US- Date Received: 2/7/2014 18:14

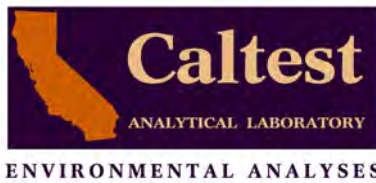
Parameters	Result	Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Total Organic Carbon Analysis		Analytical Method:		SM20-5310 B			Analyzed by: ATA			
Total Organic Carbon	16	mg/L	1	0.30	1			02/20/14 00:10	WET 7444	

Lab ID: P020481003 Date Collected: 2/6/2014 13:20 Matrix: Water
Sample ID: 544R00025DS- Date Received: 2/7/2014 18:14

Parameters	Result	Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Suspended Sediment Concentration		Analytical Method:		ASTM D 3977-97 B-Filtration			Analyzed by: UK			
Sediment Concentration	9.4	mg/L	3	2	1			02/12/14 14:54	BIO 13477	3

Chlorinated Pesticides & PCBs Analysis		Prep Method:		EPA 608		Prep by: EAB					
		Analytical Method:		EPA 608			Analyzed by: NTA				
Aldrin	ND	ug/L	0.005	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	1	
alpha-BHC	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
beta-BHC	ND	ug/L	0.005	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
delta-BHC	ND	ug/L	0.005	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
gamma-BHC (Lindane)	ND	ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
Chlordane	ND	ug/L	0.050	0.020	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
4,4'-DDD	ND	ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
4,4'-DDE	ND	ug/L	0.010	0.0030	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
4,4'-DDT	ND	ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
Dieldrin	ND	ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
Endosulfan I	ND	ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
Endosulfan II	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
Endosulfan sulfate	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
Endrin	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
Endrin aldehyde	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
Endrin ketone	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		
Heptachlor	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366		





ANALYTICAL RESULTS

Lab Order: P020481

Project ID CCCWP-SSID 030.001.0202

Lab ID: P020481003 Date Collected: 2/6/2014 13:20 Matrix: Water
Sample ID: 544R00025DS- Date Received: 2/7/2014 18:14

Parameters	Result Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Heptachlor epoxide	ND ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	
Methoxychlor	ND ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	
PCB 1016	ND ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	
PCB 1221	ND ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	
PCB 1232	ND ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	
PCB 1242	ND ug/L	0.10	0.040	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	
PCB 1248	ND ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	
PCB 1254	ND ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	
PCB 1260	ND ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	
Toxaphene	ND ug/L	0.5	0.30	1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	
Decachlorobiphenyl (SS)	63 %	10-195		1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	
Tetrachloro-m-xylene (SS)	55 %	25-105		1	02/12/14 00:00	SPR 6309	02/22/14 19:34	SMS 3366	

Fipronil Analysis, Water

Prep Method: SW846 3510C **Prep by:** ECB
Analytical Method: SW846 8270 Mod (GCMS-NCI-SIM) **Analyzed by:** RLH

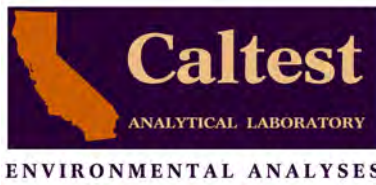
Fipronil	ND ng/L	1.5	0.5	1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	1,2
Fipronil Desulfinyl	ND ng/L	1.5	0.5	1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	
Fipronil Sulfide	ND ng/L	1.5	0.5	1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	
Fipronil Sulfone	J0.8 ng/L	1.5	0.5	1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	
Esfenvalerate-d6;#1 (SS)	53 %	70-130		1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	4
Esfenvalerate-d6;#2 (SS)	53 %	70-130		1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	4

Pyrethroids Analysis, NCI, Water

Prep Method: SW846 3510C **Prep by:** MDT
Analytical Method: SW846 8270 Mod (GCMS-NCI-SIM) **Analyzed by:** MDT

Allethrin	ND ng/L	1.5	0.1	1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	1
Bifenthrin	5.9 ng/L	1.5	0.1	1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	
Cyfluthrin	J0.7 ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	
Lambda-Cyhalothrin	BJ.394 ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	
Cypermethrin	ND ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	
Deltamethrin:Tralomethrin	ND ng/L	3.0	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	
Esfenvalerate:Fenvalerate	ND ng/L	3.0	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	
Fenpropathrin	ND ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	
Tau-Fluvalinate	ND ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	
Permethrin	ND ng/L	15	2	1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	
Tetramethrin	ND ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	
Esfenvalerate-d6;#1 (SS)	49 %	70-130		1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	4,5
Esfenvalerate-d6;#2 (SS)	50 %	70-130		1	02/09/14 12:32	SPR 6300	02/12/14 10:15	SMS 3357	4,5





ANALYTICAL RESULTS

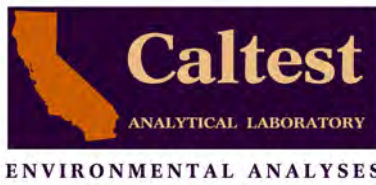
Lab Order: P020481

Project ID CCCWP-SSID 030.001.0202

Lab ID: P020481004 Date Collected: 2/6/2014 12:50 Matrix: Water
Sample ID: 544R00025US Date Received: 2/7/2014 18:14

Parameters	Result	Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Suspended Sediment Concentration		Analytical Method:		ASTM D 3977-97 B-Filtration			Analyzed by: UK			
Sediment Concentration	7.5	mg/L	3	2	1			02/12/14 14:54	BIO 13477	3
Chlorinated Pesticides & PCBs Analysis		Prep Method:		EPA 608			Prep by: EAB			
		Analytical Method:		EPA 608			Analyzed by: NTA			
Aldrin	ND	ug/L	0.005	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	1
alpha-BHC	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
beta-BHC	ND	ug/L	0.005	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
delta-BHC	ND	ug/L	0.005	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
gamma-BHC (Lindane)	ND	ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Chlordane	ND	ug/L	0.050	0.020	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
4,4'-DDD	ND	ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
4,4'-DDE	ND	ug/L	0.010	0.0030	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
4,4'-DDT	ND	ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Dieldrin	ND	ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Endosulfan I	ND	ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Endosulfan II	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Endosulfan sulfate	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Endrin	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Endrin aldehyde	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Endrin ketone	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Heptachlor	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Heptachlor epoxide	ND	ug/L	0.010	0.0040	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Methoxychlor	ND	ug/L	0.010	0.0050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
PCB 1016	ND	ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
PCB 1221	ND	ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
PCB 1232	ND	ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
PCB 1242	ND	ug/L	0.10	0.040	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
PCB 1248	ND	ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
PCB 1254	ND	ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
PCB 1260	ND	ug/L	0.10	0.050	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Toxaphene	ND	ug/L	0.5	0.30	1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Decachlorobiphenyl (SS)	63	%	10-195		1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Tetrachloro-m-xylene (SS)	64	%	25-105		1	02/12/14 00:00	SPR 6309	02/22/14 20:02	SMS 3366	
Fipronil Analysis, Water		Prep Method:		SW846 3510C			Prep by: ECB			
		Analytical Method:		SW846 8270 Mod (GCMS-NCI-SIM)			Analyzed by: RLH			
Fipronil	6.2	ng/L	1.5	0.5	1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	1,2
Fipronil Desulfinyl	2.2	ng/L	1.5	0.5	1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	





ANALYTICAL RESULTS

Lab Order: P020481

Project ID CCCWP-SSID 030.001.0202

Lab ID: P020481004 Date Collected: 2/6/2014 12:50 Matrix: Water
Sample ID: 544R00025US Date Received: 2/7/2014 18:14

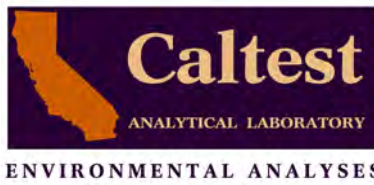
Parameters	Result Units	R. L.	MDL	DF	Prepared	Batch	Analyzed	Batch	Qual
Fipronil Sulfide	J0.5 ng/L	1.5	0.5	1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	
Fipronil Sulfone	3.8 ng/L	1.5	0.5	1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	
Esfenvalerate-d6;#1 (SS)	49 %	70-130		1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	4
Esfenvalerate-d6;#2 (SS)	50 %	70-130		1	02/12/14 18:03	SPR 6308	02/27/14 00:00	SMS 3373	4

Pyrethroids Analysis, NCI, Water

Prep Method: SW846 3510C **Prep by:** MDT
Analytical Method: SW846 8270 Mod (GCMS-NCI-SIM) **Analyzed by:** MDT

Allethrin	ND ng/L	1.5	0.1	1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	1
Bifenthrin	5.3 ng/L	1.5	0.1	1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	
Cyfluthrin	J0.7 ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	
Lambda-Cyhalothrin	BJ.386 ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	
Cypermethrin	ND ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	
Deltamethrin:Tralomethrin	ND ng/L	3.0	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	
Esfenvalerate:Fenvalerate	ND ng/L	3.0	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	
Fenpropathrin	ND ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	
Tau-Fluvalinate	ND ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	
Permethrin	ND ng/L	15	2	1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	
Tetramethrin	ND ng/L	1.5	0.2	1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	
Esfenvalerate-d6;#1 (SS)	47 %	70-130		1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	4,5
Esfenvalerate-d6;#2 (SS)	47 %	70-130		1	02/09/14 12:32	SPR 6300	02/12/14 10:49	SMS 3357	4,5





QUALITY CONTROL DATA

Lab Order: P020481

Project ID: CCCWP-SSID 030.001.0202

Analysis Description:	Suspended Sediment Concentration	QC Batch:	BIO/13477
Analysis Method:	ASTM D 3977-97 B-Filtration	QC Batch Method:	ASTM D 3977-97 B-Filtration

METHOD BLANK: 564892

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Sediment Concentration	ND	3	2	mg/L	

LABORATORY CONTROL SAMPLE & LCSD: 564893 564894

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Sediment Concentration	mg/L	500	467	489	93	98	80-120	4.6	20	

Analysis Description:	Pyrethroids Analysis, NCI, Water	QC Batch:	SPR/6300
Analysis Method:	SW846 8270 Mod (GCMS-NCI-SIM)	QC Batch Method:	SW846 3510C

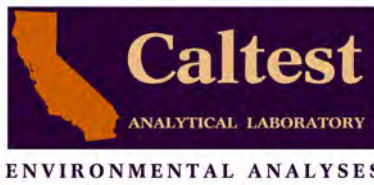
METHOD BLANK: 564069

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Allethrin	ND	1.5	0.1	ng/L	1
Bifenthrin	ND	1.5	0.1	ng/L	
Cyfluthrin	ND	1.5	0.2	ng/L	
Lambda-Cyhalothrin	J0.3	1.5	0.2	ng/L	6
Cypermethrin	ND	1.5	0.2	ng/L	
Deltamethrin:Tralomethrin	ND	3.0	0.2	ng/L	
Esfenvalerate:Fenvalerate	ND	3.0	0.2	ng/L	
Fenpropathrin	ND	1.5	0.2	ng/L	
Tau-Fluvalinate	ND	1.5	0.2	ng/L	
Permethrin	ND	15	2.0	ng/L	
Tetramethrin	ND	1.5	0.2	ng/L	
Esfenvalerate-d6;#1 (SS)	94	70-130		%	
Esfenvalerate-d6;#2 (SS)	89	70-130		%	

LABORATORY CONTROL SAMPLE & LCSD: 564070 564071

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Allethrin	ng/L	20	13	14	66	69	50-150	4.5	35	
Bifenthrin	ng/L	20	18	18	89	90	70-165	0.6	35	
Cyfluthrin	ng/L	20	16	17	82	86	55-140	4.8	30	





QUALITY CONTROL DATA

Lab Order: P020481

Project ID: CCCWP-SSID 030.001.0202

Analysis Description: Pyrethroids Analysis, NCI, Water	QC Batch: SPR/6300
Analysis Method: SW846 8270 Mod (GCMS-NCI-SIM)	QC Batch Method: SW846 3510C

LABORATORY CONTROL SAMPLE & LCSD: 564070 564071

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Lambda-Cyhalothrin	ng/L	20	14	15	70	77	40-120	8.9	35	
Cypermethrin	ng/L	20	17	18	87	90	50-130	4	30	
Deltamethrin:Tralomethrin	ng/L	40	28	28	69	71	30-105	2.5	40	
Esfenvalerate:Fenvalerate	ng/L	40	31	32	77	80	40-140	4.1	35	
Fenpropathrin	ng/L	20	20	20	98	101	30-180	3	35	
Tau-Fluvalinate	ng/L	20	14	15	71	75	30-100	5.5	40	
Permethrin	ng/L	100	85	92	85	92	50-160	8	40	
Tetramethrin	ng/L	20	14	12	69	61	45-140	12	50	
Esfenvalerate-d6;#1 (SS)	%				93	98	70-130	71		
Esfenvalerate-d6;#2 (SS)	%				88	94	70-130	72		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 564487 564488

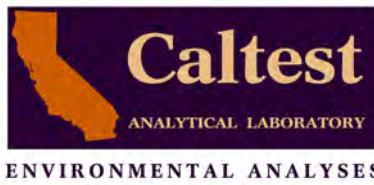
Parameter	Units	P020494001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Allethrin	ng/L	0	21	14	15	65	73	50-150	11	35	
Bifenthrin	ng/L	3.1	21	17	18	66	70	70-165	5.2	35	7
Cyfluthrin	ng/L	0.3	21	14	14	65	69	55-140	6.4	30	
Lambda-Cyhalothrin	ng/L	0.5	21	12	12	58	54	40-120	5.8	35	
Cypermethrin	ng/L	0.6	21	14	15	64	69	50-130	7.7	30	
Deltamethrin:Tralomethrin	ng/L	0	41	20	22	50	53	30-105	5.7	40	
Esfenvalerate:Fenvalerate	ng/L	0	41	24	26	59	63	40-140	6.8	35	
Fenpropathrin	ng/L	0	21	14	15	70	75	30-180	6	35	
Tau-Fluvalinate	ng/L	0	21	12	12	56	58	30-100	3.4	40	
Permethrin	ng/L	0	100	69	73	67	70	50-160	5.2	40	
Tetramethrin	ng/L	0	21	15	15	71	72	45-140	2	50	
Esfenvalerate-d6;#1 (SS)	%					65	67	70-130	3.1	4	
Esfenvalerate-d6;#2 (SS)	%					64	68	70-130	6	4	

Analysis Description: Chlorinated Pesticides & PCBs Analysis	QC Batch: SPR/6309
Analysis Method: EPA 608	QC Batch Method: EPA 608

METHOD BLANK: 565093

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Aldrin	ND	0.005	0.004	ug/L	
alpha-BHC	ND	0.010	0.005	ug/L	





QUALITY CONTROL DATA

Lab Order: P020481

Project ID: CCCWP-SSID 030.001.0202

Analysis Description:	Chlorinated Pesticides & PCBs Analysis	QC Batch:	SPR/6309
Analysis Method:	EPA 608	QC Batch Method:	EPA 608

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
beta-BHC	ND	0.005	0.004	ug/L	
delta-BHC	ND	0.005	0.004	ug/L	
gamma-BHC (Lindane)	ND	0.010	0.004	ug/L	
Chlordane	ND	0.050	0.020	ug/L	
4,4'-DDD	ND	0.010	0.004	ug/L	
4,4'-DDE	ND	0.010	0.003	ug/L	
4,4'-DDT	ND	0.010	0.004	ug/L	
Dieldrin	ND	0.010	0.004	ug/L	
Endosulfan I	ND	0.010	0.004	ug/L	
Endosulfan II	ND	0.010	0.005	ug/L	
Endosulfan sulfate	ND	0.010	0.005	ug/L	
Endrin	ND	0.010	0.005	ug/L	
Endrin aldehyde	ND	0.010	0.005	ug/L	
Endrin ketone	ND	0.010	0.005	ug/L	
Heptachlor	ND	0.010	0.005	ug/L	
Heptachlor epoxide	ND	0.010	0.004	ug/L	
Methoxychlor	ND	0.010	0.005	ug/L	
PCB 1016	ND	0.10	0.050	ug/L	
PCB 1221	ND	0.10	0.050	ug/L	
PCB 1232	ND	0.10	0.050	ug/L	
PCB 1242	ND	0.10	0.040	ug/L	
PCB 1248	ND	0.10	0.050	ug/L	
PCB 1254	ND	0.10	0.050	ug/L	
PCB 1260	ND	0.10	0.050	ug/L	
Toxaphene	ND	0.5	0.3	ug/L	
Decachlorobiphenyl (SS)	93	30-190		%	
Tetrachloro-m-xylene (SS)	75	25-105		%	

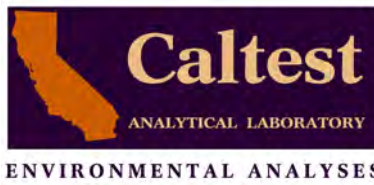
LABORATORY CONTROL SAMPLE & LCSD: 565094 565095

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Aldrin	ug/L	0.2	0.19	.18	95	89	42-122	6	24	
alpha-BHC	ug/L	0.2	0.19	.18	97	93	37-134	4.2	30	
beta-BHC	ug/L	0.2	0.18	.15	91	76	17-147	18	30	
delta-BHC	ug/L	0.2	0.18	.17	92	85	19-140	7.9	30	
gamma-BHC (Lindane)	ug/L	0.2	0.18	.15	89	75	32-127	17	20	
4,4'-DDD	ug/L	0.2	0.21	.2	107	100	31-141	6.8	30	
4,4'-DDE	ug/L	0.2	0.19	.18	96	91	30-145	5.3	30	
4,4'-DDT	ug/L	0.2	0.22	.2	108	100	25-160	7.7	19	
Dieldrin	ug/L	0.2	0.22	.2	109	102	36-146	6.6	17	

REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full, without the written consent of CALTEST ANALYTICAL LABORATORY.





QUALITY CONTROL DATA

Lab Order: P020481

Project ID: CCCWP-SSID 030.001.0202

Analysis Description: Chlorinated Pesticides & PCBs Analysis	QC Batch: SPR/6309
Analysis Method: EPA 608	QC Batch Method: EPA 608

LABORATORY CONTROL SAMPLE & LCSD: 565094 565095

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Endosulfan I	ug/L	0.2	0.2	.18	98	92	45-153	6.1	30	
Endosulfan II	ug/L	0.2	0.19	.18	95	90	1-202	5.4	30	
Endosulfan sulfate	ug/L	0.2	0.22	.2	108	101	26-144	6.2	30	
Endrin	ug/L	0.2	0.18	.17	92	85	30-147	7.9	18	
Endrin aldehyde	ug/L	0.2	0.21	.2	105	101	34-105	4.4	30	
Endrin ketone	ug/L	0.2	0.21	.2	105	98	41-127	6.9	30	
Heptachlor	ug/L	0.2	0.2	.18	100	91	34-111	8.9	23	
Heptachlor epoxide	ug/L	0.2	0.2	.19	102	97	37-142	5.5	30	
Methoxychlor	ug/L	0.2	0.22	.2	112	102	1-186	8.9	30	
Decachlorobiphenyl (SS)	%				100	95	30-190	5.7		
Tetrachloro-m-xylene (SS)	%				79	75	25-105	5.9		

Analysis Description: Fipronil Analysis, Water	QC Batch: SPR/6308
Analysis Method: SW846 8270 Mod (GCMS-NCI-SIM)	QC Batch Method: SW846 3510C

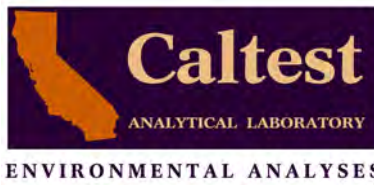
METHOD BLANK: 564956

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Fipronil	ND	1.5	0.5	ng/L	1
Fipronil Desulfinyl	ND	1.5	0.5	ng/L	
Fipronil Sulfide	ND	1.5	0.5	ng/L	
Fipronil Sulfone	ND	1.5	0.5	ng/L	
Esfenvalerate-d6;#1 (SS)	80	70-130		%	
Esfenvalerate-d6;#2 (SS)	81	70-130		%	

LABORATORY CONTROL SAMPLE & LCSD: 564957 564958

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Fipronil	ng/L	20	14	14	68	71	50-150	4.3	35	
Fipronil Desulfinyl	ng/L	20	15	16	75	79	50-150	5.2	35	
Fipronil Sulfide	ng/L	20	14	16	72	78	50-150	8	35	
Fipronil Sulfone	ng/L	20	14	14	68	71	50-150	3.6	35	
Esfenvalerate-d6;#1 (SS)	%				84	89	70-130	5.8		
Esfenvalerate-d6;#2 (SS)	%				83	90	70-130	8.1		





QUALITY CONTROL DATA

Lab Order: P020481

Project ID: CCCWP-SSID 030.001.0202

Analysis Description: Fipronil Analysis, Water	QC Batch: SPR/6308
Analysis Method: SW846 8270 Mod (GCMS-NCI-SIM)	QC Batch Method: SW846 3510C

Analysis Description: Total Organic Carbon Analysis	QC Batch: WET/7444
Analysis Method: SM20-5310 B	QC Batch Method: SM20-5310 B

METHOD BLANK: 566585

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Organic Carbon	ND	1	0.3	mg/L	

LABORATORY CONTROL SAMPLE: 566586

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Organic Carbon	mg/L	10	10	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 566657 566658

Parameter	Units	P020479022 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	16	10	28	28	113	112	80-120	0.4	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 566659 566660

Parameter	Units	P020481002 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	16	10	24	25	88	91	80-120	1.2	20	





QUALITY CONTROL DATA QUALIFIERS

Lab Order: P020481

Project ID: CCCWP-SSID 030.001.0202

QUALITY CONTROL PARAMETER QUALIFIERS

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

NS - means not spiked and will not have recoveries reported for Analyte Spike Amounts

QC Codes Keys: These descriptors are used to help identify the specific QC samples and clarify the report.

MB - Method Blank

Method Blanks are reported to the same Method Detection Limits (MDLs) or Reporting Limits (RLs) as the analytical samples in the corresponding QC batch.

LCS/LCSD - Laboratory Control Spike / Laboratory Control Spike Duplicate

DUP - Duplicate of Original Sample Matrix

MS/MSD - Matrix Spike / Matrix Spike Duplicate

RPD - Relative Percent Difference

%Recovery - Spike Recovery stated as a percentage

- 1 Analyte(s) reported as 'ND' means not detected at or above the listed Method Detection Limits (MDL).
- 4 Due to matrix interferences present in the sample, surrogate recoveries failed to meet the QA/QC acceptance criteria.
- 6 Contaminant was detected in the Method Blank.
- 7 Matrix Spike recovery(ies) outside control limits: LCS(LCSD) recoveries and RPD are in control. Possible Matrix interference in QC sample.



QUALITY CONTROL DATA CROSS REFERENCE TABLE

Lab Order: P020481

Project ID: CCCWP-SSID 030.001.0202

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
P020481003	544R00025DS-	ASTM D 3977-97 B-Filtration	BIO/13477		
P020481004	544R00025US	ASTM D 3977-97 B-Filtration	BIO/13477		
P020481003	544R00025DS-	SW846 3510C	SPR/6300	SW846 8270 Mod (GCMS-NCI-SIM)	SMS/3357
P020481004	544R00025US	SW846 3510C	SPR/6300	SW846 8270 Mod (GCMS-NCI-SIM)	SMS/3357
P020481003	544R00025DS-	SW846 3510C	SPR/6308	SW846 8270 Mod (GCMS-NCI-SIM)	SMS/3373
P020481004	544R00025US	SW846 3510C	SPR/6308	SW846 8270 Mod (GCMS-NCI-SIM)	SMS/3373
P020481003	544R00025DS-	EPA 608	SPR/6309	EPA 608	SMS/3366
P020481004	544R00025US	EPA 608	SPR/6309	EPA 608	SMS/3366
P020481001	544R00025DS-	SM20-5310 B	WET/7444		
P020481002	544R00025US-	SM20-5310 B	WET/7444		



1885 N. KELLY ROAD • NAPA, CA 94558 • (707) 258-4000 • Fax (707) 226-1001 • www.caltestlabs.com

PAGE 1 OF 27
 P.O. # 1020478
 1020481

LAB ORDER # 1020478

CLIENT: ADH Environmental

REPORT ATTN: Alessandra Matt.

ANALYSES REQUESTED

ADDRESS: 3065 Porter St
 CITY: Sequel CA

STATE: CA ZIP:

TURN-AROUND TIME
 STANDARD
 RUSH

BILLING ADDRESS: Same

PHONE #: 831 477 2003
 FAX PHONE:

SAMPLER (PRINT & SIGN NAME): Lucile Pogoff

DUE DATE:

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. OF GRAB	REMARKS
-1	2/6/14	13:20	Storm water		ice HCl	544 R00025 DS-		X	
-2		12:50			ice HCl	544 R00025 US-		X	
-3		13:20			ice	544 R00025 DS-		X	
		13:20			ice			X	
		13:20			ice			X	
		12:50			ice	544 R00025 US		X	
		12:50			ice			X	
		12:50			ice			X	
		12:50			ice			X	

TOC
 Pyrethroids
 Fipronil + degradates
 organochlorine pesticides
 SSC

By submittal of sample(s), client agrees to abide by the Terms and Conditions set forth on the reverse of this document.

RELINQUISHED BY: *Alessandra Matt* DATE/TIME: 2-7-14 6:10

RECEIVED BY: *[Signature]* DATE/TIME:

REMARKS:

FOR LAB USE ONLY

BD: BIO _____ WC _____ MET _____

CC: AA _____ SV _____ VOA _____

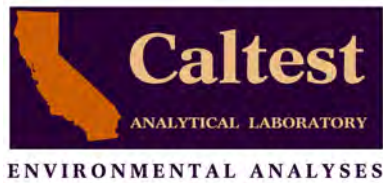
SIL: HP _____ PT _____ OT _____ VOA _____

WHNO: _____ H₂SO₄ _____ NaOH _____

PIL: HNO₃ _____ H₂SO₄ _____ NaOH _____ HCL _____

MATRIX: W = Aqueous Nondrinking Water, Digested Metals;
 ML = Low R.L.S., Aqueous Nondrinking Water, Digested Metals;
 DW = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Product

CONTAINER TYPES: AL = Amber Lifer; AHL = 500 ml Amber; PT = Pint (Plastic); OT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4 oz. BACT; BT = Brass Tube; VOA = 40 mL VOA; OTC = Other Type Container



Wednesday, April 16, 2014

Alessandro Hnatt
ADH Environmental
3065 Porter Street, Suite 101
Soquel, CA 95073

Re Lab Order: P030135
Project ID: Contra Costa Clean Water Progr

Collected By: CLIENT
PO/Contract #:

Dear Alessandro Hnatt:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday, March 04, 2014. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Enclosures

Project Manager: Todd Albertson

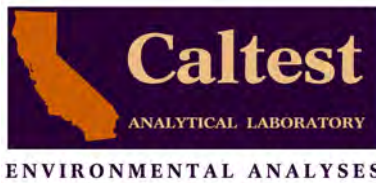


ENVIRONMENTAL ANALYSES

SAMPLE SUMMARY

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

Lab ID	Sample ID	Matrix	Date Collected	Date Received
P030135001	544R00025US-W-02	Water	02/28/2014 10:00	02/28/2014 10:00
P030135002	544R00025DS-W-02	Water	02/28/2014 09:30	02/28/2014 09:30
P030135003	207R00011DS-W-01	Water	02/28/2014 08:45	02/28/2014 08:45
P030135004	207R00011US-W-01	Water	02/28/2014 09:55	02/28/2014 09:55



NARRATIVE

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

General Qualifiers and Notes

Caltest authorizes this report to be reproduced only in its entirety. Results are specific to the sample(s) as submitted and only to the parameter(s) reported.

Caltest certifies that all test results for wastewater and hazardous waste analyses meet all applicable NELAC requirements; all microbiology and drinking water testing meet applicable ELAP requirements, unless stated otherwise.

All analyses performed by EPA Methods or Standard Methods (SM) 20th Edition except where noted (SMOL=online edition).

Caltest collects samples in compliance with 40 CFR, EPA Methods, Cal. Title 22, and Standard Methods.

Dilution Factors (DF) reported greater than '1' have been used to adjust the result, Reporting Limit (RL), and Method Detection Limit (MDL).

All Solid, sludge, and/or biosolids data is reported in Wet Weight, unless otherwise specified.

Filtrations performed at Caltest for dissolved metals (excluding mercury) and/or pH analysis were not performed within the 15 minute holding time as specified by 40CFR 136.3 table II.

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

ND - Non Detect - indicates analytical result has not been detected.

RL - Reporting Limit is the quantitation limit at which the laboratory is able to detect an analyte. An analyte not detected at or above the RL is reported as ND unless otherwise noted or qualified. For analyses pertaining to the State Implementation Plan of the California Toxics Rule, the Caltest Reporting Limit (RL) is equivalent to the Minimum Level (ML). A standard is always run at or below the ML. Where Reporting Limits are elevated due to dilution, the ML calibration criteria has been met.

J - reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detection Limit (MDL). The 'J' flag is equivalent to the DNQ Estimated Concentration flag.

E - indicates an estimated analytical result value.

B - indicates the analyte has been detected in the blank associated with the sample.

NC - means not able to be calculated for RPD or Spike Recoveries.

SS - compound is a Surrogate Spike used per laboratory quality assurance manual.

NOTE: This document represents a complete Analytical Report for the samples referenced herein and should be retained as a permanent record thereof.

Qualifiers and Compound Notes

- 1 Reporting Limits may be elevated due to limited sample volume.
- 2 Analyte(s) reported as 'ND' means not detected at or above the listed Method Detection Limits (MDL).
- 3 The sample was diluted and analyzed in attempt to minimize the matrix interferences. The dilution yielded similar results as the 1X run therefore the 1X run was reported.
- 4 This analysis is not covered under Caltest's NELAP/CAL-ELAP Accreditations.
- 5 Due to matrix interferences present in the sample, surrogate recoveries failed to meet the QA/QC acceptance criteria.
- 6 Surrogates did not meet Caltest internal acceptance criteria. The sample passes all pertinent method criteria.



ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

Lab ID P030135001 Date Collected 2/28/2014 10:00:00 AM Matrix Water
Sample ID 544R00025US-W-02 Date Received 3/4/2014 12:21:00 PM

Parameters	Result Units	R. L.	MDL	DF Prepared	Prepared	Analyzed	Prepared	Qual	
Suspended Sediment Concentration		Analytical Method: ASTM D 3977-97 B-Filtration				Analyzed by: CFG			
Sediment Concentration	13 mg/L	3	2	1		03/06/14 09:38	BIO 13574	4	
Chlorinated Pesticides & PCBs Analysis		Prep Method: EPA 608		Prep by: EAB		Analyzed by: NTA			
		Analytical Method: EPA 608							
Aldrin	ND ug/L	0.006	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	2,1
alpha-BHC	ND ug/L	0.010	0.0062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
beta-BHC	ND ug/L	0.006	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
delta-BHC	ND ug/L	0.006	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
gamma-BHC (Lindane)	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Chlordane	ND ug/L	0.062	0.025	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
4,4'-DDD	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
4,4'-DDE	ND ug/L	0.010	0.0038	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
4,4'-DDT	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Dieldrin	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Endosulfan I	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Endosulfan II	ND ug/L	0.010	0.0062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Endosulfan sulfate	ND ug/L	0.010	0.0062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Endrin	ND ug/L	0.010	0.0062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Endrin aldehyde	ND ug/L	0.010	0.0062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Endrin ketone	ND ug/L	0.010	0.0062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Heptachlor	ND ug/L	0.010	0.0062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Heptachlor epoxide	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Methoxychlor	ND ug/L	0.010	0.0062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
PCB 1016	ND ug/L	0.12	0.062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
PCB 1221	ND ug/L	0.12	0.062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
PCB 1232	ND ug/L	0.12	0.062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
PCB 1242	ND ug/L	0.12	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
PCB 1248	ND ug/L	0.12	0.062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
PCB 1254	ND ug/L	0.12	0.062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
PCB 1260	ND ug/L	0.12	0.062	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Toxaphene	ND ug/L	0.6	0.38	1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Decachlorobiphenyl (SS)	41 %	10-195		1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	
Tetrachloro-m-xylene (SS)	100 %	25-105		1	03/06/14 00:00	SPR 6346	03/19/14 01:49	SMS 3391	

Pyrethroids+Fipronil Analysis, NCI, Water		Prep Method: SW846 3510C		Prep by: EAB		Analyzed by: RLH			
		Analytical Method: SW846 8270 Mod							
Allethrin	ND ng/L	1.5	0.1	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410	2,3
Bifenthrin	8.5 ng/L	1.5	0.1	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410	
Cyfluthrin	J1.5 ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410	
Lambda-Cyhalothrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410	
Cypermethrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410	
Deltamethrin: Tralomethrin	ND ng/L	3.0	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410	
Esfenvalerate: Fenvalerate	ND ng/L	3.0	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410	
Fenpropathrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410	



ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

Lab ID	P030135001	Date Collected	2/28/2014 10:00:00 AM		Matrix	Water				
Sample ID	544R00025US-W-02		Date Received	3/4/2014 12:21:00 PM						
Parameters	Result Units	R. L.	MDL	DF Prepared	Prepared	Analyzed	Prepared	Qual		
Fipronil	4.5 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410		
Fipronil Desulfanyl	2.2 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410		
Fipronil Sulfide	ND ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410		
Fipronil Sulfone	5.5 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410		
Tau-Fluvalinate	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410		
Permethrin	ND ng/L	15	2	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410		
Tetramethrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410		
Esfenvalerate-d6;#1 (SS)	68 %	70-130		1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410	5	
Esfenvalerate-d6;#2 (SS)	67 %	70-130		1	03/07/14 00:00	SPR 6351	04/03/14 08:37	SMS 3410	5	
Total Organic Carbon Analysis	Analytical Method:	SM20-5310 B			Analyzed by:	NP				
Total Organic Carbon	14 mg/L	1	0.30	1			03/12/14 18:34	WET 7502		

Lab ID	P030135002	Date Collected	2/28/2014 9:30:00 AM		Matrix	Water				
Sample ID	544R00025DS-W-02		Date Received	3/4/2014 12:21:00 PM						
Parameters	Result Units	R. L.	MDL	DF Prepared	Prepared	Analyzed	Prepared	Qual		
Suspended Sediment Concentration	Analytical Method:	ASTM D 3977-97 B-Filtration			Analyzed by:	CFG				
Sediment Concentration	37 mg/L	3	2	1			03/06/14 09:38	BIO 13574	4	
Chlorinated Pesticides & PCBs Analysis	Prep Method:	EPA 608		Prep by:	EAB					
	Analytical Method:	EPA 608			Analyzed by:	NTA				
Aldrin	ND ug/L	0.005	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391	2	
alpha-BHC	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
beta-BHC	ND ug/L	0.005	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
delta-BHC	ND ug/L	0.005	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
gamma-BHC (Lindane)	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Chlordane	ND ug/L	0.050	0.020	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
4,4'-DDD	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
4,4'-DDE	ND ug/L	0.010	0.0030	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
4,4'-DDT	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Dieldrin	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Endosulfan I	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Endosulfan II	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Endosulfan sulfate	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Endrin	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Endrin aldehyde	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Endrin ketone	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Heptachlor	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Heptachlor epoxide	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Methoxychlor	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
PCB 1016	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
PCB 1221	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
PCB 1232	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		



ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

Lab ID	P030135002	Date Collected	2/28/2014 9:30:00 AM	Matrix	Water					
Sample ID	544R00025DS-W-02	Date Received	3/4/2014 12:21:00 PM							
Parameters	Result Units	R. L.	MDL	DF Prepared	Prepared	Analyzed	Prepared	Qual		
PCB 1242	ND ug/L	0.10	0.040	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
PCB 1248	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
PCB 1254	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
PCB 1260	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Toxaphene	ND ug/L	0.5	0.30	1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Decachlorobiphenyl (SS)	34 %	10-195		1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Tetrachloro-m-xylene (SS)	96 %	25-105		1	03/06/14 00:00	SPR 6346	03/19/14 02:16	SMS 3391		
Pyrethroids+Fipronil Analysis,NCI,Water		Prep Method:	SW846 3510C	Prep by:	EAB					
		Analytical Method:	SW846 8270 Mod	Analyzed by:	RLH					
Allethrin	ND ng/L	1.5	0.1	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410	2,3	
Bifenthrin	8.6 ng/L	1.5	0.1	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Cyfluthrin	1.7 ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Lambda-Cyhalothrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Cypermethrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Deltamethrin:Tralomethrin	ND ng/L	3.0	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Esfenvalerate:Fenvalerate	ND ng/L	3.0	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Fenpropathrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Fipronil	4.3 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Fipronil Desulfinyl	1.9 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Fipronil Sulfide	ND ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Fipronil Sulfone	5.2 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Tau-Fluvalinate	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Permethrin	ND ng/L	15	2	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Tetramethrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410		
Esfenvalerate-d6;#1 (SS)	63 %	70-130		1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410	5	
Esfenvalerate-d6;#2 (SS)	63 %	70-130		1	03/07/14 00:00	SPR 6351	04/03/14 10:23	SMS 3410	5	
Total Organic Carbon Analysis		Analytical Method:	SM20-5310 B	Analyzed by:	NP					
Total Organic Carbon	15 mg/L	1	0.30	1			03/12/14 18:51	WET 7502		

Lab ID	P030135003	Date Collected	2/28/2014 8:45:00 AM	Matrix	Water					
Sample ID	207R00011DS-W-01	Date Received	3/4/2014 12:21:00 PM							
Parameters	Result Units	R. L.	MDL	DF Prepared	Prepared	Analyzed	Prepared	Qual		
Suspended Sediment Concentration		Analytical Method:	ASTM D 3977-97 B-Filtration	Analyzed by:	CFG					
Sediment Concentration	173 mg/L	3	2	1			03/06/14 09:38	BIO 13574	4	
Chlorinated Pesticides & PCBs Analysis		Prep Method:	EPA 608	Prep by:	EAB					
		Analytical Method:	EPA 608	Analyzed by:	NTA					
Aldrin	ND ug/L	0.005	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	2	
alpha-BHC	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391		
beta-BHC	ND ug/L	0.005	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391		
delta-BHC	ND ug/L	0.005	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391		

4/16/2014 16:05

REPORT OF LABORATORY ANALYSIS

Page 6 of 15

This report shall not be reproduced, except in full, without the written consent of CALTEST ANALYTICAL LABORATORY



ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

Lab ID	P030135003	Date Collected	2/28/2014 8:45:00 AM	Matrix	Water				
Sample ID	207R00011DS-W-01	Date Received	3/4/2014 12:21:00 PM						
Parameters	Result Units	R. L.	MDL	DF Prepared	Prepared	Analyzed	Prepared	Qual	
gamma-BHC (Lindane)	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Chlordane	ND ug/L	0.050	0.020	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
4,4'-DDD	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
4,4'-DDE	ND ug/L	0.010	0.0030	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
4,4'-DDT	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Dieldrin	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Endosulfan I	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Endosulfan II	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Endosulfan sulfate	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Endrin	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Endrin aldehyde	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Endrin ketone	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Heptachlor	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Heptachlor epoxide	ND ug/L	0.010	0.0040	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Methoxychlor	ND ug/L	0.010	0.0050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
PCB 1016	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
PCB 1221	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
PCB 1232	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
PCB 1242	ND ug/L	0.10	0.040	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
PCB 1248	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
PCB 1254	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
PCB 1260	ND ug/L	0.10	0.050	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Toxaphene	ND ug/L	0.5	0.30	1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Decachlorobiphenyl (SS)	36 %	10-195		1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	
Tetrachloro-m-xylene (SS)	114 %	25-105		1	03/06/14 00:00	SPR 6346	03/19/14 02:44	SMS 3391	6
Pyrethroids+Fipronil Analysis, NCI, Water	Prep Method:	SW846 3510C		Prep by:	EAB				
	Analytical Method:	SW846 8270 Mod							
	Analyzed by:	RLH							
Allethrin	ND ng/L	1.5	0.1	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	2,3
Bifenthrin	6.5 ng/L	1.5	0.1	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Cyfluthrin	6.4 ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Lambda-Cyhalothrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Cypermethrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Deltamethrin: Tralomethrin	ND ng/L	3.0	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Esfenvalerate:Fenvalerate	ND ng/L	3.0	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Fenpropathrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Fipronil	23 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Fipronil Desulfinyl	2.2 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Fipronil Sulfide	1.6 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Fipronil Sulfone	9.5 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Tau-Fluvalinate	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Permethrin	ND ng/L	15	2	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Tetramethrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	
Esfenvalerate-d6;#1 (SS)	62 %	70-130		1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	5
Esfenvalerate-d6;#2 (SS)	63 %	70-130		1	03/07/14 00:00	SPR 6351	04/03/14 12:09	SMS 3410	5



ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

Lab ID	P030135003	Date Collected	2/28/2014 8:45:00 AM	Matrix	Water
Sample ID	207R00011DS-W-01	Date Received	3/4/2014 12:21:00 PM		

Parameters	Result Units	R. L.	MDL	DF	Prepared	Prepared	Analyzed	Prepared	Qual
Total Organic Carbon Analysis	Analytical Method:	SM20-5310 B					Analyzed by:	NP	
Total Organic Carbon	10 mg/L	1	0.30	1			03/12/14 19:04	WET 7502	

Lab ID	P030135004	Date Collected	2/28/2014 9:55:00 AM	Matrix	Water
Sample ID	207R00011US-W-01	Date Received	3/4/2014 12:21:00 PM		

Parameters	Result Units	R. L.	MDL	DF	Prepared	Prepared	Analyzed	Prepared	Qual
Suspended Sediment Concentration	Analytical Method:	ASTM D 3977-97 B-Filtration					Analyzed by:	CFG	
Sediment Concentration	37 mg/L	3	2	1			03/06/14 09:38	BIO 13574	4

Chlorinated Pesticides & PCBs Analysis		Prep Method:	EPA 608	Prep by:	EAB
		Analytical Method:	EPA 608	Analyzed by:	NTA
Aldrin	ND ug/L	0.005	0.0040	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391 2
alpha-BHC	ND ug/L	0.010	0.0050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
beta-BHC	ND ug/L	0.005	0.0040	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
delta-BHC	ND ug/L	0.005	0.0040	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
gamma-BHC (Lindane)	ND ug/L	0.010	0.0040	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Chlordane	ND ug/L	0.050	0.020	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
4,4'-DDD	ND ug/L	0.010	0.0040	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
4,4'-DDE	ND ug/L	0.010	0.0030	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
4,4'-DDT	ND ug/L	0.010	0.0040	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Dieldrin	ND ug/L	0.010	0.0040	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Endosulfan I	ND ug/L	0.010	0.0040	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Endosulfan II	ND ug/L	0.010	0.0050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Endosulfan sulfate	ND ug/L	0.010	0.0050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Endrin	ND ug/L	0.010	0.0050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Endrin aldehyde	ND ug/L	0.010	0.0050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Endrin ketone	ND ug/L	0.010	0.0050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Heptachlor	ND ug/L	0.010	0.0050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Heptachlor epoxide	ND ug/L	0.010	0.0040	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Methoxychlor	ND ug/L	0.010	0.0050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
PCB 1016	ND ug/L	0.10	0.050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
PCB 1221	ND ug/L	0.10	0.050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
PCB 1232	ND ug/L	0.10	0.050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
PCB 1242	ND ug/L	0.10	0.040	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
PCB 1248	ND ug/L	0.10	0.050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
PCB 1254	ND ug/L	0.10	0.050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
PCB 1260	ND ug/L	0.10	0.050	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Toxaphene	ND ug/L	0.5	0.30	1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Decachlorobiphenyl (SS)	39 %	10-195		1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391
Tetrachloro-m-xylene (SS)	95 %	25-105		1 03/06/14 00:00	SPR 6346 03/19/14 03:11 SMS 3391

Pyrethroids+Fipronil Analysis, NCI, Water		Prep Method:	SW846 3510C	Prep by:	EAB
--	--	---------------------	-------------	-----------------	-----



ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

Lab ID	P030135004	Date Collected	2/28/2014 9:55:00 AM		Matrix	Water			
Sample ID	207R00011US-W-01		Date Received	3/4/2014 12:21:00 PM					
Parameters	Result Units	R. L.	MDL	DF Prepared	Prepared	Analyzed	Prepared	Qual	
Analytical Method:		SW846 8270 Mod		Analyzed by:		RLH			
Allethrin	ND ng/L	1.5	0.1	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	2
Bifenthrin	7.3 ng/L	1.5	0.1	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Cyfluthrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Lambda-Cyhalothrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Cypermethrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Deltamethrin:Tralomethrin	4.7 ng/L	3.0	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Esfenvalerate:Fenvalerate	ND ng/L	3.0	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Fenpropathrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Fipronil	19 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Fipronil Desulfinyl	2.9 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Fipronil Sulfide	J1.3 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Fipronil Sulfone	14 ng/L	1.5	0.5	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Tau-Fluvalinate	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Permethrin	ND ng/L	15	2	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Tetramethrin	ND ng/L	1.5	0.2	1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Esfenvalerate-d6;#1 (SS)	71 %	70-130		1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Esfenvalerate-d6;#2 (SS)	71 %	70-130		1	03/07/14 00:00	SPR 6351	04/03/14 13:54	SMS 3410	
Total Organic Carbon Analysis		Analytical Method:		SM20-5310 B		Analyzed by:		NP	
Total Organic Carbon	11 mg/L	1	0.30	1			03/12/14 19:18	WET 7502	



QUALITY CONTROL DATA

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

Analysis Description:	Suspended Sediment Concentration	QC Batch:	BIO/13574
Analysis Method:	ASTM D 3977-97 B-Filtration	QC Batch Method:	ASTM D 3977-97 B-Filtration

METHOD BLANK: 570093

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Sediment Concentration	ND	3	2	mg/L	

LABORATORY CONTROL SAMPLE & LCSD: 570094 570095

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Sediment Concentration	mg/L	500	508	506	102	101	80-120	0.3	20	

Analysis Description:	Chlorinated Pesticides & PCBs Analysis	QC Batch:	SPR/6346
Analysis Method:	EPA 608	QC Batch Method:	EPA 608

METHOD BLANK: 570101

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Aldrin	ND	0.050	0.004	ug/L	
alpha-BHC	ND	0.050	0.005	ug/L	
beta-BHC	ND	0.050	0.004	ug/L	
delta-BHC	ND	0.050	0.004	ug/L	
gamma-BHC (Lindane)	ND	0.050	0.004	ug/L	
Chlordane	ND	0.50	0.020	ug/L	
4,4'-DDD	ND	0.10	0.004	ug/L	
4,4'-DDE	ND	0.10	0.003	ug/L	
4,4'-DDT	ND	0.10	0.004	ug/L	
Dieldrin	ND	0.10	0.004	ug/L	
Endosulfan I	ND	0.050	0.004	ug/L	
Endosulfan II	ND	0.10	0.005	ug/L	
Endosulfan sulfate	ND	0.10	0.005	ug/L	
Endrin	ND	0.10	0.005	ug/L	
Endrin aldehyde	ND	0.050	0.005	ug/L	
Endrin ketone	ND	0.10	0.005	ug/L	
Heptachlor	ND	0.050	0.005	ug/L	
Heptachlor epoxide	ND	0.050	0.004	ug/L	
Methoxychlor	ND	0.50	0.005	ug/L	
PCB 1016	ND	0.10	0.050	ug/L	
PCB 1221	ND	0.10	0.050	ug/L	
PCB 1232	ND	0.10	0.050	ug/L	
PCB 1242	ND	0.10	0.040	ug/L	
PCB 1248	ND	0.10	0.050	ug/L	
PCB 1254	ND	0.10	0.050	ug/L	
PCB 1260	ND	0.10	0.050	ug/L	



ENVIRONMENTAL ANALYSES

QUALITY CONTROL DATA

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

Analysis Description:	Chlorinated Pesticides & PCBs Analysis	QC Batch:	SPR/6346
Analysis Method:	EPA 608	QC Batch Method:	EPA 608

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Toxaphene	ND	1.0	0.3	ug/L	
Decachlorobiphenyl (SS)	42	30-190		%	
Tetrachloro-m-xylene (SS)	78	25-105		%	

LABORATORY CONTROL SAMPLE & LCSD: 570102 570103

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Aldrin	ug/L	0.2	0.15	0.16	77	81	42-122	5.1	24	
alpha-BHC	ug/L	0.2	0.16	0.16	79	82	37-134	3.1	30	
beta-BHC	ug/L	0.2	0.14	0.15	71	75	17-147	4.8	30	
delta-BHC	ug/L	0.2	0.14	0.14	70	73	19-140	4.2	30	
gamma-BHC (Lindane)	ug/L	0.2	0.16	0.16	78	81	32-127	3.8	20	
4,4'-DDD	ug/L	0.2	0.16	0.17	82	84	31-141	3	30	
4,4'-DDE	ug/L	0.2	0.16	0.16	79	81	30-145	2.5	30	
4,4'-DDT	ug/L	0.2	0.18	0.19	93	93	25-160	0.5	19	
Dieldrin	ug/L	0.2	0.17	0.17	85	87	36-146	2.3	17	
Endosulfan I	ug/L	0.2	0.16	0.17	82	85	45-153	3.3	30	
Endosulfan II	ug/L	0.2	0.17	0.17	87	86	1-202	0.6	30	
Endosulfan sulfate	ug/L	0.2	0.18	0.18	91	90	26-144	1.1	30	
Endrin	ug/L	0.2	0.14	0.14	69	69	30-147	0.7	18	
Endrin aldehyde	ug/L	0.2	0.18	0.18	92	93	34-105	1.1	30	
Endrin ketone	ug/L	0.2	0.18	0.18	90	89	41-127	0.6	30	
Heptachlor	ug/L	0.2	0.16	0.16	78	80	34-111	2.5	23	
Heptachlor epoxide	ug/L	0.2	0.16	0.17	81	83	37-142	2.4	30	
Methoxychlor	ug/L	0.2	0.18	0.18	90	90	1-186	0	30	
Decachlorobiphenyl (SS)	%				49	46	30-190	7		
Tetrachloro-m-xylene (SS)	%				77	80	25-105	4.5		

Analysis Description:	Pyrethroids+Fipronil Analysis,NCI,Water	QC Batch:	SPR/6351
Analysis Method:	SW846 8270 Mod (GCMS-NCI-SIM)	QC Batch Method:	SW846 3510C

METHOD BLANK: 570428

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Allethrin	ND	1.5	0.1	ng/L	2
Bifenthrin	ND	1.5	0.1	ng/L	
Cyfluthrin	ND	1.5	0.2	ng/L	
Lambda-Cyhalothrin	ND	1.5	0.2	ng/L	
Cypermethrin	ND	1.5	0.2	ng/L	
Deltamethrin:Tralomethrin	ND	3.0	0.2	ng/L	
Esfenvalerate:Fenvalerate	ND	3.0	0.2	ng/L	



ENVIRONMENTAL ANALYSES

QUALITY CONTROL DATA

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

Analysis Description:	Pyrethroids+Fipronil Analysis,NCI,Water	QC Batch:	SPR/6351
Analysis Method:	SW846 8270 Mod (GCMS-NCI-SIM)	QC Batch Method:	SW846 3510C

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Fenpropathrin	ND	1.5	0.2	ng/L	
Fipronil	ND	1.5	0.5	ng/L	
Fipronil Desulfinyl	ND	1.5	0.5	ng/L	
Fipronil Sulfide	ND	1.5	0.5	ng/L	
Fipronil Sulfone	ND	1.5	0.5	ng/L	
Tau-Fluvalinate	ND	1.5	0.2	ng/L	
Permethrin	ND	15	2.0	ng/L	
Tetramethrin	ND	1.5	0.2	ng/L	
Esfenvalerate-d6;#1 (SS)	90	70-130		%	
Esfenvalerate-d6;#2 (SS)	87	70-130		%	

LABORATORY CONTROL SAMPLE & LCSD: 570429 570430

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Allethrin	ng/L	20	16	16	82	80	50-150	2.5	35	
Bifenthrin	ng/L	20	18	17	88	84	70-165	4.7	35	
Cyfluthrin	ng/L	20	18	17	91	84	55-140	7.4	30	
Lambda-Cyhalothrin	ng/L	20	20	18	98	89	40-120	9.6	35	
Cypermethrin	ng/L	20	19	18	96	89	50-130	7.6	30	
Deltamethrin:Tralomethrin	ng/L	40	33	32	83	81	30-105	2.5	40	
Esfenvalerate:Fenvalerate	ng/L	40	34	32	86	81	40-140	6.6	35	
Fenpropathrin	ng/L	20	27	20	137	103	30-180	29	35	
Fipronil	ng/L	20	18	15	88	76	50-150	15	35	
Fipronil Desulfinyl	ng/L	20	18	16	89	80	50-150	10	35	
Fipronil Sulfide	ng/L	20	17	15	85	76	50-150	11	35	
Fipronil Sulfone	ng/L	20	16	15	81	77	50-150	5.7	35	
Tau-Fluvalinate	ng/L	20	14	13	69	63	30-100	9.1	40	
Permethrin	ng/L	100	110	110	111	108	50-160	2.7	40	
Tetramethrin	ng/L	20	16	15	78	76	45-140	2	50	
Esfenvalerate-d6;#1 (SS)	%				85	75	70-130	12		
Esfenvalerate-d6;#2 (SS)	%				86	75	70-130	13		

Analysis Description:	Total Organic Carbon Analysis	QC Batch:	WET/7502
Analysis Method:	SM20-5310 B	QC Batch Method:	SM20-5310 B

METHOD BLANK: 571219

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Organic Carbon	ND	1	0.3	mg/L	



ENVIRONMENTAL ANALYSES

QUALITY CONTROL DATA

Lab Order: P030135
 Project ID: Contra Costa Clean Water Progr

Analysis Description:	Total Organic Carbon Analysis	QC Batch:	WET/7502
Analysis Method:	SM20-5310 B	QC Batch Method:	SM20-5310 B

LABORATORY CONTROL SAMPLE: 571220

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Total Organic Carbon	mg/L	10	10	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 571221 571222

Parameter	Units	P030133001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	8.1	10	18	18	95	95	80-120	0.1	20	



ENVIRONMENTAL ANALYSES

QUALITY CONTROL DATA QUALIFIERS

Lab Order: P030135
Project ID: Contra Costa Clean Water Progr

QUALITY CONTROL PARAMETER QUALIFIERS

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

NS - means not spiked and will not have recoveries reported for Analyte Spike Amounts

QC Codes Keys: These descriptors are used to help identify the specific QC samples and clarify the report.

MB - Method Blank

Method Blanks are reported to the same Method Detection Limits (MDLs) or Reporting Limits (RLs) as the analytical samples in the corresponding QC batch.

LCS/LCSD - Laboratory Control Spike / Laboratory Control Spike Duplicate

DUP - Duplicate of Original Sample Matrix

MS/MSD - Matrix Spike / Matrix Spike Duplicate

RPD - Relative Percent Difference

%Recovery - Spike Recovery stated as a percentage

2 Analyte(s) reported as 'ND' means not detected at or above the listed Method Detection Limits (MDL).



ENVIRONMENTAL ANALYSES

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Lab Order: P030135

Project ID: Contra Costa Clean Water Progr

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
P030135001	544R00025US-W-02	ASTM D 3977-97	BIO/13574		
P030135002	544R00025DS-W-02	ASTM D 3977-97	BIO/13574		
P030135003	207R00011DS-W-01	ASTM D 3977-97	BIO/13574		
P030135004	207R00011US-W-01	ASTM D 3977-97	BIO/13574		
P030135001	544R00025US-W-02	EPA 608	SPR/6346	EPA 608	SMS/3391
P030135002	544R00025DS-W-02	EPA 608	SPR/6346	EPA 608	SMS/3391
P030135003	207R00011DS-W-01	EPA 608	SPR/6346	EPA 608	SMS/3391
P030135004	207R00011US-W-01	EPA 608	SPR/6346	EPA 608	SMS/3391
P030135001	544R00025US-W-02	SW846 3510C	SPR/6351	SW846 8270 Mod	SMS/3410
P030135002	544R00025DS-W-02	SW846 3510C	SPR/6351	SW846 8270 Mod	SMS/3410
P030135003	207R00011DS-W-01	SW846 3510C	SPR/6351	SW846 8270 Mod	SMS/3410
P030135004	207R00011US-W-01	SW846 3510C	SPR/6351	SW846 8270 Mod	SMS/3410
P030135001	544R00025US-W-02	SM20-5310 B	WET/7502		
P030135002	544R00025DS-W-02	SM20-5310 B	WET/7502		
P030135003	207R00011DS-W-01	SM20-5310 B	WET/7502		
P030135004	207R00011US-W-01	SM20-5310 B	WET/7502		



1885 N. KELLY ROAD NAPA, CA 94558 (707) 258-4000 FAX (707) 226-1001
CHAIN OF CUSTODY

PROJECT NAME / PROJECT NUMBER:
 CCCWP-SSID / 030.001.0202

P.O. NUMBER

LAB ORDER #
P030135

CLIENT:
 ADH Environmental

REPORT ATTN:
 Alessandro Hnatt

ANALYSES REQUESTED

MAILING ADDRESS:
 3065 Porter St., Suite 101, Soquel

STATE: CA ZIP: 95073

BILLING ADDRESS:
 same as above

ATTN: Alessandro Hnatt

PHONE NUMBER:
 831-477-2003

FAX PHONE NUMBER:
 831-477-0895

SAMPLER (PRINT & SIGN NAME):
 Alessandro Hnatt

TURN-AROUND TIME
 STANDARD
 RUSH
 DUE DATE: _____

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX*	CONTAINER TYPE/ AMOUNT**	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GRAB	ANALYSES REQUESTED											
									Organochlorine Pesticides	Pyrethroids Pesticides	Fipronil	Degradates	TOC	SSC						
	2/28/14	1000	Strmwr	2 x 1L AG	<6C	544R00025US-W-02		Grab	X											
			Strmwr	2 x 1L AG	<6C			Grab		X	X									
			Strmwr	3 x 40ml VOA	<6C, HCl			Grab				X								
			Strmwr	250 ml HDPE	<6C			Grab					X							
	2/28/14	0930	Strmwr	2 x 1L AG	<6C	544R00025US-W-02		Grab	X											
			Strmwr	2 x 1L AG	<6C			Grab		X	X									
			Strmwr	3 x 40ml VOA	<6C, HCl			Grab				X								
			Strmwr	250 ml HDPE	<6C			Grab					X							

FOR LAB USE ONLY

RELINQUISHED BY: <i>[Signature]</i>	DATE/TIME: 3-4-14 10:21	RECEIVED BY: <i>[Signature]</i>	DATE/TIME: /
RELINQUISHED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:

COMMENTS: pH 5.7

*MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.S. Aqueous Nondrinking Water; Digested Metals; DW = Drinking Water; SL = Soil Sludge; Solid; FP = ****CONTAINER TYPES: AL = Amber Lier; AHL = 500 ml Amber; PT = Pint (Plastic); OT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4oz. BACT; BT = Brass Tube; VOA = 40ml VOA; OTC = Other Type Container**

R _____ P _____ M _____ F _____



1885 N. KELLY ROAD NAPA, CA 94558 (707) 258-4000 FAX (707) 226-1001
CHAIN OF CUSTODY

PROJECT NAME / PROJECT NUMBER:
 CCCWP-SSID / 030.001.0202

P.O. NUMBER

LAB ORDER #
P030135

CLIENT:
 ADH Environmental

REPORT ATTN:
 Alessandro Hnatt

ANALYSES REQUESTED

MAILING ADDRESS:
 3065 Porter St., Suite 101, Soquel

STATE: CA ZIP: 95073

BILLING ADDRESS:
 Same as above

ATTN: Alessandro Hnatt

PHONE NUMBER:
 831-477-2003

FAX PHONE NUMBER:
 831-477-0895

SAMPLER (PRINT & SIGN NAME):
 Alessandro Hnatt

TURNAROUND TIME
 STANDARD
 RUSH
 DUE DATE: _____

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX*	CONTAINER TYPE/ AMOUNT**	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GRAB	ANALYSES REQUESTED							REMARKS		
									Organochlorine Pesticides	Pyrethroids Pesticides	Fipronil	Degradates	TOC	SSC				
	2-28-14	0845	Strmwr	2 x 1L AG	<6C	207R00011DS-W-01		Grab	X									
			Strmwr	2 x 1L AG	<6C	207R00011DS-W-01		Grab	X	X	X							
			Strmwr	3 x 40ml VOA	<6C, HCl	207R00011DS-W-01		Grab				X						
			Strmwr	250 ml HDPE	<6C	207R00011DS-W-01		Grab					X					
		0955	Strmwr	2 x 1L AG	<6C	207R00011US-W-01		Grab	X									
			Strmwr	2 x 1L AG	<6C	207R00011US-W-01		Grab		X	X	X						
			Strmwr	3 x 40ml VOA	<6C, HCl	207R00011US-W-01		Grab				X						
			Strmwr	250 ml HDPE	<6C	207R00011US-W-01		Grab					X					

RELINQUISHED BY
Alexander Hnatt

DATE/TIME
 3-4-14 10:33

RECEIVED BY
Alexander Hnatt

RELINQUISHED BY

DATE/TIME

RECEIVED BY

FOR LAB USE ONLY

Samples: WC MICRO BIO AA SV VOA pH V/N TEMP: 67 SEALED: Y/N INTACT: Y/N

BD: BIO WC AA
 CC: AA SV VOA
 SIL: FP PT OT VOA
 W/HNO₃ H₂SO₄ NaOH
 PL: HNO₃ H₂SO₄ NaOH HCl

COMMENTS:

*MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.S. Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil Sludge; Solid; FP = **CONTAINER TYPES: AL = Amber Liter; AHL = 500 ml Amber; PT = Pint (Plastic); OT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4oz. BACT; BT = Brass Tube; VOA = 40ml VOA; OTC - Other Type Container

R PR M F



Wednesday, April 16, 2014

Alessandro Hnatt
ADH Environmental
3065 Porter Street, Suite 101
Soquel, CA 95073

Re Lab Order: P031034
Project ID: CCCWP-SSID/030.001.0202

Collected By: CLIENT
PO/Contract #:

Dear Alessandro Hnatt:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday, March 26, 2014. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Enclosures

Project Manager: Todd Albertson



ENVIRONMENTAL ANALYSES

SAMPLE SUMMARY

Lab Order: P031034
Project ID: CCCWP-SSID/030.001.0202

<u>Lab ID</u>	<u>Sample ID</u>	<u>Matrix</u>	<u>Date Collected</u>	<u>Date Received</u>
P031034001	207R00011DS-W-02	Water	03/26/2014 14:00	03/26/2014 14:00
P031034002	207R00011US-W-02	Water	03/26/2014 12:40	03/26/2014 12:40



NARRATIVE

Lab Order: P031034
Project ID: CCCWP-SSID/030.001.0202

General Qualifiers and Notes

Caltest authorizes this report to be reproduced only in its entirety. Results are specific to the sample(s) as submitted and only to the parameter(s) reported.

Caltest certifies that all test results for wastewater and hazardous waste analyses meet all applicable NELAC requirements; all microbiology and drinking water testing meet applicable ELAP requirements, unless stated otherwise.

All analyses performed by EPA Methods or Standard Methods (SM) 20th Edition except where noted (SMOL=online edition).

Caltest collects samples in compliance with 40 CFR, EPA Methods, Cal. Title 22, and Standard Methods.

Dilution Factors (DF) reported greater than '1' have been used to adjust the result, Reporting Limit (RL), and Method Detection Limit (MDL).

All Solid, sludge, and/or biosolids data is reported in Wet Weight, unless otherwise specified.

Filtrations performed at Caltest for dissolved metals (excluding mercury) and/or pH analysis were not performed within the 15 minute holding time as specified by 40CFR 136.3 table II.

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

ND - Non Detect - indicates analytical result has not been detected.

RL - Reporting Limit is the quantitation limit at which the laboratory is able to detect an analyte. An analyte not detected at or above the RL is reported as ND unless otherwise noted or qualified. For analyses pertaining to the State Implementation Plan of the California Toxics Rule, the Caltest Reporting Limit (RL) is equivalent to the Minimum Level (ML). A standard is always run at or below the ML. Where Reporting Limits are elevated due to dilution, the ML calibration criteria has been met.

J - reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detection Limit (MDL). The 'J' flag is equivalent to the DNQ Estimated Concentration flag.

E - indicates an estimated analytical result value.

B - indicates the analyte has been detected in the blank associated with the sample.

NC - means not able to be calculated for RPD or Spike Recoveries.

SS - compound is a Surrogate Spike used per laboratory quality assurance manual.

NOTE: This document represents a complete Analytical Report for the samples referenced herein and should be retained as a permanent record thereof.

Qualifiers and Compound Notes

- | | |
|---|---|
| 1 | Analyte(s) reported as 'ND' means not detected at or above the listed Method Detection Limits (MDL). |
| 2 | Sample diluted due to a high concentration of non-target analyte(s), resulting in increased reporting limits. |
| 3 | This analysis is not covered under Caltest's NELAP/CAL-ELAP Accreditations. |
| 4 | Due to matrix interferences present in the sample, surrogate recoveries failed to meet the QA/QC acceptance criteria. |
| 5 | Reporting Limits may be elevated due to limited sample volume. |



ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P031034
 Project ID: CCCWP-SSID/030.001.0202

Lab ID P031034001 Date Collected 3/26/2014 2:00:00 PM Matrix Water
Sample ID 207R00011DS-W-02 Date Received 3/26/2014 3:18:00 PM

Parameters	Result Units	R. L.	MDL	DF Prepared	Prepared	Analyzed	Prepared	Qual
Suspended Sediment Concentration	Analytical Method:	ASTM D 3977-97	B-Filtration			Analyzed by:	CFG	
Sediment Concentration	14 mg/L	3	2	1		04/01/14 09:41	BIO 13669	3

Chlorinated Pesticides & PCBs Analysis

Prep Method: EPA 608 **Prep by:** NTA

Analytical Method: EPA 608 **Analyzed by:** NTA

Aldrin	ND ug/L	0.005	0.0040	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	1
alpha-BHC	ND ug/L	0.010	0.0050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
beta-BHC	ND ug/L	0.005	0.0040	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
delta-BHC	ND ug/L	0.005	0.0040	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
gamma-BHC (Lindane)	ND ug/L	0.010	0.0040	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Chlordane	ND ug/L	0.050	0.020	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
4,4'-DDD	ND ug/L	0.010	0.0040	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
4,4'-DDE	ND ug/L	0.010	0.0030	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
4,4'-DDT	ND ug/L	0.010	0.0040	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Dieldrin	ND ug/L	0.010	0.0040	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Endosulfan I	ND ug/L	0.010	0.0040	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Endosulfan II	ND ug/L	0.010	0.0050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Endosulfan sulfate	ND ug/L	0.010	0.0050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Endrin	ND ug/L	0.010	0.0050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Endrin aldehyde	ND ug/L	0.010	0.0050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Endrin ketone	ND ug/L	0.010	0.0050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Heptachlor	ND ug/L	0.010	0.0050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Heptachlor epoxide	ND ug/L	0.010	0.0040	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Methoxychlor	ND ug/L	0.010	0.0050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
PCB 1016	ND ug/L	0.10	0.050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
PCB 1221	ND ug/L	0.10	0.050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
PCB 1232	ND ug/L	0.10	0.050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
PCB 1242	ND ug/L	0.10	0.040	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
PCB 1248	ND ug/L	0.10	0.050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
PCB 1254	ND ug/L	0.10	0.050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
PCB 1260	ND ug/L	0.10	0.050	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Toxaphene	ND ug/L	0.5	0.30	1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Decachlorobiphenyl (SS)	59 %	10-195		1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	
Tetrachloro-m-xylene (SS)	62 %	25-105		1	04/02/14 00:00	SPR 6386	04/09/14 22:45	SMS 3412	

Pyrethroids+Fipronil Analysis, NCI, Water

Prep Method: SW846 3510C **Prep by:** EAB

Analytical Method: SW846 8270 Mod **Analyzed by:** RLH

Allethrin	ND ng/L	1.5	0.2	2	03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416	1,2
Bifenthrin	4.2 ng/L	1.5	0.2	2	03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416	
Cyfluthrin	J0.9 ng/L	1.5	0.4	2	03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416	
Lambda-Cyhalothrin	ND ng/L	1.5	0.4	2	03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416	
Cypermethrin	J0.7 ng/L	1.5	0.4	2	03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416	
Deltamethrin: Tralomethrin	ND ng/L	3.0	0.4	2	03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416	
Esfenvalerate: Fenvalerate	ND ng/L	3.0	0.4	2	03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416	
Fenpropathrin	ND ng/L	1.5	0.4	2	03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416	



ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P031034
 Project ID: CCCWP-SSID/030.001.0202

Lab ID	P031034001	Date Collected	3/26/2014 2:00:00 PM		Matrix	Water				
Sample ID	207R00011DS-W-02		Date Received	3/26/2014 3:18:00 PM						
Parameters	Result Units	R. L.	MDL	DF Prepared	Prepared	Analyzed	Prepared	Qual		
Fipronil	12 ng/L	2.0	1	2 03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416			
Fipronil Desulfanyl	3.5 ng/L	2.0	1	2 03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416			
Fipronil Sulfide	2.6 ng/L	2.0	1	2 03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416			
Fipronil Sulfone	6.8 ng/L	2.0	1	2 03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416			
Tau-Fluvalinate	ND ng/L	1.5	0.4	2 03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416			
Permethrin	J12 ng/L	20	4	2 03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416			
Tetramethrin	ND ng/L	1.5	0.4	2 03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416			
Esfenvalerate-d6;#1 (SS)	69 %	70-130		2 03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416	4		
Esfenvalerate-d6;#2 (SS)	70 %	70-130		2 03/28/14 00:00	SPR 6382	04/13/14 06:25	SMS 3416			
Total Organic Carbon Analysis	Analytical Method:	SM20-5310 B			Analyzed by:	NP				
Total Organic Carbon	13 mg/L	1	0.30	1		04/01/14 00:50	WET 7533			

Lab ID	P031034002	Date Collected	3/26/2014 12:40:00 PM		Matrix	Water				
Sample ID	207R00011US-W-02		Date Received	3/26/2014 3:18:00 PM						
Parameters	Result Units	R. L.	MDL	DF Prepared	Prepared	Analyzed	Prepared	Qual		
Suspended Sediment Concentration	Analytical Method:	ASTM D 3977-97 B-Filtration			Analyzed by:	CFG				
Sediment Concentration	13 mg/L	3	2	1		04/01/14 09:41	BIO 13669	3		
Chlorinated Pesticides & PCBs Analysis	Prep Method:	EPA 608		Prep by:	NTA					
	Analytical Method:	EPA 608			Analyzed by:	NTA				
Aldrin	ND ug/L	0.006	0.0049	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412	1,5		
alpha-BHC	ND ug/L	0.010	0.0061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
beta-BHC	ND ug/L	0.006	0.0049	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
delta-BHC	ND ug/L	0.006	0.0049	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
gamma-BHC (Lindane)	ND ug/L	0.010	0.0049	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
Chlordane	ND ug/L	0.061	0.024	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
4,4'-DDD	ND ug/L	0.010	0.0049	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
4,4'-DDE	ND ug/L	0.010	0.0037	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
4,4'-DDT	ND ug/L	0.010	0.0049	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
Dieldrin	ND ug/L	0.010	0.0049	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
Endosulfan I	ND ug/L	0.010	0.0049	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
Endosulfan II	ND ug/L	0.010	0.0061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
Endosulfan sulfate	ND ug/L	0.010	0.0061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
Endrin	ND ug/L	0.010	0.0061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
Endrin aldehyde	ND ug/L	0.010	0.0061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
Endrin ketone	ND ug/L	0.010	0.0061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
Heptachlor	ND ug/L	0.010	0.0061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
Heptachlor epoxide	ND ug/L	0.010	0.0049	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
Methoxychlor	ND ug/L	0.010	0.0061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
PCB 1016	ND ug/L	0.12	0.061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
PCB 1221	ND ug/L	0.12	0.061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			
PCB 1232	ND ug/L	0.12	0.061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412			



ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P031034
 Project ID: CCCWP-SSID/030.001.0202

Lab ID	P031034002	Date Collected	3/26/2014 12:40:00 PM	Matrix	Water				
Sample ID	207R00011US-W-02	Date Received	3/26/2014 3:18:00 PM						
Parameters	Result Units	R. L.	MDL	DF Prepared	Prepared	Analyzed	Prepared	Qual	
PCB 1242	ND ug/L	0.12	0.049	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412		
PCB 1248	ND ug/L	0.12	0.061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412		
PCB 1254	ND ug/L	0.12	0.061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412		
PCB 1260	ND ug/L	0.12	0.061	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412		
Toxaphene	ND ug/L	0.6	0.37	1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412		
Decachlorobiphenyl (SS)	57 %	10-195		1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412		
Tetrachloro-m-xylene (SS)	63 %	25-105		1 04/02/14 00:00	SPR 6386	04/09/14 23:12	SMS 3412		
Pyrethroids+Fipronil Analysis,NCI,Water		Prep Method: SW846 3510C		Prep by: EAB					
		Analytical Method: SW846 8270 Mod				Analyzed by: RLH			
Allethrin	ND ng/L	1.5	0.2	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416	1,2	
Bifenthrin	11 ng/L	1.5	0.2	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Cyfluthrin	J1.1 ng/L	1.5	0.4	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Lambda-Cyhalothrin	J1.1 ng/L	1.5	0.4	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Cypermethrin	ND ng/L	1.5	0.4	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Deltamethrin:Tralomethrin	ND ng/L	3.0	0.4	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Esfenvalerate:Fenvalerate	ND ng/L	3.0	0.4	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Fenpropathrin	ND ng/L	1.5	0.4	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Fipronil	15 ng/L	2.0	1	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Fipronil Desulfinyl	6.5 ng/L	2.0	1	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Fipronil Sulfide	J1.4 ng/L	2.0	1	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Fipronil Sulfone	11 ng/L	2.0	1	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Tau-Fluvalinate	ND ng/L	1.5	0.4	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Permethrin	ND ng/L	20	4	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Tetramethrin	ND ng/L	1.5	0.4	2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Esfenvalerate-d6;#1 (SS)	75 %	70-130		2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Esfenvalerate-d6;#2 (SS)	75 %	70-130		2 03/28/14 00:00	SPR 6382	04/13/14 10:11	SMS 3416		
Total Organic Carbon Analysis		Analytical Method: SM20-5310 B				Analyzed by: NP			
Total Organic Carbon	11 mg/L	1	0.30	1		04/01/14 01:04	WET 7533		



QUALITY CONTROL DATA

Lab Order: P031034
 Project ID: CCCWP-SSID/030.001.0202

Analysis Description:	Suspended Sediment Concentration	QC Batch:	BIO/13669
Analysis Method:	ASTM D 3977-97 B-Filtration	QC Batch Method:	ASTM D 3977-97 B-Filtration

METHOD BLANK: 574708

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Sediment Concentration	ND	3	2	mg/L	

LABORATORY CONTROL SAMPLE & LCSD: 574709 574762

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Sediment Concentration	mg/L	500	477	484	95	97	80-120	1.5	20	

Analysis Description:	Chlorinated Pesticides & PCBs Analysis	QC Batch:	SPR/6386
Analysis Method:	EPA 608	QC Batch Method:	EPA 608

METHOD BLANK: 574847

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Aldrin	ND	0.050	0.004	ug/L	
alpha-BHC	ND	0.050	0.005	ug/L	
beta-BHC	ND	0.050	0.004	ug/L	
delta-BHC	ND	0.050	0.004	ug/L	
gamma-BHC (Lindane)	ND	0.050	0.004	ug/L	
Chlordane	ND	0.50	0.020	ug/L	
4,4'-DDD	ND	0.10	0.004	ug/L	
4,4'-DDE	ND	0.10	0.003	ug/L	
4,4'-DDT	ND	0.10	0.004	ug/L	
Dieldrin	ND	0.10	0.004	ug/L	
Endosulfan I	ND	0.050	0.004	ug/L	
Endosulfan II	ND	0.10	0.005	ug/L	
Endosulfan sulfate	ND	0.10	0.005	ug/L	
Endrin	ND	0.10	0.005	ug/L	
Endrin aldehyde	ND	0.050	0.005	ug/L	
Endrin ketone	ND	0.10	0.005	ug/L	
Heptachlor	ND	0.050	0.005	ug/L	
Heptachlor epoxide	ND	0.050	0.004	ug/L	
Methoxychlor	ND	0.50	0.005	ug/L	
PCB 1016	ND	0.10	0.050	ug/L	
PCB 1221	ND	0.10	0.050	ug/L	
PCB 1232	ND	0.10	0.050	ug/L	
PCB 1242	ND	0.10	0.040	ug/L	
PCB 1248	ND	0.10	0.050	ug/L	
PCB 1254	ND	0.10	0.050	ug/L	
PCB 1260	ND	0.10	0.050	ug/L	



ENVIRONMENTAL ANALYSES

QUALITY CONTROL DATA

Lab Order: P031034
 Project ID: CCCWP-SSID/030.001.0202

Analysis Description:	Chlorinated Pesticides & PCBs Analysis	QC Batch:	SPR/6386
Analysis Method:	EPA 608	QC Batch Method:	EPA 608

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Toxaphene	ND	1.0	0.3	ug/L	
Decachlorobiphenyl (SS)	46	30-190		%	
Tetrachloro-m-xylene (SS)	62	25-105		%	

LABORATORY CONTROL SAMPLE & LCSD: 574848 574849

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Aldrin	ug/L	0.2	0.14	0.15	68	74	42-122	8.5	24	
alpha-BHC	ug/L	0.2	0.14	0.16	71	79	37-134	11	30	
beta-BHC	ug/L	0.2	0.14	0.15	68	74	17-147	9.2	30	
delta-BHC	ug/L	0.2	0.12	0.13	62	67	19-140	7.8	30	
gamma-BHC (Lindane)	ug/L	0.2	0.14	0.15	70	76	32-127	8.9	20	
4,4'-DDD	ug/L	0.2	0.15	0.16	76	81	31-141	5.8	30	
4,4'-DDE	ug/L	0.2	0.14	0.15	73	77	30-145	6	30	
4,4'-DDT	ug/L	0.2	0.16	0.17	78	85	25-160	8.6	19	
Dieldrin	ug/L	0.2	0.16	0.17	79	85	36-146	8	17	
Endosulfan I	ug/L	0.2	0.15	0.16	76	82	45-153	7.9	30	
Endosulfan II	ug/L	0.2	0.16	0.17	78	84	1-202	7.5	30	
Endosulfan sulfate	ug/L	0.2	0.16	0.18	81	90	26-144	11	30	
Endrin	ug/L	0.2	0.15	0.16	75	80	30-147	7.1	18	
Endrin aldehyde	ug/L	0.2	0.18	0.2	92	99	34-105	6.8	30	
Endrin ketone	ug/L	0.2	0.16	0.17	79	86	41-127	8.5	30	
Heptachlor	ug/L	0.2	0.14	0.15	71	77	34-111	8.8	23	
Heptachlor epoxide	ug/L	0.2	0.15	0.17	77	83	37-142	8.2	30	
Methoxychlor	ug/L	0.2	0.15	0.17	76	83	1-186	9.5	30	
Decachlorobiphenyl (SS)	%				48	54	30-190	11		
Tetrachloro-m-xylene (SS)	%				63	69	25-105	9.9		

Analysis Description:	Pyrethroids+Fipronil Analysis,NCI,Water	QC Batch:	SPR/6382
Analysis Method:	SW846 8270 Mod (GCMS-NCI-SIM)	QC Batch Method:	SW846 3510C

METHOD BLANK: 574094

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Allethrin	ND	1.5	0.1	ng/L	1
Bifenthrin	ND	1.5	0.1	ng/L	
Cyfluthrin	ND	1.5	0.2	ng/L	
Lambda-Cyhalothrin	ND	1.5	0.2	ng/L	
Cypermethrin	ND	1.5	0.2	ng/L	
Deltamethrin:Tralomethrin	ND	3.0	0.2	ng/L	
Esfenvalerate:Fenvalerate	ND	3.0	0.2	ng/L	



ENVIRONMENTAL ANALYSES

QUALITY CONTROL DATA

Lab Order: P031034
 Project ID: CCCWP-SSID/030.001.0202

Analysis Description:	Pyrethroids+Fipronil Analysis,NCI,Water	QC Batch:	SPR/6382
Analysis Method:	SW846 8270 Mod (GCMS-NCI-SIM)	QC Batch Method:	SW846 3510C

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Fenpropathrin	ND	1.5	0.2	ng/L	
Fipronil	ND	1.5	0.5	ng/L	
Fipronil Desulfinyl	ND	1.5	0.5	ng/L	
Fipronil Sulfide	ND	1.5	0.5	ng/L	
Fipronil Sulfone	ND	1.5	0.5	ng/L	
Tau-Fluvalinate	ND	1.5	0.2	ng/L	
Permethrin	ND	15	2.0	ng/L	
Tetramethrin	ND	1.5	0.2	ng/L	
Esfenvalerate-d6;#1 (SS)	68	70-130		%	6,
Esfenvalerate-d6;#2 (SS)	68	70-130		%	6,,

LABORATORY CONTROL SAMPLE & LCSD: 574095 574096

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Allethrin	ng/L	20	18	19	89	94	50-150	5.5	35	
Bifenthrin	ng/L	20	18	19	91	93	70-165	2.2	35	
Cyfluthrin	ng/L	20	17	18	84	92	55-140	9.7	30	
Lambda-Cyhalothrin	ng/L	20	16	17	78	85	40-120	9.2	35	
Cypermethrin	ng/L	20	18	19	92	96	50-130	4.3	30	
Deltamethrin:Tralomethrin	ng/L	40	31	33	78	83	30-105	5.9	40	
Esfenvalerate:Fenvalerate	ng/L	40	34	35	84	88	40-140	4.1	35	
Fenpropathrin	ng/L	20	21	23	106	114	30-180	7.3	35	
Fipronil	ng/L	20	16	16	79	78	50-150	1.9	35	
Fipronil Desulfinyl	ng/L	20	16	15	82	77	50-150	6.9	35	
Fipronil Sulfide	ng/L	20	17	16	85	80	50-150	6.7	35	
Fipronil Sulfone	ng/L	20	16	14	81	71	50-150	13	35	
Tau-Fluvalinate	ng/L	20	13	13	64	65	30-100	1.6	40	
Permethrin	ng/L	100	75	84	75	84	50-160	12	40	
Tetramethrin	ng/L	20	16	16	82	81	45-140	0.6	50	
Esfenvalerate-d6;#1 (SS)	%				79	80	70-130	1.9		
Esfenvalerate-d6;#2 (SS)	%				79	81	70-130	2.9		

Analysis Description:	Total Organic Carbon Analysis	QC Batch:	WET/7533
Analysis Method:	SM20-5310 B	QC Batch Method:	SM20-5310 B

METHOD BLANK: 574492

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Organic Carbon	ND	1	0.3	mg/L	



ENVIRONMENTAL ANALYSES

QUALITY CONTROL DATA

Lab Order: P031034
 Project ID: CCCWP-SSID/030.001.0202

Analysis Description:	Total Organic Carbon Analysis	QC Batch:	WET/7533
Analysis Method:	SM20-5310 B	QC Batch Method:	SM20-5310 B

LABORATORY CONTROL SAMPLE: 574493

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Total Organic Carbon	mg/L	10	10	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 574497 574498

Parameter	Units	P031026001 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Total Organic Carbon	mg/L	3.6	10	13	13	93	93	80-120	0.1	20	



ENVIRONMENTAL ANALYSES

QUALITY CONTROL DATA QUALIFIERS

Lab Order: P031034
Project ID: CCCWP-SSID/030.001.0202

QUALITY CONTROL PARAMETER QUALIFIERS

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

NS - means not spiked and will not have recoveries reported for Analyte Spike Amounts

QC Codes Keys: These descriptors are used to help identify the specific QC samples and clarify the report.

MB - Method Blank

Method Blanks are reported to the same Method Detection Limits (MDLs) or Reporting Limits (RLs) as the analytical samples in the corresponding QC batch.

LCS/LCSD - Laboratory Control Spike / Laboratory Control Spike Duplicate

DUP - Duplicate of Original Sample Matrix

MS/MSD - Matrix Spike / Matrix Spike Duplicate

RPD - Relative Percent Difference

%Recovery - Spike Recovery stated as a percentage

- 1 Analyte(s) reported as 'ND' means not detected at or above the listed Method Detection Limits (MDL).
- 6 Surrogate recoveries were not within QC Acceptance Criteria.



ENVIRONMENTAL ANALYSES

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Lab Order: P031034

Project ID: CCCWP-SSID/030.001.0202

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
P031034001	207R00011DS-W-02	ASTM D 3977-97	BIO/13669		
P031034002	207R00011US-W-02	ASTM D 3977-97	BIO/13669		
P031034001	207R00011DS-W-02	SW846 3510C	SPR/6382	SW846 8270 Mod	SMS/3416
P031034002	207R00011US-W-02	SW846 3510C	SPR/6382	SW846 8270 Mod	SMS/3416
P031034001	207R00011DS-W-02	EPA 608	SPR/6386	EPA 608	SMS/3412
P031034002	207R00011US-W-02	EPA 608	SPR/6386	EPA 608	SMS/3412
P031034001	207R00011DS-W-02	SM20-5310 B	WET/7533		
P031034002	207R00011US-W-02	SM20-5310 B	WET/7533		



1885 N. KELLY ROAD NAPA, CA 94558 (707) 258-4000 FAX (707) 226-1001
CHAIN OF CUSTODY

PROJECT NAME / PROJECT NUMBER:
 CCCWP-SSID / 030.001.0202

REPORT ATTN:
 Alessandro Hnatt

STATE: CA ZIP: 95073

ANALYSES REQUESTED

LAB ORDER # **9031834**

MAILING ADDRESS:
 3065 Porter St., Suite 101, Soquel

BILLING ADDRESS:
 Same as above

PHONE NUMBER: 831-477-2003
 FAX PHONE NUMBER: 831-477-0895

SAMPLER (PRINT & SIGN NAME):
 Alessandro Hnatt

ATTN: Alessandro Hnatt

TURN-AROUND TIME
 STANDARD
 RUSH
 DUE DATE: _____

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX	CONTAINER TYPE ¹ & AMOUNT ²	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GRAB	ANALYSES REQUESTED					REMARKS		
									Organochlorine Pesticides	Pyrethroids Pesticides	Fipronil	Degradates	TOC		SSC	
	3-26-11	12:40	Stirrnwr	2 x 1L AG	<6C	207R00011DS-W-01		Grab	X							
			Stirrnwr	2 x 1L AG	<6C	207R00011DS-W-02		Grab	X	X	X					
			Stirrnwr	3 x 40ml VOA	<6C, HCl	207R00011DS-W-02		Grab				X				
			Stirrnwr	250 ml HDPE	<6C	207R00011DS-W-01		Grab					X			
		14:00	Stirrnwr	2 x 1L AG	<6C	207R00011US-W-01		Grab	X							
			Stirrnwr	2 x 1L AG	<6C	207R00011US-W-02		Grab	X	X	X					
			Stirrnwr	3 x 40ml VOA	<6C, HCl	207R00011US-W-02		Grab				X				
			Stirrnwr	250 ml HDPE	<6C	207R00011US-W-01		Grab					X			

1 glass Carboy

RELINQUISHED BY
[Signature]

DATE/TIME
 3/26/11
 RECEIVED BY
[Signature]

RELINQUISHED BY

DATE/TIME

RECEIVED BY

FOR LAB USE ONLY

Samples: WC MICRO BIO AA SV VOA pH³ Y/N TEMP: SEALED: Y/N INTACT: Y/N

BD: B10 WC AA
 CC: AA SV VOA
 SLL: HP PT QT VOA
 W/HNO₃ H₂SO₄ NaOH
 P/L: HNO₃ H₂SO₄ NaOH HCl

COMMENTS:

MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.S. Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil Sludge; Solid; FP = ****CONTAINER TYPES:** AL = Amber Litr; AHL = 500 ml Amber; PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; BT = 4oz BACT; BI = Brass Tube; VOA = 40ml VOA; OTC = Other Type Container

R PR M F



1885 N. KELLY ROAD NAPA, CA 94558 (707) 258-4000 FAX (707) 226-1001
CHAIN OF CUSTODY

PROJECT NAME / PROJECT NUMBER
 CCCWP-SSID / 030.001.0202

LAB ORDER #
 P031634

CLIENT: ADH Environmental
 REPORT ADDR: Alessandro Hnat

ANALYSIS REQUESTED

MAILING ADDRESS: 3065 Porter St, Suite 101, Sonoma, CA 95073

BILLING ADDRESS: Same as above
 PHONE NUMBER: 831-477-2003 FAX PHONE NUMBER: 831-477-0995

SAMPLER (PRINT & SIGN NAME): Alessandro Hnat

CLIENT LAB #

TURN-AROUND TIME
 STANDARD
 RUSH

DUE DATE: _____

- Organochlorine Pesticides
- Pyrethroids Pesticides
- Fipronil
- Degradates
- TOC
- SSC

REMARKS

COLLECT LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX	CONTAINER AMOUNT	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP OR GRAB								
32614	7/14	1400	Stirrvtr	2 x 1L AG	<6C	207R00011US-W-01	Grab	X								
			Stirrvtr	2 x 1L AG	<6C	207R00011DS-W-02	Grab	X								
			Stirrvtr	3 x 40ml VOA	<6C, HCl	207R00011DS-W-02	Grab	X								
			Stirrvtr	250 ml HDPE	<6C	207R00011DS-W-01	Grab	X								
			Stirrvtr	2 x 1L AG	<6C	207R00011US-W-02	Grab	X								
			Stirrvtr	2 x 1L AG	<6C	207R00011US-W-01	Grab	X								
			Stirrvtr	3 x 40ml VOA	<6C, HCl	207R00011US-W-02	Grab	X								
			Stirrvtr	250 ml HDPE	<6C	207R00011US-W-01	Grab	X								

Adh

REMOVED BY: *[Signature]* DATE/TIME: *7/20/02* RECEIVED BY: *[Signature]* DATE/TIME: *7/20/02*

REMOVED BY: _____ DATE/TIME: _____ RECEIVED BY: _____ DATE/TIME: _____

Sample:	WC	MICRO	BIO	AA	SV	VOA	PT	YIN	TEMP.	SEALED:	YIN	INTACT:	YIN	
GC:	BID	W/C	AA											
CC:	AA	SV	VOA											
SL:	VP	PT	OT	VOA										
WH/CO:	H3SO		NICH											
P/L:	H2O	H3O	NICH	HCL										

COMMENTS: _____

MATRIX: AQ = Aqueous Noninking Water; Digested Metals; FE = Low R.L.s Aqueous Noninking Water; Digested Metals; DW = Drinking Water; SL = Soil Sludge; Solid; FP = _____

CONTAINER TYPES: AL = Amber Lier; ARL = 500 ml Amber; PT = Pint (Plastic); OT = Quart (Plastic); JIG = Half Gallon (Plastic); SJ = Soil Jar; BA = 4oz BAC; BI = Brass Tube; VOA = 40ml VOA; OTC = Other Types Container

IR _____ PR _____ LI _____ F _____

Alessandro D. Hnatt
 ADH Environmental
 3065 Porter Street, Suite 101
 Soquel, CA 95073

April 10, 2014

Alessandro:

I have enclosed one copy of our report “Evaluation of the Toxicity of Contra Costa Clean Water Program Stormwater Samples” for the samples that were collected February 26 and 28, 2014. The results of this testing are summarized below.

Toxicity summary for CCCWP stormwater samples.						
Sample Station	Toxicity relative to the Lab Control treatment?					
	<i>Selenastrum capricornutum</i>	<i>Ceriodaphnia dubia</i>		<i>Hyaella azteca</i>	Fathead Minnow	
	Growth	Survival	Reproduction	Survival	Survival	Growth
206R00551	no	no	no	no	no	no
207R00843	no	no	no	Yes	Yes	no
207R00011US				Yes		
207R00011DS				Yes		
544R00025US				Yes		
544R00025DS				Yes		

Chronic Toxicity of CCCWP Stormwater to *Selenastrum capricornutum*

There was **no** significant reduction in algal growth in the CCCWP stormwater samples.

Chronic Toxicity of CCCWP Stormwater to *Ceriodaphnia dubia*

There was **no** significant reduction in *C. dubia* survival or reproduction in the CCCWP stormwater samples.

Toxicity of CCCWP Stormwater to *Hyaella azteca*

There was **no** significant reduction in survival in the 206R00551 stormwater sample. However, there were significant reductions in *H. azteca* survival in the remaining CCCWP stormwater samples.

Chronic Toxicity of CCCWP Stormwater to Fathead Minnows

There was *no* significant reduction in fathead minnow survival or growth in the 206R00551 stormwater sample. There was a significant reduction in fathead minnow survival in the 207R00843 stormwater sample. However, pathogen-related mortality (PRM) was observed in both stormwater samples. It is our best professional judgment that the observations of PRM are not associated with or indicative of stormwater toxicity (indeed, had the stormwater been toxic, the pathogens might have been killed or otherwise impaired before the fish were [e.g., toxicants are often used as therapeutic treatments for control of pathogens in fish cultures]).

If you have any questions regarding the performance and interpretation of these tests, feel free to contact my colleague Eddie Kalombo or myself at (707) 207-7760.

Sincerely,

Stephen L. Clark
Vice President/Special Projects Director



Pacific EcoRisk is accredited in accordance with NELAP (ORELAP ID 4043). Pacific EcoRisk certifies that the test results reported herein conform to the most current NELAP requirements for parameters for which accreditation is required and available. Any exceptions to NELAP requirements are noted, where applicable, in the body of the report. This report shall not be reproduced, except in full, without the written consent of Pacific EcoRisk. This testing was performed under Lab Order 19397.



Evaluation of the Toxicity of Contra Costa Clean Water Program Stormwater Samples

Samples collected February 26 and 28, 2014

Prepared For:

ADH Environmental
3065 Porter Street, Suite 101
Soquel, CA 95073

Prepared By:

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534

April 2014



PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

Evaluation of the Toxicity of Contra Costa Clean Water Program Stormwater Samples

Samples collected February 26 and 28, 2014

Table of Contents

	Page
1. INTRODUCTION	1
2. TOXICITY TEST PROCEDURES	1
2.1 Sample Receipt and Handling.....	1
2.2 Algal Growth Toxicity Testing with <i>Selenastrum capricornutum</i>	2
2.2.1 Reference Toxicant Testing of the <i>Selenastrum capricornutum</i>	3
2.3 Survival and Reproduction Toxicity Testing with <i>Ceriodaphnia dubia</i>	3
2.3.1 Reference Toxicant Testing of the <i>Ceriodaphnia dubia</i>	4
2.4 Survival Toxicity Testing of Stormwater Samples with <i>Hyaella azteca</i>	4
2.4.1 Reference Toxicant Testing of the <i>Hyaella azteca</i>	5
2.5 Survival and Growth Toxicity Testing with Larval Fathead Minnows	5
2.5.1 Reference Toxicant Testing of the Fathead Minnows.....	6
3. RESULTS	7
3.1 Effects of the CCCWP Stormwater on <i>Selenastrum capricornutum</i>	7
3.2 Effects of the CCCWP Stormwater on <i>Ceriodaphnia dubia</i>	7
3.3 Effects of the CCCWP Stormwater on <i>Hyaella azteca</i>	8
3.4 Effects of the CCCWP Stormwater on Fathead Minnows	8
3.4.1 Pathogen Related Mortality (PRM) Evaluation	9
4. AQUATIC TOXICITY DATA QUALITY CONTROL.....	13
4.1 Maintenance of Acceptable Test Conditions	13
4.2 Negative Control Testing.....	13
4.3 Positive Control Testing	13
4.3.1 Reference Toxicant Toxicity to <i>Selenastrum capricornutum</i>	13
4.3.2 Reference Toxicant Toxicity to <i>Ceriodaphnia dubia</i>	14
4.3.3 Reference Toxicant Toxicity to <i>Hyaella azteca</i>	14
4.3.4 Reference Toxicant Toxicity to Fathead Minnows	15
4.4 Concentration Response Relationships.....	15
5. SUMMARY & CONCLUSIONS.....	16



Appendices

- Appendix A Chain-of-Custody Records for the Collection and Delivery of the CCCWP Stormwater Samples
- Appendix B Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of CCCWP Stormwater to *Selenastrum capricornutum*
- Appendix C Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of CCCWP Stormwater to *Ceriodaphnia dubia*
- Appendix D Test Data and Summary of Statistics for the Evaluation of the Toxicity of CCCWP Stormwater to *Hyalella azteca*
- Appendix E Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of CCCWP Stormwater to Fathead Minnows
- Appendix F Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Selenastrum capricornutum*
- Appendix G Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Ceriodaphnia dubia*
- Appendix H Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Hyalella azteca*
- Appendix I Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the Fathead Minnow
- Appendix J Supplemental Data/Information Required to Document Observations of Pathogen-Related Mortality in the Chronic Fathead Minnow Test



1. INTRODUCTION

Under contract to ADH Environmental, and in support of the Bay Area Stormwater Management Agencies Association (BASMAA) Regional Monitoring Coalition ongoing monitoring efforts, Pacific EcoRisk (PER) has been contracted to evaluate the chronic toxicity of stormwater samples collected for the Contra Costa Clean Water Program (CCCWP). This evaluation consist of performing the following US EPA and modified-EPA short-term chronic toxicity tests:

- 96-hour algal growth test with the green alga *Selenastrum capricornutum*;
- 3-brood (6-8 day) survival and reproduction test with the crustacean *Ceriodaphnia dubia*;
- 10-day survival test with the freshwater amphipod *Hyalella azteca*; and
- 7-day survival and growth test with larval fathead minnows (*Pimephales promelas*).

These toxicity tests were conducted on stormwater samples collected on February 26 and 28, 2014. In order to assess the sensitivity of the test organisms to toxic stress, reference toxicant tests were also performed. This report describes the performance and results of these tests.

2. TOXICITY TEST PROCEDURES

The methods used in conducting the testing with *S. capricornutum*, *C. dubia*, and fathead minnows followed the guidelines established by the EPA manual "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition" (EPA-821-R-02-013).

Testing with *H. azteca* followed the SWAMP test protocol, which is based on a modification of the US EPA guidelines, "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates" (EPA/600/R-99/064).

2.1 Sample Receipt and Handling

On February 26 and 28, ADH collected stormwater samples into appropriately-cleaned containers, which were transported, on ice and under chain-of-custody, to the PER testing laboratory in Fairfield, CA. Upon receipt at the testing laboratory, aliquots of each sample were collected for analysis of initial water quality characteristics (Table 1), with the remainder of each sample being stored at 0-6°C except when being used to prepare test solutions.

The chain-of-custody records for the collection and delivery of these stormwater samples are provided as Appendix A.



Date Sample Received	Sample ID	Temp (°C)	pH	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Total Ammonia (mg/L N)
2/27/14	206R00551	0.4	7.46	10.4	226	304	907	<1.0
2/27/14	207R00843	0.6	7.63	10.7	83	104	283	<1.0
2/28/14	207R00011US-W-01	8.5	7.87	9.9	59	92	323	<1.0
2/28/14	207R00011DS-W-01	8.2	7.98	9.6	37	64	186	<1.0
2/28/14	544R00025US-W-02	4.3	7.87	9.8	76	244	1153	<1.0
2/28/14	544R00025DS-W-02	10.7	7.87	9.5	72	229	1080	<1.0

2.2 Algal Growth Toxicity Testing with *Selenastrum capricornutum*

The short-term chronic toxicity algal test consists of exposing *Selenastrum capricornutum* to the stormwater samples for ~ 96-hrs, after which the effects on cell growth are evaluated. The specific procedures used in this test are described below.

The Lab Control water for this test consisted of Type 1 Lab Water (reverse-osmosis, de-ionized water). The stormwater sample was tested at the 100% concentration only. The Lab Control water and the stormwater sample were filtered (using sterile 0.45 µm filters) and then spiked with nutrients (without any added EDTA) before use in this test, as per testing guidelines. “New” water quality characteristics (pH, dissolved oxygen [D.O.], and conductivity) were measured on the resulting test solutions prior to use in the test.

There were 4 replicates at each test treatment, each replicate consisting of a 250-mL glass Erlenmeyer flask containing 100 mL of test solution. Each flask was inoculated to an initial algal cell density of 10,000 cells/mL from a laboratory culture of *S. capricornutum* that is maintained in log growth phase. These flasks were loosely-capped and randomly positioned within a temperature-controlled room at 25°C, under continuous cool-white fluorescent illumination.

Each day, the temperature and pH were measured and recorded from one randomly-selected replicate at each treatment; each replicate flask was gently shaken in the three times daily and re-positioned within the temperature-controlled room.

After 96 (+2) hrs exposure, the flasks were removed from the temperature-controlled room and the algal cell density in each was determined by spectrophotometric analysis. The resulting cell density data were analyzed to evaluate any growth impairment, or toxicity, caused by the stormwater sample; all statistical analyses were performed using CETIS[®] statistical software (TidePool Scientific, McKinleyville, CA).



2.2.1 Reference Toxicant Testing of the *Selenastrum capricornutum*

In order to assess the sensitivity of the *S. capricornutum* to toxic stress, a monthly reference toxicant test was performed. The reference toxicant test was performed similarly to the stormwater tests except that test solutions consisted of Lab Control water spiked with NaCl at concentrations of 0.125, 0.25, 0.5, 1, 2, and 4 g/L. The resulting test response data were statistically analyzed to determine key dose-response point estimates (e.g., IC₅₀); all statistical analyses were made using the CETIS[®] software. These response endpoints were then compared to the typical response range established by the mean \pm 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

2.3 Survival and Reproduction Toxicity Testing with *Ceriodaphnia dubia*

The short-term chronic *C. dubia* test consists of exposing individual females to the stormwater samples for the length of time it takes for the Lab Control treatment females to produce 3 broods (typically 6-8 days), after which effects on survival and reproduction are evaluated. The specific procedures used in this test are described below.

The Lab Control water for this test consisted of modified EPA synthetic moderately-hard water. The stormwater sample was tested at the 100% concentration only. For each treatment, a 200 mL aliquot of test solution was amended with the alga *Selenastrum capricornutum* and Yeast-Cerophyll[®]-Trout (YCT) to provide food for the test organisms. “New” water quality characteristics (pH, D.O., and conductivity) were measured on these food-amended test solutions prior to use in this test.

There were 10 replicates at each test treatment, each replicate consisting of 15 mL of test solution in a 30-mL plastic cup. These “3-brood” tests were initiated by allocating one neonate (<24 hours old, and within 8 hours of age) *C. dubia*, obtained from in-house laboratory cultures, into each replicate cup. The replicate cups were placed into a temperature-controlled room at 25°C, under cool-white fluorescent lighting on a 16L:8D photoperiod.

Each day of the test, fresh test solutions and a “new” set of replicate cups were prepared, as before. “New” water quality characteristics (pH, D.O., and conductivity) were measured on these solutions prior to use in the tests. The test replicate cups were removed from the temperature-controlled room and then each replicate was examined, with surviving “original” individual organisms being transferred to the corresponding new replicate cup; the new replicate cups, now carrying *C. dubia* in fresh media, were then returned to the temperature-controlled room. Each old replicate cup was carefully examined to determine the number of neonate offspring produced by each original organism, after which the “old” water quality characteristics (pH, D.O., and conductivity) were measured for the old test solution from one randomly-selected replicate at each treatment.



After it was determined that $\geq 60\%$ of the *C. dubia* in the Lab Control treatments had produced their third brood of offspring, the accompanying stormwater sample test was terminated. The resulting survival and reproduction (number of offspring) data were analyzed to evaluate any impairments caused by the stormwater sample; all statistical analyses were performed using the CETIS[®] statistical software.

2.3.1 Reference Toxicant Testing of the *Ceriodaphnia dubia*

In order to assess the sensitivity of the *C. dubia* test organisms to toxic stress, a monthly reference toxicant test was performed. The reference toxicant test was performed similarly to the stormwater tests, except that test solutions consisted of the Lab Control water spiked with NaCl at concentrations of 500, 1000, 1500, 2000, and 2500 mg/L. The resulting test response data were statistically analyzed to determine key dose-response point estimates (e.g., IC₅₀); all statistical analyses were made using the CETIS[®] software. These response endpoints were then compared to the typical response range established by the mean \pm 2 SD of the point estimates generated by the most recent previous reference toxicant tests performed by this lab.

2.4 Survival Toxicity Testing of Stormwater Samples with *Hyalella azteca*

This test consists of exposing the amphipods to the stormwater samples for 10 days, after which effects on survival are evaluated. The specific procedures used in this testing are described below.

The *H. azteca* used in this testing were obtained from a commercial supplier (Chesapeake Cultures, VA). Upon receipt at the PER laboratory, the organisms were maintained at 23°C in aerated aquaria containing Standard Artificial Medium (SAM-5S) water (Borgmann 1996) prior to their use in this test. During this pre-test period, the organisms were fed the alga *Selenastrum capricornutum* and YCT amended with *Spirulina*.

The Lab Control water for these tests consisted of SAM-5S water. The stormwater samples were tested at the 100% concentration only. “New” water quality characteristics (pH, D.O., and conductivity) were measured on the test solutions prior to use in these tests.

There were 5 replicates for each test treatment, each replicate consisting a 250-mL glass beaker containing 100 mL of test solution. These tests were initiated by allocating 10 *H. azteca*, into each replicate, followed by the addition of 1.5 mL of *Spirulina* amended YCT. The replicate beakers were placed into a temperature-controlled room at 23°C, under cool-white fluorescent lighting on a 16L:8D photoperiod.

Each day of the tests, each replicate beaker was examined and the number of surviving organisms determined; ‘old’ water quality characteristics were measured in one randomly-selected beaker at each test treatment at this time. On Days 2, 4, 6, and 8 of the test, the organisms were fed 1.5 mL of *Spirulina* amended YCT in each test chamber.



On Day 5 of the 10-day tests, fresh test solutions were prepared and characterized, as before. Each replicate was examined, with any dead animals, uneaten food, wastes, and other detritus being removed. The number of live organisms in each replicate was determined and then approximately 80% of the test media in each beaker was carefully poured out and replaced with fresh test solution. "Old" water quality characteristics (pH, D.O., and conductivity) were measured on the old test solution that had been discarded from one randomly-selected replicate at each treatment.

After 10 days of exposure, the tests were terminated and the number of live organisms in each replicate was recorded. The resulting survival data were analyzed to evaluate any impairment due to the stormwater samples; all statistical analyses were performed using CETIS[®] statistical software.

2.4.1 Reference Toxicant Testing of the *Hyaella azteca*

In order to assess the sensitivity of the *H. azteca* test organisms to toxic stress, a reference toxicant test was performed. The reference toxicant test was performed similarly to the stormwater tests, except that test solutions consisted of Control water spiked with KCl at test concentrations of 0, 0.1, 0.2, 0.4, 0.8 and 1.6 g/L, and the test was performed for 96 hours. The resulting survival data were statistically analyzed to determine key dose-response point estimates (e.g., EC50); all statistical analyses were made using the CETIS[®] software. This response endpoint was then compared to the 'typical response' range established by the mean \pm 2 SD of the point estimates generated by the 20 most recent previous reference toxicant tests performed by this lab.

2.5 Survival and Growth Toxicity Testing with Larval Fathead Minnows

The short-term chronic fathead minnow test consists of exposing larval fish to the stormwater for 7 days, after which effects on survival and growth are evaluated. The specific procedures used in this testing are described below.

The larval fathead minnows used in this test were obtained from a commercial supplier (Aquatox, Hot Springs, AR). Upon receipt at the testing lab, the larval fish were maintained in aerated tanks of EPA moderately-hard water at 25°C, and were fed brine shrimp nauplii *ad libitum*.

The Lab Water Control/dilution water for this test consisted of EPA synthetic moderately-hard water. The stormwater samples were tested at the 100% concentration only. "New" water quality characteristics (pH, D.O., and conductivity) were measured on these test solutions prior to use in the tests.



There were 4 replicates for each test treatment, each replicate consisting of 400 mL of test solution in a 600-mL glass beaker. The test was initiated by randomly allocating 10 larval fathead minnows (<48 hrs old) into each replicate. These replicate beakers were placed in a temperature-controlled room at 25°C, under cool-white fluorescent lighting on a 16L:8D photoperiod. The test fish were fed brine shrimp nauplii twice daily.

Each day of the test, fresh test solutions were prepared for each treatment, and water quality characteristics were determined as before. The beakers containing the fathead minnows were examined, with any dead animals, uneaten food, wastes, and other detritus being removed. The number of live fish in each replicate was determined and then approximately 80% of the old test media in each beaker was carefully poured out and replaced with fresh test solution. “Old” water quality characteristics (pH, D.O., and conductivity) were measured on the old test water that had been discarded from one randomly selected replicate at each treatment.

After 7 days exposure, the tests were terminated and the number of live fish in each replicate beaker was recorded. The fish from each replicate were then carefully euthanized in methanol, rinsed in de-ionized water, and transferred to a pre-dried and pre-tared weighing pan. These fish were then dried at 100°C for >24 hrs and re-weighed to determine the total weight of fish in each replicate. The total weight was then divided by the initial number of fish per replicate (n=10) to determine the “biomass value”. The resulting survival and growth data were analyzed to evaluate any impairment(s) caused by the stormwater sample; all statistical analyses were performed using the CETIS® statistical software.

2.5.1 Reference Toxicant Testing of the Fathead Minnows

In order to assess the sensitivity of the fish to toxic stress, a reference toxicant test was performed. The reference toxicant test was performed similarly to the stormwater tests, except that test solutions consisted of “Lab Control” media spiked with NaCl at test concentrations of 0.75, 1.5, 3, 6, and 9 g/L. The resulting test response data were analyzed to determine key dose-response point estimates (e.g., EC50); all statistical analyses were made using the CETIS® software. These response endpoints were then compared to the ‘typical response’ range established by the mean ± 2 SD of the point estimates generated by the 20 most recent previous reference toxicant tests performed by this lab.



3. RESULTS

3.1 Effects of the CCCWP Stormwater on *Selenastrum capricornutum*

The results for this test are summarized below in Table 2. There was ***no*** significant reduction in algal growth in the CCCWP stormwater samples.

The test data and summary of statistical analyses for this test are presented in Appendix B.

Table 2. Effects of CCCWP stormwater on <i>Selenastrum capricornutum</i> .		
Test Initiation Date (Time)	Treatment/Sample ID	Mean Algal Cell Density (cells/mL x 10 ⁶)
2/27/24 (1715)	Lab Control	2.83
	206R00551	7.19
	207R00843	7.01

3.2 Effects of the CCCWP Stormwater on *Ceriodaphnia dubia*

The results for this test are summarized below in Table 3. There was ***no*** significant reduction in *Ceriodaphnia dubia* survival or reproduction in the CCCWP stormwater samples.

The test data and summary of statistical analyses for this test are presented in Appendix C.

Table 3. Effects of CCCWP stormwater on <i>Ceriodaphnia dubia</i> .			
Test Initiation Date (Time)	Treatment/Sample ID	Mean % Survival	Mean Reproduction (# neonates/female)
2/27/14 (1600)	Lab Control	100	31.3
	206R00551	100	28.9
	207R00843	90	29.1



3.3 Effects of the CCCWP Stormwater on *Hyaella azteca*

The results for these tests are summarized below in Table 4. There was *no* significant reduction in survival in the 206R00551 stormwater sample. However, there were significant reductions in *H. azteca* survival in the remaining CCCWP stormwater samples. The test data and summary of statistical analyses for these tests are presented in Appendix D.

Test Initiation Date (Time)	Treatment/Sample ID	10-Day Mean % Survival
2/27/14 (1800)	Lab Control	98
	206R00551	94
	207R00843	64*
2/28/14 (1750)	Lab Control	96
	207R00011US	48*
	207R00011DS	48*
	544R00025US	18*
	544R00025DS	6*

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

3.4 Effects of the CCCWP Stormwater on Fathead Minnows

The results for this test are summarized below in Table 5. There was *no* significant reduction in fathead minnow survival or growth in the 206R00551 stormwater sample. There was a significant reduction in fathead minnow survival in the 207R00843 stormwater sample. However, pathogen-related mortality (PRM) was observed in both stormwater samples. It is our best professional judgment that the observations of PRM are not associated with or indicative of stormwater toxicity (indeed, had the stormwater been toxic, the pathogens might have been killed or otherwise impaired before the fish were [e.g., toxicants are often used as therapeutic treatments for control of pathogens in fish cultures]). The test data and summary of statistical analyses for this test are presented in Appendix E.

Test Initiation Date (Time)	Treatment/Sample ID	Mean % Survival	Mean Biomass Value (mg)
2/27/14 (1700)	Lab Control	100	0.72
	206R00551	92.5 ^a	0.73
	207R00843	57.5*^a	0.59

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

a – PRM was observed in multiple replicates for this stormwater sample.



3.4.1 Pathogen Related Mortality (PRM) Evaluation

Per contractual requirements ADH Environmental, PER has agreed to include all observations leading identification PRM. This evaluation consisted of performing tasks:

1. Provide a brief narrative describing the observations leading to the determination that PRM interference had occurred.
 - On March 1, 2 and 3, PRM was observed in test replicate B and C the 206R00551 stormwater sample, and all test replicates of the 207R00843 stormwater sample.
2. Provide “Comments and Observations” sheets with daily records completed by PER identifying PRM in treatments (i.e., stormwater sample ID) and replicates, as well as the number(s) of affected fish.
 - The Comments and Observation sheet is provided in Appendix J.
3. Provide photographs of representative fish from each affected water sample identified by treatment, replicate, and date.



Figure 1: Photo of PRM affected fish in Replicate B of 206R00551. Observed on March 2, 2014.



Figure 2: Photo of PRM affected fish in Replicate D of 207R00843. Observed on March 1, 2014.

4. Provide a photograph of a non-pathogenic fish from a replicate affected by PRM, identified by treatment, replicate, and date.



Figure 3: Photo of non-pathogenic fish in Replicate B of 206R00551. Taken at test termination, March 6, 2014.

5. Provide a photograph of a fish from a lab control treatment documenting the absence of PRM in the Lab Control treatment, identified by treatment, replicate, and date.

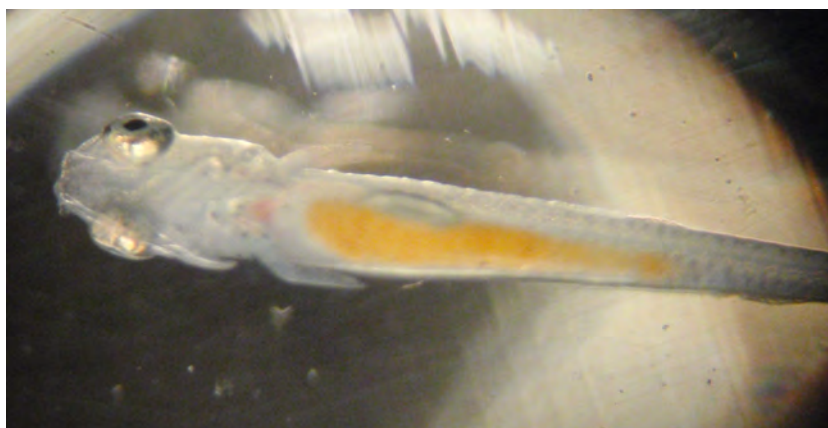


Figure 4: Photo of Control fish in Replicate A. Taken at test termination, March 6, 2014.

6. Provide a photograph of a lab control beaker showing the water in a lab control replicate and a photograph of a replicate beaker affected by PRM prior to test termination.

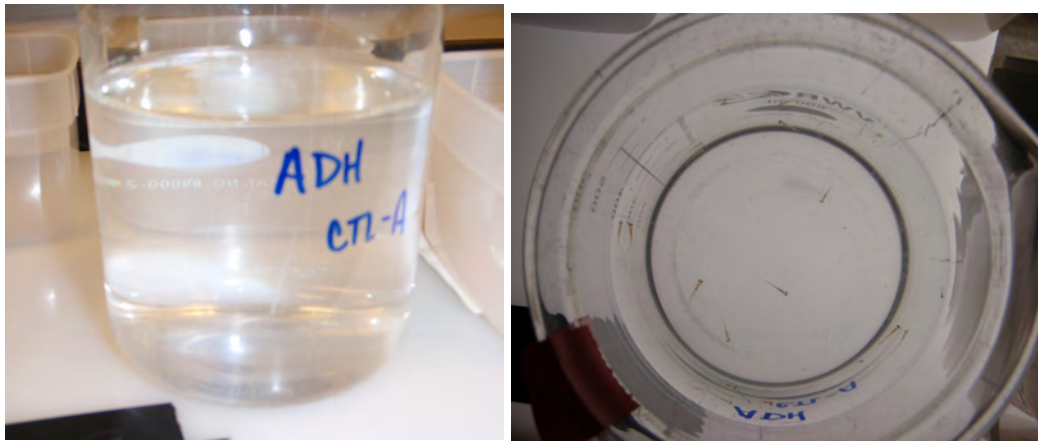


Figure 5: Photo of Lab Control Replicate A. Taken at test termination, March 6, 2014.

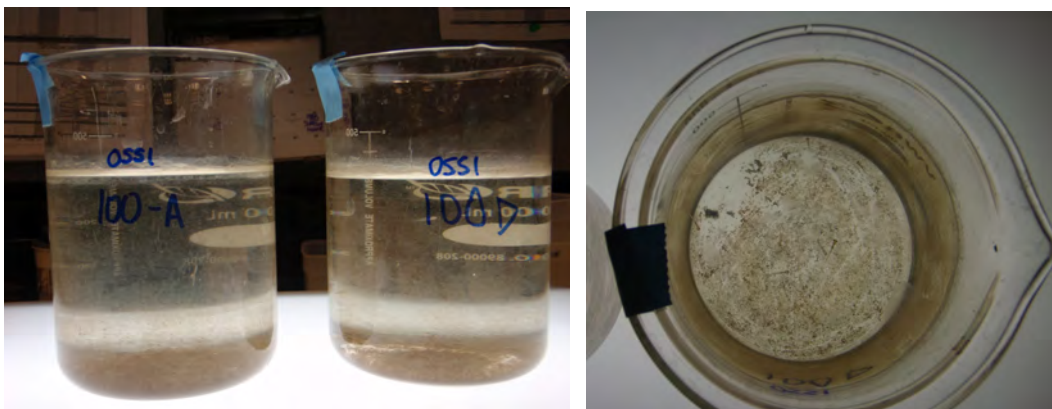


Figure 6: Photo of non-pathogen affected (Rep A & D) of 206R00551 stormwater sample.



Figure 7: Photo of pathogen affected (Rep B & C) of 207R00843 stormwater sample.

7. Provide a discussion of the calculated CV for the PRM-affected sample(s).
 - The EPA testing manual indicates a CV of >40% “*may be*” an indication of pathogen interference. However it is worth noting that there is no mandate that CV **must be** >40% in order to characterize mortalities as related to pathogen interference.
 - The supporting documentation (pictures and test observations) clearly indicates that PRM was present in the 206R00551 and 207R00843 stormwater samples.
 - The survival CV was 10.4% and the growth CV was 13.0% for the affected 206R00551 stormwater sample. Although though test CVs for the affected sample were not >40%, the photo documentation clearly supports the presence of PRM.
 - The survival CV was 57.5% and the growth CV was 38.4% for the affected 207R00843 stormwater sample.

8. Provide documentation that the presence of PRM was not a reflection of poor laboratory.
 - As is clearly evident, PRM accounted for all mortality observed in the 206R00551 and 207R00843 stormwater samples. There was 100% survival at the Lab water control treatment and 92.5% survival in the 206R00551 and 57.5% survival in the 207R00843 stormwater sample. The absence of PRM in the Laboratory Control treatment eliminates the fish source, husbandry, etc., as causes of PRM.
 - Pacific EcoRisk adheres to good laboratory practices when performing aquatic toxicity tests, as per guidance found in Section 11.3.4.3 of the EPA testing manual (USEPA, 2002). Our test change procedures requires that:
 - All test equipment, glassware, and pipettes are kept dry and clean during the duration of the test.
 - For all stormwater samples, staff use of separate glassware, pipettes, and siphons for each test replicate in order to minimize cross-contamination from an affected test replicate into a non-affected replicate.
 - Prior of each test renewal, care was taken to properly clean test chambers by removing excess food, dead fish larvae, and other debris.

In conclusion, PRM was present in the 206R00551 and 207R00843 stormwater samples and was not present in the Laboratory Control treatment, as is supported by photo documentation. It is important to note that PRM was present in the 206R00551 stormwater sample even though the test CV was much less than 40%. The observed PRM was not related to the source of the test organisms (i.e., PRM was not observed in the Lab Control treatment) or laboratory practices (i.e., all good laboratory practices were followed).



4. AQUATIC TOXICITY DATA QUALITY CONTROL

Four QC measures were assessed during the toxicity testing:

- Maintenance of acceptable test conditions;
- Negative Control testing;
- Positive Control (reference toxicant) testing; and
- Concentration Response Relationship assessment.

4.1 Maintenance of Acceptable Test Conditions

All test conditions (pH, D.O., temperature, etc.) were within acceptable limits for these tests. All analyses were performed according to laboratory Standard Operating Procedures.

4.2 Negative Control Testing

The responses at the Lab Control treatments were acceptable.

4.3 Positive Control Testing

4.3.1 Reference Toxicant Toxicity to *Selenastrum capricornutum*

The results of this test are summarized below in Table 6. The IC₅₀ for this test was consistent with the “typical response” range established by the reference toxicant test database for this species, indicating that these organisms were responding to toxic stress in a typical fashion. The test data and summary of statistical analyses for this test are presented in Appendix F.

Table 6. Reference toxicant testing: Effects of NaCl on <i>Selenastrum capricornutum</i> growth.	
NaCl Treatment (g/L)	Mean Algal Cell Density (cells/mL x 10 ⁶)
Lab Control	3.12
0.125	2.87*
0.25	2.93*
0.5	2.75*
1	2.49*
2	1.98*
4	0.48*
Summary of Statistics	
IC ₂₅ =	2.6 g/L NaCl
“Typical response” range (mean ± 2 SD)	1.0 – 3.2 g/L NaCl

* Significantly less than the Lab Control treatment response at p < 0.05.



4.3.2 Reference Toxicant Toxicity to *Ceriodaphnia dubia*

The results of this test are summarized below in Table 7. The EC₅₀ and IC₅₀ for this test were both consistent with the “typical response” ranges established by reference toxicant test database for this species, indicating that these organisms were responding to toxic stress in a typical fashion. The test data and the summary of statistical analyses for this test are presented in Appendix G.

NaCl Treatment (mg/L)	Mean % Survival	Reproduction (# neonates/female)
Lab Water Control	90	22.9
500	80	18.2
1000	100	24.6
1500	80	8.2*
2000	60	0.2*
2500	10*	-
Summary of Key Statistics		
Survival EC ₅₀ or Reproduction IC ₅₀ =	2120 mg/L NaCl	1380 mg/L NaCl
“Typical response” range (mean ± 2 SD)	1708 – 2142 mg/L NaCl	1333 – 1792 mg/L NaCl

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

4.3.3 Reference Toxicant Toxicity to *Hyalella azteca*

The results of this test are presented in Table 8. The EC₅₀ for this test was consistent with the “typical response” range established by the reference toxicant test database for this species, indicating that these organisms were responding to toxic stress in a typical fashion. The test data and summary of statistical analyses for this test are presented in Appendix H.

KCl Treatment (g/L)	Mean% Survival
Control	100
0.1	100
0.2	100
0.4	100
0.8	10*
1.6	0*
Summary of Statistics	
EC ₅₀ =	0.61 g/L KCl
“Typical response” range (mean ±2 SD)	0.25 – 0.62 g/L KCl

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.



4.3.4 Reference Toxicant Toxicity to Fathead Minnows

The results of this test are summarized below in Table 9. The EC₅₀ and IC₅₀ for this test were both consistent with the “typical response” ranges established by the reference toxicant test database for this species, indicating that these organisms were responding to toxic stress in a typical fashion. The test data and summary of statistical analyses for this test are presented in Appendix I.

Table 9. Reference toxicant testing: Effects of NaCl on fathead minnows.		
NaCl Treatment (gm/L)	Mean % Survival	Mean Biomass Value (mg)
Lab Control	100	0.73
0.75	92.5	0.72
1.5	90	0.65*
3	37.5*	0.24
6	47.5*	0.24
9	0*	-
Summary of Statistics		
Survival EC ₅₀ or Growth IC ₅₀ =	3.3 g/L NaCl	2.5 g/L NaCl
“Typical response” range (mean ±2 SD)	2.6 – 6.1 g/L NaCl	2.1 – 4.8 g/L NaCl

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

4.4 Concentration Response Relationships

The concentration-response relationships for the reference toxicant tests were evaluated as per EPA guidelines (EPA-821-B-00-004), and were determined to be acceptable.



5. SUMMARY & CONCLUSIONS

Chronic Toxicity of CCCWP Stormwater to *Selenastrum capricornutum*

There was ***no*** significant reduction in algal growth in the CCCWP stormwater samples.

Chronic Toxicity of CCCWP Stormwater to *Ceriodaphnia dubia*

There was ***no*** significant reduction in *C. dubia* survival or reproduction in the CCCWP stormwater samples.

Chronic Toxicity of CCCWP Stormwater to *Hyaella azteca*

There was ***no*** significant reduction in survival in the 206R00551 stormwater sample. However, there were significant reductions in *H. azteca* survival in the remaining CCCWP stormwater samples

Chronic Toxicity of CCCWP Stormwater to Fathead Minnows

There was ***no*** significant reduction in fathead minnow survival or growth in the 206R00551 stormwater sample. There was a significant reduction in fathead minnow survival in the 207R00843 stormwater sample. However, pathogen-related mortality (PRM) was observed in both stormwater samples. It is our best professional judgment that the observations of PRM are not associated with or indicative of stormwater toxicity (indeed, had the stormwater been toxic, the pathogens might have been killed or otherwise impaired before the fish were [e.g., toxicants are often used as therapeutic treatments for control of pathogens in fish cultures]).



Appendix A

Chain-of-Custody Records for the Collection and Delivery of the CCCWP Stormwater Samples





Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
 (707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Client Name: ADH Environmental				REQUESTED ANALYSIS																									
Client Address: 3065 Porter Street, Suite 101 Soquel, CA 95073				Chronic Selenastrum capricornutum	Chronic Ceriodaphnia dubia	Chronic Pimephales promelas	10-day Hyalella azteca (water)	10-day Hyalella azteca (sediment)																					
Phone: 831 477-2003 FAX:																													
Project Manager: Alessandro Hnatt																													
Project Name: CCCWP - Creek Status																													
Project # / P.O. Number: 030.001.0100																													
Project # / P.O. Number: 030.001.0100																													
Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container																									
				Number	Type																								
1 206R00551	02-26-14	15:20	STRMW		10 x 1 ga AG	x	x	x	x																				
2 207R00843	02-26-14	17:45	STRMW		10 x 1 ga AG	x	x	x	x																				
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													
12																													
Samples collected by: Kevin Lewis, Eric Dhakni / ADH Environmental																													
Comments/Special Instruction: contract # 030 001 0100 CCCWP - Creek Status				RELINQUISHED BY:								RECEIVED BY:																	
				Signature: <i>Cameron Carothers</i>								Signature: <i>Y. Khadigev</i>																	
				Print: <i>Cameron Carothers</i>								Print: <i>Y. Khadigev</i>																	
				Organization: <i>ADH</i>								Organization: <i>PER</i>																	
				Date: <i>2-27-14</i> Time: <i>1611</i>								Date: <i>2/27/14</i> Time: <i>1611</i>																	
				RELINQUISHED BY:								RECEIVED BY:																	
				Signature:								Signature:																	
				Print:								Print:																	
Organization:								Organization:																					
Date:								Time:								Date:								Time:					

*Example Matrix Codes: (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other



Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
 (707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Client Name: ADH Environmental				REQUESTED ANALYSIS																
Client Address: 3065 Porter Street, Suite 101				Chronic Selenastrum capricornutum	Chronic Ceriodaphnia dubia	Chronic Pimephales promelas	10-day Hyalella azteca (water)	10-day Hyalella azteca (sediment)												
Soquel, CA 95073																				
Phone: 831 477-2003		FAX:																		
Project Manager: Alessandro Hnatt																				
Project Name: CCCWP - SSID																				
Project # / P.O. Number: 030.001.0202																				
Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container																
				Number	Type															
1 207R00011DS-W-01	2-28-14	0645	STRMW	10	3.7L glass							x								
2 207R00011US-W-01	2-28-14	0955	STRMW	10	3.7L glass							x								
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
12																				

Samples collected by:

Comments/Special Instruction:	RELINQUISHED BY:		RECEIVED BY:	
	Signature: <i>Calvin Sandlin</i>		Signature: <i>Y. Khadiryeva</i>	
	Print: Calvin Sandlin		Print: Y. Khadiryeva	
	Organization: ADH		Organization: PER	
	Date: 2-28-14 Time: 1143		Date: 2-28-14 Time: 1143	
	RELINQUISHED BY:		RECEIVED BY:	
	Signature:		Signature:	
	Print:		Print:	
Organization:		Organization:		
Date:		Date:		
Time:		Time:		

*Example Matrix Codes: (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other



Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
(707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Client Name: <i>ADH Environmental</i>				REQUESTED ANALYSIS																				
Client Address:				Chronic Selenastrum capricornutum Chronic Ceriodaphnia dubia Chronic Pimephales promelas 10-day Survival Hyalella azteca (water) 10-day Hyalella azteca (sediment)																				
Phone:																								
FAX:																								
Project Manager:																								
Project Name: <i>CCCWP-SSI</i>																								
Project # / P.O. Number: <i>030.001.0202</i>																								
Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container																				
				Number	Type																			
1 <i>544R00025DS-W-02</i>	<i>2-28-14</i>	<i>0930</i>	<i>STRMW</i>	<i>10</i>	<i>1 gall. amber</i>																			
2 <i>544R00025US-W-02</i>	<i>2-28-14</i>	<i>1000</i>	<i>STRMW</i>	<i>AW</i>	<i>1 gal amber</i>																			
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
12																								
Samples collected by:																								
Comments/Special Instruction: Note - Fathead minnow testing is to be performed using the standard EPA protocol (i.e., 4 replicates) <i>Contract # 030.001.0202</i> <i>SSID Study task 2g</i>				RELINQUISHED BY:						RECEIVED BY:														
				Signature: <i>Adam Wainscoat</i>						Signature: <i>Adam Wainscoat</i>														
				Print: <i>Adam Wainscoat</i>						Print: <i>C. Gloner</i>														
				Organization:						Organization: <i>PER</i>														
Date: <i>2-28-14</i> Time: <i>1520</i>						Date: <i>2/28/14</i> Time: <i>1520</i>																		
				RELINQUISHED BY:						RECEIVED BY:														
				Signature:						Signature:														
				Print:						Print:														
				Organization:						Organization:														
Date:						Date:																		
Time:						Time:																		

*Example Matrix Codes: (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other

Appendix B

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the CCCWP Stormwater to *Selenastrum capricornutum*



CETIS Summary Report

Report Date: 12 Mar-14 12:14 (p 1 of 1)
 Test Code: ADH_0227_SC_C1 | 02-3497-5955

Algal Growth Test							Pacific EcoRisk			
Batch ID:	01-1997-4859	Test Type:	Cell Growth		Analyst:	Cassy Glover				
Start Date:	27 Feb-14 17:15	Protocol:	EPA-821-R-02-013 (2002)		Diluent:	Not Applicable				
Ending Date:	03 Mar-14 16:00	Species:	Selenastrum capricornutum		Brine:	Not Applicable				
Duration:	95h	Source:	In-House Culture		Age:	6				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
LABQA	09-8486-0532	27 Feb-14 17:15	27 Feb-14 17:15	NA (25.3 °C)	ADH Environmental, Inc.	19397				
207R00843	14-6517-7241	26 Feb-14 17:45	27 Feb-14 16:11	23h (0.6 °C)						
206R00551	08-4072-0786	26 Feb-14 15:20	27 Feb-14 16:11	26h (0.4 °C)						
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude				
LABQA	Lab Water	ADH Environmental, Inc.	LABQA							
207R00843	Ambient Water	ADH Environmental, Inc.	207R00843							
206R00551	Ambient Water	ADH Environmental, Inc.	206R00551							
96h Cell Density-without EDTA Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
LABQA	4	2.83E+6	2.75E+6	2.91E+6	2.63E+6	3.10E+6	1.03E+5	2.05E+5	7.26%	0.0%
207R00843	4	7.01E+6	6.88E+6	7.14E+6	6.51E+6	7.29E+6	1.73E+5	3.46E+5	4.93%	-148.0%
206R00551	4	7.19E+6	7.09E+6	7.28E+6	6.86E+6	7.43E+6	1.31E+5	2.62E+5	3.64%	-154.0%
96h Cell Density-without EDTA Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4						
LABQA	2.63E+6	3.10E+6	2.72E+6	2.87E+6						
207R00843	7.29E+6	7.17E+6	7.08E+6	6.51E+6						
206R00551	6.86E+6	7.36E+6	7.09E+6	7.43E+6						

CETIS Analytical Report

Report Date: 12 Mar-14 12:14 (p 2 of 2)

Test Code: ADH_0227_SC_C1 | 02-3497-5955

Algal Growth Test **Pacific EcoRisk**

Analysis ID: 03-6506-0778	Endpoint: 96h Cell Density-without EDTA	CETIS Version: CETISv1.8.5
Analyzed: 12 Mar-14 12:13	Analysis: Parametric-Two Sample	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	11.4%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
LABQA		206R00551	-26.2	1.94	3E+05	6	1.0000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.793205E+13	3.793205E+13	1	686	<0.0001	Significant Effect
Error	3.319E+11	55316670000	6			
Total	3.826395E+13		7			

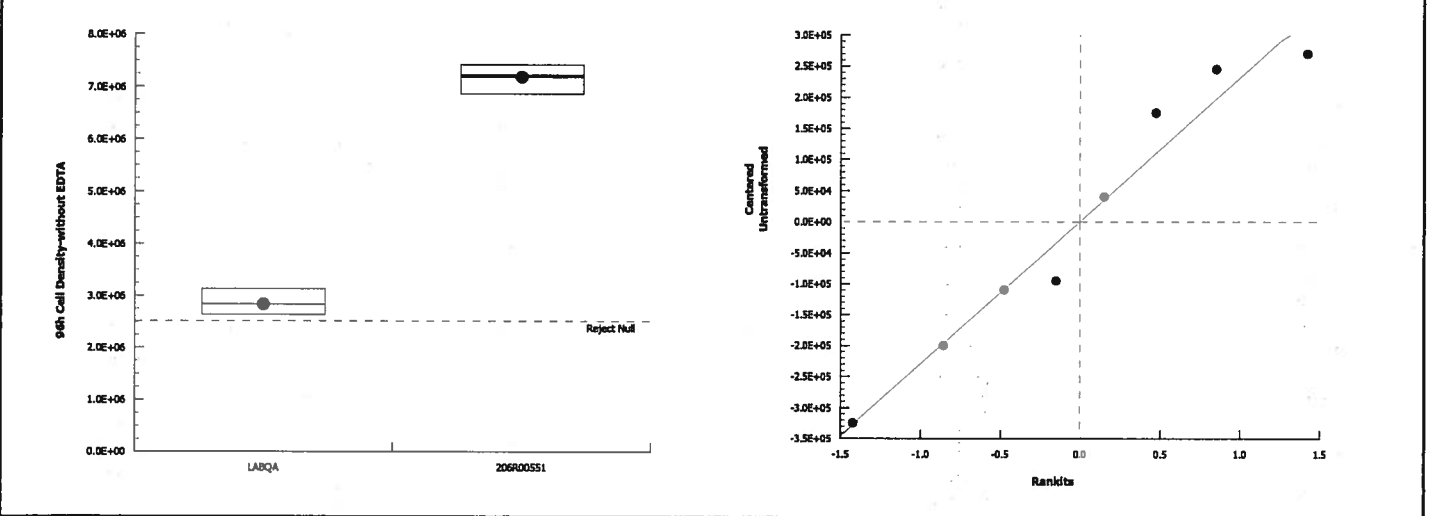
Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.62	47.5	0.7009	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.939	0.645	0.6025	Normal Distribution

96h Cell Density-without EDTA Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	4	2.83E+6	2.50E+6	3.16E+6	2800000	2.63E+6	3.10E+6	1.03E+5	7.26%	0.0%
206R00551	4	7.19E+6	6.77E+6	7.60E+6	7230000	6.86E+6	7.43E+6	1.31E+5	3.64%	-154.0%

Graphics



Analyst: QA:

Selenastrum capricornutum Algal Toxicity Test Data Sheet

Client: ADH / CCCWP

Material: 206R00551

Test Start Date: 2/27/14

Test ID #: 55486

Project #: 19397

Test End Date: 3/3/14

Control/Diluent: Lab water w/o EDTA

Location: TR6/R4/S1

Test Treatment	Temp (°C)	pH	D.O. (mg/L)	Conductivity (µS/cm)	Sign-Off
Lab Water Control	25.3	7.59	8.1	94.6	Date: 2/27/14
100%	25.3	7.69	12.1	961	Sample ID #: 34205
					Test Solution Prep: KP
					New WQ: <u>OK</u>
					Inoculation Time: 1715
					Inoculation Signoff: KP
Meter ID	62A	PH19	RD04	EO04	Date: 2-28-14
Lab Water Control	25.0	7.91			WQ Time: 0845
100%	25.0	8.32			WQ Signoff: APF
Meter ID	62A	PH19			Date: 03/01/14
Lab Water Control	25.2 25.0	7.9 7.820			WQ Time: 1000
100%	25.2 25.0	8.5 8.49			WQ Signoff: AS
Meter ID	62A	PH19 PH5			Date: 03/02/14
Lab Water Control	25.7	8.98			WQ Time: 1000
100%	25.7	8.89			WQ Signoff: AS
Meter ID	62A	PH19			Date: 3-3-14
Lab Water Control	26.0	9.56	11.4	96.5	WQ Time: 0850
100%	26.0	9.55	20.7	771	WQ Signoff: APF
Meter ID	62A	PH16	PD04	EO09	

Initial Count: 10,000 cells/mL Termination Time: 1600 Enumerating Scientist: PA

Treatment	Cell Density (cells/mL x 10 ⁶)				Mean Cell Density (cells/mL x 10 ⁶)	
	Rep A	Rep B	Rep C	Rep D		
Lab Water Control	2.63	3.10	2.72	2.87	2.83 ^{SV} 2.83	
100%	6.86	7.30	7.09	7.43	7.19	
This datasheet has been reviewed for completeness and consistency with Test Acceptability Criteria and/or other issues of concern.		Control Mean Density (cells/mL x 10 ⁶)	% CV	Date:	Time:	Signoff:
		2.83	7.26	3-3-14 3-3-14	1630	PA

Initial Test Conditions	Alkalinity	Hardness	Light Intensity (ftc)
	231	319	373.6

Selenastrum capricornutum Algal Toxicity Test Data Sheet

Client: ADH / CCCWP

Material: 207R00843

Test Start Date: 2/27/14

Test ID #: 55490

Project #: 19397

Test End Date: 3/3/14

Control/Diluent: Lab water w/o EDTA

Location: TRG/RU/SI

Test Treatment	Temp (°C)	pH	D.O. (mg/L)	Conductivity (µS/cm)	Sign-Off
Lab Water Control	25.3 25.3	7.59	8.1	94.6	Date: 2/27/14
100%	25.3	7.65	10.3	350	Sample ID #: 34206
					Test Solution Prep: KP
					New WQ: AK
					Inoculation Time: 1715
Meter ID	62A	PH19	R004	B004	Inoculation Signoff: KP
Lab Water Control	25.0	7.91			Date: 2-28-14
100%	25.0	8.14			WQ Time: 0850
Meter ID	62A	PH19			WQ Signoff: ARF
Lab Water Control	25.0	8.20			Date: 03/01/14
100%	25.0	8.32			WQ Time: 1000
Meter ID	62A	PH15			WQ Signoff: AS
Lab Water Control	25.7	8.98			Date: 03/02/14
100%	25.7	9.16			WQ Time: 1000
Meter ID	62A	PH19			WQ Signoff: AS
Lab Water Control	26.0	10.02 9.56	11.6	96.5	Date: 3-3-14
100%	26.0	10.02	18.3	352	WQ Time: 0850
Meter ID	62A	PH16	R004	E109	WQ Signoff: ARF

Initial Count: 10,000 cells/mL Termination Time: 1600 Enumerating Scientist: PA

Treatment	Cell Density (cells/mL x 10 ⁶)				Mean Cell Density (cells/mL x 10 ⁶)		
	Rep A	Rep B	Rep C	Rep D			
Lab Water Control	2.63	3.10	2.72	2.82	2.83 2.83		
100%	7.29	7.17	7.08	6.57	7.01		
This datasheet has been reviewed for completeness and consistency with Test Acceptability Criteria and/or other issues of concern.			Control Mean Density (cells/mL x 10 ⁶)	% CV	Date:	Time:	Signoff:
			2.83	7.26	3.3.14 3.3.14	1630	PA

Initial Test Conditions	Alkalinity	Hardness	Light Intensity (ftc)
	93	113	373.6

Appendix C

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the CCCWP Stormwater to *Ceriodaphnia dubia*



CETIS Summary Report

Report Date: 12 Mar-14 10:51 (p 1 of 1)

Test Code: ADH_0227_CD_C1 | 03-0011-7960

Ceriodaphnia Survival and Reproduction Test							Pacific EcoRisk			
Batch ID:	10-6010-4569	Test Type:	Reproduction-Survival (7d)			Analyst:	Cassy Glover			
Start Date:	27 Feb-14 16:00	Protocol:	EPA-821-R-02-013 (2002)			Diluent:	Not Applicable			
Ending Date:	05 Mar-14 17:00	Species:	Ceriodaphnia dubia			Brine:	Not Applicable			
Duration:	6d 1h	Source:	In-House Culture			Age:	1			
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project				
LABQA	07-1612-1969	27 Feb-14 16:00	27 Feb-14 16:00	NA (25.5 °C)	ADH Environmental, Inc.	19397				
207R00843	14-6517-7241	26 Feb-14 17:45	27 Feb-14 16:11	22h (0.6 °C)						
206R00551	08-4072-0786	26 Feb-14 15:20	27 Feb-14 16:11	25h (0.4 °C)						
Sample Code	Material Type	Sample Source		Station Location		Latitude	Longitude			
LABQA	Lab Water	ADH Environmental, Inc.		LABQA						
207R00843	Ambient Water	ADH Environmental, Inc.		207R00843						
206R00551	Ambient Water	ADH Environmental, Inc.		206R00551						
Reproduction Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
LABQA	10	31.3	30.1	32.5	28	37	1.04	3.3	10.5%	0.0%
207R00843	10	29.1	27.1	31.1	16	34	1.73	5.47	18.8%	7.03%
206R00551	10	28.9	27.7	30.1	23	33	1.05	3.31	11.5%	7.67%
Survival Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
LABQA	10	1	1	1	1	1	0	0	0.0%	0.0%
207R00843	10	0.9	0.782	1	0	1	0.1	0.316	35.1%	10.0%
206R00551	10	1	1	1	1	1	0	0	0.0%	0.0%
Reproduction Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
LABQA	29	29	34	30	28	30	32	36	37	28
207R00843	27	33	26	34	33	16	34	31	29	28
206R00551	23	31	29	31	32	30	33	29	24	27
Survival Detail										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
LABQA	1	1	1	1	1	1	1	1	1	1
207R00843	1	1	1	1	1	0	1	1	1	1
206R00551	1	1	1	1	1	1	1	1	1	1
Survival Binomials										
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
LABQA	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
207R00843	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
206R00551	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: 12 Mar-14 10:51 (p 2 of 2)

Test Code: ADH_0227_CD_C1 | 03-0011-7960

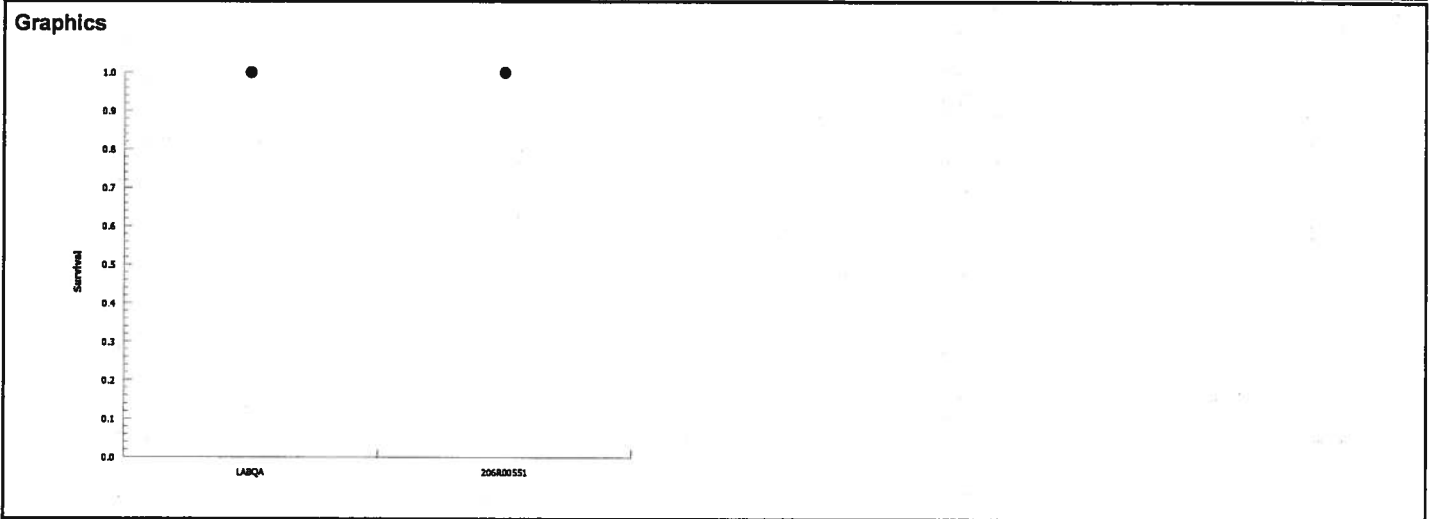
Ceriodaphnia Survival and Reproduction Test	Pacific EcoRisk
--	------------------------

Analysis ID: 17-9071-7117	Endpoint: Survival	CETIS Version: CETISv1.8.5
Analyzed: 12 Mar-14 10:51	Analysis: Single 2x2 Contingency Table	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test						
Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
LABQA		206R00551	1	1.0000	Exact	Non-Significant Effect

Data Summary							
Sample Code	NR	R	NR + R	Prop NR	Prop R	%Effect	
LABQA	Lab Water	10	0	10	1	0	0.0%
206R00551		10	0	10	1	0	0.0%



CETIS Analytical Report

Report Date: 12 Mar-14 10:51 (p 1 of 2)

Test Code: ADH_0227_CD_C1 | 03-0011-7960

Ceriodaphnia Survival and Reproduction Test Pacific EcoRisk

Analysis ID: 02-5680-4343 Endpoint: Reproduction CETIS Version: CETISv1.8.5
 Analyzed: 12 Mar-14 10:51 Analysis: Parametric-Two Sample Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	8.2%	

Equal Variance t Two-Sample Test

Sample Code	vs Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
LABQA	206R00551	1.62	1.73	2.57	18	0.0611	CDF	Non-Significant Effect

ANOVA Table

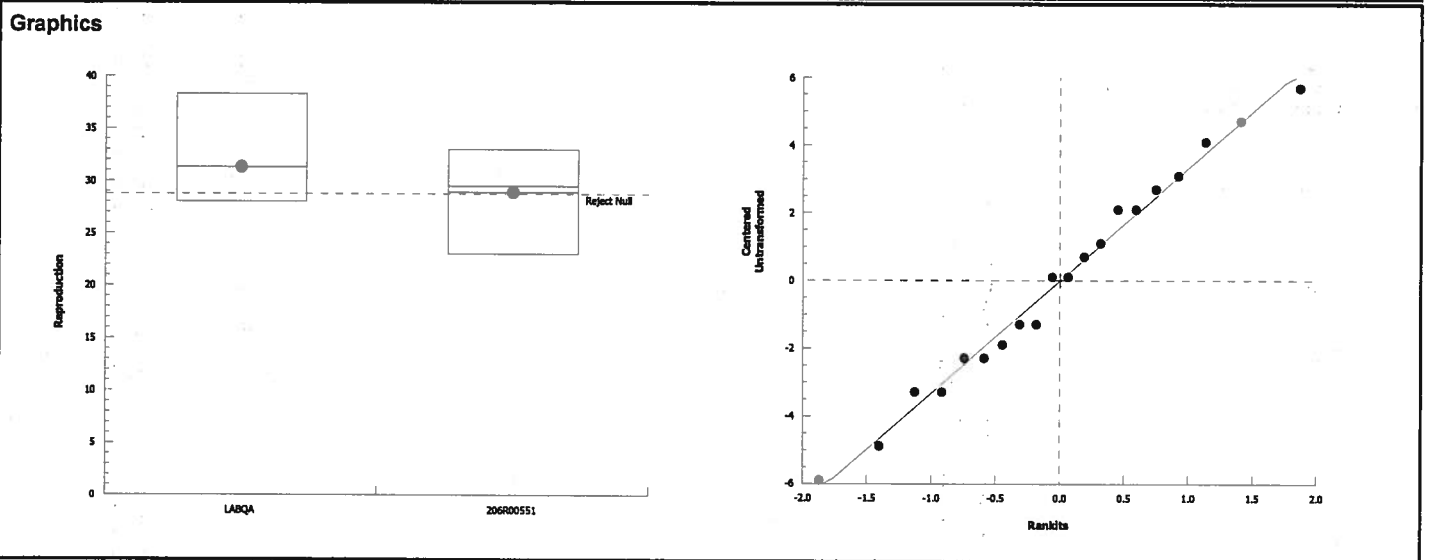
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	28.8	28.8	1	2.63	0.1221	Non-Significant Effect
Error	197	10.94444	18			
Total	225.8		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.01	6.54	0.9905	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.98	0.866	0.9391	Normal Distribution

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	10	31.3	28.9	33.7	30	28	37	1.04	10.5%	0.0%
206R00551	10	28.9	26.5	31.3	29.5	23	33	1.05	11.5%	7.67%



Analyst: CB QA: SV

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: ADH / CCCWP Material: 206R00551 Test Date: 2-27-14
 Project #: 19397 Test ID: 55487 Randomization: 10.4.3 Control Water: Modified EPAMH

	Day	pH		D.O.		Cond. (µS/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF						
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	Date:	New WQ:	Test Init.:				
Lab Water Control	0	7.81 8.04		7.8 9.7		349 881 ST	25.5	0	0	0	0	0	0	0	0	0	0	0	0	0	Date: 2/27/14 Sol'n Prep: SM	New WQ: SM	Test Init. SM Time: 1600	
	1	8.04	7.96	8.3	8.1	349	25.2	0	0	0	0	0	0	0	0	0	0	0	0	0	Date: 2/28/14 Sol'n Prep: CD	New WQ: LH Old WQ: JLA	Counts: 04 Time: 1715	
	2	7.97	8.08	8.2	8.2	351	25.7	0	0	0	0	0	0	0	0	0	0	0	0	0	Date: 3/1/14 Sol'n Prep: S1	New WQ: CD Old WQ: CP	Counts: 000 Time: 1200	
	3	7.92	8.14	8.5	7.3	350	25.9	6	6	5	3	5	6	7	6	7	5				Date: 3/2/14 Sol'n Prep: GSD	New WQ: P.M.S. Old WQ: PWP	Counts: 1600 Time: 1600	
	4	7.90	7.97	8.4	7.9	350	25.7	8	7	0	0	7	7	8	11	0	10				Date: 7/3/14 Sol'n Prep: J2	New WQ: CP Old WQ: J2	Counts: 1650 Time: 1650	
	5	8.14	7.97	8.0	8.2	388	25.5	0	0	12	12	0	0	0	0	14	0				Date: 3-4-14 Sol'n Prep: SM	New WQ: K5 Old WQ: CP	Counts: 1600 Time: 1600	
	6	-	7.73	-	8.1	8371	25.7	15	16	17	15	16	17	17	19	16	13				Date: 3-5-14 Sol'n Prep: -	New WQ: - Old WQ: -	Counts: 1700 Time: 1700	
	7																					Date:	New WQ:	Counts:
	8																					Date:	New WQ:	Counts:
Total=							29	29	34	30	28	30	32	36	37	28	Mean Neonates/Female = 31.3							
	Day	pH		D.O.		Cond. (µS/cm)		Survival / Reproduction										SAMPLE ID						
		New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	Date:	New WQ:	Test Init.:				
100%	0	8.01		9.7		881		0	0	0	0	0	0	0	0	0	0	0	0	0			34205	
	1	7.95	8.37	10.0	7.3	907		0	0	0	0	0	0	0	0	0	0	0	0	0			34205	
	2	7.89	8.34	8.8	7.3	871		0	0	0	0	0	0	0	0	0	0	0	0	0			34205	
	3	7.93	8.32	9.8	7.1	832		21 ³	20 ⁴	20 ⁶	20 ⁵	6	5	20 ⁶	20 ⁷	20 ⁴	20 ³						34205	
	4	7.92	8.27	9.0	7.7	893		3	11	9	9	11	11	12	9	7	10						34205	
	5	8.30	8.35	9.3	8.1	889		3	0	0	0	0	0	0	6	0	0						34205	
	6	-	8.18	-	8.1	968		14	16	14	17	15	14	15	7	13	14						-	
	7																							
	8																							
Total=							23	31	29	31	32	30	33	29	24	27	Mean Neonates/Female = 28.9							

CETIS Analytical Report

Report Date: 12 Mar-14 10:51 (p 1 of 2)
 Test Code: ADH_0227_CD_C1 | 03-0011-7960

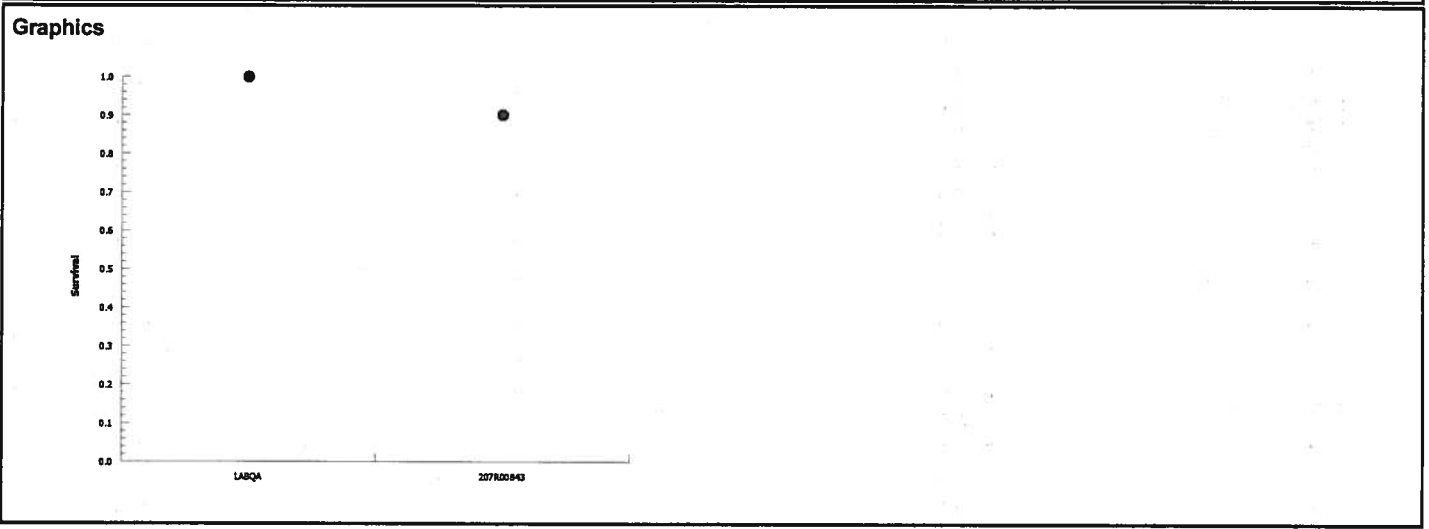
Ceriodaphnia Survival and Reproduction Test	Pacific EcoRisk
--	------------------------

Analysis ID: 15-9148-3656	Endpoint: Survival	CETIS Version: CETISv1.8.5
Analyzed: 12 Mar-14 10:51	Analysis: Single 2x2 Contingency Table	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test						
Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
LABQA		207R00843	0.5	0.5000	Exact	Non-Significant Effect

Data Summary							
Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
LABQA	Lab Water	10	0	10	1	0	0.0%
207R00843		9	1	10	0.9	0.1	10.0%



Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: ADH / CCCWP Material: 207R00843 Test Date: 2-27-14
 Project #: 19397 Test ID: 55491 Randomization: 10.4.3 Control Water: Modified EPAMH

Day	pH		D.O.		Cond. (µS/cm)	Temp (°C)	Survival / Reproduction										SIGN-OFF					
	New	Old	New	Old			A	B	C	D	E	F	G	H	I	J	Date	New WQ	Test Init			
0	7.81		7.8		349	25.5	0	0	0	0	0	0	0	0	0	0	0	0	0	Date: 2/27/14 Sol'n Prep: SM	New WQ: SM	Test Init: SM Time: 1600
1	8.04	7.96	8.3	8.1	349	25.2	0	0	0	0	0	0	0	0	0	0	0	0	0	Date: 2/28/14 Sol'n Prep: CD	New WQ: LH Old WQ: DA	Counts: 09 Time: 1715
2	7.97	8.08	8.2	8.2	351	25.7	0	0	0	0	0	0	0	0	0	0	0	0	0	Date: 3/1/14 Sol'n Prep: SS	New WQ: CD Old WQ: CP	Counts: 000 Time: 1200
3	7.92	8.14	8.5	7.3	350	25.9	6	6	5	3	5	6	7	6	7	5				Date: 3/2/14 Sol'n Prep: COD	New WQ: P.M.S. Old WQ: P.M.S.	Counts: 7m Time: 1600
4	7.90	7.97	8.4	7.9	350	25.7	8	7	0	0	7	7	8	11	0	10				Date: 3/3/14 Sol'n Prep: 22	New WQ: CP Old WQ: 7m	Counts: 7m Time: 1650
5	8.14	7.97	8.6	8.2	338	25.5	0	0	12	12	0	0	0	0	14	0				Date: 3-4-14 Sol'n Prep: SM	New WQ: AS Old WQ: CP	Counts: 7m Time: 1600
6	-	7.73	-	8.1	371	25.9	15	16	17	15	16	17	17	19	16	13				Date: 3-5-14 Sol'n Prep: -	New WQ: 7m Old WQ: 7m	Counts: 7m Time: 1700
7																				Date:	New WQ:	Counts:
8																				Date:	New WQ:	Counts:
Total=							29	29	34	30	28	30	32	36	37	28	Mean Neonates/Female = 31.3					

Day	pH		D.O.		Cond. (µS/cm)	Survival / Reproduction										SAMPLE ID	
	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J		
0	7.75		10.4		272	0	0	0	0	0	0	0	0	0	0	0	34206
1	7.72	7.94	10.6	7.9	307	0	0	0	0	0	0	0	0	0	0	0	34206
2	7.69	7.97	10.6	7.1	278	0	0	0	0	0	0	0	0	0	0	0	34206
3	7.67	8.03	10.8	7.4	288	2 ⁵	4	2 ⁵	2 ⁶	2 ⁵	5 ⁶	2 ⁷	5 ⁶	2 ⁴	2 ³		34206
4	7.64	7.84	8.9	7.6	280	0	11	5	10	11	10	11	9	8	9		34206
5	8.05	8.00	8.9	8.2	285	8	0	0	0	0	0	0	0	0	0		34206
6	-	7.99	-	8.1	336	14	18	14	18	17	-	16	16	17	16		-
7																	
8																	
Total=						27	33	26	34	33	7/6	34	31	29	28	Mean Neonates/Female = 29.1	

Appendix D

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the CCCWP Stormwater to *Hyalella azteca*



CETIS Summary Report

Report Date: 11 Mar-14 16:19 (p 1 of 1)
 Test Code: ADH_0227_HA_C1 | 06-3972-8324

Hyalella Survival and Growth Test							Pacific EcoRisk				
Batch ID:	01-9938-1231	Test Type:	Survival-Growth (10 day)			Analyst:	Cassy Glover				
Start Date:	27 Feb-14 18:00	Protocol:	GCML			Diluent:	Not Applicable				
Ending Date:	09 Mar-14 09:20	Species:	Hyalella azteca			Brine:	Not Applicable				
Duration:	9d 15h	Source:	Chesapeake Cultures, Inc.			Age:	9				
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
LABQA	11-0836-4836	27 Feb-14 18:00	27 Feb-14 18:00	NA (23.1 °C)	ADH Environmental, Inc.	19397					
207R00843	14-6517-7241	26 Feb-14 17:45	27 Feb-14 16:11	24h (0.6 °C)							
206R00551	08-4072-0786	26 Feb-14 15:20	27 Feb-14 16:11	27h (0.4 °C)							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
LABQA	Sediment	ADH Environmental, Inc.	LABQA								
207R00843	Ambient Water	ADH Environmental, Inc.	207R00843								
206R00551	Ambient Water	ADH Environmental, Inc.	206R00551								
Survival Rate Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect	
LABQA	5	0.98	0.963	0.997	0.9	1	0.02	0.0447	4.56%	0.0%	
207R00843	5	0.64	0.572	0.708	0.4	0.9	0.0812	0.182	28.4%	34.7%	
206R00551	5	0.94	0.907	0.973	0.8	1	0.04	0.0894	9.52%	4.08%	
Survival Rate Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5						
LABQA	1	0.9	1	1	1						
207R00843	0.4	0.6	0.7	0.6	0.9						
206R00551	0.9	0.8	1	1	1						
Survival Rate Binomials											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5						
LABQA	10/10	9/10	10/10	10/10	10/10						
207R00843	4/10	6/10	7/10	6/10	9/10						
206R00551	9/10	8/10	10/10	10/10	10/10						

CETIS Analytical Report

Report Date: 11 Mar-14 16:19 (p 2 of 2)
 Test Code: ADH_0227_HA_C1 | 06-3972-8324

Hyalella Survival and Growth Test Pacific EcoRisk

Analysis ID: 19-1284-5857 Endpoint: Survival Rate CETIS Version: CETISv1.8.5
 Analyzed: 11 Mar-14 16:19 Analysis: Parametric-Two Sample Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.11%	

Equal Variance t Two-Sample Test

Sample Code	vs Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
LABQA	206R00551	0.876	1.86	0.129	8	0.2034	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.009294413	0.009294413	1	0.767	0.4068	Non-Significant Effect
Error	0.0969765	0.01212206	8			
Total	0.1062709		9			

Distributional Tests

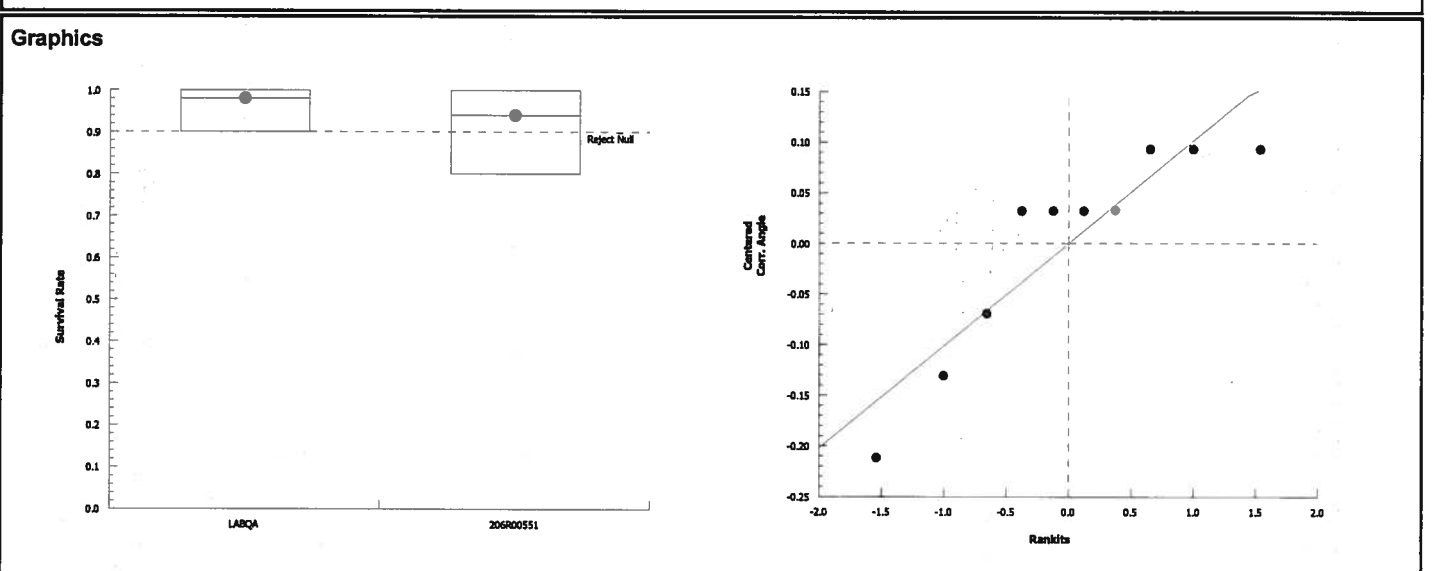
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.56	23.2	0.2460	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.829	0.741	0.0324	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	5	0.98	0.924	1	1	0.9	1	0.02	4.56%	0.0%
206R00551	5	0.94	0.829	1	1	0.8	1	0.04	9.52%	4.08%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	0.0%
206R00551	5	1.32	1.15	1.49	1.41	1.11	1.41	0.0615	10.4%	4.42%



10 Day Acute *Hyaella azteca* Toxicity Test Data

Client: ADH / CCCWP
 Test Material: 206R00551
 Test ID#: 55488 Project #: 19397
 Test Date: 2/27/14

Organism Log#: 7993 Age: 9 days
 Organism Supplier: Chesapeake Cultures
 Control/Diluent: SAM-5 Hyaella Water
 Control Water Batch: 92

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Lab Control	23.1	7.91		9.0		410	10	10	10	10	10	Date: <u>2/27/14</u> Sample ID: <u>34205</u> Test Solution Prep: <u>SM</u> New WQ: <u>SM</u> Initiation Time: <u>1800</u> Initiation Signoff: <u>SM</u>
100%	23.1	7.94		10.8		899	10	10	10	10	10	
Meter ID	<u>43A</u>	<u>PH10</u>		<u>RD04</u>		<u>EC04</u>						
Lab Control	23.1				8.3		10	9	10	10	10	Date: <u>2/28/14</u> Count Time: <u>1040</u> Count Signoff: <u>MK</u> Old WQ: <u>MA</u>
100%	23.1				7.9		10	10	10	10	10	
Meter ID	<u>430</u>				<u>RD07</u>							
Lab Control	23.2				7.2		10	9	10	10	10	Date: <u>3/1/14</u> Count Time: <u>905</u> Count Signoff: <u>m</u> Old WQ: <u>AS</u> Feed: <u>m</u>
100%	23.2				7.2		10	10	10	10	10	
Meter ID	<u>43A</u>				<u>RD04</u>							
Lab Control	23.1				7.5		10	9	10	10	10	Date: <u>3/2/14</u> Count Time: <u>0925</u> Count Signoff: <u>JE</u> Old WQ: <u>FO15</u>
100%	23.1				7.8		10	9	10	10	10	
Meter ID	<u>43A</u>				<u>RD07</u>							
Lab Control	23.0				7.7		10	9	10	10	10	Date: <u>3/3/14</u> Count Time: <u>1600</u> Count Signoff: <u>JE</u> Old WQ: <u>CSD</u> Feed: <u>JE</u>
100%	23.0				7.5		10	9	10	10	10	
Meter ID	<u>43A</u>				<u>RD09</u>							
Lab Control	23.0	7.99	7.73	8.7	6.8	413	10	9	10	10	10	Date: <u>3-4-14</u> Sample ID: <u>34205</u> Test Solution Prep: <u>SM</u> New WQ: <u>CP</u> Renewal Time: <u>1615</u> Renewal Signoff: <u>JE</u> Old WQ: <u>JE</u>
100%	23.0	8.07	8.19	9.0	5.8	894	9	9	10	10	10	
Meter ID	<u>43A</u>	<u>PH16</u>	<u>PH19</u>	<u>RD07</u>	<u>RD09</u>	<u>EC06</u>						
Lab Control	23.0				7.3		10	9	10	10	10	Date: <u>3/5/14</u> Count Time: <u>1100</u> Count Signoff: <u>CSD</u> Old WQ: <u>KEE</u> Feed: <u>CSD</u>
100%	23.0				7.4		9	9	10	10	10	
Meter ID	<u>43A</u>				<u>RD08</u>							
Lab Control	23.1				6.7		10	9	10	10	10	Date: <u>3.6.14</u> Count Time: <u>1045</u> Count Signoff: <u>Pa</u> Old WQ: <u>JE</u>
100%	23.1				5.7		9	9	10	10	10	
Meter ID	<u>430</u>				<u>RD07</u>							
Lab Control	22.9				6.8		10	9	10	10	10	Date: <u>3/7/14</u> Count Time: <u>1405</u> Count Signoff: <u>JE</u> Old WQ: <u>GG</u> Feed: <u>JE</u>
100%	22.9				6.3		9	8	10	10	10	
Meter ID	<u>43A</u>				<u>RD07</u>							
Lab Control	22.5				4.9		10	9	10	10	10	Date: <u>3-8-14</u> Count Time: <u>1330</u> Count Signoff: <u>m</u> Old WQ: <u>GG</u>
100%	22.5				5.2		9	8	10	10	10	
Meter ID	<u>43A</u>				<u>RD07</u>							
Lab Control	22.9		7.63		6.8	443	10	9	10	10	10	Date: <u>3/9/14</u> Termination Time: <u>0920</u> Termination Signoff: <u>MF</u> Old WQ: <u>GP</u>
100%	22.9		7.89		5.9	907	9	8	10	10	10	
Meter ID	<u>43A</u>		<u>PH21</u>		<u>RD07</u>	<u>EC04</u>						

CETIS Analytical Report

Report Date: 11 Mar-14 16:19 (p 1 of 2)
 Test Code: ADH_0227_HA_C1 | 06-3972-8324

Hyalella Survival and Growth Test			Pacific EcoRisk		
Analysis ID: 00-2680-1465	Endpoint: Survival Rate	CETIS Version: CETISv1.8.5			
Analyzed: 11 Mar-14 16:19	Analysis: Parametric-Two Sample	Official Results: Yes			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	11.5%	

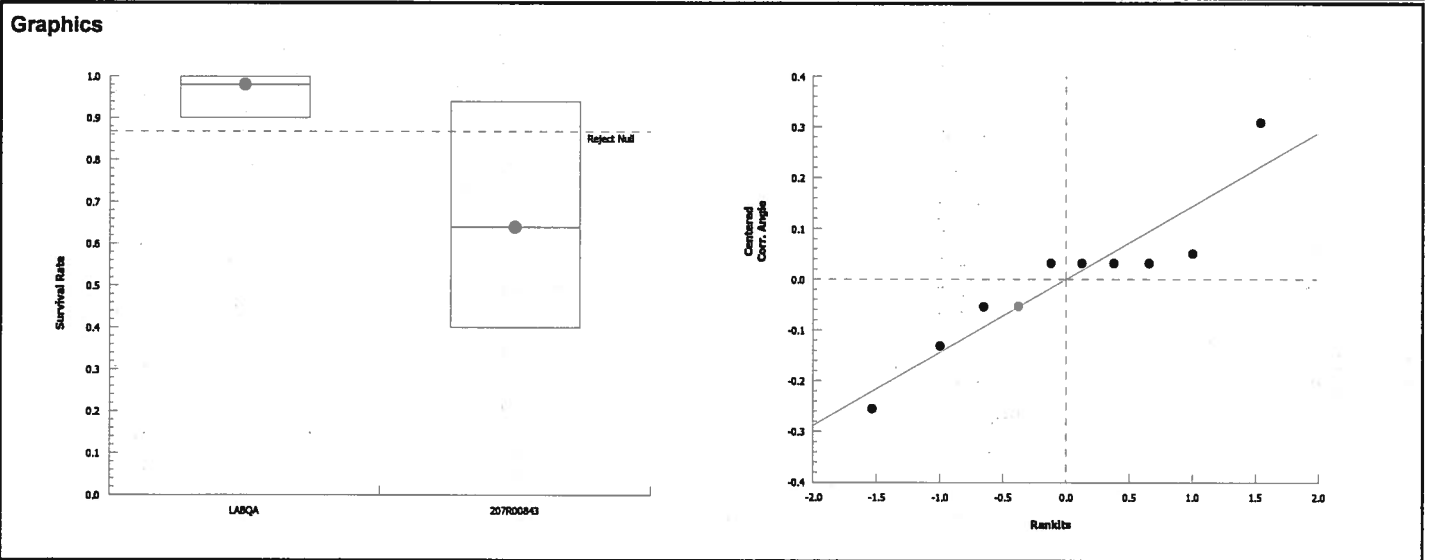
Equal Variance t Two-Sample Test									
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
LABQA		207R00843	4.51	1.86	0.181	8	0.0010	CDF	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.4840151	0.4840151	1	20.3	0.0020	Significant Effect
Error	0.1903557	0.02379446	8			
Total	0.6743708		9			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	7.96	23.2	0.0692	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.895	0.741	0.1905	Normal Distribution	

Survival Rate Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
LABQA	5	0.98	0.924	1	1	0.9	1	0.02	4.56%	0.0%	
207R00843	5	0.64	0.414	0.866	0.6	0.4	0.9	0.0812	28.4%	34.7%	

Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
LABQA	5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	0.0%	
207R00843	5	0.939	0.684	1.19	0.886	0.685	1.25	0.092	21.9%	31.9%	



10 Day Acute *Hyaella azteca* Toxicity Test Data

Client: ADH / CCCWP
 Test Material: 207R00843
 Test ID#: 55492 Project #: 19397
 Test Date: 2/27/14

Organism Log#: 7993 Age: 9 days
 Organism Supplier: Chesapeake Cultures
 Control/Diluent: SAM-5 Hyaella Water
 Control Water Batch: 92

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Lab Control	23.1	7.91		9.0		410	10	10	10	10	10	Date: <u>2/27/14</u> Sample ID: <u>34209</u>
100%	23.1	8.04		12.0		299	10	10	10	10	10	Test Solution Prep: <u>MA</u> New WQ: <u>MA</u>
Meter ID	43A	PH19		R004		EC04						Initiation Time: <u>1600</u> Initiation Signoff: <u>SN</u>
Lab Control	23.1				8.3		10	9	10	10	10	Date: <u>2/28/14</u> Count Time: <u>1040</u>
100%	23.1				7.7		10	10	10	10	10	Count Signoff: <u>MK</u> Old WQ: <u>MA</u>
Meter ID	43A				R007							
Lab Control	23.2				7.2		10	9	10	10	10	Date: <u>3/1/14</u> Count Time: <u>905</u>
100%	23.2				7.2		10	10	10	10	10	Count Signoff: <u>MM</u> Old WQ: <u>AS</u>
Meter ID	43A				R004							Feed: <u>MM</u>
Lab Control	23.1				7.5		10	9	10	10	10	Date: <u>3/2/14</u> Count Time: <u>0925</u>
100%	23.1				7.8		8	10	10	10	10	Count Signoff: <u>RA</u> Old WQ: <u>FOUR</u>
Meter ID	43A				R007							
Lab Control	23.0				7.7		10	9	10	10	10	Date: <u>3/3/14</u> Count Time: <u>1600</u>
100%	23.0				7.6		6	10	10	8	10	Count Signoff: <u>GG</u> Old WQ: <u>CSJ</u>
Meter ID	43A				R009							Feed: <u>MM</u>
Lab Control	23.0	7.99	7.73	8.7	6.8	413	10	9	10	10	10	Date: <u>3-4-14</u> Sample ID: <u>34206</u>
100%	23.0	8.03	8.08	9.0	6.0	276	4	8 ¹⁰	8	7	10	Test Solution Prep: <u>SM</u> New WQ: <u>CP</u>
Meter ID	43A	PH16	PH19	R007	R009	EC06						Renewal Time: <u>1615</u> Renewal Signoff: <u>Ze</u> Old WQ: <u>Ze</u>
Lab Control	23.0				7.3		10	9	10	10	10	Date: <u>3/5/14</u> Count Time: <u>1100</u>
100%	23.0				7.0		4	10	7	6	10	Count Signoff: <u>CSJ</u> Old WQ: <u>RAE</u>
Meter ID	43A				R007							Feed: <u>CSJ</u>
Lab Control	23.1				6.7		10	9	10	10	10	Date: <u>3.6.14</u> Count Time: <u>1045</u>
100%	23.1				6.3		4	10	7	6	10	Count Signoff: <u>RA</u> Old WQ: <u>RA</u>
Meter ID	43A				R007							
Lab Control	22.9				6.8		10	9	10	10	10	Date: <u>3/7/14</u> Count Time: <u>1405</u>
100%	22.9				7.1		4	8	7	6	10	Count Signoff: <u>Ze</u> Old WQ: <u>GG</u>
Meter ID	43A				R007							Feed: <u>Ze</u>
Lab Control	22.5				4.9		10	9	10	10	10	Date: <u>3.8.14</u> Count Time: <u>1330</u>
100%	22.5				6.6		4	8	7	6	9	Count Signoff: <u>MM</u> Old WQ: <u>GG</u>
Meter ID	43A				R007							
Lab Control	22.9		7.63		6.8	443	10	9	10	10	10	Date: <u>3/9/14</u> Termination Time: <u>0920</u>
100%	22.9		7.85		6.7	313	4	6	7	6	9	Termination Signoff: <u>MF</u> Old WQ: <u>CP</u>
Meter ID	43A		PH21		R007	EC04						

CETIS Summary Report

Report Date: 12 Mar-14 11:08 (p 1 of 1)

Test Code: ADH_0228_HA_C2 | 12-0908-4952

Hyalella Survival and Growth Test Pacific EcoRisk

Batch ID: 02-1871-2871	Test Type: Survival-Growth (10 day)	Analyst: Cassy Glover
Start Date: 28 Feb-14 17:50	Protocol: GCML	Diluent: Not Applicable
Ending Date: 10 Mar-14 10:15	Species: Hyalella azteca	Brine: Not Applicable
Duration: 9d 16h	Source: Chesapeake Cultures, Inc.	Age: 10

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
LABQA	07-1122-1925	28 Feb-14 17:50	28 Feb-14 17:50	NA (22.8 °C)	ADH Environmental, Inc.	19397
207R00011US	12-4879-0307	28 Feb-14 09:55	28 Feb-14 11:43	8h (8.5 °C)		
207R00011DS	19-7063-6676	28 Feb-14 08:45	28 Feb-14 11:43	9h (8.2 °C)		
544R00025US	00-0717-3326	28 Feb-14 10:00	28 Feb-14 15:20	8h (4.3 °C)		
544R00025DS	15-1384-1621	28 Feb-14 09:30	28 Feb-14 15:20	8h (10.7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
LABQA	Lab Control	ADH Environmental, Inc.	LABQA		
207R00011US	Ambient Water	ADH Environmental, Inc.	207R00011US		
207R00011DS	Ambient Water	ADH Environmental, Inc.	207R00011DS		
544R00025US	Ambient Water	ADH Environmental, Inc.	544R00025US		
544R00025DS	Ambient Water	ADH Environmental, Inc.	544R00025DS		

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
LABQA	5	0.96	0.94	0.98	0.9	1	0.0245	0.0548	5.71%	0.0%
207R00011US	5	0.48	0.463	0.497	0.4	0.5	0.02	0.0447	9.32%	50.0%
207R00011DS	5	0.48	0.364	0.596	0.1	0.8	0.139	0.311	64.9%	50.0%
544R00025US	5	0.18	0.139	0.221	0.1	0.3	0.049	0.11	60.9%	81.3%
544R00025DS	5	0.06	0.0395	0.0805	0	0.1	0.0245	0.0548	91.3%	93.8%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
LABQA	1	1	1	0.9	0.9
207R00011US	0.5	0.4	0.5	0.5	0.5
207R00011DS	0.8	0.1	0.2	0.6	0.7
544R00025US	0.3	0.3	0.1	0.1	0.1
544R00025DS	0.1	0.1	0	0	0.1

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
LABQA	10/10	10/10	10/10	9/10	9/10
207R00011US	5/10	4/10	5/10	5/10	5/10
207R00011DS	8/10	1/10	2/10	6/10	7/10
544R00025US	3/10	3/10	1/10	1/10	1/10
544R00025DS	1/10	1/10	0/10	0/10	1/10

CETIS Analytical Report

Report Date: 12 Mar-14 11:07 (p 1 of 4)

Test Code: ADH_0228_HA_C2 | 12-0908-4952

Hyalella Survival and Growth Test Pacific EcoRisk

Analysis ID: 02-7452-7739 Endpoint: Survival Rate CETIS Version: CETISv1.8.5
 Analyzed: 12 Mar-14 10:58 Analysis: Parametric-Two Sample Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	5.35%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
LABQA		207R00011US	13	1.86	0.083	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.8455464	0.8455464	1	169	<0.0001	Significant Effect
Error	0.0399802	0.004997525	8			
Total	0.8855265		9			

Distributional Tests

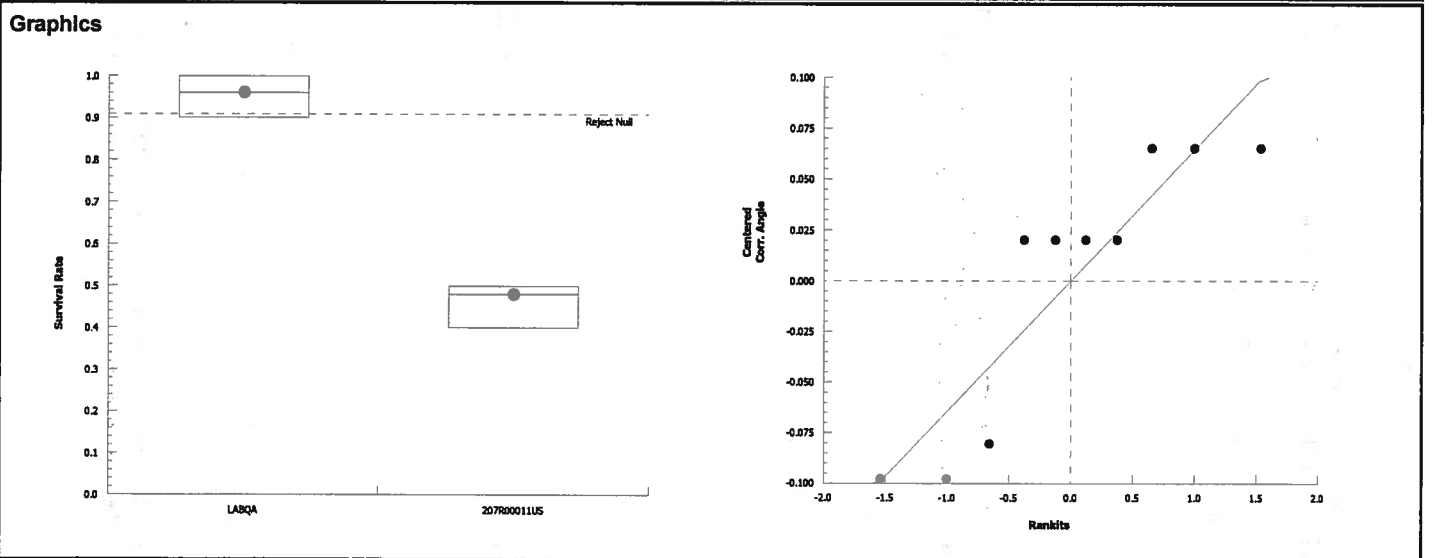
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.93	23.2	0.2135	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.796	0.741	0.0128	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	5	0.96	0.892	1	1	0.9	1	0.0245	5.71%	0.0%
207R00011US	5	0.48	0.424	0.536	0.5	0.4	0.5	0.02	9.32%	50.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	5	1.35	1.24	1.46	1.41	1.25	1.41	0.0399	6.63%	0.0%
207R00011US	5	0.765	0.709	0.821	0.785	0.685	0.785	0.0201	5.88%	43.2%



10 Day Acute *Hyalella azteca* Toxicity Test Data

Client: ADH / CCCWP
 Test Material: 207R00011US
 Test ID#: 55494 Project #: 19397
 Test Date: 2/28/14

Organism Log#: 7993 Age: 9-10 d
 Organism Supplier: Chesapeake
 Control/Diluent: SAM-5 Hyalella Water
 Control Water Batch: 92

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Lab Control	22.8	7.76		8.8		410	10	10	10	10	10	Date: 2/28/14 Sample ID: 34220 Test Solution Prep: MF New WQ: LH Initiation Time: 1750 Initiation Signoff: [initials]
100%	22.8	7.79		10.0		323	10	10	10	10	10	Count Signoff: [initials] Old WQ: CP
Meter ID	43A	pH19		R007		EcoG						
Lab Control	23.2				9.1		10	10	10	10	10	Date: 3/1/14 Count Time: 930 Count Signoff: [initials] Old WQ: CP
100%	23.2				8.7		10	10	10	10	10	Count Signoff: [initials] Old WQ: CP
Meter ID	43A				R007							
Lab Control	23.1				7.5		10	10	10	9	9	Date: 3/2/14 Count Time: 1010 Count Signoff: [initials] Old WQ: FOUR Feed: [initials]
100%	23.1				7.4		10	9	10	9	9	Count Signoff: [initials] Old WQ: FOUR Feed: [initials]
Meter ID	43A				R007							
Lab Control	23.0				5.6		10	10	10	9	9	Date: 3/3/14 Count Time: 1045 Count Signoff: [initials] Old WQ: [initials]
100%	23.0				5.4		10	9	9	9	9	Count Signoff: [initials] Old WQ: [initials]
Meter ID	43A				R006							
Lab Control	22.9				5.7		10	10	10	9	9	Date: 3/4/14 3/4/14 Count Time: 1045 0940 Count Signoff: [initials] Old WQ: CP Feed: [initials]
100%	22.9				4.8		8	7	6	9	6	Count Signoff: [initials] Old WQ: CP Feed: [initials]
Meter ID	43A				R007							
Lab Control	23.0	7.81	7.67	8.8	7.8	407	10	10	10	9	9	Date: 3/5/14 Sample ID: 34220 Test Solution Prep: [initials] New WQ: [initials] Renewal Time: 1445 Renewal Signoff: [initials] Old WQ: [initials]
100%	23.0	7.83	7.77	9.6	7.5	346	6	4	5	9	6	Count Signoff: [initials] Old WQ: [initials]
Meter ID	43A	pH14	pH19	R007	R009	Eco4						
Lab Control	23.0				4.9		10	10	10	9	9	Date: 3-6-14 Count Time: 0900 Count Signoff: SM Old WQ: SM Feed: SM
100%	23.0				4.8		6	4	5	8	6	Count Signoff: [initials] Old WQ: [initials]
Meter ID	43A				R007							
Lab Control	22.9				6.5		10	10	10	9	9	Date: 3/7/14 Count Time: 1440 Count Signoff: [initials] Old WQ: GG
100%	22.9				6.0		5	4	5	6	5	Count Signoff: [initials] Old WQ: GG
Meter ID	43A				R007							
Lab Control	22.6				6.7		10	10	10	9	9	Date: 3-8-14 Count Time: 1315 Count Signoff: [initials] Old WQ: GG Feed: [initials]
100%	22.6				6.3		5	4	5	6	5	Count Signoff: [initials] Old WQ: GG
Meter ID	43A				R007							
Lab Control	22.8				6.3		10	10	10	9	9	Date: 3/9/14 Count Time: 1015 Count Signoff: [initials] Old WQ: CP
100%	22.8				5.8		5	4	5	5	5	Count Signoff: [initials] Old WQ: CP
Meter ID	43A				R007							
Lab Control	22.9		8.01		7.6	454	10	10	10	9	9	Date: 3-10-14 Termination Time: 1005 Termination Signoff: [initials] Old WQ: VLL
100%	22.9		7.73		6.9	440	5	4	5	5	5	Count Signoff: [initials] Old WQ: VLL
Meter ID	43A		pH21		R009	Eco9						

CETIS Analytical Report

Report Date: 12 Mar-14 11:07 (p 2 of 4)
 Test Code: ADH_0228_HA_C2 | 12-0908-4952

Hyalella Survival and Growth Test Pacific EcoRisk

Analysis ID: 19-2142-4264 Endpoint: Survival Rate CETIS Version: CETISv1.8.5
 Analyzed: 12 Mar-14 10:59 Analysis: Parametric-Two Sample Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	21.4%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
LABQA		207R00011DS	3.74	1.86	0.294	8	0.0028	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.8787426	0.8787426	1	14	0.0057	Significant Effect
Error	0.5014169	0.06267712	8			
Total	1.380159		9			

Distributional Tests

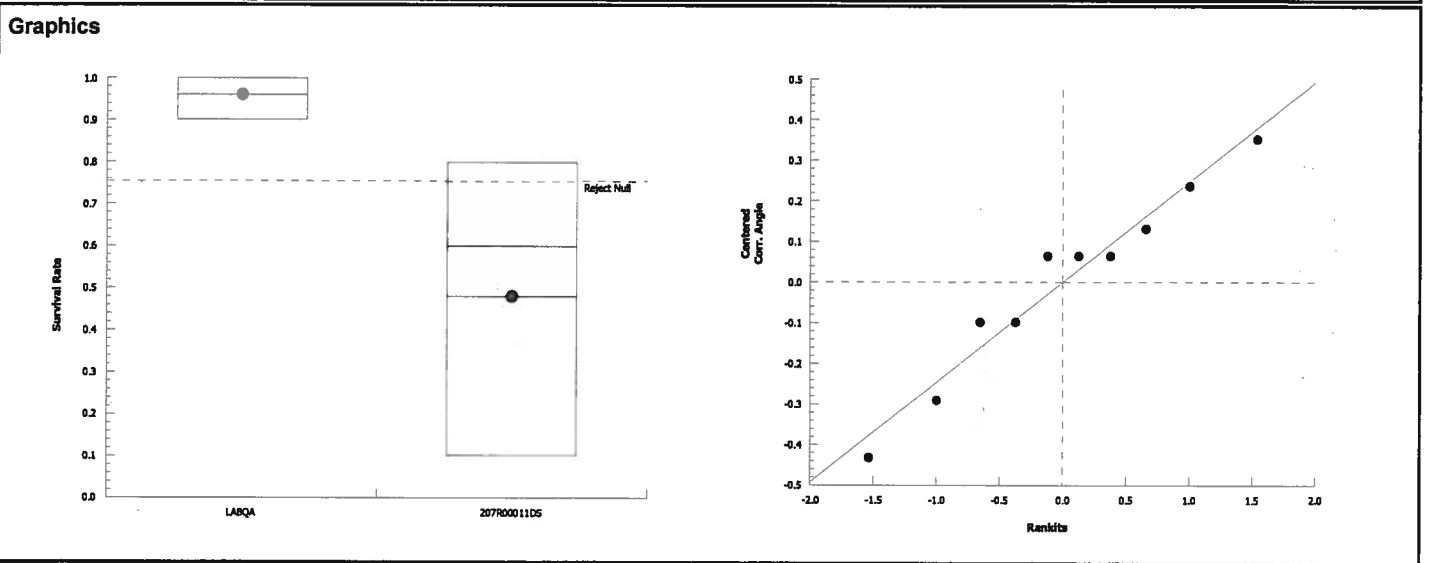
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	14.7	23.2	0.0232	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.959	0.741	0.7738	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	5	0.96	0.892	1	1	0.9	1	0.0245	5.71%	0.0%
207R00011DS	5	0.48	0.0933	0.867	0.6	0.1	0.8	0.139	64.9%	50.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	5	1.35	1.24	1.46	1.41	1.25	1.41	0.0399	6.63%	0.0%
207R00011DS	5	0.754	0.329	1.18	0.886	0.322	1.11	0.153	45.4%	44.0%



10 Day Acute *Hyaella azteca* Toxicity Test Data

Client: ADH / CCCWP
 Test Material: 207R0001IDS
 Test ID#: 55495 Project #: 19397
 Test Date: 2/28/14

Organism Log#: 7993 Age: 9-10 d
 Organism Supplier: Chesapeake
 Control/Diluent: SAM-5 Hyaella Water
 Control Water Batch: 92

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Lab Control	22.8	7.76		8.8		410	10	10	10	10	10	Date: 2/28/14 Sample ID: 34219 Test Solution Prep: MF New WQ: LH Initiation Time: 1750 Initiation Signoff: [Signature]
100%	22.8	7.70		10.1		187	10	10	10	10	10	
Meter ID	43A	pH19		R007		EC06						
Lab Control	23.2				9.1		10	10	10	10	10	Date: 3/1/14 Count Time: 930 Count Signoff: [Signature] Old WQ: CP
100%	23.2				8.8		10	10	10	10	10	
Meter ID	43A				R007							
Lab Control	23.1				7.5		10	10	10	9	9	Date: 3/2/14 Count Time: 1010 Count Signoff: [Signature] Old WQ: F01B Feed: [Signature]
100%	23.1				7.8		10	7	8	10	10	
Meter ID	43A				R007							
Lab Control	23.0				5.6		10	10	10	9	9	Date: 3/3/14 Count Time: 1045 Count Signoff: [Signature] Old WQ: [Signature]
100%	23.0				5.5		10	2	8	10	10	
Meter ID	43A				R008							
Lab Control	22.9				5.7		10	10	10	9	9	Date: 3/4/14 Count Time: 0940 Count Signoff: [Signature] Old WQ: CP Feed: [Signature]
100%	22.9				5.3		10	2	5	9	10	
Meter ID	43A				R007							
Lab Control	23.0	7.81	7.67	8.8	7.8	407	10	10	10	9	9	Date: 3/5/14 Sample ID: 34219 Test Solution Prep: [Signature] New WQ: [Signature] Renewal Time: 1445 Renewal Signoff: [Signature] Old WQ: [Signature]
100%	23.0	7.71	7.67	9.5	7.4	188	10	1	4	9	10	
Meter ID	43A	pH14	pH19	P007	R009	EC06						
Lab Control	23.0				4.9		10	10	10	9	9	Date: 3-6-14 Count Time: 0900 Count Signoff: [Signature] Old WQ: SM Feed: SM
100%	23.0				5.1		10	1	4	9	9	
Meter ID	43A				R007							
Lab Control	22.9				6.5		10	10	10	9	9	Date: 3/7/14 Count Time: 1440 Count Signoff: [Signature] Old WQ: GS
100%	22.9				6.4		10	1	3	6	8	
Meter ID	43A				R007							
Lab Control	22.6				6.7		10	10	10	9	9	Date: 3/8/14 Count Time: 1315 Count Signoff: [Signature] Old WQ: GS Feed: [Signature]
100%	22.6				6.4		9	1	3	6	8	
Meter ID	43A				R007							
Lab Control	22.8				6.3		10	10	10	9	9	Date: 3/9/14 Count Time: 1015 Count Signoff: [Signature] Old WQ: CP
100%	22.8				6.0		9	1	2	6	8	
Meter ID	43A				R007							
Lab Control	22.9		8.01		7.6	454	10	10	10	9	9	Date: 3/10/14 Termination Time: 1515 Termination Signoff: [Signature] Old WQ: [Signature]
100%	22.9		7.80		6.8	209	8	1	2	6	7	
Meter ID	43A		pH21		R007	EC04						

10 Day Acute *Hyaella azteca* Toxicity Test Data

Client: ADH / CCCWP
 Test Material: 544R00025US
 Test ID#: 55552 Project #: 19397
 Test Date: 2/28/14

Organism Log#: 7993 Age: 9-10d
 Organism Supplier: Chesapeake
 Control/Diluent: SAM-5 Hyaella Water
 Control Water Batch: 92

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Lab Control	22.8	7.76		8.8		410	10	10	10	10	10	Date: <u>2/28/14</u> Sample ID: <u>34242</u>
100%	22.8	7.69		9.8		1117	10	10	10	10	10	Test Solution Prep: <u>AK</u> New WQ: <u>141</u>
Meter ID	<u>43A</u>	<u>pH19</u>		<u>RD07</u>		<u>EC06</u>						Initiation Time: <u>1750</u> Initiation Signoff: <u>AK</u>
Lab Control	23.2			9.1			10	10	10	10	10	Date: <u>3/1/14</u> Count Time: <u>930</u>
100%	23.2			9.0			10	10	10	10	10	Count Signoff: <u>AK</u> Old WQ: <u>CP</u>
Meter ID	<u>43A</u>			<u>RD07</u>								
Lab Control	23.1			7.5			10	10	10	9	9	Date: <u>3/1/14</u> Count Time: <u>1010</u>
100%	<u>23.1</u>			6.4			9	10	9	6	9	Count Signoff: <u>AK</u> Old WQ: <u>AK</u>
Meter ID	<u>43A</u>			<u>RD07</u>								Feed: <u>AK</u>
Lab Control	23.0			5.6			10	10	10	9	9	Date: <u>3/3/14</u> Count Time: <u>1645</u>
100%	23.0			4.8			4	9	9	5	9	Count Signoff: <u>AK</u> Old WQ: <u>AK</u>
Meter ID	<u>43A</u>			<u>RD06</u>								
Lab Control	22.9			5.7			10	10	10	9	9	Date: <u>3/4/14</u> Count Time: <u>0940</u>
100%	22.9			3.1			4	6	5	3	6	Count Signoff: <u>AK</u> Old WQ: <u>CP</u>
Meter ID	<u>43A</u>			<u>RD07</u>								Feed: <u>AK</u>
Lab Control	23.0	7.81	7.67	8.8	7.8	407	10	10	10	9	9	Date: <u>3/5/14</u> Sample ID: <u>34242</u>
100%	23.0	7.71	7.61	9.4	6.9	1148	3	3	4	2	3	Test Solution Prep: <u>AK</u> New WQ: <u>AK</u>
Meter ID	<u>43A</u>	<u>pH14</u>	<u>pH19</u>	<u>RD07</u>	<u>RD09</u>	<u>EC04</u>						Renewal Time: <u>1445</u> Renewal Signoff: <u>AK</u> Old WQ: <u>AK</u>
Lab Control	23.0			4.9			10	10	10	9	9	Date: <u>3-6-14</u> Count Time: <u>0900</u>
100%	23.0			3.9			3	3	3	2	3	Count Signoff: <u>SM</u> Old WQ: <u>SM</u>
Meter ID	<u>43A</u>			<u>RD07</u>								Feed: <u>SM</u>
Lab Control	22.9			6.5			10	10	10	9	9	Date: <u>3/7/14</u> Count Time: <u>1440</u>
100%	22.9			6.2			3	3	3	2	3	Count Signoff: <u>AK</u> Old WQ: <u>66</u>
Meter ID	<u>43A</u>			<u>RD07</u>								
Lab Control	22.6			6.7			10	10	10	9	9	Date: <u>3-8-14</u> Count Time: <u>1315</u>
100%	22.6			6.2			3	3	3	2	2	Count Signoff: <u>AK</u> Old WQ: <u>CB</u>
Meter ID	<u>43A</u>			<u>RD07</u>								Feed: <u>AK</u>
Lab Control	22.8			6.3			10	10	10	9	9	Date: <u>3/9/14</u> Count Time: <u>1015</u>
100%	22.8			4.5			3	3	2	1	1	Count Signoff: <u>AK</u> Old WQ: <u>CP</u>
Meter ID	<u>43A</u>			<u>RD07</u>								
Lab Control	22.9		8-01	7.6		454	10	10	10	9	9	Date: <u>3-9-14</u> Termination Time: <u>1015</u>
100%	22.9		7.85	7.2		1145	3	3	1	1	1	Termination Signoff: <u>SM</u> Old WQ: <u>AK</u>
Meter ID	<u>43A</u>		<u>pH21</u>	<u>RD09</u>		<u>EC09</u>						

CETIS Analytical Report

Report Date: 12 Mar-14 11:07 (p 4 of 4)

Test Code: ADH_0228_HA_C2 | 12-0908-4952

Hyalella Survival and Growth Test Pacific EcoRisk

Analysis ID: 19-1235-0465	Endpoint: Survival Rate	CETIS Version: CETISv1.8.5
Analyzed: 12 Mar-14 10:59	Analysis: Nonparametric-Two Sample	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.7%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
LABQA	544R00025DS	15	NA	0	8	0.0040	Exact	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.971698	2.971698	1	373	<0.0001	Significant Effect
Error	0.0637424	0.0079678	8			
Total	3.03544		9			

Distributional Tests

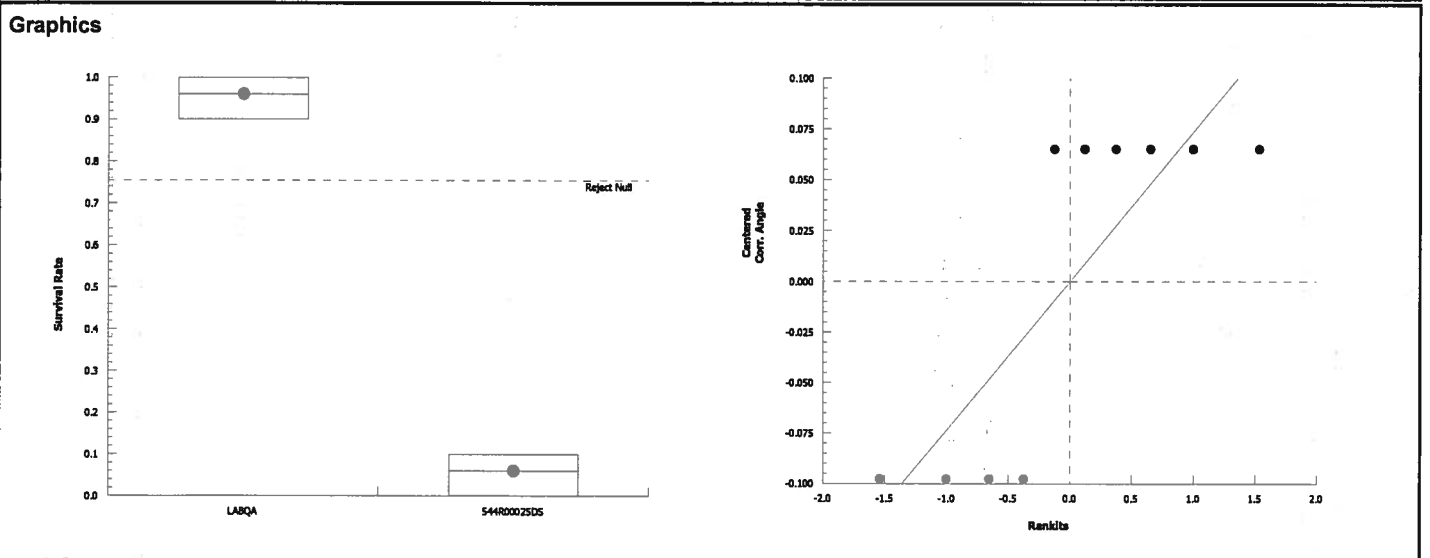
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.64	0.741	0.0002	Non-normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	5	0.96	0.892	1	1	0.9	1	0.0245	5.71%	0.0%
544R00025DS	5	0.06	0	0.128	0.1	0	0.1	0.0245	91.3%	93.8%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	5	1.35	1.24	1.46	1.41	1.25	1.41	0.0399	6.63%	0.0%
544R00025DS	5	0.257	0.146	0.367	0.322	0.159	0.322	0.0399	34.8%	81.0%



10 Day Acute *Hyalella azteca* Toxicity Test Data

Client: ADH / CCCWP
 Test Material: 544R00025DS
 Test ID#: 55553 Project #: 19397
 Test Date: 2/28/14

Organism Log#: 7993 Age: 9-10 d
 Organism Supplier: Chesapeake
 Control/Diluent: SAM-5 Hyalella Water
 Control Water Batch: 92

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Lab Control	22.8	7.76		8.8		410	10	10	10	10	10	Date: 2/28/14 Sample ID: 31243 Test Solution Prep: [initials] New WQ: [initials] Initiation Time: 1950 Initiation Signoff: [initials]
100%	22.8	7.72		10.1		1073	10	10	10	10	10	
Meter ID	43A	PH19		R007		ECO9						
Lab Control	23.2				9.1		10	10	10	10	10	Date: 3/1/14 Count Time: 930 Count Signoff: [initials] Old WQ: CP
100%	23.2				8.6		10	10	10	10	10	
Meter ID	43A				R007							
Lab Control	23.1				7.5		10	10	10	9	9	Date: 3/2/14 Count Time: 1010 Count Signoff: [initials] Old WQ: [initials] Feed: [initials]
100%	23.1				7.5		7	8	8	6	9	
Meter ID	43A				R007							
Lab Control	23.0				5.6		10	10	10	9	9	Date: 3/3/14 Count Time: 1045 Count Signoff: [initials] Old WQ: [initials]
100%	23.0				5.5		5	6	6	6	8	
Meter ID	43A				R006							
Lab Control	22.9				5.7		10	10	10	9	9	Date: 3/4/14 Count Time: 0946 Count Signoff: [initials] Old WQ: CP [initials] Feed: [initials]
100%	22.9				4.9		2	2	0	0	5	
Meter ID	43A				R007							
Lab Control	23.0	7.81	7.67	8.8	7.8	407	10	10	10	9	9	Date: 3/5/14 Sample ID: 31243 Test Solution Prep: [initials] New WQ: [initials] Renewal Time: 1445 Renewal Signoff: [initials] Old WQ: [initials]
100%	23.0	7.70	7.76	9.6	7.5	1683	1	1	-	-	1	
Meter ID	43A	PH14	PH19	R007	R009	5.06						
Lab Control	23.0				4.9		10	10	10	9	9	Date: 3-6-14 Count Time: 0900 Count Signoff: [initials] Old WQ: SM Feed: SM
100%	23.0				4.0		1	1	-	-	1	
Meter ID	43A				R007							
Lab Control	22.9				6.5		10	10	10	9	9	Date: 3/7/14 Count Time: 1440 Count Signoff: [initials] Old WQ: G6
100%	22.9				6.8		1	1	-	-	1	
Meter ID	43A				R007							
Lab Control	22.6				6.7		10	10	10	9	9	Date: 3-8-14 Count Time: 1315 Count Signoff: [initials] Old WQ: G6 Feed: [initials]
100%	22.6				6.4		1	1	-	-	1	
Meter ID	43A				R007							
Lab Control	22.8				6.3		10	10	10	9	9	Date: 3/9/14 Count Time: 1015 Count Signoff: [initials] Old WQ: CP
100%	22.8				5.7		1	1	-	-	1	
Meter ID	43A				R007							
Lab Control	22.9		8.01		7.6	454	10	10	10	9	9	Date: 3-10-14 Termination Time: 1015 Termination Signoff: [initials] Old WQ: [initials]
100%	22.9		7.64		6.6	1114	1	1	-	-	1	
Meter ID	43A		PH21		R009	ECO9						

Appendix E

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the CCCWP Stormwater to Fathead Minnows



CETIS Summary Report

Report Date: 12 Mar-14 10:55 (p 1 of 1)
 Test Code: ADH_0227_PP_C1 | 15-6006-6778

Chronic Larval Fish Survival and Growth Test							Pacific EcoRisk				
Batch ID:	17-6115-7814	Test Type:	Growth-Survival (7d)		Analyst:	Cassy Glover					
Start Date:	27 Feb-14 17:00	Protocol:	EPA-821-R-02-013 (2002)		Diluent:	Not Applicable					
Ending Date:	06 Mar-14 08:00	Species:	Pimephales promelas		Brine:	Not Applicable					
Duration:	6d 15h	Source:	Aquatox, AR		Age:	1					
Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project					
LABQA	14-0598-7522	27 Feb-14 17:00	27 Feb-14 17:00	NA (25.1 °C)	ADH Environmental, Inc.	19397					
207R00843	14-6517-7241	26 Feb-14 17:45	27 Feb-14 16:11	23h (0.6 °C)							
206R00551	08-4072-0786	26 Feb-14 15:20	27 Feb-14 16:11	26h (0.4 °C)							
Sample Code	Material Type	Sample Source	Station Location		Latitude	Longitude					
LABQA	Lab Water	ADH Environmental, Inc.	LABQA								
207R00843	Ambient Water	ADH Environmental, Inc.	207R00843								
206R00551	Ambient Water	ADH Environmental, Inc.	206R00551								
7d Survival Rate Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect	
LABQA	4	1	1	1	1	1	0	0	0.0%	0.0%	
207R00843	4	0.575	0.452	0.698	0.2	0.9	0.165	0.33	57.5%	42.5%	
206R00551	4	0.925	0.889	0.961	0.8	1	0.0479	0.0957	10.4%	7.5%	
Mean Dry Biomass-mg Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect	
LABQA	4	0.715	0.679	0.75	0.613	0.831	0.0482	0.0964	13.5%	0.0%	
207R00843	4	0.59	0.505	0.674	0.293	0.776	0.113	0.226	38.4%	17.5%	
206R00551	4	0.733	0.698	0.768	0.656	0.865	0.0475	0.0951	13.0%	-2.59%	
Mean Dry Weight-mg Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect	
LABQA	4	0.715	0.679	0.75	0.613	0.831	0.0482	0.0964	13.5%	0.0%	
207R00843	4	1.15	1.04	1.26	0.84	1.46	0.148	0.295	25.6%	-61.3%	
206R00551	4	0.797	0.754	0.841	0.672	0.924	0.0584	0.117	14.7%	-11.6%	
7d Survival Rate Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4							
LABQA	1	1	1	1							
207R00843	0.4	0.8	0.9	0.2							
206R00551	1	0.8	0.9	1							
Mean Dry Biomass-mg Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4							
LABQA	0.613	0.663	0.751	0.831							
207R00843	0.534	0.776	0.756	0.293							
206R00551	0.672	0.739	0.656	0.865							
Mean Dry Weight-mg Detail											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4							
LABQA	0.613	0.663	0.751	0.831							
207R00843	1.34	0.97	0.84	1.46							
206R00551	0.672	0.924	0.729	0.865							
7d Survival Rate Binomials											
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4							
LABQA	10/10	10/10	10/10	10/10							
207R00843	4/10	8/10	9/10	2/10							
206R00551	10/10	8/10	9/10	10/10							

CETIS Analytical Report

Report Date: 12 Mar-14 10:55 (p 2 of 6)
 Test Code: ADH_0227_PP_C1 | 15-6006-6778

Chronic Larval Fish Survival and Growth Test Pacific EcoRisk

Analysis ID: 08-0438-6910 Endpoint: 7d Survival Rate CETIS Version: CETISv1.8.5
 Analyzed: 12 Mar-14 10:54 Analysis: Parametric-Two Sample Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.82%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
LABQA		206R00551	1.59	1.94	0.143	6	0.0813	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02735902	0.02735902	1	2.53	0.1625	Non-Significant Effect
Error	0.06478542	0.01079757	6			
Total	0.09214444		7			

Distributional Tests

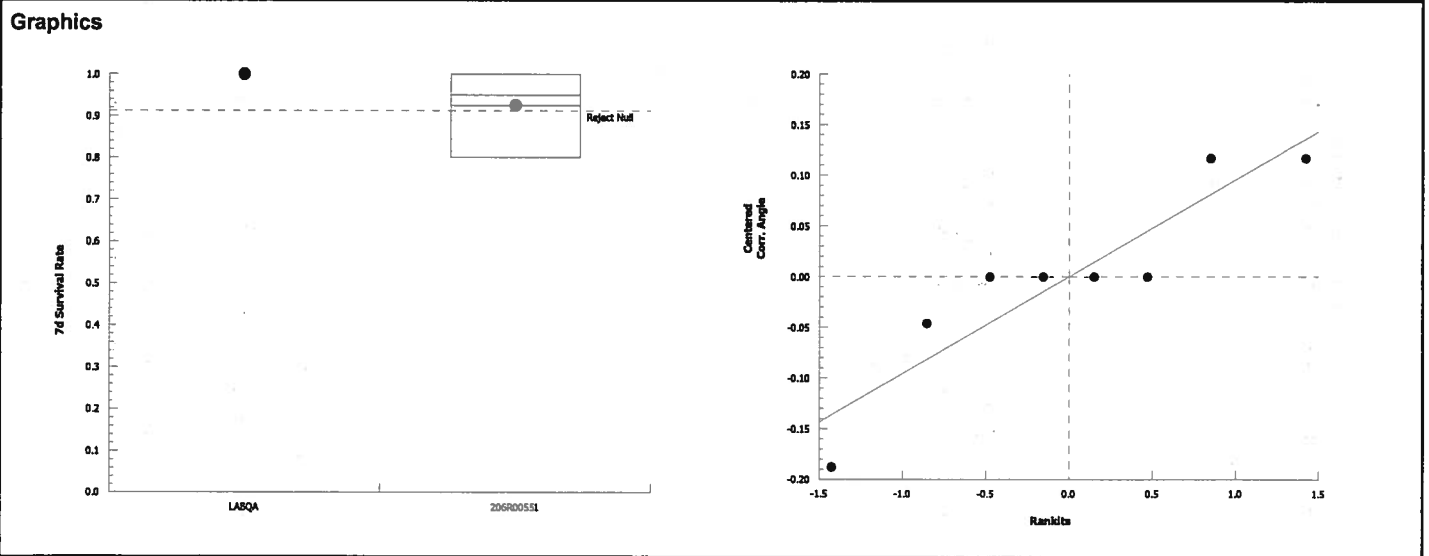
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	10.9	13.7	0.0165	Equal Variances
Variances	Levene Equality of Variance	16.3	13.7	0.0068	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.86	0.645	0.1195	Normal Distribution

7d Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	4	1	1	1	1	1	1	0	0.0%	0.0%
206R00551	4	0.925	0.773	1	0.95	0.8	1	0.0479	10.4%	7.5%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	4	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
206R00551	4	1.3	1.06	1.53	1.33	1.11	1.41	0.0735	11.3%	8.28%



CETIS Analytical Report

Report Date: 12 Mar-14 10:55 (p 3 of 6)
 Test Code: ADH_0227_PP_C1 | 15-6006-6778

Chronic Larval Fish Survival and Growth Test **Pacific EcoRisk**

Analysis ID: 18-2591-0104 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.8.5
 Analyzed: 12 Mar-14 10:54 Analysis: Parametric-Two Sample Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	18.4%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
LABQA		206R00551	-0.273	1.94	0.132	6	0.6031	CDF	Non-Significant Effect

ANOVA Table

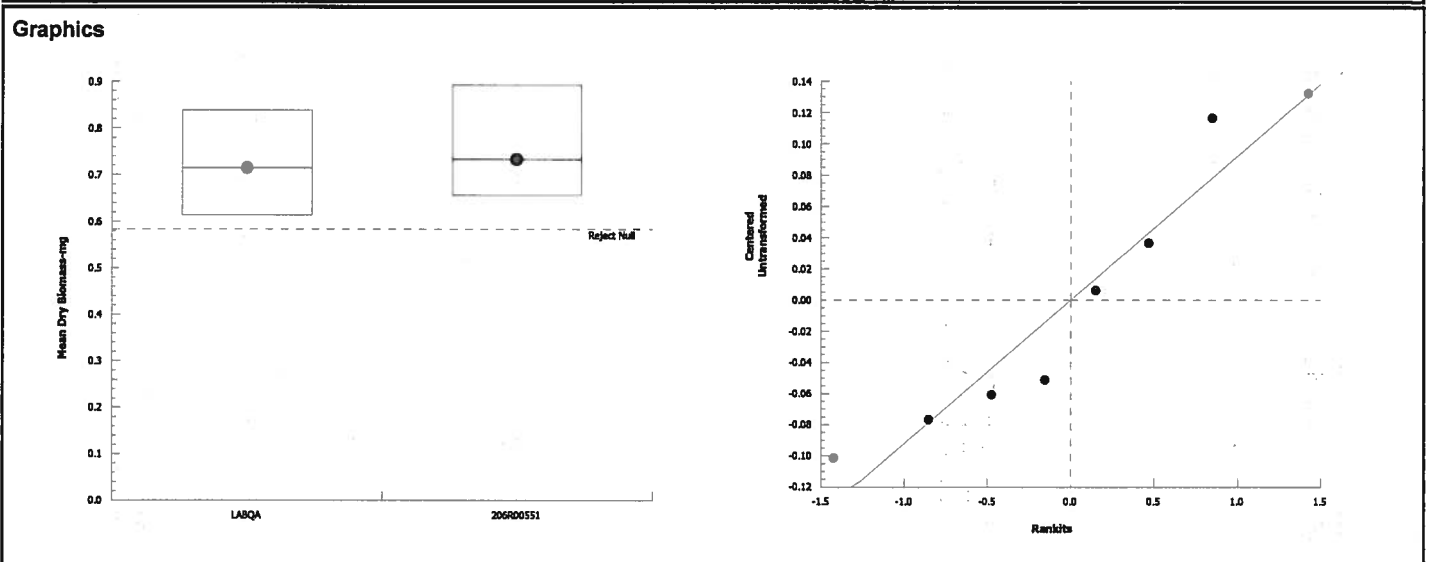
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006844824	0.0006844824	1	0.0747	0.7938	Non-Significant Effect
Error	0.05496849	0.009161416	6			
Total	0.05565298		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.03	47.5	0.9826	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.903	0.645	0.3081	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	4	0.715	0.561	0.868	0.707	0.613	0.831	0.0482	13.5%	0.0%
206R00551	4	0.733	0.582	0.884	0.706	0.656	0.865	0.0475	13.0%	-2.59%



7 Day Chronic Fathead Minnow Toxicity Test Data

Client: ADH / CCCWP Organism Log#: 7990 Age: <48hrs
 Test Material: 206R00551 Organism Supplier: Agassiz
 Test ID#: 55489 Project #: 19397 Control/Diluent: EPAMH
 Test Date: 2/27/14 Randomization: 4.6.2 Control Water Batch: 2/27/14-1666

Test Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms				SIGN-OFF
		new	old	new	old		A	B	C	D	
Lab Control	25.1	8.01		8.3		297	10	10	10	10	Date: 2/27/14 Test Solution Prep: CA
100%	25.1	7.80		11.4		908	10	10	10	10	Sample ID: 34205 Initiation Time: 1700
Meter ID	30A	pH19		RD04		EC04	New WQ: CA				Initiation Signoff: CTD
Lab Control	25.2	7.98	7.85	8.2	7.6	297	10	10	10	10	Date: 2/28/14 Test Solution Prep: CD
100%	25.2	7.87	8.24	11.6	6.4	902	10	10	10	9	Sample ID: 34205 Renewal Time: 1456
Meter ID	30A	pH21	pH19	RD07	RD07	EC06	New WQ: LH		Old WQ: LH		Renewal Signoff: CA
Lab Control	25.7	8.17	7.83	8.6	7.2	307	10	10	10	10	Date: 3/1/14 Test Solution Prep: SS
100%	25.7	7.91	8.26	11.0	7.0	911	10	9	10	10	Sample ID: 34205 Renewal Time: 1045
Meter ID	30A	pH16	pH19	RD09	RD08	EC06	New WQ: CD		Old WQ: CTD		Renewal Signoff: SM
Lab Control	26.0	8.08	7.64	8.8	7.1	296	10	10	10	10	Date: 3/2/14 Test Solution Prep: CD
100%	26.0	7.98	8.03 7.9 _{min}	10.5	7.6	902	10	8	10	10	Sample ID: 34205 Renewal Time: 1125
Meter ID	30A	pH21	pH21	RD05	RD06	2109	New WQ: AFP		Old WQ: AFP		Renewal Signoff: PR
Lab Control	25.7	8.22	7.70	8.7	5.9	295	10	10	10	10	Date: 3/3/14 Test Solution Prep: AR
100%	25.7	7.91	7.95	10.4	5.5	899	10	8	9	10	Sample ID: 34205 Renewal Time: 1500
Meter ID	30A	pH21	pH16	RD07	RD04	EC06	New WQ: TM		Old WQ: AFP		Renewal Signoff: BR
Lab Control	25.4	8.43	7.73	8.3	7.3	305	10	10	10	10	Date: 3-4-14 Test Solution Prep: SM
100%	25.4	8.05	8.21	10.1	6.9	889	10	8	9	10	Sample ID: 34205 Renewal Time: 1120
Meter ID	30A	pH19	pH19	RD09	RD09	EC04	New WQ: LU		Old WQ: LU		Renewal Signoff: SN
Lab Control	25.3	8.03	7.71	8.4	8.1	307	10	10	10	10	Date: 3/5/14 Test Solution Prep: WJ
100%	25.3	7.94	8.19	10.5	8.3	895	10	8	9	10	Sample ID: 34205 Renewal Time: 1115
Meter ID	30A	pH16	pH19	RD07	RD09	EC06	New WQ: AFP		Old WQ: MA		Renewal Signoff: CP
Lab Control	25.5		7.42		7.1	309	10	10	10	10	Date: 3.6.14 Termination Time: 0800
100%	25.5		8.09		6.7	918	10	8	9	10	Termination Signoff: BR
Meter ID	30A		pH21		RD04	EC06			Old WQ: U		

Fathead Minnow Dry Weight Data Sheet

Client: ADH / CCCWP

Test ID #: 55489

Project # 19397

Sample ID: 206R00551

Tare Weight Date: 2 / 28 / 14

Sign-off: JLN

Test Date: 2 . 27 . 14

Final Weight Date: 3 / 7 / 14

Sign-off: MA

Pan ID	Concentration	Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Lab Control	A	157.42	163.55	10	0.613
2		B	180.78	187.41	10	0.663
3		C	152.31	159.82	10	0.751
4		D	161.99	170.30	10	0.831
5	100%	A	175.53	182.25	10	0.672
6		B	175.41	182.80	10	0.739
7		C	159.01	165.57	10	0.656
8		D	157.47	166.12	10	0.865
QA1			166.39	166.36		

CETIS Analytical Report

Report Date: 12 Mar-14 10:55 (p 4 of 6)
 Test Code: ADH_0227_PP_C1 | 15-6006-6778

Chronic Larval Fish Survival and Growth Test Pacific EcoRisk

Analysis ID: 16-2171-3786 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.8.5
 Analyzed: 12 Mar-14 10:54 Analysis: Parametric-Two Sample Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	33.4%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
LABQA		207R00843	1.01	1.94	0.239	6	0.1747	CDF	Non-Significant Effect

ANOVA Table

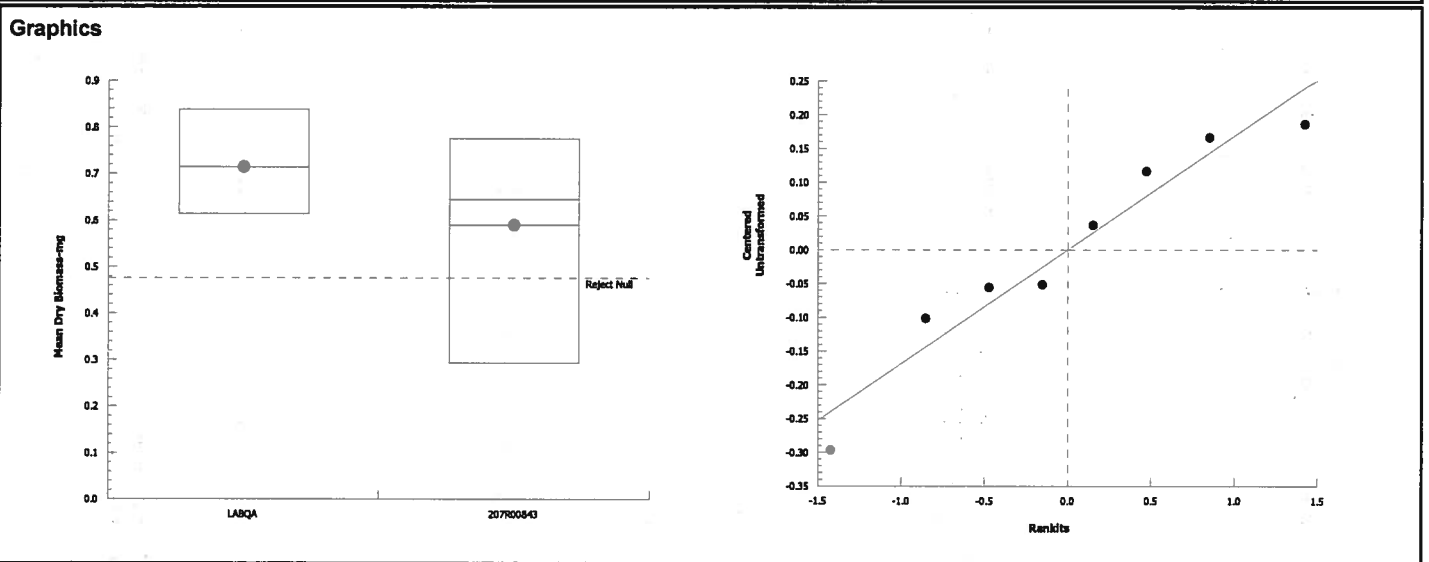
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.03112519	0.03112519	1	1.03	0.3494	Non-Significant Effect
Error	0.1813561	0.03022602	6			
Total	0.2124813		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	5.51	47.5	0.1947	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.936	0.645	0.5749	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LABQA	4	0.715	0.561	0.868	0.707	0.613	0.831	0.0482	13.5%	0.0%
207R00843	4	0.59	0.23	0.95	0.645	0.293	0.776	0.113	38.4%	17.5%



7 Day Chronic Fathead Minnow Toxicity Test Data

Client: ADH / CCCWP
 Test Material: 207R00843
 Test ID#: 55493 Project #: 19397
 Test Date: 2/27/14 Randomization: 4.6.2

Organism Log#: 7990 Age: <48 hrs
 Organism Supplier: Aquatox
 Control/Diluent: EPAMH
 Control Water Batch: 1666

Test Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms				SIGN-OFF
		new	old	new	old		A	B	C	D	
Lab Control	25.1	8.01		8.3		297	10	10	10	10	Date: 2/27/14 Test Solution Prep: [initials]
100%	25.1	7.92		11.4		280	10	10	10	10	Sample ID: 34206 Initiation Time: 1700
Meter ID	30A	PH19		RD01		EC04	New WQ: [initials]				Initiation Signoff: [initials]
Lab Control	25.2	7.98	7.85	8.2	7.6	297	10	10	10	10	Date: 2/28/14 Test Solution Prep: [initials]
100%	25.2	7.76	7.89	10.2	7.0	279	10	10	10	10	Sample ID: 34206 Renewal Time: 1450
Meter ID	30A	PH21	PH19	RD07	RD07	EC06	New WQ: LH		Old WQ: LH		Renewal Signoff: [initials]
Lab Control	25.7	8.11	7.83	8.6	7.2	307	10	10	10	10	Date: 3/1/14 Test Solution Prep: [initials]
100%	25.7	7.75	7.88	9.11.2	7.1	269	10	10	10	8	Sample ID: 34206 Renewal Time: 1045
Meter ID	30A	PH16	PH19	RD09	RD08	EC06	New WQ: CD		Old WQ: CJD		Renewal Signoff: SM
Lab Control	26.0	8.08	7.64	8.8	7.1	296	10	10	10	10	Date: 3/2/14 Test Solution Prep: [initials]
100%	26.0	7.90	7.60	10.6	7.0	281	5	8	9	4	Sample ID: 34206 Renewal Time: 1125
Meter ID	30A	PH21	PH21	RD08	RD08	EC09	New WQ: AAF		Old WQ: AAF		Renewal Signoff: [initials]
Lab Control	25.7	8.22	7.70	8.7	5.9	295	10	10	10	10	Date: 3/3/14 Test Solution Prep: [initials]
100%	25.7	7.79	7.60	10.1	6.0	276	4	8	9	2	Sample ID: 34206 Renewal Time: 1500
Meter ID	30A	PH21	PH16	RD07	RD04	EC06	New WQ: TM		Old WQ: AAF		Renewal Signoff: [initials]
Lab Control	25.4	8.43	7.73	8.3	7.3	305	10	10	10	10	Date: 3-4-14 Test Solution Prep: SM
100%	25.4	7.88	7.73	9.7	7.0	281	4	8	9	2	Sample ID: 34206 Renewal Time: 1120
Meter ID	30A	PH19	PH19	RD09	RD09	EC04	New WQ: [initials]		Old WQ: [initials]		Renewal Signoff: [initials]
Lab Control	25.3	8.03	7.71	8.6	8.1	307	10	10	10	10	Date: 3/5/14 Test Solution Prep: [initials]
100%	25.3	7.86	7.82	9.11.0	8.3	276	4	8	9	2	Sample ID: 34206 Renewal Time: 1115
Meter ID	30A	PH16	PH19	RD07	RD09	EC06	New WQ: AAF		Old WQ: MA		Renewal Signoff: CP
Lab Control	25.5		7.92		7.1	309	10	10	10	10	Date: 3.6.14 Termination Time: 0300
100%	25.5		7.8		7.2	287	4	8	9	2	Termination Signoff: [initials]
Meter ID	30A		PH21		RD04	EC06			Old WQ: A		

Fathead Minnow Dry Weight Data Sheet

Client: ADH / CCCWP

Test ID #: 55493

Project # 19397

Sample ID: 207R00843

Tare Weight Date: 2 / 28 / 14

Sign-off: JLA

Test Date: 2, 27, 14

Final Weight Date: 3 / 7 / 14

Sign-off: MA

Pan ID	Concentration	Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Lab Control	A	172.50	163.55	10	0.613
2		B	142.59	187.41	10	0.663
3		C	146.67	159.82	10	0.751
4		D	148.36	170.30	10	0.831
9	100%	A	169.48	174.82	10	0.534
10		B	162.66	170.42	10	0.776
11		C	160.40	167.96	10	0.756
12		D	168.80	171.73	10	0.293
QA1			172.30	172.38		

Appendix F

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Selenastrum capricornutum*



CETIS Summary Report

Report Date: 11 Mar-14 14:15 (p 1 of 1)
 Test Code: 55554 | 05-3854-9335

Algal Growth Test Pacific EcoRisk

Batch ID: 02-1961-7457	Test Type: Cell Growth	Analyst: Cassy Glover
Start Date: 27 Feb-14 15:45	Protocol: EPA-821-R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 03 Mar-14 15:15	Species: Selenastrum capricornutum	Brine: Not Applicable
Duration: 95h	Source: In-House Culture	Age: 6

Sample ID: 01-6567-6579	Code: NaCl	Client: Pacific Ecorisk
Sample Date: 27 Feb-14 15:45	Material: Sodium chloride	Project: 22124
Receive Date: 27 Feb-14 15:54	Source: Reference Toxicant	
Sample Age: NA (25.1 °C)	Station: In House	

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
13-1183-7724	96h Cell Density-without E	<0.125	0.125	NA	5.98%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
04-7067-6656	96h Cell Density-without E	IC5	0.0882	0.043	0.524		Linear Interpolation (ICPIN)
		IC10	0.4	N/A	0.72		
		IC15	0.686	0.344	0.999		
		IC20	0.989	0.717	1.27		
		IC25	1.29	0.998	1.57		
		IC40	2.14	1.82	2.38		
		IC50	2.55	2.31	2.76		

96h Cell Density-without EDTA Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	4	3.12E+6	3.07E+6	3.17E+6	2.93E+6	3.20E+6	6.49E+4	1.30E+5	4.15%	0.0%
0.125		4	2.87E+6	2.82E+6	2.92E+6	2.70E+6	3.01E+6	7.08E+4	1.42E+5	4.94%	8.09%
0.25		4	2.93E+6	2.90E+6	2.97E+6	2.80E+6	3.01E+6	4.85E+4	9.71E+4	3.31%	6.08%
0.5		4	2.75E+6	2.71E+6	2.79E+6	2.62E+6	2.87E+6	5.12E+4	1.02E+5	3.72%	11.9%
1		4	2.49E+6	2.46E+6	2.52E+6	2.41E+6	2.59E+6	3.71E+4	7.41E+4	2.97%	20.2%
2		4	1.98E+6	1.93E+6	2.02E+6	1.80E+6	2.10E+6	6.61E+4	1.32E+5	6.7%	36.7%
4		4	4.84E+5	4.68E+5	4.99E+5	4.36E+5	5.23E+5	2.05E+4	4.10E+4	8.48%	84.5%

96h Cell Density-without EDTA Detail

C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	3.20E+6	3.16E+6	2.93E+6	3.20E+6
0.125		2.70E+6	3.01E+6	2.96E+6	2.81E+6
0.25		2.80E+6	3.00E+6	3.01E+6	2.92E+6
0.5		2.76E+6	2.62E+6	2.87E+6	2.75E+6
1		2.49E+6	2.41E+6	2.59E+6	2.48E+6
2		2.05E+6	2.10E+6	1.80E+6	1.95E+6
4		5.12E+5	4.36E+5	5.23E+5	4.63E+5

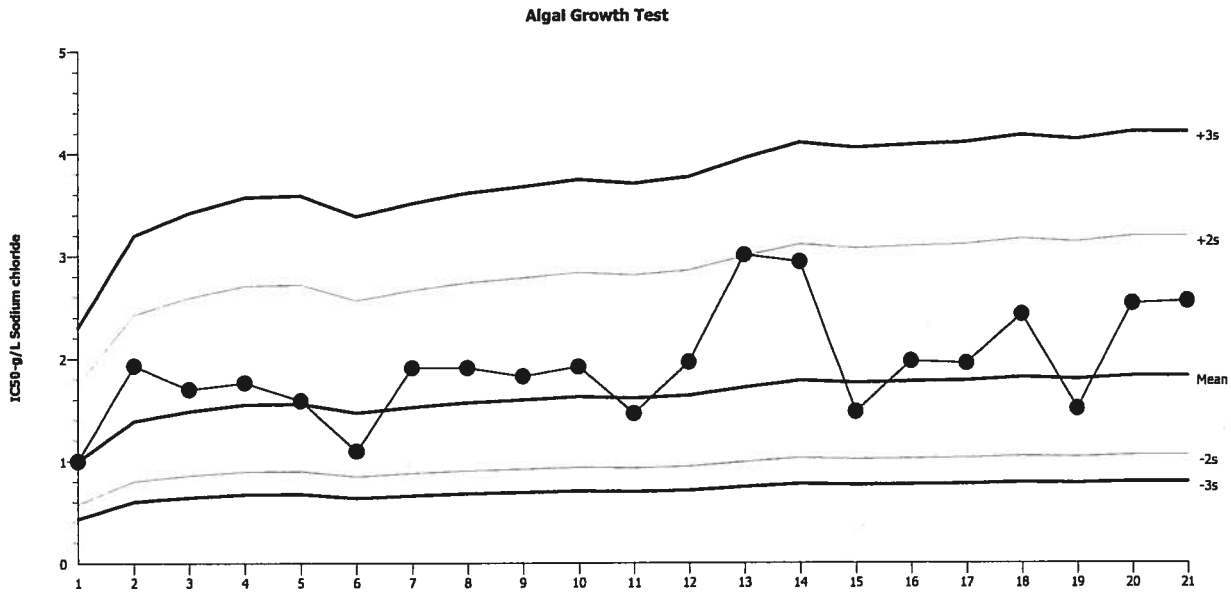
Algal Growth Test

Pacific EcoRisk

Test Type: Cell Growth
 Protocol: EPA-821-R-02-013 (2002)

Organism: Selenastrum capricornutum (Green)
 Endpoint: 96h Cell Density-without EDTA

Material: Sodium chloride
 Source: Reference Toxicant-REF



Mean: 1.826 Count: 20 -2s Warning Limit: 1.047 -3s Action Limit: 0.7929
 Sigma: NA CV: 32.10% +2s Warning Limit: 3.185 +3s Action Limit: 4.206

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2012	Nov	14	11:35	1	-0.8263	-2.166	(-)		19-3651-9449	02-4093-7643
2			30	11:45	1.928	0.102	0.1953			06-8774-9598	00-2376-6641
3		Dec	12	14:00	1.698	-0.128	-0.2613			21-1404-8287	09-6532-2652
4	2013	Jan	9	14:50	1.764	-0.06267	-0.1256			20-3540-5103	02-4694-0562
5		Feb	20	14:25	1.589	-0.2377	-0.5014			19-4816-2041	19-1093-3601
6		Mar	6	17:00	1.096	-0.7307	-1.837			18-8696-2927	19-9405-0991
7		Apr	18	14:30	1.908	0.08193	0.1578			04-8640-5545	13-1906-6299
8		May	15	14:25	1.908	0.08199	0.1579			12-4530-9929	20-4208-0803
9		Jun	12	16:30	1.825	-0.00114	-0.00224			03-8736-5752	05-2456-6169
10		Jul	10	16:30	1.919	0.09293	0.1785			00-7938-6478	19-4822-0015
11		Aug	14	12:07	1.46	-0.3658	-0.8038			03-5576-3584	12-8935-7956
12		Sep	11	11:26	1.962	0.1352	0.2568			11-1345-1076	05-7278-8891
13		Oct	9	14:32	3.006	1.18	1.792			13-2313-5960	13-5763-7826
14			9	14:32	2.939	1.113	1.711			11-7111-2371	05-1907-8644
15			24	16:25	1.477	-0.3496	-0.764			08-9082-3583	05-0631-1673
16		Nov	13	16:31	1.97	0.1437	0.2723			10-6527-3067	07-8249-1370
17		Dec	11	15:05	1.95	0.1238	0.2359			19-9359-6560	16-1399-8784
18	2014	Jan	15	15:03	2.426	0.5999	1.021			06-3179-4459	01-5918-9112
19		Feb	3	15:15	1.505	-0.3217	-0.6967			05-4911-8245	14-2525-8722
20			7	16:40	2.533	0.7066	1.176			12-2944-4902	10-9013-2498
21			27	15:45	2.555	0.7285	1.207			05-3854-9335	04-7067-6656

***Selenastrum capricornutum* Cell Density Enumeration Data**

Client: Reference Toxicant Initial Count: 10,000 cells/mL
 Test Material: NaCl Enumerating Scientist: PA
 Test Start Date: 2/27/14 Start Time: 1545 Project #: 22131
 Test End Date: 2.28.14 End Time: 1515 Test ID #: 55636

Treatment	Cell Density (cells/mL x 10 ⁶)				
	Rep A	Rep B	Rep C	Rep D	Mean
Lab Water Control	3.20	3.16	2.93	3.20	3.12
0.125	2.70	3.01	2.96	2.81	2.87
0.25	2.80	3.00	3.01	2.92	2.93
0.5	2.76	2.62	2.87	2.75	2.75
1	2.49	2.41	2.59	2.48	2.49
2	2.05	2.10	1.80	1.95	1.98
4	0.512	0.436	0.523	0.463	0.484
This datasheet has been reviewed for completeness and consistency with Test Acceptability Criteria and/or other issues of concern.	Control Mean Density (cells/mL x 10 ⁶)	% CV	Date:	Time:	Signoff:
	3.12	4.15	2/27/14 PA	1537	PA

Selenastrum capricornutum Algal Toxicity Test Water Quality Data

Client: Reference Toxicant

Test ID #: 55554

Test Date: 2/27/14

Test Material: NaCl

Project #: 22124

Control/Diluent: Lab Water Without EDTA

Reference Toxicant Test Treatment (g/L NaCl)	Temp (°C)	pH	D.O. (mg/L)	Conductivity (µS/cm)	Sign-Off
Lab Water Control	25.1	7.59	8.1	94.6	Date: 2/27/14
0.125	25.1	7.59	8.9	386368	Test Solution Prep: KP
0.25	25.1	7.57	8.8	611	New WQ: TM
0.5	25.1	7.51	8.7	1075	Innoculation Time: 1545
1	25.1	7.49	8.6	22407	Innoculation Signoff: KP
2	25.1	7.44	8.7	3960	Shelf ID: +26/23/1
4	25.1	7.39	8.7	959750	
Meter ID:	USA	PH19	R004	EC04	
Lab Water Control	25.4	7.72			Date: 2-28-14
0.125	25.4	7.56			WQ Time: 0930
0.25	25.4	7.53			WQ Signoff: APF
0.5	25.4	7.48			
1	25.4	7.41			
2	25.4	7.37			
4	25.4	7.28			
Meter ID:	65A	PH19			
Lab Water Control	25.3	8.39			Date: 3-1-14
0.125	25.3	8.29			WQ Time: 0900
0.25	25.3	8.25			WQ Signoff: LH
0.5	25.3	8.21			
1	25.3	8.12			
2	25.3	8.03			
4	25.3	7.74			
Meter ID:	65A	PH16			
Lab Water Control	24.8	9.55			Date: 3/2/14
0.125	24.8	9.42			WQ Time: 0900
0.25	24.8	9.29			WQ Signoff: LH
0.5	24.8	9.30			
1	24.8	9.01			
2	24.8	8.69			
4	24.8	7.69			
Meter ID:	65A	PH19			
Lab Water Control	25.0	9.69	12.5	9510	Date: 3-3-14
0.125	25.0	9.46	12.0	367	Termination Time: 1515
0.25	25.0	9.50	12.2	621	Termination Signoff: PQ
0.5	25.0	9.40	12.1	1088	WQ Time: 0955
1	25.0	9.35	11.5	2285	WQ Signoff: APF
2	25.0	9.07	11.0	3940	
4	25.0	8.44	9.7	7510	
Meter ID:	65A	PH16	R004	EC09	

Initial Test Conditions			
Target: 8.000 g NaCl in 2 L	Alkalinity	Hardness	Light Intensity (ftc)
Actual:	12	14	412.5

Appendix G

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Ceriodaphnia dubia*



CETIS Summary Report

Report Date: 06 Mar-14 15:56 (p 1 of 2)

Test Code: 55555 | 06-7069-6201

Ceriodaphnia Survival and Reproduction Test **Pacific EcoRisk**

Batch ID: 17-2490-4388	Test Type: Reproduction-Survival (7d)	Analyst: Cassy Glover
Start Date: 27 Feb-14 14:20	Protocol: EPA-821-R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Mar-14 14:40	Species: Ceriodaphnia dubia	Brine: Not Applicable
Duration: 6d 0h	Source: In-House Culture	Age: 1

Sample ID: 16-7726-1869	Code: NaCl	Client: Pacific Ecorisk
Sample Date: 27 Feb-14 14:20	Material: Sodium chloride	Project: 22125
Receive Date: 27 Feb-14 14:20	Source: Reference Toxicant	
Sample Age: NA (25.8 °C)	Station: In House	

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
19-4434-6354	Reproduction	1000	1500	1225	40.2%		Steel Many-One Rank Sum Test
17-2587-0001	Survival	2000	2500	2236	NA		Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary

Analysis ID	Endpoint	Level	mg/L	95% LCL	95% UCL	TU	Method
12-4436-7470	Reproduction	IC5	382	76.7	1060		Linear Interpolation (ICPIN)
		IC10	1030	153	1110		
		IC15	1070	230	1170		
		IC20	1120	307	1220		
		IC25	1160	383	1280		
		IC40	1290	1110	1460		
		IC50	1380	1210	1560		
01-7956-2087	Survival	EC5	1680	101	1960		Linear Regression (MLE)
		EC10	1770	178	2020		
		EC15	1830	260	2070		
		EC20	1880	352	2110		
		EC25	1930	455	2150		
		EC40	2050	860	2280		
		EC50	2120	1230	2420		

Reproduction Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	22.9	17.8	28	0	35	4.33	13.7	59.7%	0.0%
500		10	18.2	13.2	23.2	0	32	4.22	13.3	73.3%	20.5%
1000		10	24.6	22.9	26.3	19	34	1.4	4.43	18.0%	-7.42%
1500		10	8.2	5.72	10.7	0	18	2.1	6.65	81.1%	64.2%
2000		10	0.2	0.0426	0.357	0	1	0.133	0.422	211.0%	99.1%
2500		10	0	0	0	0	0	0	0		100.0%

Survival Summary

C-mg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	0.9	0.782	1	0	1	0.1	0.316	35.1%	0.0%
500		10	0.8	0.643	0.957	0	1	0.133	0.422	52.7%	11.1%
1000		10	1	1	1	1	1	0	0	0.0%	-11.1%
1500		10	0.8	0.643	0.957	0	1	0.133	0.422	52.7%	11.1%
2000		10	0.6	0.407	0.793	0	1	0.163	0.516	86.1%	33.3%
2500		10	0.1	0	0.218	0	1	0.1	0.316	316.0%	88.9%

CETIS Summary Report

Report Date: 06 Mar-14 15:56 (p 2 of 2)
 Test Code: 55555 | 06-7069-6201

Ceriodaphnia Survival and Reproduction Test											Pacific EcoRisk
Reproduction Detail											
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	32	27	29	0	32	10	35	1	32	31
500		15	29	26	0	0	29	0	24	27	32
1000		20	25	19	26	25	20	25	24	28	34
1500		12	0	15	14	18	0	6	8	9	0
2000		0	0	0	0	0	0	0	0	1	1
2500		0	0	0	0	0	0	0	0	0	0
Survival Detail											
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	0	1	1
500		0	1	1	1	0	1	1	1	1	1
1000		1	1	1	1	1	1	1	1	1	1
1500		1	1	1	1	1	0	0	1	1	1
2000		0	1	0	1	0	0	1	1	1	1
2500		1	0	0	0	0	0	0	0	0	0
Survival Binomials											
C-mg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
500		0/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
1000		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1500		1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1
2000		0/1	1/1	0/1	1/1	0/1	0/1	1/1	1/1	1/1	1/1
2500		1/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

Ceriodaphnia Survival and Reproduction Test

Pacific EcoRisk

Test Type: Reproduction-Survival (7d)

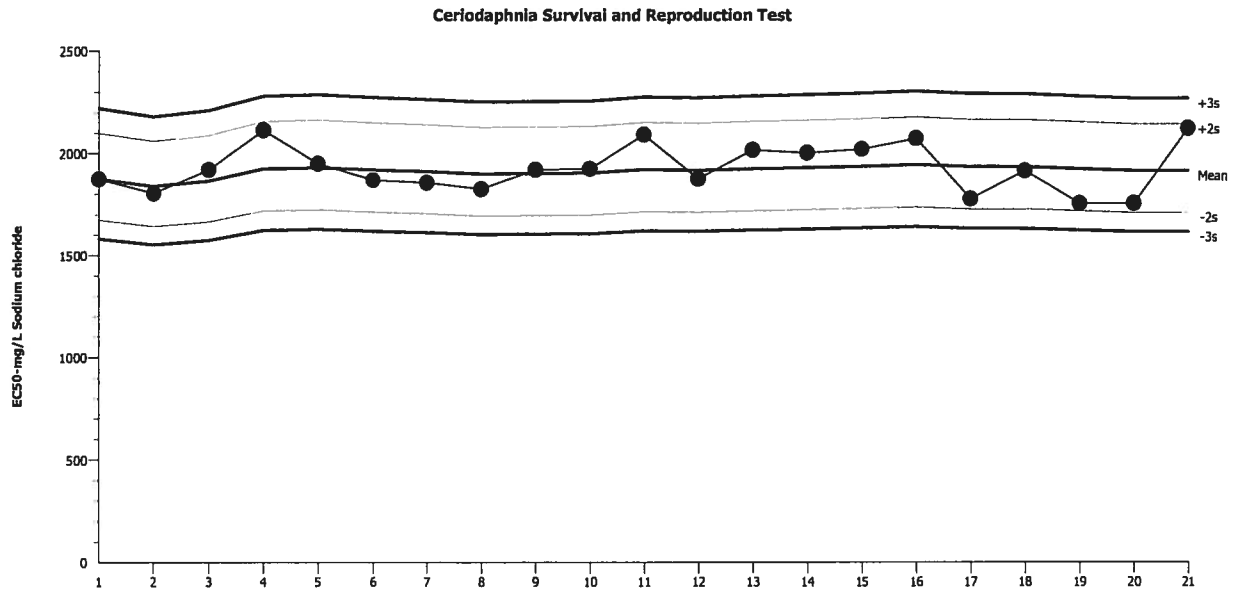
Organism: Ceriodaphnia dubia (Water Flea)

Material: Sodium chloride

Protocol: EPA-821-R-02-013 (2002)

Endpoint: Survival

Source: Reference Toxicant-REF

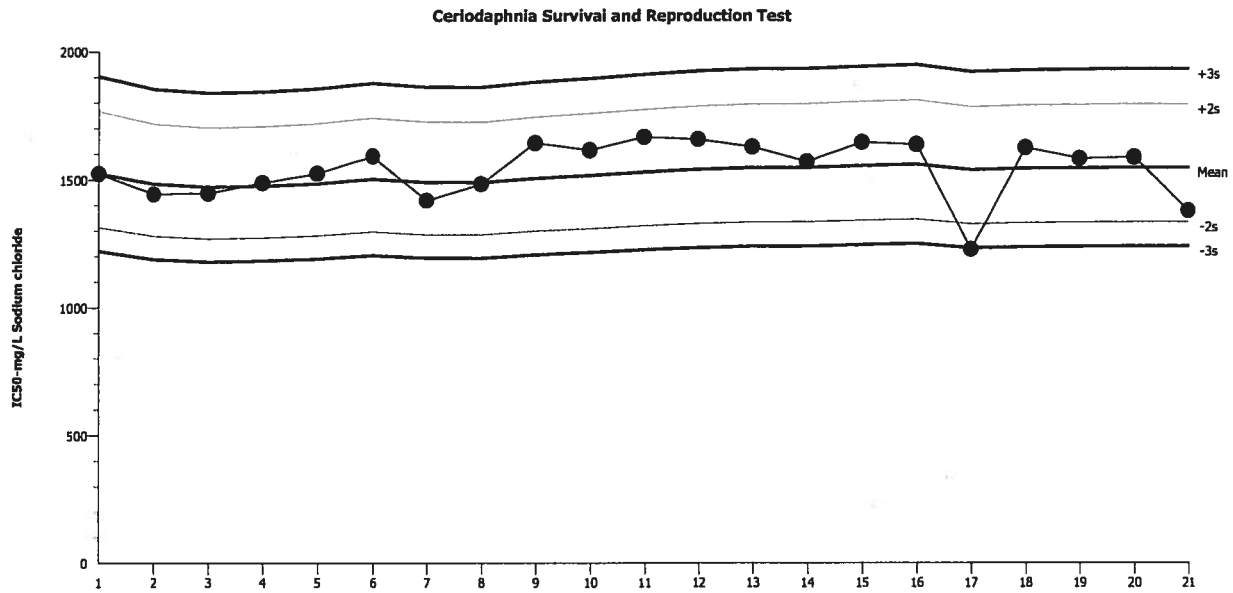


Mean: 1912 Count: 20 -2s Warning Limit: 1708 -3s Action Limit: 1614
 Sigma: NA CV: 5.82% +2s Warning Limit: 2142 +3s Action Limit: 2266

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Dec	3	11:15	1874	-38.52	-0.3598			12-5884-0560	21-4298-8538
2			4	16:05	1804	-107.9	-1.026			09-5622-2304	14-7350-4776
3			10	15:30	1918	6.18	0.05705			15-2935-9896	14-4880-2619
4			12	15:20	2113	200.5	1.763			14-8624-9987	17-8299-3643
5			17	15:19	1948	36.04	0.3302			02-9668-0960	17-7617-0085
6			27	11:30	1869	-43.46	-0.4065			12-5245-4230	15-7366-0270
7			28	11:00	1855	-57.24	-0.5373			12-0330-1397	15-7695-0801
8			31	15:00	1825	-87.22	-0.8254			09-7312-0881	18-4154-6303
9	2014	Jan	4	13:45	1918	6.18	0.05705			09-6104-7564	05-9919-1152
10			7	15:00	1923	11.21	0.1034			16-7246-6353	12-7662-2537
11			8	14:00	2091	178.5	1.578			01-9031-3368	18-5138-9208
12			14	14:15	1874	-38.52	-0.3598			09-8747-3748	16-6708-5060
13			15	14:45	2015	102.8	0.9259			08-6494-0499	17-9141-6278
14			18	13:30	2001	88.54	0.8003			17-1468-6197	11-6280-7655
15			21	14:30	2019	106.7	0.9602			00-6454-2258	07-5797-6910
16			23	12:00	2071	159	1.412			17-1293-4057	08-5501-2982
17		Feb	4	14:25	1776	-136.7	-1.311			07-2877-2070	10-6962-3923
18			5	14:40	1913	0.5345	0.004945			18-1807-5589	02-4863-0686
19			7	14:45	1753	-159.3	-1.538			20-3710-9112	04-8582-3441
20			11	15:55	1754	-158.2	-1.527			16-5289-2619	00-2481-8592
21			27	14:20	2121	208.4	1.829			06-7069-6201	01-7956-2087

Ceriodaphnia Survival and Reproduction Test			Pacific EcoRisk
Test Type: Reproduction-Survival (7d)	Organism: Ceriodaphnia dubia (Water Flea)	Material: Sodium chloride	
Protocol: EPA-821-R-02-013 (2002)	Endpoint: Reproduction	Source: Reference Toxicant-REF	



Mean: 1545 Count: 20 -2s Warning Limit: 1333 -3s Action Limit: 1238
 Sigma: NA CV: 7.69% +2s Warning Limit: 1792 +3s Action Limit: 1930

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Dec	3	11:15	1525	-20.83	-0.1833			12-5884-0560	15-0597-1397
2			4	16:05	1444	-101.5	-0.9173			09-5622-2304	14-3869-0648
3			10	15:30	1447	-97.86	-0.8835			15-2935-9896	14-2020-4870
4			12	15:20	1487	-58.2	-0.5184			14-8624-9987	00-7585-2713
5			17	15:19	1525	-20.69	-0.1821			02-9668-0960	09-7177-9871
6			27	11:30	1591	45.78	0.3943			12-5245-4230	01-2027-4739
7			28	11:00	1418	-127	-1.158			12-0330-1397	17-0523-0865
8			31	15:00	1482	-62.92	-0.5613			09-7312-0881	13-4764-4425
9	2014	Jan	4	13:45	1643	97.33	0.8248			09-6104-7564	12-3234-0188
10			7	15:00	1614	68.68	0.5872			16-7246-6353	12-1079-9052
11			8	14:00	1665	120.1	1.011			01-9031-3368	13-9221-2159
12			14	14:15	1656	111.1	0.9372			09-8747-3748	14-9137-2943
13			15	14:45	1626	81.06	0.6904			08-6494-0499	11-1750-3693
14			18	13:30	1570	24.33	0.211			17-1468-6197	01-8126-0604
15			21	14:30	1644	99.02	0.8388			00-6454-2258	19-6243-3715
16			23	12:00	1636	90.65	0.7698			17-1293-4057	17-6505-0888
17		Feb	4	14:25	1225	-320.3	-3.137	(-)	(-)	07-2877-2070	21-4219-1483
18			5	14:40	1623	77.36	0.6597			18-1807-5589	21-1964-3214
19			7	14:45	1580	34.98	0.3023			20-3710-9112	02-2044-4977
20			11	15:55	1586	40.52	0.3495			16-5289-2619	03-9065-0204
21			27	14:20	1377	-168.4	-1.559			06-7069-6201	12-4436-7470

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: Reference Toxicant Material: Sodium Chloride Test Date: 2-27-14
 Project #: 22125 Test ID: 55555 Randomization: 10.6.2 Control Water: Modified EPAMH

Day	pH		D.O.		Conductivity (µS/cm)		Temp (°C)	Survival / Reproduction										SIGN-OFF						
	New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J	Date:	New WQ:	Test Init:	Time:			
0	8.01		7.9		343		25.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Date: <u>2/27/14</u> New WQ: <u>MIA</u> Test Init: <u>JM</u> Sol'n Prep: <u>CP</u> Old WQ: <u>CP</u> Time: <u>1425</u>
1	7.93	8.20	8.0	7.8	350	366	25.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Date: <u>2/28/14</u> New WQ: <u>LH</u> Counts: <u>AB</u> Sol'n Prep: <u>CO</u> Old WQ: <u>AS</u> Time: <u>1510</u>
2	7.99	8.06	8.1	7.4	351	358	25.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Date: <u>3-1-14</u> New WQ: <u>CP</u> Counts: <u>57</u> Sol'n Prep: <u>JM</u> Old WQ: <u>AMS</u> Time: <u>1145</u>
3	7.94	7.97	8.3	7.2	350	360	25.8	0	3	0	0	0	4	3	0	0	0	0	0	0	0	0	0	Date: <u>3/2/14</u> New WQ: <u>AMS</u> Counts: <u>05</u> Sol'n Prep: <u>KP</u> Old WQ: <u>LH</u> Time: <u>1550</u>
4	7.93	7.92	8.5	8.7	349	380	25.6	5	1	4	0	6	0	1	X/1	5	3							Date: <u>3/3/14</u> New WQ: <u>CP</u> Counts: <u>CP</u> Sol'n Prep: <u>CP</u> Old WQ: <u>CP</u> Time: <u>1500</u>
5	7.83	7.92	8.2	8.8	341	393	25.7	10	7	10	0	9	6	10	-	12	13							Date: <u>3/4/14</u> New WQ: <u>CP</u> Counts: <u>2</u> Sol'n Prep: <u>CP</u> Old WQ: <u>CP</u> Time: <u>1550</u>
6	8.26	8.16	8.4	8.0	350	383	25.6	17	16	15	0	17	0	21	-	15	15							Date: <u>3/5/14</u> New WQ: <u>AMS</u> Counts: <u>KF</u> Sol'n Prep: <u>CP</u> Old WQ: <u>SVV</u> Time: <u>1400</u>
7																								Date: <u></u> New WQ: <u></u> Counts: <u></u> Sol'n Prep: <u></u> Old WQ: <u></u> Time: <u></u>
8																								Date: <u></u> Old WQ: <u></u> Counts: <u></u> Time: <u></u>
Total=								32	27	29	0	32	10	35	X/1	32	31	Mean Neonates/Female = 22.9						
Day	pH		D.O.		Conductivity (µS/cm)		Temp (°C)	Survival / Reproduction										RT BATCH NUMBER						
	New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J	Date:	New WQ:	Test Init:	Time:			
0	8.01		7.9		1368			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9423 122
1	7.95	8.16	8.3	7.8	1363	1472		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	122
2	7.94	8.07	8.3	7.4	1388	1410		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	122
3	7.90	7.99	8.3	7.2	1343	1436		0	0	0	0	X/0	0	0	0	0	0	0	0	0	0	0	0	124
4	7.99	7.91	8.4	8.4	1314	1406		4	6	6	0	-	0	0	5	3	4							124
5	7.85	7.92	8.2	8.7	1318	1377		X/1	11	12	0	-	12	0	7	10	13							124
6	8.17	8.01	8.6	8.0	1300	1439		-	12	8	0	-	17	0	12	14	15							124
7																								
8																								
Total=								X/5	29	26	0	X/0	29	0	24	27	32	Mean Neonates/Female = 18.2						

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: Reference Toxicant Material: Sodium Chloride Test Date: 2-27-14
 Project #: 22125 Test ID: 55555 Randomization: 10.6.2 Control Water: Modified EPAMH

	Day	pH		D.O.		Conductivity (µS/cm)		Temp (°C)	Survival / Reproduction												
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J			
1000 mg/L	0	7.98		8.2		2306			0	0	0	0	0	0	0	0	0	0	0	0	
	1	7.96	8.13	8.7	7.7	2247	2435		0	0	0	0	0	0	0	0	0	0	0	0	
	2	7.91	8.03	8.4	7.4	2236	2358		0	0	0	0	0	0	0	0	0	0	0	0	
	3	7.90	7.98	8.5	7.2	2288	2358		0	0	0	0	0	0	0	0	0	2	0		
	4	7.96	7.89	8.5	8.3	2296	2515		0	5	7	4	3	1	3	4	0	8			
	5	7.85	7.90	8.3	8.6	2300	2431		9	11	0	9	10	9	11	11	12	13			
	6	8.13	7.99	8.7	8.2	2289	2605		11	9	12	13	12	11	11	9	14	13			
	7																				
8																					
Total=								20	25	19	26	25	20	25	24	28	34	Mean Neonates/Female = 29.6			
1500 mg/L	0	7.96		8.3		3220			0	0	0	0	0	0	0	0	0	0	0	0	
	1	7.95	8.09	9.1	7.7	3220	3410		0	0	0	0	0	0	0	0	0	0	0	0	
	2	7.88	8.05	8.6	7.5	3120	3380		0	0	0	0	0	0	0	0	0	0	0	0	
	3	7.86	7.98	8.7	7.2	3240	3230		0	0	0	0	0	-	0	0	0	0	0		
	4	7.94	7.88	8.6	8.2	3260	3460		3	0	0	3	2	-	2	0	1	0			
	5	7.84	7.91	8.4	8.7	3250	3590		5	0	10	5	7	-	4	3	6	0			
	6	8.10	7.93	8.9	8.3	3210	3570		4	0	5	6	9	-	-	5	2	0			
	7													-							
8													-								
Total=								12	0	15	14	18	40	7/6	8	9	0	Mean Neonates/Female = 8.2			

Short-Term Chronic 3-Brood *Ceriodaphnia dubia* Survival & Reproduction Test Data

Client: Reference Toxicant Material: Sodium Chloride Test Date: 2-27-14
 Project #: 22125 Test ID: 55555 Randomization: 10.6-2 Control Water: Modified EPAMH

	Day	pH		D.O.		Conductivity (µS/cm)		Temp (°C)	Survival / Reproduction											
		New	Old	New	Old	New	Old		A	B	C	D	E	F	G	H	I	J		
2000 mg/L	0	7.91		9.2		4170			0	0	0	0	0	0	0	0	0	0	0	
	1	7.94	8.08	9.4	7.8	4130	4390		0	0	0	0	0	0	0	0	0	0	0	
	2	7.87	8.04	8.9	7.5	4110	4310		0	0	0	0	0	0	0	0	0	0	0	
	3	7.79	7.96	8.9	7.2	4100	4300		0	0	0	0	0	0	0	0	0	0	0	
	4	7.94	7.86	8.7	8.1	4110	4570		0	0	1/0	0	0	1/0	0	0	1	1		
	5	7.83	7.89	8.5	8.5	4180	4500		1/0	0	-	0	1/0	-	0	0	0	0		
	6	8.06	7.97	9.1	8.4	4120	4640		-	0	-	0	-	-	0	0	0	0		
	7								-		-		-							
	8										-		-							
Total=								1/0	0	1/0	0	1/0	1/0	0	0	1	1		Mean Neonates/Female = 0.2	
2500 mg/L	0	7.87		8.9		5000			0	0	0	0	0	0	0	0	0	0		
	1	7.92	8.18	10.1	8.1	5040	5320		0	1/0	1/0	1/0	0	0	0	1/0	1/0	0		
	2	7.84	7.99	9.1	7.4	5070	5640		0	-	-	-	1/0	1/0	1/0	-	-	1/0		
	3	7.78	7.88	9.0	7.2	5040	5200		0	-	-	-	-	-	-	-	-	-		
	4	7.92	7.86	8.8	8.1	5040	5310		0	-	-	-	-	-	-	-	-	-		
	5	7.82	7.87	8.6	8.5	5140	5640		0	-	-	-	-	-	-	-	-	-		
	6	8.04	7.93	9.6	8.6	4980	5670		0	-	-	-	-	-	-	-	-	-		
	7									-	-	-	-	-	-	-	-	-		
	8									-	-	-	-	-	-	-	-	-		
Total=								0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	1/0	Mean Neonates/Female = 0.0	

Appendix H

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Hyaella azteca*



CETIS Summary Report

Report Date: 06 Mar-14 15:44 (p 1 of 1)
 Test Code: 55556 | 00-8786-3488

Hyalella 96-h Acute Survival Test		Pacific EcoRisk
-----------------------------------	--	-----------------

Batch ID: 03-3671-5678	Test Type: Survival (96h)	Analyst: Cassy Glover
Start Date: 27 Feb-14 18:10	Protocol: EPA-821-R-02-012 (2002)	Diluent: SAM-5S
Ending Date: 03 Mar-14 16:30	Species: Hyalella azteca	Brine: Not Applicable
Duration: 94h	Source: Chesapeake Cultures, Inc.	Age: 9

Sample ID: 08-3593-4881	Code: KCI	Client: Reference Toxicant
Sample Date: 27 Feb-14 18:10	Material: Potassium chloride	Project: 22126
Receive Date: 27 Feb-14 18:10	Source: Reference Toxicant	
Sample Age: NA (22.9 °C)	Station: In House	

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
17-1121-4972	96h Survival Rate	0.4	0.8	0.5657	NA		Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary							
Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
13-6064-7851	96h Survival Rate	EC50	0.606	0.532	0.692		Spearman-Kärber

96h Survival Rate Summary											
C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
0.1		10	1	1	1	1	1	0	0	0.0%	0.0%
0.2		10	1	1	1	1	1	0	0	0.0%	0.0%
0.4		10	1	1	1	1	1	0	0	0.0%	0.0%
0.8		10	0.1	0	0.218	0	1	0.1	0.316	316.0%	90.0%
1.6		10	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail											
C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
0.1		1	1	1	1	1	1	1	1	1	1
0.2		1	1	1	1	1	1	1	1	1	1
0.4		1	1	1	1	1	1	1	1	1	1
0.8		0	0	1	0	0	0	0	0	0	0
1.6		0	0	0	0	0	0	0	0	0	0

96h Survival Rate Binomials											
C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.4		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.8		0/1	0/1	1/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
1.6		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

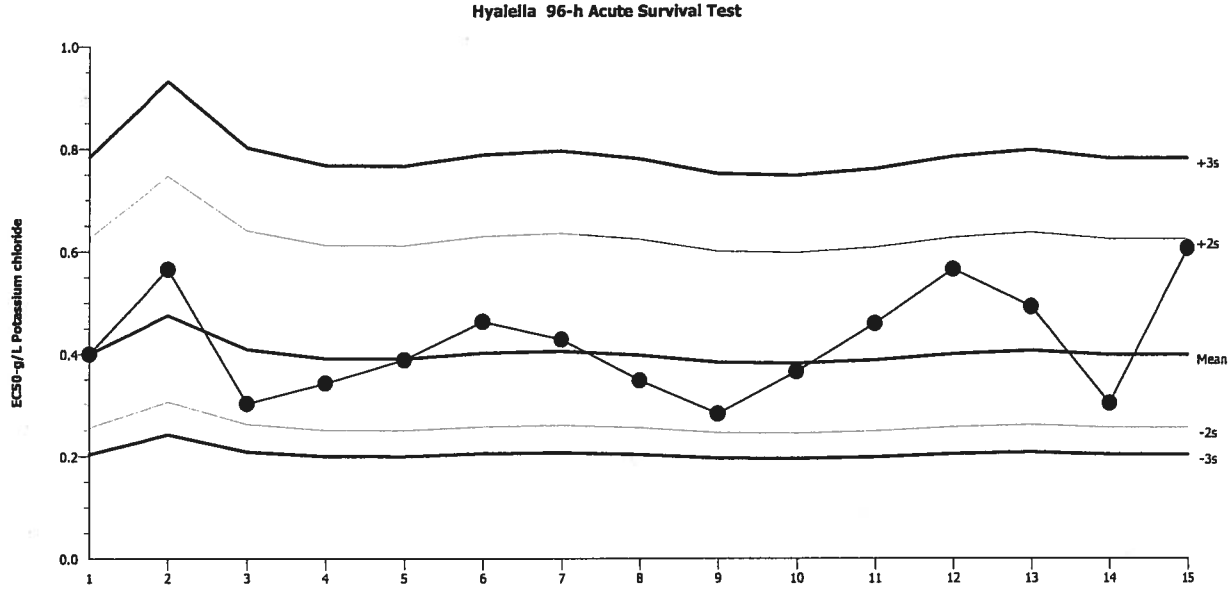
Hyalella 96-h Acute Survival Test

Pacific EcoRisk

Test Type: Survival (96h)
 Protocol: EPA-821-R-02-012 (2002)

Organism: *Hyalella azteca* (Freshwater Amphip)
 Endpoint: 96h Survival Rate

Material: Potassium chloride
 Source: Reference Toxicant-REF



Mean: 0.3984 Count: 14 -2s Warning Limit: 0.2543 -3s Action Limit: 0.2032
 Sigma: NA CV: 25.20% +2s Warning Limit: 0.624 +3s Action Limit: 0.781

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Nov	6	15:40	0.4	0.00164	0.01831			15-7026-7439	19-7036-5835
2			20	17:00	0.5657	0.1673	1.563			01-7958-1543	09-3590-7589
3			21	16:55	0.3031	-0.09522	-1.217			17-4328-3485	11-7628-5959
4		Dec	11	17:45	0.3429	-0.05549	-0.6685			06-4892-3798	02-7681-8091
5	2014	Jan	22	15:30	0.3887	-0.00964	-0.1092			15-1323-9580	12-5039-1906
6			23	12:20	0.4634	0.06507	0.6742			12-4927-8114	03-4534-5077
7			24	13:50	0.4287	0.03035	0.3272			04-8256-1553	14-6784-2933
8			29	12:45	0.3482	-0.05014	-0.5995			02-0910-9206	20-3009-8021
9			30	13:00	0.2828	-0.1155	-1.526			07-7453-2234	19-6136-6595
10			31	15:00	0.3651	-0.03323	-0.3881			07-3562-2451	09-8419-3354
11		Feb	4	16:00	0.4595	0.06112	0.6361			07-2556-9878	06-3437-8862
12			7	17:40	0.5657	0.1673	1.563			12-2780-2249	04-4756-7462
13			15	17:00	0.4925	0.0941	0.945			20-0080-3088	01-2359-2306
14			20	15:45	0.3031	-0.09522	-1.217			05-7047-7703	05-1521-5106
15			27	18:10	0.6063	0.2079	1.872			00-8786-3488	13-6064-7851

96 Hour *Hyalella azteca* Reference Toxicant Test Data

Client: Reference Toxicant
 Test Material: Potassium Chloride
 Test ID#: 55556 Project #: 22126
 Test Date: 2/27/14 Randomization: 10-6-13
 Feeding T0 Time: 900 Initials: DS

Organism Log #: 7993 Age: 8-9 days
 Organism Supplier: Chesapeake Cult
 Control/Diluent: SAM-5 Hyalella Water
 Control Water Batch: 92
 Feeding T46 Time: 0945 Initials: MS

Treatment (g/L)	Temp (°C)	pH	D.O. (mg/L)	Conductivity (µS/cm)	# Live Animals										Sign-Off
					A	B	C	D	E	F	G	H	I	J	
Control	22.9	8.26	9.0	407											Test Solution Prep: <u>JD</u>
0.1	22.9	8.14	8.6	600											New WQ: <u>MA</u>
0.2	22.9	8.09	8.7	778											Initiation Date: <u>2/27/14</u>
0.4	22.9	8.03	8.7	1096											Initiation Time: <u>1810</u>
0.8	22.9	7.97	8.8	1850											Initiation Signoff: <u>mm</u>
1.6	22.9	7.84	8.7	3190											RT Batch #: <u>14</u>
Meter ID	43A	PH19	RD04	EC04											
Control	22.8														Count Date: <u>2/28/14</u>
0.1	22.8														Count Time: <u>1230</u>
0.2	22.8														Count Signoff: <u>DS</u>
0.4	22.8														
0.8	22.8								0						
1.6	22.8				0	0	0	0	0	0	0	0	0	0	
Meter ID	43A														
Control	23.1														Count Date: <u>3/1/14</u>
0.1	23.1														Count Time: <u>0930</u>
0.2	23.1														Count Signoff: <u>DS</u>
0.4	23.1														
0.8	23.1				0	0	1	0	-	0	0	0	1	0	
1.6	-				-	-	-	-	-	-	-	-	-	-	
Meter ID	43A														
Control	23.1														Count Date: <u>3/2/14</u>
0.1	23.1														Count Time: <u>0910</u>
0.2	23.1														Count Signoff: <u>SN</u>
0.4	23.1														
0.8	23.1				-	-	1	-	-	-	-	-	1	-	
1.6	-				-	-	-	-	-	-	-	-	-	-	
Meter ID	43A														
Control	23.0	7.86	8.8	447											Termination Date: <u>3/2/14</u>
0.1	23.0	7.80	8.8	691											Termination Time: <u>1630</u>
0.2	23.0	7.82	8.7	964											Termination Signoff: <u>MF</u>
0.4	23.0	7.84	8.7	1314											Old WQ: <u>CJD</u>
0.8	23.0	7.81	8.3	2197	-	-	1	-	-	-	-	-	0	-	
1.6	-	7.74	8.1	3750	-	-	-	-	-	-	-	-	-	-	
Meter ID	43A	PH15	RD09	EC06											

Appendix I

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the Fathead Minnow



CETIS Summary Report

Report Date: 12 Mar-14 16:31 (p 1 of 2)
 Test Code: 55557 | 00-5491-0321

Chronic Larval Fish Survival and Growth Test **Pacific EcoRisk**

Batch ID: 10-3510-1967	Test Type: Growth-Survival (7d)	Analyst: Stevi Vasquez
Start Date: 27 Feb-14 17:00	Protocol: EPA-821-R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Mar-14 08:15	Species: Pimephales promelas	Brine: Not Applicable
Duration: 6d 15h	Source: Aquatox, AR	Age: 1

Sample ID: 12-9771-3014	Code: NaCl	Client: Pacific Ecorisk
Sample Date: 27 Feb-14 17:00	Material: Sodium chloride	Project: 22127
Receive Date: 27 Feb-14 17:00	Source: Reference Toxicant	
Sample Age: NA (25.1 °C)	Station: In House	

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
07-0393-4181	7d Survival Rate	1.5	3	2.121	13.0%		Steel Many-One Rank Sum Test
07-1700-5636	Mean Dry Biomass-mg	0.75	1.5	1.061	10.2%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
07-9451-9891	7d Survival Rate	EC5	0.772	0.377	1.16		Linear Regression (MLE)
		EC10	1.06	0.59	1.5		
		EC15	1.31	0.795	1.79		
		EC20	1.56	1	2.06		
		EC25	1.8	1.22	2.35		
		EC40	2.61	1.95	3.33		
00-1230-5703	Mean Dry Biomass-mg	IC5	1.04	0.444	1.86		Linear Interpolation (ICPIN)
		IC10	1.42	0.828	1.83		
		IC15	1.6	1.16	1.94		
		IC20	1.74	1.41	2.14		
		IC25	1.87	1.59	2.35		
		IC40	2.27	2.07	2.99		
		IC50	2.54	2.33	3.89		

7d Survival Rate Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	4	1	1	1	1	1	0	0	0.0%	0.0%
0.75		4	0.925	0.906	0.944	0.9	1	0.025	0.05	5.41%	7.5%
1.5		4	0.9	0.87	0.93	0.8	1	0.0408	0.0816	9.07%	10.0%
3		4	0.375	0.292	0.458	0.2	0.7	0.111	0.222	59.1%	62.5%
6		4	0.475	0.456	0.494	0.4	0.5	0.025	0.05	10.5%	52.5%
9		4	0	0	0	0	0	0	0	100.0%	100.0%

Mean Dry Biomass-mg Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	4	0.73	0.715	0.744	0.696	0.786	0.0193	0.0387	5.3%	0.0%
0.75		4	0.721	0.713	0.73	0.704	0.754	0.0116	0.0231	3.2%	1.15%
1.5		4	0.649	0.622	0.675	0.579	0.718	0.0352	0.0704	10.8%	11.1%
3		4	0.241	0.19	0.291	0.14	0.431	0.0676	0.135	56.2%	67.0%
6		4	0.24	0.229	0.252	0.208	0.266	0.015	0.03	12.5%	67.0%
9		4	0	0	0	0	0	0	0	100.0%	100.0%

CETIS Summary Report

Report Date: 12 Mar-14 16:31 (p 2 of 2)
 Test Code: 55557 | 00-5491-0321

Chronic Larval Fish Survival and Growth Test						Pacific EcoRisk
7d Survival Rate Detail						
C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	
0	Lab Water Contr	1	1	1	1	
0.75		0.9	1	0.9	0.9	
1.5		0.8	0.9	0.9	1	
3		0.7	0.3	0.3	0.2	
6		0.4	0.5	0.5	0.5	
9		0	0	0	0	
Mean Dry Biomass-mg Detail						
C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	
0	Lab Water Contr	0.696	0.717	0.721	0.786	
0.75		0.722	0.706	0.704	0.754	
1.5		0.598	0.579	0.7	0.718	
3		0.431	0.242	0.14	0.149	
6		0.208	0.222	0.266	0.266	
9		0	0	0	0	
7d Survival Rate Binomials						
C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	
0	Lab Water Contr	10/10	10/10	10/10	9/9	
0.75		9/10	10/10	9/10	9/10	
1.5		8/10	9/10	9/10	10/10	
3		7/10	3/10	3/10	2/10	
6		4/10	5/10	5/10	5/10	
9		0/10	0/10	0/10	0/10	

Chronic Larval Fish Survival and Growth Test

Pacific EcoRisk

Test Type: Growth-Survival (7d)

Organism: Pimephales promelas (Fathead Minn)

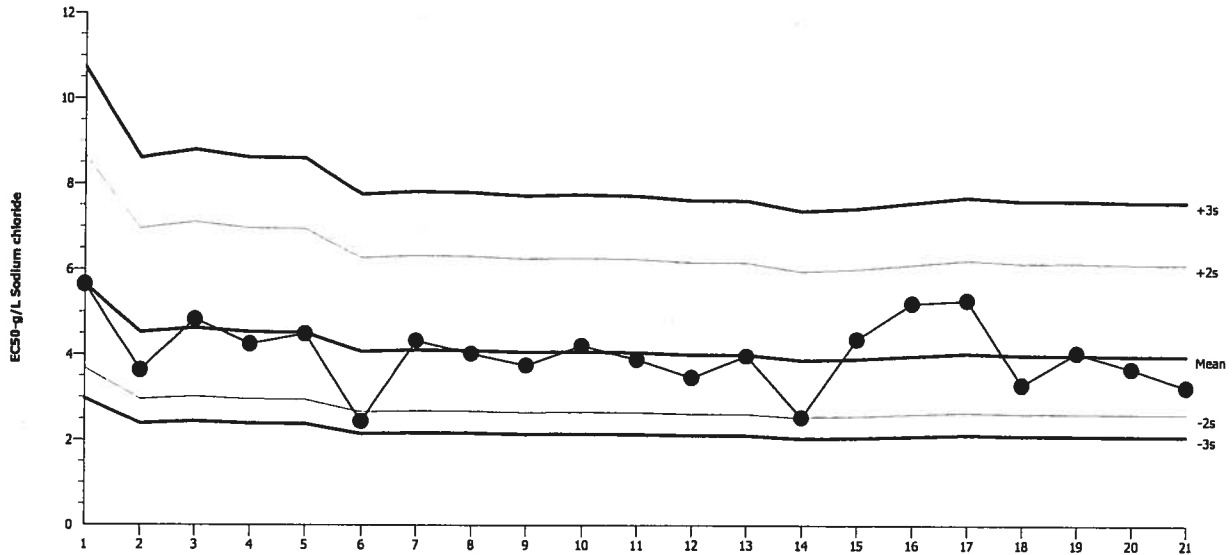
Material: Sodium chloride

Protocol: EPA-821-R-02-013 (2002)

Endpoint: 7d Survival Rate

Source: Reference Toxicant-REF

Chronic Larval Fish Survival and Growth Test



Mean: 3.987 Count: 20 -2s Warning Limit: 2.598 -3s Action Limit: 2.097
 Sigma: NA CV: 23.90% +2s Warning Limit: 6.118 +3s Action Limit: 7.578

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Oct	1	16:40	5.646	1.66	1.626			15-8925-1363	13-7186-9661
2			2	15:30	3.632	-0.3544	-0.4348			10-0960-8572	00-5987-4084
3			8	15:05	4.833	0.8462	0.899			15-0374-2073	07-5438-7669
4			15	15:30	4.254	0.267	0.3028			20-5469-9563	16-9983-9699
5			17	15:10	4.496	0.5092	0.5614			09-9216-5569	17-2634-3422
6		Nov	5	15:35	2.437	-1.55	-2.299	(-)		14-2080-3139	10-0967-0697
7			7	14:00	4.335	0.3485	0.3914			14-5006-8214	19-9459-5987
8			12	15:30	4.026	0.03871	0.04513			16-1508-4402	15-0857-3987
9			19	16:40	3.751	-0.2363	-0.2853			10-1364-1127	10-8722-5568
10		Dec	3	16:00	4.221	0.2338	0.2661			16-2647-7149	00-2423-1163
11			10	18:30	3.892	-0.09524	-0.1129			15-5516-6346	16-6930-0253
12			17	17:20	3.464	-0.5229	-0.6567			14-4525-2754	01-4087-1734
13			31	17:00	3.974	-0.01307	-0.01533			17-4848-2922	19-9554-7447
14	2014	Jan	7	16:15	2.532	-1.455	-2.121	(-)		00-8911-3467	08-0589-7337
15			14	16:30	4.373	0.3863	0.432			06-8606-1268	14-0370-1802
16			21	14:35	5.214	1.227	1.254			02-6681-4000	00-1989-7275
17		Feb	4	15:30	5.283	1.297	1.315			03-2406-2742	20-9102-1057
18			7	17:00	3.301	-0.6855	-0.8813			07-1665-5566	03-0403-9044
19			11	15:45	4.06	0.07321	0.08499			08-6176-1319	13-6169-4175
20			18	16:00	3.68	-0.3064	-0.3735			06-6722-5517	14-1919-5029
21			27	17:00	3.254	-0.7332	-0.9492			00-5491-0321	07-9451-9891

Chronic Larval Fish Survival and Growth Test

Pacific EcoRisk

Test Type: Growth-Survival (7d)

Organism: Pimephales promelas (Fathead Minn)

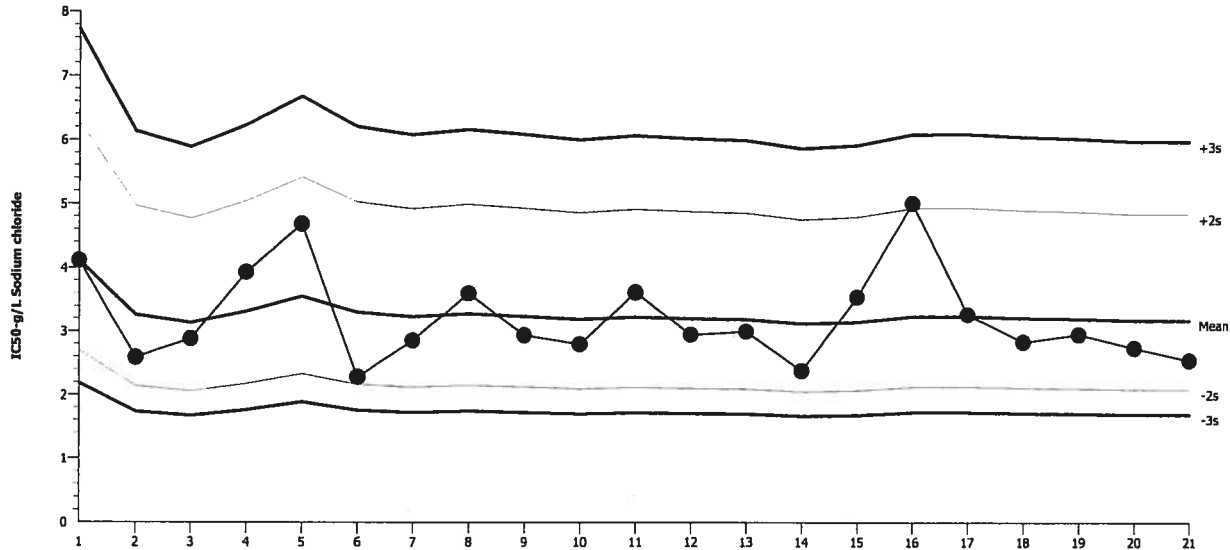
Material: Sodium chloride

Protocol: EPA-821-R-02-013 (2002)

Endpoint: Mean Dry Biomass-mg

Source: Reference Toxicant-REF

Chronic Larval Fish Survival and Growth Test



Mean: 3.174 Count: 20 -2s Warning Limit: 2.084 -3s Action Limit: 1.688
 Sigma: NA CV: 23.40% +2s Warning Limit: 4.836 +3s Action Limit: 5.969

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Oct	1	16:40	4.109	0.935	1.227			15-8925-1363	02-3852-0541
2			2	15:30	2.59	-0.5839	-0.9658			10-0960-8572	09-4900-2290
3			8	15:05	2.883	-0.2915	-0.4576			15-0374-2073	02-1681-8042
4			15	15:30	3.926	0.7523	1.01			20-5469-9563	17-1640-4628
5			17	15:10	4.682	1.508	1.846			09-9216-5569	10-6908-2283
6		Nov	5	15:35	2.284	-0.8903	-1.564			14-2080-3139	15-4499-5202
7			7	14:00	2.851	-0.3225	-0.5091			14-5006-8214	08-9769-4709
8			12	15:30	3.594	0.4195	0.5897			16-1508-4402	14-7453-1475
9			19	16:40	2.935	-0.2387	-0.3715			10-1364-1127	17-5976-0050
10		Dec	3	16:00	2.793	-0.3807	-0.6071			16-2647-7149	05-7650-2111
11			10	18:30	3.613	0.4391	0.6155			15-5516-6346	15-3099-3517
12			17	17:20	2.943	-0.2312	-0.3593			14-4525-2754	16-6836-6369
13			31	17:00	2.99	-0.1843	-0.2842			17-4848-2922	12-0714-0529
14	2014	Jan	7	16:15	2.376	-0.7979	-1.375			00-8911-3467	20-3219-7836
15			14	16:30	3.538	0.364	0.5158			06-8606-1268	05-1045-9218
16			21	14:35	5.006	1.832	2.165	(+)		02-6681-4000	05-4831-2782
17		Feb	4	15:30	3.267	0.0927	0.1368			03-2406-2742	01-0421-5918
18			7	17:00	2.829	-0.345	-0.5466			07-1665-5566	17-6292-1670
19			11	15:45	2.947	-0.2267	-0.352			08-6176-1319	04-0035-1288
20			18	16:00	2.737	-0.4373	-0.7043			06-6722-5517	08-4679-3575
21			27	17:00	2.543	-0.6313	-1.053			00-5491-0321	00-1230-5703

7 Day Chronic Fathead Minnow Reference Toxicant Test Data

Client: Reference Toxicant
 Test Material: Sodium Chloride
 Test ID#: 55557 Project #: 22127
 Test Date: 2/27/14 Randomization: 4.6.1

Organism Log#: 7990 Age: < 48 hrs
 Organism Supplier: Aquatox
 Control/Diluent: EPAMH
 Control Water Batch: 1666

Treatment (g/L)	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µs/cm)		# Live Organisms				SIGN-OFF
		New	Old	New	Old	New	Old	A	B	C	D	
Control	25.1	8.11		8.2		298		10	10	10	10	Date: 2/27/14
0.75	25.1	8.01		8.3		1940		10	10	10	10	Test Solution Prep: CJD
1.5	25.1	7.97		8.3		3250		10	10	10	10	New WQ: MA
3	25.1	7.75		8.5		5880		10	10	10	10	Initiation Time: 1700
6	25.1	7.70		9.0		11040		10	10	10	10	Initiation Signoff: CP
9	25.1	7.66		9.4		16050		10	10	10	10	RT Stock Batch #: 188/189
Meter ID	30A	PH19		12004		EC04						
Control	25.6	8.06	7.93	8.0	7.6	299	1103	10	10	10	10	Date: 2-28-14
0.75	25.6	7.98	7.80	8.2	7.1	1775	1952	10	10	10	10	Test Solution Prep: DS
1.5	25.6	7.95	7.70	8.3	7.3	3180	3280	10	10	10	10	New WQ: DS
3	25.6	7.90	7.64	8.4	7.4	5920	6030	10	10	10	10	Renewal Time: 1200
6	25.6	7.81	7.65	8.9	7.7	11080	11270	10	10	10	10	Renewal Signoff: DS
9	25.6	7.76	7.61	9.2	7.9	16280	16270	0	0	0	0	Old WQ: LH
Meter ID	30A	PH16	PH19	R2004	R2007	EC09	EC09					RT Stock Batch #: 189
Control	25.7	8.16	7.96	7.5	7.0	299	315	10	10	10	10	Date: 2/1/14
0.75	25.7	8.04	7.98	7.5	6.9	1861	1792	10	10	10	10	Test Solution Prep: [Signature]
1.5	25.7	8.01	7.85	7.7	7.0	3320	3190	10	9	10	10	New WQ: MA
3	25.7	7.95	7.83	7.5	7.2	6110	5920	10	9	10	9	Renewal Time: 1030
6	25.7	7.85	7.80	7.8	7.3	11190	11110	8	10	8	10	Renewal Signoff: DS
9	25.7	-	-	-	-	-	-	-	-	-	-	Old WQ: AS
Meter ID	30A	PH19	PH14	R2008	R2004	EC04	EC09					RT Stock Batch #: 189
Control	25.9	7.97	8.04	8.5	8.4	296	304	10	10	10	9	Date: 3/2/14
0.75	25.9	7.91	7.89	8.7	8.0	1775	1890	9	10	10	9	Test Solution Prep: MF
1.5	25.9	7.88	7.82	8.7	7.9	3220	3330	9	9	9	10	New WQ: D.M.S.
3	25.9	7.84	7.76	8.8	7.8	5880	6210	10	9	10	9	Renewal Time: 1030
6	25.9	7.76	7.71	9.1	7.9	11130	11390	8	10	7	9	Renewal Signoff: CP
9	-	-	-	-	-	-	-	-	-	-	-	Old WQ: CP
Meter ID	30A	PH15	PH16	R2009	R2008	EC08	EC04					RT Stock Batch #: 189

7 Day Chronic Fathead Minnow Reference Toxicant Test Data

Client: Reference Toxicant
 Test Material: Sodium Chloride
 Test ID#: 55557 Project #: 22127
 Test Date: 2/27/14 Randomization: 4.6.1

Organism Log#: 7990 Age: 48 hrs
 Organism Supplier: Aquatox
 Control/Diluent: EPAMH
 Control Water Batch: 1666

Treatment (g/L)	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µs/cm)		# Live Organisms				SIGN-OFF
		new	old	new	old	New	Old	A	B	C	D	
Control	25.4	8.23	7.81	8.6	7.0	299	304	10	10	10	9	Date: <u>3/3/14</u>
0.75	25.4	8.07	7.74	8.7	7.0	1847	1796	9	10	9	9	Test Solution Prep: <u>CSD</u>
1.5	25.4	7.95	7.67	8.9	7.0	3200	3240	9	9	9	10	New WQ: <u>TM</u>
3	25.4	7.92	7.60	9.0	6.8	5880	5950	9	9	8	9	Renewal Time: <u>1220</u>
6	25.4	7.81	7.58	9.5	7.0	11010	11180	8	10	7	8	Renewal Signoff: <u>JM</u>
9	-	-	-	-	-	-	-	-	-	-	-	Old WQ: <u>CP</u>
Meter ID	30A	PH21	PH16	RD07	RD04	ECO6	EC09					RT Stock Batch #: <u>189</u>
Control	25.5	7.99	7.90	8.5	8.3	300	305	10	10	10	9	Date: <u>3/4/14</u>
0.75	25.5	7.99	7.83	8.5	8.2	1875	1883	9	10	9	9	Test Solution Prep: <u>CP</u>
1.5	25.5	7.97	7.79	8.6	8.1	3140	3250	9	9	9	10	New WQ: <u>CP</u>
3	25.5	7.94	7.75	8.9	8.0	5890	5990	9	8	7	8	Renewal Time: <u>1020</u>
6	25.5	7.87	7.70	9.6	8.0	11110	11260	8	9	6	8	Renewal Signoff: <u>J</u>
9	-	-	-	-	-	-	-	-	-	-	-	Old WQ: <u>30A</u>
Meter ID	30A	PH16	PH16	RD07	RD08	ECO6	EC08					RT Stock Batch #: <u>189</u>
Control	25.9	8.03	7.81	8.6	8.1	301	307	10	10	10	9	Date: <u>3/5/14</u>
0.75	25.9	7.91	7.71	8.5	8.2	1951	1897	9	10	9	9	Test Solution Prep: <u>SNV</u>
1.5	25.9	7.90	7.69	8.7	7.9	3390	3170	9	9	9	10	New WQ: <u>ARF</u>
3	25.9	7.86	7.66	8.9	8.0	6040	5970	8	7	6	6	Renewal Time: <u>0945</u>
6	25.9	7.81	7.62	9.3	7.8	11300	11220	5	7	6	5	Renewal Signoff: <u>J</u>
9	-	-	-	-	-	-	-	-	-	-	-	Old WQ: <u>JM</u>
Meter ID	30A	PH16	PH21	RD07	RD09	ECO6	EC09					RT Stock Batch #: <u>189</u>
Control	25.4		7.70		7.8		310	10	10	10	9	Date: <u>2/6/14</u>
0.75	25.4		7.62		7.8		1971	9	10	9	9	Termination Time: <u>0815</u>
1.5	25.4		7.60		7.8		3300	8	9	9	10	Termination Signoff: <u>CSD</u>
3	25.4		7.57		7.7		6050	7	3	3	2	Old WQ: <u>JM</u>
6	25.4		7.53		7.9		11320	4	5	5	5	
9	-		-		-		-	-	-	-	-	
Meter ID	30A		PH15		RD08		ECO8					

Fathead Minnow Dry Weight Data Sheet

Client: Reference Toxicant Test ID #: 55557 Project #: 22127
 Sample: Sodium Chloride Tare Weight Date: 3/2/14 Sign-off: FMS
 Test Date: 2. 27. 14 Final Weight Date: 3/8/14 Sign-off: MA

Pan ID	Concentration	Replicate	Initial Pan Weight (mg)	Final Pan Weight (mg)	Initial # of Organisms	Biomass Value (mg)
1	Control	A	173.21	180.17	10	0.696
2		B	172.99	180.16	10	0.717
3		C	179.88	187.09	10	0.721
4		D	179.83	186.90	10 9	0.786
5	0.75	A	182.03	189.25	10	0.722
6		B	189.77	196.83	10	0.706
7		C	181.66	188.70	10	0.704
8		D	189.05	196.59	10	0.754
9	1.5	A	181.93	187.91	10	0.598
10		B	174.65	180.44	10	0.579
11		C	180.81	185 187.81	10	0.700
12		D	189.97	197.15	10	0.718
13	3	A	182.27	186.58	10	0.431
14		B	182.95	185.37	10	0.242
15		C	177.45	178.85	10	0.140
16		D	174.87	176.36	10	0.149
17	6	A	178.32	180.40	10	0.208
18		B	181.60	183.82	10	0.222
19		C	175.37	178.03	10	0.266
20		D	176.06	178.72	10	0.266
21	9	A	179.17	—	10	—
22		B	205.15	—	10	—
23		C	209.70	—	10	—
24		D	194.54	—	10	—
QA1			176.29	176.34		
QA2			185.83	185.80		
QA3			207.18	207.25		
Balance ID:			BA101	BA101		

Appendix J

Supplemental Data/Information Required to Document Observations of Pathogen-Related Mortality in the Chronic Fathead Minnow Test





Alessandro D. Hnatt
ADH Environmental
3065 Porter Street, Suite 101
Soquel, CA 95073

May 14, 2014

Alessandro:

I have enclosed one copy of our report “Evaluation of the Toxicity of Contra Costa Clean Water Program Stormwater Samples” for the samples that were collected March 26, 2014. The results of this testing are summarized below.

<i>Hyaella azteca</i> toxicity summary for CCCWP stormwater samples.	
Sample Station	Survival Toxicity relative to the Lab Control treatment?
207R00011US	Yes (100% effect)
207R00011DS	Yes (100% effect)

Toxicity of CCCWP Stormwater to *Hyaella azteca*

There was complete mortality in both upstream (US) and downstream (DS) 207R00011 stormwater samples.

If you have any questions regarding the performance and interpretation of these tests, feel free to contact my colleague Eddie Kalombo or myself at (707) 207-7760.

Sincerely,

Stephen L. Clark
Vice President/Special Projects Director



Pacific EcoRisk is accredited in accordance with NELAP (ORELAP ID 4043). Pacific EcoRisk certifies that the test results reported herein conform to the most current NELAP requirements for parameters for which accreditation is required and available. Any exceptions to NELAP requirements are noted, where applicable, in the body of the report. This report shall not be reproduced, except in full, without the written consent of Pacific EcoRisk. This testing was performed under Lab Order 19397.

Evaluation of the Toxicity of Contra Costa Clean Water Program Stormwater Samples

Samples collected March 26, 2014

Prepared For:

ADH Environmental
3065 Porter Street, Suite 101
Soquel, CA 95073

Prepared By:

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534

May 2014



Evaluation of the Toxicity of Contra Costa Clean Water Program Stormwater Samples

Samples collected March 26, 2014

Table of Contents

	Page
1. INTRODUCTION	1
2. TOXICITY TEST PROCEDURES	1
2.1 Sample Receipt and Handling.....	1
2.2 Survival Toxicity Testing of Stormwater Samples with <i>Hyalella azteca</i>	2
2.2.1 Reference Toxicant Testing of the <i>Hyalella azteca</i>	3
3. RESULTS	3
3.1 Effects of the CCCWP Stormwater on <i>Hyalella azteca</i>	3
4. AQUATIC TOXICITY DATA QUALITY CONTROL.....	4
4.1 Maintenance of Acceptable Test Conditions	4
4.2 Negative Control Testing.....	4
4.3 Positive Control Testing	4
4.3.1 Reference Toxicant Toxicity to <i>Hyalella azteca</i>	4
4.4 Concentration Response Relationships.....	5
5. SUMMARY & CONCLUSIONS.....	5

Appendices

- Appendix A Chain-of-Custody Record for the Collection and Delivery of the CCCWP Stormwater Samples
- Appendix B Test Data and Summary of Statistics for the Evaluation of the Toxicity of CCCWP Stormwater Samples to *Hyalella azteca*
- Appendix C Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Hyalella azteca*



1. INTRODUCTION

Under contract to ADH Environmental, and in support of the Bay Area Stormwater Management Agencies Association (BASMAA) Regional Monitoring Coalition ongoing monitoring efforts, Pacific EcoRisk (PER) has been contracted to evaluate the toxicity of stormwater samples collected for the Contra Costa Clean Water Program (CCCWP). This evaluation consist of performing the following US EPA toxicity test:

- 10-day survival test with the freshwater amphipod *Hyalella azteca*.

This toxicity test was conducted on stormwater samples collected on March 26, 2014. In order to assess the sensitivity of the test organisms to toxic stress, a concurrent reference toxicant test was also performed. This report describes the performance and results of these tests.

2. TOXICITY TEST PROCEDURES

The method used in conducting testing with *H. azteca* followed a test protocol that is based on a modification of the US EPA guidelines, “Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates” (EPA/600/R-99/064).

2.1 Sample Receipt and Handling

On March 26, ADH collected stormwater samples into appropriately-cleaned containers, which were transported, on ice and under chain-of-custody, to the PER testing laboratory in Fairfield, CA. Upon receipt at the testing laboratory, aliquots of each sample were collected for analysis of initial water quality characteristics (Table 1), with the remainder of each sample being stored at 0-6°C except when being used to prepare test solutions.

The chain-of-custody record for the collection and delivery of these stormwater samples is provided as Appendix A.

Table 1. Initial water quality characteristics of the CCCWP stormwater samples.

Date Sample Received	Sample ID	Temp (°C)	pH	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Total Ammonia (mg/L N)
3/26/14	207R00011US-W-02	5.3	7.79	10.0	72	108	425	<1.0
3/26/14	207R00011DS-W-02	5.8	8.10	10.1	70	96	320	<1.0



2.2 Survival Toxicity Testing of Stormwater Samples with *Hyaella azteca*

This test consists of exposing the amphipods to the stormwater samples for 10 days, after which effects on survival are evaluated. The specific procedures used in this testing are described below.

The *H. azteca* used in this testing were obtained from a commercial supplier (Chesapeake Cultures, VA). Upon receipt at the PER laboratory, the organisms were maintained at 23°C in aerated aquaria containing Standard Artificial Medium (SAM-5S) water (Borgmann 1996) prior to their use in this test. During this pre-test period, the organisms were fed the alga *Selenastrum capricornutum* and Yeast-Cerophyll®-Trout (YCT) food amended with *Spirulina*.

The Lab Control water for these tests consisted of SAM-5S water. The stormwater samples were tested at the 100% concentration only. “New” water quality characteristics (pH, D.O., and conductivity) were measured on the test solutions prior to use in these tests.

There were 5 replicates for each test treatment, each replicate consisting of a 250-mL glass beaker containing 100 mL of test solution. These tests were initiated by allocating ten 8-day old *H. azteca*, into each replicate, followed by the addition of 1.5 mL of *Spirulina* amended YCT. The replicate beakers were placed into a temperature-controlled room at 23°C, under cool-white fluorescent lighting on a 16L:8D photoperiod.

Each day of the tests, each replicate beaker was examined and the number of surviving organisms determined; ‘old’ water quality characteristics were measured in one randomly-selected beaker at each test treatment at this time. On Days 2, 4, 6, and 8 of the test, the organisms were fed 1.5 mL of *Spirulina* amended YCT in each test chamber.

On Day 5 of the 10-day tests, fresh test solutions were prepared and characterized, as before. Each replicate was examined, with any dead animals, uneaten food, wastes, and other detritus being removed. The number of live organisms in each replicate was determined and then approximately 80% of the test media in each beaker was carefully poured out and replaced with fresh test solution. “Old” water quality characteristics (pH, D.O., and conductivity) were measured on the old test solution that had been discarded from one randomly-selected replicate at each treatment.

After 10 days of exposure, the tests were terminated and the number of live organisms in each replicate was recorded. The resulting survival data were analyzed to evaluate any impairment due to the stormwater samples; all statistical analyses were performed using CETIS® statistical software (TidePool Scientific, McKinleyville, CA).



2.2.1 Reference Toxicant Testing of the *Hyaella azteca*

In order to assess the sensitivity of the *H. azteca* test organisms to toxic stress, a reference toxicant test was performed. The reference toxicant test was performed as a 96-hr waterborne exposure to Control water spiked with KCl at test concentrations of 0, 0.1, 0.2, 0.4, 0.8 and 1.6 g/L. The resulting survival data were statistically analyzed to determine key dose-response point estimates (e.g., EC50); all statistical analyses were made using the CETIS[®] software. This response endpoint was then compared to the ‘typical response’ range established by the mean \pm 2 SD of the point estimates generated by the 20 most recent previous reference toxicant tests performed by this lab.

3. RESULTS

3.1 Effects of the CCCWP Stormwater on *Hyaella azteca*

The results for these tests are summarized below in Table 2. There was complete mortality in both upstream (US) and downstream (DS) 207R00011 stormwater samples.

The test data and summary of statistical analyses for these tests are presented in Appendix B.

Test Initiation Date (Time)	Treatment/Sample ID	10-Day Mean % Survival
4/27/14 (1615)	Lab Control	98
	207R00011US	0*
	207R00011DS	0*

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.



4. AQUATIC TOXICITY DATA QUALITY CONTROL

Four QC measures were assessed during the toxicity testing:

- Maintenance of acceptable test conditions;
- Negative Control testing;
- Positive Control (reference toxicant) testing; and
- Concentration Response Relationship assessment.

4.1 Maintenance of Acceptable Test Conditions

All test conditions (e.g., pH, D.O., temperature, etc.) were within acceptable limits for these tests. All analyses were performed according to laboratory Standard Operating Procedures.

4.2 Negative Control Testing

The responses at the Lab Control treatments were acceptable.

4.3 Positive Control Testing

4.3.1 Reference Toxicant Toxicity to *Hyalella azteca*

The results of this test are presented in Table 3. The EC₅₀ for this test was consistent with the “typical response” range established by the reference toxicant test database for this species, indicating that these organisms were responding to toxic stress in a typical fashion.

The test data and summary of statistical analyses for this test are presented in Appendix C.

Table 3. Reference toxicant testing: Effects of KCl on <i>Hyalella azteca</i> survival.	
KCl Treatment (g/L)	Mean% Survival
Control	100
0.1	100
0.2	100
0.4	40*
0.8	0*
1.6	0*
Summary of Statistics	
EC ₅₀ =	0.37 g/L KCl
“Typical response” range (mean ±2 SD)	0.26 – 0.66 g/L KCl

* The response at this test treatment was significantly less than the Lab Control treatment response at p < 0.05.



4.4 Concentration Response Relationships

The concentration-response relationship for the reference toxicant test was evaluated as per EPA guidelines (EPA-821-B-00-004), and determined to be acceptable.

5. SUMMARY & CONCLUSIONS

Toxicity of CCCWP Stormwater to *Hyalella azteca*

There was complete mortality in both upstream (US) and downstream (DS) 207R00011 stormwater samples.



Appendix A

Chain-of-Custody Record for the Collection and Delivery of the CCCWP Stormwater Samples





Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
 (707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Client Name:				REQUESTED ANALYSIS																
Client Address:				Chronic Selenastrum capricornutum	Chronic Ceriodaphnia dubia	Chronic Pimephales promelas	10-day Survival Hyalella azteca (water)	10-day Hyalella azteca (sediment)												
Phone:																				
Project Manager:																				
Project Name:																				
Project # / P.O. Number:																				
FAX:																				
Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container																
				Number	Type															
1 207R00011 DS-W-0	3-26-14	16:00	STRMW	10	1 gall. amber							x								
2 207R00011 US-W-1	3-26-14	12:40	STRMW	10	1 gal Amber							^								
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
12																				
Samples collected by:																				
Comments/Special Instruction: Note - Fathead minnow testing is to be performed using the standard EPA protocol (i.e., 4 replicates)						RELINQUISHED BY:						RECEIVED BY:								
						Signature: <i>[Signature]</i>						Signature: <i>[Signature]</i>								
						Print: LUCAS ALDIN GER						Print: Y. Khadiyeva								
						Organization: TDT						Organization: PER								
						Date: 3-26-14 Time: 16:00						Date: 3/26/14 Time: 1600								
RELINQUISHED BY:						RECEIVED BY:														
Signature:						Signature:														
Print:						Print:														
Organization:						Organization:														
Date:						Date:														
Time:						Time:														

*Example Matrix Codes: (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other

Appendix B

Test Data and Summary of Statistics for the Evaluation of the Toxicity of the CCCWP Stormwater Samples to *Hyalella azteca*



CETIS Summary Report

Report Date: 10 Apr-14 08:19 (p 1 of 1)
 Test Code: ADH_0327_HA_C1 | 00-2342-2841

Hyalella Survival and Growth Test **Pacific EcoRisk**

Batch ID: 21-2937-9939	Test Type: Survival-Growth (10 day)	Analyst: Eddie Kalombo
Start Date: 27 Mar-14 16:15	Protocol: GCML	Diluent: Not Applicable
Ending Date: 06 Apr-14 08:30	Species: Hyalella azteca	Brine: Not Applicable
Duration: 9d 16h	Source: Chesapeake Cultures, Inc.	Age: 8

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
ADH_0327_HA_C1	20-7657-3526	27 Mar-14 16:15	27 Mar-14 16:15	NA (22.5 °C)	ADH Environmental, Inc.	19397
207R00011US	09-8287-0810	26 Mar-14 12:40	26 Mar-14 16:00	28h (5.3 °C)	CCCWP	
207R00011DS	09-0740-7073	26 Mar-14 14:00	26 Mar-14 16:00	26h (5.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
ADH_0327_HA_C1	Lab Control	ADH Environmental, Inc.	LABQA		
207R00011US	Stormwater	ADH Environmental, Inc.	207R00011US		
207R00011DS	Stormwater	ADH Environmental, Inc.	207R00011DS		

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
ADH_0327_HA_C1	5	0.98	0.963	0.997	0.9	1	0.02	0.0447	4.56%	0.0%
207R00011US	5	0	0	0	0	0	0	0		100.0%
207R00011DS	5	0	0	0	0	0	0	0		100.0%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
ADH_0327_HA_C1	1	1	1	0.9	1
207R00011US	0	0	0	0	0
207R00011DS	0	0	0	0	0

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
ADH_0327_HA_C1	10/10	10/10	10/10	9/10	10/10
207R00011US	0/10	0/10	0/10	0/10	0/10
207R00011DS	0/10	0/10	0/10	0/10	0/10

CETIS Analytical Report

Report Date: 10 Apr-14 08:19 (p 1 of 2)
 Test Code: ADH_0327_HA_C1 | 00-2342-2841

Hyalella Survival and Growth Test			Pacific EcoRisk		
Analysis ID: 16-5696-1328	Endpoint: Survival Rate	CETIS Version: CETISv1.8.5			
Analyzed: 10 Apr-14 8:19	Analysis: Nonparametric-Two Sample	Official Results: Yes			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.3%	

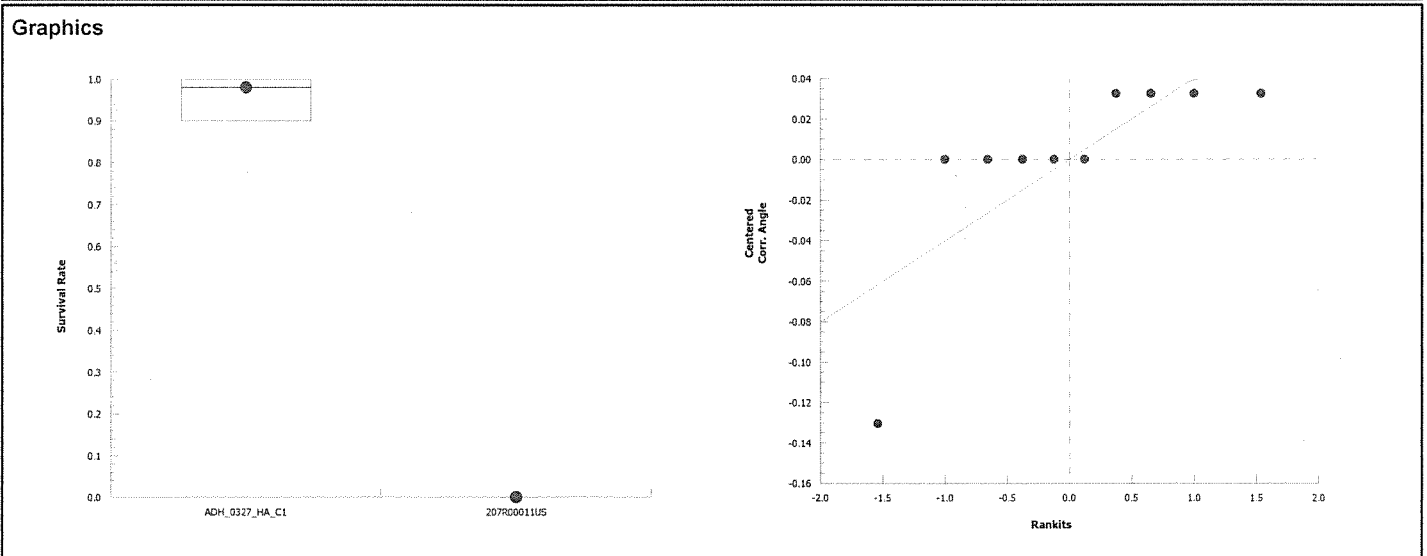
Wilcoxon Rank Sum Two-Sample Test									
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
ADH_0327_HA_C1		207R00011US	15	NA	0	8	0.0040	Exact	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.724916	3.724916	1	1400	<0.0001	Significant Effect
Error	0.02124747	0.002655933	8			
Total	3.746164		9			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Mod Levene Equality of Variance	1	13.7	0.3559	Equal Variances	
Variances	Levene Equality of Variance	7.11	11.3	0.0285	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.625	0.741	0.0001	Non-normal Distribution	

Survival Rate Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
ADH_0327_HA_C1	5	0.98	0.924	1	1	0.9	1	0.02	4.56%	0.0%	
207R00011US	5	0	0	0	0	0	0	0		100.0%	

Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
ADH_0327_HA_C1	5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	0.0%	
207R00011US	5	0.159	0.159	0.159	0.159	0.159	0.159	0	0.0%	88.5%	



10 Day Acute *Hyalella azteca* Toxicity Test Data

Client: ADH / CCCWP
 Test Material: 207R00011US
 Test ID#: 56062 Project #: 19397
 Test Date: 3/27/14

Organism Log#: 8006
 Organism Supplier: ABS
 Control/Diluent: SAM-5 Hyalella Water
 Control Water Batch: 99
 Age: 8 days

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Lab Control	22.5	7.70		8.2		411	10	10	10	10	10	Date: 3/27/14 Sample ID: 34566 Test Solution Prep: ze New WQ: RD
100%	22.5	7.89		9.1		420	10	10	10	10	10	Initiation Time: 1015 Initiation Signoff: KP
Meter ID	43A	PH21		R007		EC04						
Lab Control	22.5				8.1		10	10	10	10	10	Date: 3/28/14 Count Time: 1400 Count Signoff: ze Old WQ: CSJ
100%	22.5				7.4		10	10	10	10	10	Old WQ: CSJ
Meter ID	43A				R008							
Lab Control	22.7				7.9		10	10	10	10	10	Date: 3/29/14 Count Time: 1140 Count Signoff: MK Old WQ: CSJ
100%	22.7				7.3		6	5	4	5	4	Feed: MK
Meter ID	43A				R008							
Lab Control	22.9				6.9		10	10	10	10	10	Date: 3/30/14 Count Time: 1100 Count Signoff: CP Old WQ: CSJ
100%	22.9				6.8		0	0	0	0	0	Old WQ: CSJ
Meter ID	43A				R209							
Lab Control	23.1				6.7		10	10	10	10	10	Date: 3-31-14 Count Time: 1130 Count Signoff: ze Old WQ: CSJ
100%	23.1				-		-	-	-	-	-	Feed: ze
Meter ID	43A				R004							
Lab Control	23.2	8.36	7.55	8.8	6.8	415	10	10	10	10	10	Date: 4/1/14 Sample ID: ze Test Solution Prep: ze New WQ: ze
100%	-	-	-	-	-	-	-	-	-	-	-	Renewal Time: 0930 Renewal Signoff: CSJ Old WQ: ze
Meter ID	43A	PH19	PH21	R008	R004	EC06						
Lab Control	23.2				8.4		10	10	10	10	10	Date: 4/2/14 Count Time: 1530 Count Signoff: ze Old WQ: CSJ
100%	-				-		-	-	-	-	-	Feed: ze
Meter ID	43A				R004							
Lab Control	23.2				5.4		10	10	10	10	10	Date: 4/3/14 Count Time: 0915 Count Signoff: CSJ Old WQ: ze
100%	-				-		-	-	-	-	-	
Meter ID	43A				R008							
Lab Control	23.2				8.0		10	10	10	10	10	Date: 4/4/14 Count Time: 1322 Count Signoff: ze Old WQ: CSJ
100%	-				-		-	-	-	-	-	Feed: ze
Meter ID	43A				R009							
Lab Control	23.3				3.9 3.4 3.1		10	10	10	9	10	Date: 4/5/14 Count Time: 1025 Count Signoff: ze Old WQ: CSJ
100%	-				-		-	-	-	-	-	
Meter ID	43A				R009							
Lab Control	23.3		7.54		5.4	473	10	10	10	9	10	Date: 4/6/14 Termination Time: 0830 Termination Signoff: CP Old WQ: RD
100%	-		-		-	-	-	-	-	-	-	
Meter ID	43A		PH19		R009	EC08						

CETIS Analytical Report

Report Date: 10 Apr-14 08:19 (p 2 of 2)
 Test Code: ADH_0327_HA_C1 | 00-2342-2841

Hyalella Survival and Growth Test				Pacific EcoRisk	
Analysis ID: 11-6870-9117	Endpoint: Survival Rate	CETIS Version: CETISv1.8.5		Official Results: Yes	
Analyzed: 10 Apr-14 8:19	Analysis: Nonparametric-Two Sample				

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.3%	

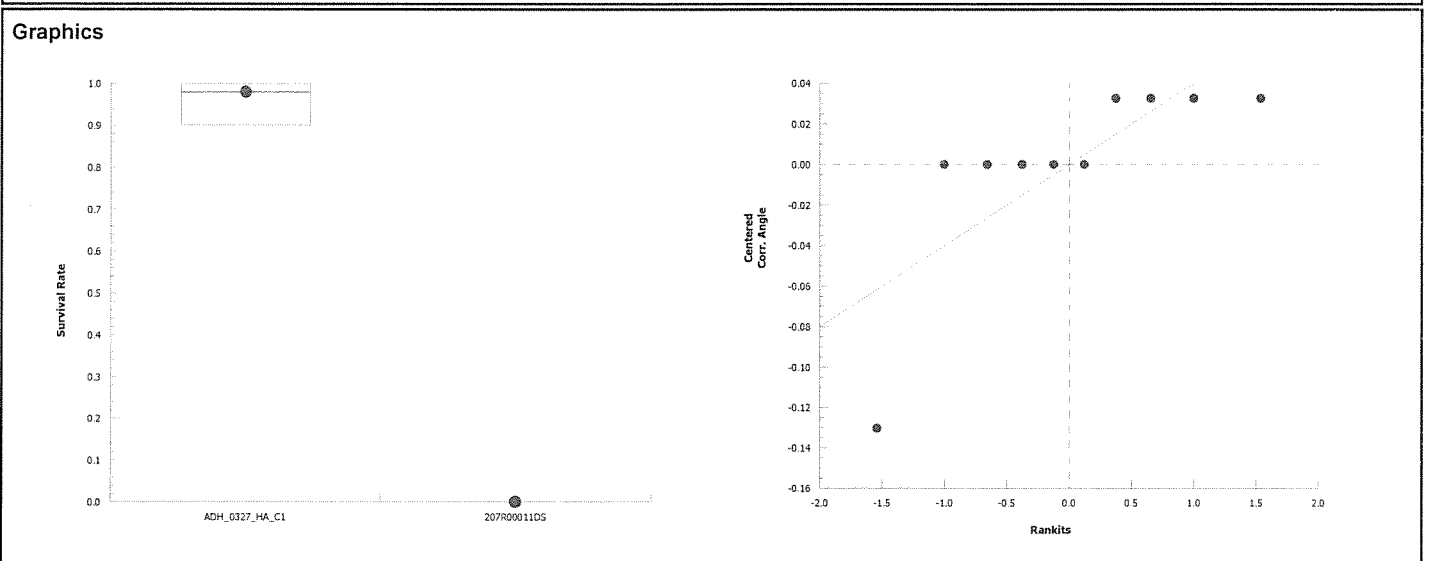
Wilcoxon Rank Sum Two-Sample Test									
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
ADH_0327_HA_C1		207R00011DS	15	NA	0	8	0.0040	Exact	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.724916	3.724916	1	1400	<0.0001	Significant Effect
Error	0.02124747	0.002655933	8			
Total	3.746164		9			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Mod Levene Equality of Variance	1	13.7	0.3559	Equal Variances	
Variances	Levene Equality of Variance	7.11	11.3	0.0285	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.625	0.741	0.0001	Non-normal Distribution	

Survival Rate Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
ADH_0327_HA_C1	5	0.98	0.924	1	1	0.9	1	0.02	4.56%	0.0%	
207R00011DS	5	0	0	0	0	0	0	0		100.0%	

Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
ADH_0327_HA_C1	5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	0.0%	
207R00011DS	5	0.159	0.159	0.159	0.159	0.159	0.159	0	0.0%	88.5%	



10 Day Acute *Hyaella azteca* Toxicity Test Data

Client: ADH / CCCWP
 Test Material: 207R0001IDS
 Test ID#: 56063 Project #: 19397
 Test Date: 3/27/14

Organism Log#: 8066 Age: 8 days
 Organism Supplier: ABS
 Control/Diluent: SAM-5 Hyaella Water
 Control Water Batch: 99

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Lab Control	22.5	7.76		8.2		411	10	10	10	10	10	Date: 3/27/14 Sample ID: 34567 Test Solution Prep: <u>ze</u> New WQ: <u>RD</u> Initiation Time: <u>1615</u> Initiation Signoff: <u>KP</u>
100%	22.5	7.95		9.6		319	10	10	10	10	10	
Meter ID	43A	pH21		R207		EC04						
Lab Control	22.5				8.1		10	10	10	10	10	Date: 3/28/14 Count Time: 1400 Count Signoff: <u>W</u> Old WQ: <u>CSG</u>
100%	22.5				7.3		10	10	10	10	10	
Meter ID	43A				R208							
Lab Control	22.7				7.9		10	10	10	10	10	Date: 3/29/14 Count Time: 1140 Count Signoff: <u>MK</u> Old WQ: <u>CSG</u> Feed: <u>MK</u>
100%	22.7				7.3		10	8	6	10	10	
Meter ID	43A				R207							
Lab Control	22.9				6.9		10	10	10	10	10	Date: 3/30/14 Count Time: 1100 Count Signoff: <u>CP</u> Old WQ: <u>CSG</u>
100%	22.9				7.0		0	0	0	0	0	
Meter ID	43A				R209							
Lab Control	23.1				6.7		10	10	10	10	10	Date: 3-31-14 Count Time: 1130 Count Signoff: <u>JH</u> Old WQ: <u>CSG</u> Feed: <u>JH</u>
100%	-				-		-	-	-	-	-	
Meter ID	43A				R204							
Lab Control	23.2	8.36	7.55	8.8	6.8	415	10	10	10	10	10	Date: 4/1/14 Sample ID: <u>-</u> Test Solution Prep: <u>W</u> New WQ: <u>ze</u> Renewal Time: 0930 Renewal Signoff: <u>CTD</u> Old WQ: <u>ze</u>
100%	-	-	-	-	-	-	-	-	-	-	-	
Meter ID	43A	pH19	pH21	R208	R204	EC06						
Lab Control	23.2				8.4		10	10	10	10	10	Date: 4/2/14 Count Time: 1550 Count Signoff: <u>AS</u> Old WQ: <u>CSG</u> Feed: <u>AS</u>
100%	-				-		-	-	-	-	-	
Meter ID	43A				R204							
Lab Control	23.2				5.4		10	10	10	10	10	Date: 4/3/14 Count Time: 0715 Count Signoff: <u>CTD</u> Old WQ: <u>PK</u>
100%	-				-		-	-	-	-	-	
Meter ID	43A				R208							
Lab Control	23.2				8.0		10	10	10	10	10	Date: 4/4/14 Count Time: 1322 Count Signoff: <u>W</u> Old WQ: <u>CSG</u> Feed: <u>W</u>
100%	-				-		-	-	-	-	-	
Meter ID	43A				R205							
Lab Control	23.3				3.9		10	10	10	9	10	Date: 4/5/14 Count Time: 1025 Count Signoff: <u>ze</u> Old WQ: <u>CSG</u>
100%	-				-		-	-	-	-	-	
Meter ID	43A				R209							
Lab Control	23.3		7.54		5.4	473	10	10	10	9	10	Date: 4/6/14 Termination Time: 0830 Termination Signoff: <u>CP</u> Old WQ: <u>RD</u>
100%	-		-		-	-	-	-	-	-	-	
Meter ID	43A		pH19		R209	EC08						

Appendix C

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Hyaella azteca*



CETIS Summary Report

Report Date: 02 Apr-14 11:17 (p 1 of 1)
 Test Code: 56010 | 08-8207-4257

Hyalella 96-h Acute Survival Test Pacific EcoRisk

Batch ID: 02-2070-1586	Test Type: Survival (96h)	Analyst: Stevi Vasquez
Start Date: 27 Mar-14 13:00	Protocol: EPA-821-R-02-012 (2002)	Diluent: SAM-5S
Ending Date: 31 Mar-14 13:45	Species: Hyalella azteca	Brine: Not Applicable
Duration: 4d 1h	Source: Aquatic Biosystems, CO	Age: 8

Sample ID: 13-5495-2751	Code: KCI	Client: Reference Toxicant
Sample Date: 27 Mar-14 13:00	Material: Potassium chloride	Project: 22246
Receive Date: 27 Mar-14 13:00	Source: Reference Toxicant	
Sample Age: NA (23 °C)	Station: In House	

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
16-1326-9012	96h Survival Rate	0.2	0.4	0.2828	NA		Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
13-7765-3936	96h Survival Rate	EC50	0.373	0.301	0.463		Spearman-Kärber

96h Survival Rate Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
0.1		10	1	1	1	1	1	0	0	0.0%	0.0%
0.2		10	1	1	1	1	1	0	0	0.0%	0.0%
0.4		10	0.4	0.207	0.593	0	1	0.163	0.516	129.0%	60.0%
0.8		10	0	0	0	0	0	0	0		100.0%
1.6		10	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
0.1		1	1	1	1	1	1	1	1	1	1
0.2		1	1	1	1	1	1	1	1	1	1
0.4		1	0	0	1	0	1	0	0	0	1
0.8		0	0	0	0	0	0	0	0	0	0
1.6		0	0	0	0	0	0	0	0	0	0

96h Survival Rate Binomials

C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.4		1/1	0/1	0/1	1/1	0/1	1/1	0/1	0/1	0/1	1/1
0.8		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
1.6		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

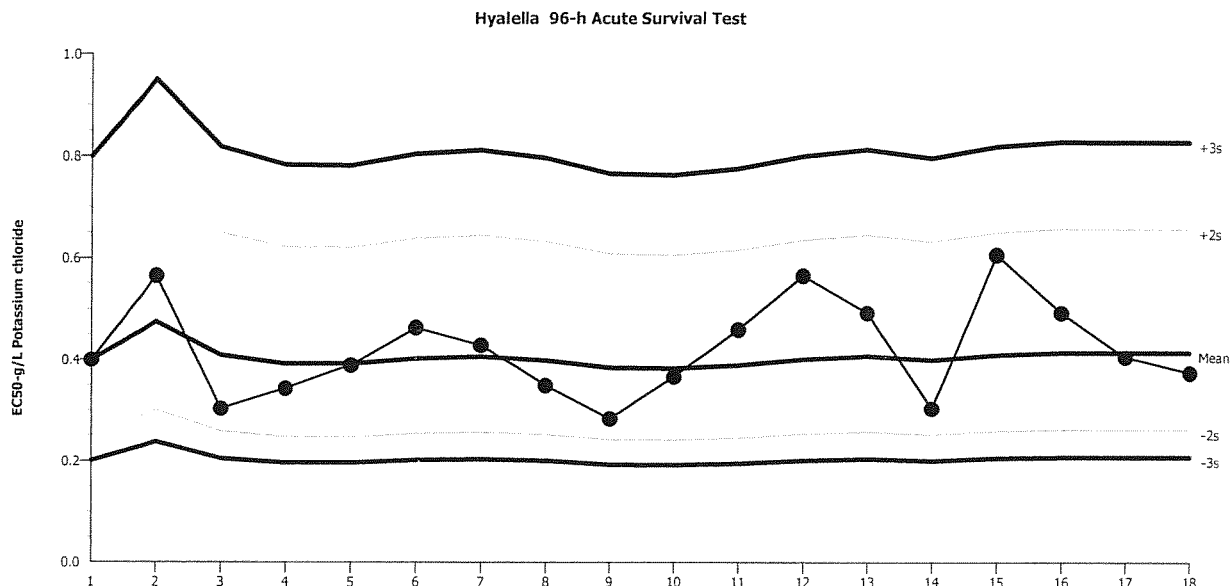
Hyaella 96-h Acute Survival Test

Pacific EcoRisk

Test Type: Survival (96h)
Protocol: EPA-821-R-02-012 (2002)

Organism: Hyaella azteca (Freshwater Amphipo)
Endpoint: 96h Survival Rate

Material: Potassium chloride
Source: Reference Toxicant-REF



Mean: 0.4138 Count: 17 -2s Warning Limit: 0.2609 -3s Action Limit: 0.2071
Sigma: NA CV: 25.90% +2s Warning Limit: 0.6565 +3s Action Limit: 0.8268

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Nov	6	15:40	0.4	-0.01383	-0.1473			15-7026-7439	19-7036-5835
2			20	17:00	0.5657	0.1519	1.355			01-7958-1543	09-3590-7589
3			21	16:55	0.3031	-0.1107	-1.349			17-4328-3485	11-7628-5959
4		Dec	11	17:45	0.3429	-0.07096	-0.8154			06-4892-3798	02-7681-8091
5	2014	Jan	22	15:30	0.3887	-0.02511	-0.2713			15-1323-9580	12-5039-1906
6			23	12:20	0.4634	0.0496	0.4907			12-4927-8114	03-4534-5077
7			24	13:50	0.4287	0.01488	0.1531			04-8256-1553	14-6784-2933
8			29	12:45	0.3482	-0.06561	-0.7482			02-0910-9206	20-3009-8021
9			30	13:00	0.2828	-0.131	-1.65			07-7453-2234	19-6136-6595
10			31	15:00	0.3651	-0.0487	-0.5427			07-3562-2451	09-8419-3354
11		Feb	4	16:00	0.4595	0.04565	0.4536			07-2556-9878	06-3437-8862
12			7	17:40	0.5657	0.1519	1.355			12-2780-2249	04-4756-7462
13			15	17:00	0.4925	0.07863	0.754			20-0080-3088	01-2359-2306
14			20	15:45	0.3031	-0.1107	-1.349			05-7047-7703	05-1521-5106
15			27	18:10	0.6063	0.1925	1.655			00-8786-3488	13-6064-7851
16			28	18:20	0.4925	0.07863	0.754			17-7114-0796	13-7617-1964
17		Mar	1	17:30	0.4048	-0.009021	-0.09554			13-0688-9437	00-6627-1218
18			27	13:00	0.3732	-0.04062	-0.4478			08-8207-4257	13-7765-3936

96 Hour *Hyalella azteca* Reference Toxicant Test Data

Client: Reference Toxicant
 Test Material: Potassium Chloride
 Project # 22246 Test ID#: N^o 22246-56010
 Test Date: 3/27/14 Randomization: 10.6.13
 Feeding T0 Time: 1300 Initials: mm

Organism Log #: 8066 Age: 8 days
 Organism Supplier: ABS
 Control/Diluent: SAM-5
 Control Water Batch: 97
 Feeding T46 Time: 1245 Initials: mm

Treatment (g/L)	Temp (°C)	pH	D.O. (mg/L)	Conductivity (µS/cm)	# Live Animals												Sign-off
					A	B	C	D	E	F	G	H	I	J			
Control	23.0	7.93	8.8	419											Test Solution Prep: <u>GD</u>		
0.1	23.0	7.93	8.9	671											New WQ: <u>GD</u>		
0.2	23.0	7.94	9.0	810											Initiation Date: <u>3/27/14</u>		
0.4	23.0	7.94	9.2	1143											Initiation Time: <u>1300</u>		
0.8	23.0	7.90	9.4	1875											Initiation Signoff: <u>mm</u>		
1.6	23.0	7.86	9.8	3310											RT Batch #: <u>14</u>		
Meter ID	84A	PH21	R009	EC06													
Control	23.2														Count Date: <u>3/28/14</u>		
0.1	23.2														Count Time: <u>1145</u>		
0.2	23.2														Count Signoff: <u>mm</u>		
0.4	23.2																
0.8	23.2				0	0	0	0	1	0	0	0	0	0			
1.6	23.2				0	0	0	0	0	0	0	0	0	0			
Meter ID	84A																
Control	23.1														Count Date: <u>3/29/14</u>		
0.1	23.1														Count Time: <u>1245</u>		
0.2	23.1														Count Signoff: <u>mm</u>		
0.4	23.1					0	0					0					
0.8	23.1				-	-	-	-	0	-	-	-	-	-			
1.6	23.1				-	-	-	-	-	-	-	-	-	-			
Meter ID	84A																
Control	22.8														Count Date: <u>3/30/14</u>		
0.1	22.8														Count Time: <u>1000</u>		
0.2	22.8														Count Signoff: <u>CP</u>		
0.4	22.8					-	-		0			-	0				
0.8	22.8				-	-	-	-	-	-	-	-	-	-			
1.6	22.8				-	-	-	-	-	-	-	-	-	-			
Meter ID	84A																
Control	23.2	7.65	8.5	441											Termination Date: <u>3-31-14</u>		
0.1	23.2	7.70	8.4	703											Termination Time: <u>1345</u>		
0.2	23.2	7.70	8.9	843											Termination Signoff: <u>mm</u>		
0.4	23.2	7.71	8.5	1107		-	-		-	1	0	-	-		Old WQ: <u>LS</u>		
0.8	-	7.76	8.6	1919	-	-	-	-	-	-	-	-	-	-			
1.6	-	7.73	8.5	3260	-	-	-	-	-	-	-	-	-	-			
Meter ID	84A	PH21	R009	EC06													

**REVISED**

Tuesday, September 30, 2014

Alessandro Hnatt
ADH Environmental
3065 Porter Street, Suite 101
Soquel, CA 95073

Re Lab Order: P070867
Project ID: CCCWP-SSID SEDIMENTS

Collected By: KEVIN LEWIS
PO/Contract #: 030.001.0202

Dear Alessandro Hnatt:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday, July 22, 2014. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Enclosures

Project Manager: Todd Albertson


REVISED
SAMPLE SUMMARY

Lab Order: P070867
 Project ID: CCCWP-SSID SEDIMENTS

Lab ID	Sample ID	Matrix	Date Collected	Date Received
P070867001	544MSH065	Solid	07/22/2014 11:45	07/22/2014 17:54
P070867002	544MSH062	Solid	07/22/2014 10:15	07/22/2014 17:54
P070867003	207WAL078	Solid	07/22/2014 14:45	07/22/2014 17:54
P070867004	207WAL060	Solid	07/22/2014 11:45	07/22/2014 17:54
P070867005	544MSH065	Solid	07/22/2014 11:45	07/22/2014 17:54
P070867006	544MSH062	Solid	07/22/2014 10:15	07/22/2014 17:54
P070867007	207WAL078	Solid	07/22/2014 14:45	07/22/2014 17:54
P070867008	207WAL060	Solid	07/22/2014 11:45	07/22/2014 17:54



REVISED

NARRATIVE

Lab Order: P070867
Project ID: CCCWP-SSID SEDIMENTS

General Qualifiers and Notes

Caltest authorizes this report to be reproduced only in its entirety. Results are specific to the sample(s) as submitted and only to the parameter(s) reported.

Caltest certifies that all test results for wastewater and hazardous waste analyses meet all applicable NELAC requirements; all microbiology and drinking water testing meet applicable ELAP requirements, unless stated otherwise.

All analyses performed by EPA Methods or Standard Methods (SM) 20th Edition except where noted (SMOL=online edition).

Caltest collects samples in compliance with 40 CFR, EPA Methods, Cal. Title 22, and Standard Methods.

Dilution Factors (DF) reported greater than '1' have been used to adjust the result, Reporting Limit (RL), and Method Detection Limit (MDL).

All Solid, sludge, and/or biosolids data is reported in Wet Weight, unless otherwise specified.

Filtrations performed at Caltest for dissolved metals (excluding mercury) and/or pH analysis are not performed within the 15 minute holding time as specified by 40CFR 136.3 table II.

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

ND - Non Detect - indicates analytical result has not been detected.

RL - Reporting Limit is the quantitation limit at which the laboratory is able to detect an analyte. An analyte not detected at or above the RL is reported as ND unless otherwise noted or qualified. For analyses pertaining to the State Implementation Plan of the California Toxics Rule, the Caltest Reporting Limit (RL) is equivalent to the Minimum Level (ML). A standard is always run at or below the ML. Where Reporting Limits are elevated due to dilution, the ML calibration criteria has been met.

J - reflects estimated analytical result value detected below the Reporting Limit (RL) and above the Method Detection Limit (MDL). The 'J' flag is equivalent to the DNQ Estimated Concentration flag.

E - indicates an estimated analytical result value.

B - indicates the analyte has been detected in the blank associated with the sample.

NC - means not able to be calculated for RPD or Spike Recoveries.

SS - compound is a Surrogate Spike used per laboratory quality assurance manual.

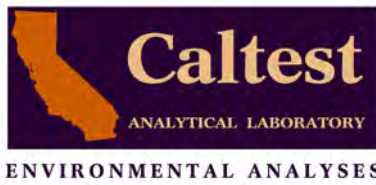
NOTE: This document represents a complete Analytical Report for the samples referenced herein and should be retained as a permanent record thereof.

Workorder Notes

Revised to include complete list of 8081 compounds for sample P070867004.

Qualifiers and Compound Notes

- | | |
|---|--|
| 1 | Analyte(s) reported as 'ND' means not detected at or above the listed Method Detection Limits (MDL). |
| 2 | This sample was analyzed following Florisil column cleanup (EPA Method 3620B). |
| 3 | Due to severe matrix interferences this compounds result should be considered an estimated value. The sample was run at a 2X and 5X dilution with similar results. |
| 4 | Due to matrix interferences present in the sample, surrogate recoveries failed to meet the QA/QC acceptance criteria. |
| 5 | Analysis performed past regulatory holding time per client authorization. |
| 6 | Due to severe matrix interferences all results should be considered estimated values. The sample was run at a 2X and 5X dilution with similar results. |



REVISED

NARRATIVE

Lab Order: P070867
Project ID: CCCWP-SSID SEDIMENTS

Qualifiers and Compound Notes

7 Sample diluted to bring concentration of target analyte(s) within the working range of the instrument, resulting in increased reporting limits.





REVISED

ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P070867
Project ID: CCCWP-SSID SEDIMENTS

Solid results are reported on a dry weight basis.

Lab ID P070867001 Date Collected 7/22/2014 11:45 Matrix Solid
Sample ID 544MSH065 Date Received 7/22/2014 17:54 Results are expressed as dry weight values

Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Chlorinated Pesticides Analysis		Prep Method: SW846 3541		Prep by: EAB				
		Analytical Method: SW846 8081				Analyzed by: MDT		
Aldrin	ND mg/kg	0.0022	0.00097	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	2.1
alpha-BHC	ND mg/kg	0.0022	0.00097	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
beta-BHC	ND mg/kg	0.0022	0.00097	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
delta-BHC	ND mg/kg	0.0022	0.00076	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
gamma-BHC (Lindane)	ND mg/kg	0.0022	0.00076	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
alpha-Chlordane (cis)	ND mg/kg	0.0060	0.0011	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Chlordane	ND mg/kg	0.0043	0.0032	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
gamma-Chlordane (trans)	ND mg/kg	0.0060	0.0011	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
2,4'-DDD	0.012 mg/kg	0.0050	0.0022	1 07/30/14 00:00	SPR 6556	08/11/14 17:59	SEC 2174	
2,4'-DDE	0.0058 mg/kg	0.0050	0.0022	1 07/30/14 00:00	SPR 6556	08/11/14 17:59	SEC 2174	
2,4'-DDT	ND mg/kg	0.0050	0.0022	1 07/30/14 00:00	SPR 6556	08/11/14 17:59	SEC 2174	
4,4'-DDD	0.0036 mg/kg	0.0022	0.00086	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
4,4'-DDE	0.028 mg/kg	0.0022	0.0013	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
4,4'-DDT	ND mg/kg	0.0022	0.0011	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Dieldrin	ND mg/kg	0.0022	0.0013	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Endosulfan I	ND mg/kg	0.0022	0.00097	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Endosulfan II	ND mg/kg	0.0022	0.00076	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Endosulfan sulfate	ND mg/kg	0.0022	0.00097	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Endrin	ND mg/kg	0.0022	0.0011	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Endrin aldehyde	ND mg/kg	0.0022	0.00097	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Endrin ketone	ND mg/kg	0.0022	0.00097	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Heptachlor	ND mg/kg	0.0022	0.00065	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Heptachlor epoxide	ND mg/kg	0.0022	0.0012	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Kepone	ND mg/kg	0.03	0.0097	1 08/19/14 00:00	SPR 6584	09/05/14 05:46	SEC 2176	5
Methoxychlor	ND mg/kg	0.0022	0.00097	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Mirex	ND mg/kg	0.022	0.00054	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Toxaphene	ND mg/kg	0.04	0.022	1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	
Decachlorobiphenyl (SS)	2.9 %	10-200		1 08/19/14 00:00	SPR 6584	09/05/14 05:46	SEC 2176	4
Decachlorobiphenyl (SS)	4.9 %	10-200		1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	4
Tetrachloro-m-xylene (SS)	65 %	10-200		1 08/19/14 00:00	SPR 6584	09/05/14 05:46	SEC 2176	
Tetrachloro-m-xylene (SS)	43 %	10-200		1 07/30/14 00:00	SPR 6556	08/14/14 18:56	SEC 2174	

Pyrethroids+Fipronil Analysis,NCI,Solid		Prep Method: SW846 3540C Soxhlet		Prep by: EAB				
		Analytical Method: SW846 8270 Mod				Analyzed by: RLH		
Allethrin	ND ug/kg	0.33	0.054	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	1
Bifenthrin	99 ug/kg	0.33	0.11	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	3
Cyfluthrin	6.2 ug/kg	0.33	0.12	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	
Lambda-Cyhalothrin	0.37 ug/kg	0.33	0.065	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	3
Cypermethrin	J0.30 ug/kg	0.33	0.11	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	
Deltamethrin:Tralomethrin	ND ug/kg	0.33	0.13	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	
Esfenvalerate:Fenvalerate	ND ug/kg	0.33	0.14	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	
Fenpropathrin	ND ug/kg	0.33	0.076	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	
Fipronil	ND ug/kg	0.33	0.11	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	





REVISED

ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P070867
 Project ID: CCCWP-SSID SEDIMENTS

Solid results are reported on a dry weight basis.

Lab ID	P070867001	Date Collected	7/22/2014 11:45	Matrix	Solid					
Sample ID	544MSH065	Date Received	7/22/2014 17:54	Results are expressed as dry weight values						
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual		
Fipronil Desulfinyl	0.56 ug/kg	0.33	0.11	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	3		
Fipronil Sulfide	ND ug/kg	0.33	0.11	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515			
Fipronil Sulfone	3.0 ug/kg	0.33	0.11	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	3		
Tau-Fluvalinate	ND ug/kg	0.33	0.043	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515			
Permethrin	6.0 ug/kg	0.33	0.12	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515	3		
Tetramethrin	ND ug/kg	0.33	0.065	1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515			
Esfenvalerate-d6;#1 (SS)	94 %	70-130		1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515			
Esfenvalerate-d6;#2 (SS)	102 %	70-130		1 07/29/14 00:00	SPR 6555	08/08/14 01:58	SMS 3515			
Dried Sediment as Extracted		Analytical Method:	SM20-2540 G			Analyzed by:	CFG			
Solids, Percent	92 %	0.1	0.1	1		07/30/14 14:18	WGR 5525			

Lab ID	P070867002	Date Collected	7/22/2014 10:15	Matrix	Solid					
Sample ID	544MSH065	Date Received	7/22/2014 17:54	Results are expressed as dry weight values						
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual		
Chlorinated Pesticides Analysis		Prep Method:	SW846 3541	Prep by:	EAB	Analyzed by:	MDT			
		Analytical Method:	SW846 8081							
Aldrin	ND mg/kg	0.0021	0.00094	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174	2,1		
alpha-BHC	ND mg/kg	0.0021	0.00094	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
beta-BHC	ND mg/kg	0.0021	0.00094	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
delta-BHC	ND mg/kg	0.0021	0.00073	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
gamma-BHC (Lindane)	ND mg/kg	0.0021	0.00073	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
alpha-Chlordane (cis)	ND mg/kg	0.0060	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Chlordane	ND mg/kg	0.0042	0.0031	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
gamma-Chlordane (trans)	ND mg/kg	0.0060	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
2,4'-DDD	0.034 mg/kg	0.0050	0.0021	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
2,4'-DDE	0.019 mg/kg	0.0050	0.0021	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
2,4'-DDT	ND mg/kg	0.0050	0.0021	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
4,4'-DDD	0.023 mg/kg	0.0021	0.00084	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
4,4'-DDE	0.076 mg/kg	0.010	0.0063	5 07/30/14 00:00	SPR 6556	08/14/14 20:49	SEC 2174	7		
4,4'-DDT	ND mg/kg	0.0021	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Dieldrin	ND mg/kg	0.0021	0.0013	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Endosulfan I	ND mg/kg	0.0021	0.00094	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Endosulfan II	ND mg/kg	0.0021	0.00073	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Endosulfan sulfate	ND mg/kg	0.0021	0.00094	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Endrin	ND mg/kg	0.0021	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Endrin aldehyde	ND mg/kg	0.0021	0.00094	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Endrin ketone	ND mg/kg	0.0021	0.00094	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Heptachlor	ND mg/kg	0.0021	0.00063	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Heptachlor epoxide	ND mg/kg	0.0021	0.0012	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Kepone	ND mg/kg	0.03	0.0094	1 08/19/14 00:00	SPR 6584	09/05/14 06:14	SEC 2176	5		
Methoxychlor	ND mg/kg	0.0021	0.00094	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Mirex	ND mg/kg	0.021	0.00052	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			
Toxaphene	ND mg/kg	0.04	0.021	1 07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174			

9/30/2014 12:36

REPORT OF LABORATORY ANALYSIS

Page 6 of 18

This report shall not be reproduced, except in full,
 without the written consent of CALTEST ANALYTICAL LABORATORY



**REVISED**

ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P070867
Project ID: CCCWP-SSID SEDIMENTS

Solid results are reported on a dry weight basis.

Lab ID	P070867002	Date Collected	7/22/2014 10:15	Matrix	Solid					
Sample ID	544MSH062	Date Received	7/22/2014 17:54	Results are expressed as dry weight values						
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual		
Decachlorobiphenyl (SS)	3.9 %	10-200		1	08/19/14 00:00	SPR 6584	09/05/14 06:14	SEC 2176	4	
Decachlorobiphenyl (SS)	16 %	10-200		1	07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174		
Tetrachloro-m-xylene (SS)	60 %	10-200		1	07/30/14 00:00	SPR 6556	08/11/14 18:20	SEC 2174		
Tetrachloro-m-xylene (SS)	66 %	10-200		1	08/19/14 00:00	SPR 6584	09/05/14 06:14	SEC 2176		
Pyrethroids+Fipronil Analysis,NCI,Solid	Prep Method:	SW846 3540C Soxhlet		Prep by:	EAB					
	Analytical Method:	SW846 8270 Mod			Analyzed by:	RLH				
Allethrin	ND ug/kg	0.33	0.052	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515	1,6	
Bifenthrin	40 ug/kg	0.33	0.10	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515	3	
Cyfluthrin	3.4 ug/kg	0.33	0.12	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Lambda-Cyhalothrin	J0.24 ug/kg	0.33	0.063	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515	3	
Cypermethrin	0.35 ug/kg	0.33	0.10	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Deltamethrin:Tralomethrin	ND ug/kg	0.33	0.13	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Esfenvalerate:Fenvalerate	ND ug/kg	0.33	0.14	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Fenpropathrin	ND ug/kg	0.33	0.073	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Fipronil	ND ug/kg	0.33	0.10	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Fipronil Desulfinyl	J0.27 ug/kg	0.33	0.10	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515	3	
Fipronil Sulfide	ND ug/kg	0.33	0.10	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Fipronil Sulfone	ND ug/kg	0.33	0.10	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Tau-Fluvalinate	ND ug/kg	0.33	0.042	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Permethrin	9.4 ug/kg	0.33	0.12	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515	3	
Tetramethrin	ND ug/kg	0.33	0.063	1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Esfenvalerate-d6;#1 (SS)	103 %	70-130		1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Esfenvalerate-d6;#2 (SS)	118 %	70-130		1	07/29/14 00:00	SPR 6555	08/08/14 03:44	SMS 3515		
Dried Sediment as Extracted Solids, Percent	Analytical Method:	SM20-2540 G		Analyzed by:	CFG					
	95 %	0.1	0.1	1	07/30/14 14:18 WGR 5525					

Lab ID	P070867003	Date Collected	7/22/2014 14:45	Matrix	Solid					
Sample ID	207WAL078	Date Received	7/22/2014 17:54	Results are expressed as dry weight values						
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual		
Chlorinated Pesticides Analysis	Prep Method:	SW846 3541		Prep by:	EAB					
	Analytical Method:	SW846 8081			Analyzed by:	MDT				
Aldrin	ND mg/kg	0.0023	0.0010	1	07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174	2,1	
alpha-BHC	ND mg/kg	0.0023	0.0010	1	07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174		
beta-BHC	ND mg/kg	0.0023	0.0010	1	07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174		
delta-BHC	ND mg/kg	0.0023	0.00081	1	07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174		
gamma-BHC (Lindane)	ND mg/kg	0.0023	0.00081	1	07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174		
alpha-Chlordane (cis)	ND mg/kg	0.0060	0.0012	1	07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174		
Chlordane	ND mg/kg	0.0046	0.0035	1	07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174		
gamma-Chlordane (trans)	ND mg/kg	0.0060	0.0012	1	07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174		
2,4'-DDD	ND mg/kg	0.0050	0.0023	1	07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174		
2,4'-DDE	ND mg/kg	0.0050	0.0023	1	07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174		

9/30/2014 12:36

REPORT OF LABORATORY ANALYSIS

Page 7 of 18

This report shall not be reproduced, except in full,
without the written consent of CALTEST ANALYTICAL LABORATORY

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com





REVISED

ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P070867
 Project ID: CCCWP-SSID SEDIMENTS

Solid results are reported on a dry weight basis.

Lab ID	P070867003	Date Collected	7/22/2014 14:45	Matrix	Solid					
Sample ID	207WAL078	Date Received	7/22/2014 17:54	Results are expressed as dry weight values						
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual		
2,4'-DDT	ND mg/kg	0.0050	0.0023	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
4,4'-DDD	ND mg/kg	0.0023	0.00092	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
4,4'-DDE	ND mg/kg	0.0023	0.0014	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
4,4'-DDT	ND mg/kg	0.0023	0.0012	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Dieldrin	ND mg/kg	0.0023	0.0014	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Endosulfan I	ND mg/kg	0.0023	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Endosulfan II	ND mg/kg	0.0023	0.00081	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Endosulfan sulfate	ND mg/kg	0.0023	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Endrin	ND mg/kg	0.0023	0.0012	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Endrin aldehyde	ND mg/kg	0.0023	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Endrin ketone	ND mg/kg	0.0023	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Heptachlor	ND mg/kg	0.0023	0.00069	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Heptachlor epoxide	ND mg/kg	0.0023	0.0013	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Kepone	ND mg/kg	0.03	0.010	1 08/19/14 00:00	SPR 6584	09/05/14 06:41	SEC 2176	5		
Methoxychlor	ND mg/kg	0.0023	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Mirex	ND mg/kg	0.023	0.00058	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Toxaphene	ND mg/kg	0.05	0.023	1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Decachlorobiphenyl (SS)	9.5 %	10-200		1 08/19/14 00:00	SPR 6584	09/05/14 06:41	SEC 2176	4		
Decachlorobiphenyl (SS)	12 %	10-200		1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Tetrachloro-m-xylene (SS)	36 %	10-200		1 07/30/14 00:00	SPR 6556	08/11/14 18:41	SEC 2174			
Tetrachloro-m-xylene (SS)	33 %	10-200		1 08/19/14 00:00	SPR 6584	09/05/14 06:41	SEC 2176			

Pyrethroids+Fipronil Analysis,NCI,Solid

Prep Method: SW846 3540C Soxhlet Prep by: EAB

Analytical Method: SW846 8270 Mod

Analyzed by: RLH

Allethrin	ND ug/kg	0.33	0.058	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	1
Bifenthrin	5.6 ug/kg	0.33	0.12	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	3
Cyfluthrin	0.80 ug/kg	0.33	0.13	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	3
Lambda-Cyhalothrin	ND ug/kg	0.33	0.069	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	
Cypermethrin	J0.28 ug/kg	0.33	0.12	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	3
Deltamethrin:Tralomethrin	ND ug/kg	0.33	0.14	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	
Esfenvalerate:Fenvalerate	ND ug/kg	0.33	0.15	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	
Fenpropathrin	ND ug/kg	0.33	0.081	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	
Fipronil	ND ug/kg	0.33	0.12	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	
Fipronil Desulfinyl	ND ug/kg	0.33	0.12	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	
Fipronil Sulfide	ND ug/kg	0.33	0.12	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	
Fipronil Sulfone	ND ug/kg	0.33	0.12	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	
Tau-Fluvalinate	ND ug/kg	0.33	0.046	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	
Permethrin	1.9 ug/kg	0.33	0.13	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	3
Tetramethrin	ND ug/kg	0.33	0.069	1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	
Esfenvalerate-d6;#1 (SS)	97 %	70-130		1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	
Esfenvalerate-d6;#2 (SS)	115 %	70-130		1 07/29/14 00:00	SPR 6555	08/08/14 05:32	SMS 3515	

Dried Sediment as Extracted

Analytical Method: SM20-2540 G

Analyzed by: CFG

Solids, Percent	87 %	0.1	0.1	1		07/30/14 14:18	WGR 5525
-----------------	------	-----	-----	---	--	----------------	----------





REVISED

ANALYTICAL RESULTS

Lab Order: P070867
 Project ID: CCCWP-SSID SEDIMENTS

Solid results are reported on a dry weight basis.

Lab ID P070867004 Date Collected 7/22/2014 11:45 Matrix Solid
Sample ID 207WAL060 Date Received 7/22/2014 17:54 Results are expressed as dry weight values

Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Chlorinated Pesticides Analysis		Prep Method: SW846 3541		Prep by: EAB				
		Analytical Method: SW846 8081				Analyzed by: MDT		
Aldrin	ND mg/kg	0.0021	0.00092	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	2.1
alpha-BHC	ND mg/kg	0.0021	0.00092	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
beta-BHC	ND mg/kg	0.0021	0.00092	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
delta-BHC	ND mg/kg	0.0021	0.00072	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
gamma-BHC (Lindane)	ND mg/kg	0.0021	0.00072	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
alpha-Chlordane (cis)	ND mg/kg	0.0060	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Chlordane	ND mg/kg	0.0041	0.0031	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
gamma-Chlordane (trans)	ND mg/kg	0.0060	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
2,4'-DDD	ND mg/kg	0.0050	0.0021	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
2,4'-DDE	ND mg/kg	0.0050	0.0021	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
2,4'-DDT	ND mg/kg	0.0050	0.0021	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
4,4'-DDD	ND mg/kg	0.0021	0.00082	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
4,4'-DDE	ND mg/kg	0.0021	0.0012	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
4,4'-DDT	ND mg/kg	0.0021	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Dieldrin	ND mg/kg	0.0021	0.0012	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Endosulfan I	ND mg/kg	0.0021	0.00092	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Endosulfan II	ND mg/kg	0.0021	0.00072	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Endosulfan sulfate	ND mg/kg	0.0021	0.00092	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Endrin	ND mg/kg	0.0021	0.0010	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Endrin aldehyde	ND mg/kg	0.0021	0.00092	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Endrin ketone	ND mg/kg	0.0021	0.00092	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Heptachlor	ND mg/kg	0.0021	0.00062	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Heptachlor epoxide	ND mg/kg	0.0021	0.0011	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Kepone	ND mg/kg	0.03	0.0092	1 08/19/14 00:00	SPR 6584	09/05/14 07:09	SEC 2176	5
Methoxychlor	ND mg/kg	0.0021	0.00092	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Mirex	ND mg/kg	0.021	0.00051	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Toxaphene	ND mg/kg	0.04	0.021	1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Decachlorobiphenyl (SS)	4.6 %	10-200		1 08/19/14 00:00	SPR 6584	09/05/14 07:09	SEC 2176	4
Decachlorobiphenyl (SS)	7.3 %	10-200		1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	4
Tetrachloro-m-xylene (SS)	20 %	10-200		1 07/30/14 00:00	SPR 6556	08/11/14 19:02	SEC 2174	
Tetrachloro-m-xylene (SS)	915 %	10-200		1 08/19/14 00:00	SPR 6584	09/05/14 07:09	SEC 2176	4

Pyrethroids+Fipronil Analysis,NCI,Solid		Prep Method: SW846 3540C Soxhlet		Prep by: EAB				
		Analytical Method: SW846 8270 Mod				Analyzed by: RLH		
Allethrin	ND ug/kg	0.33	0.051	1 07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515	1
Bifenthrin	3.6 ug/kg	0.33	0.10	1 07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515	3
Cyfluthrin	0.41 ug/kg	0.33	0.11	1 07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515	3
Lambda-Cyhalothrin	ND ug/kg	0.33	0.062	1 07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515	
Cypermethrin	J0.21 ug/kg	0.33	0.10	1 07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515	3
Deltamethrin:Tralomethrin	ND ug/kg	0.33	0.12	1 07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515	
Esfenvalerate:Fenvalerate	ND ug/kg	0.33	0.13	1 07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515	
Fenpropathrin	ND ug/kg	0.33	0.072	1 07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515	
Fipronil	ND ug/kg	0.33	0.10	1 07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515	





REVISED

ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: P070867
Project ID: CCCWP-SSID SEDIMENTS

Solid results are reported on a dry weight basis.

Lab ID	P070867004	Date Collected	7/22/2014 11:45	Matrix	Solid					
Sample ID	207WAL060	Date Received	7/22/2014 17:54	Results are expressed as dry weight values						
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual		
Fipronil Desulfanyl	ND ug/kg	0.33	0.10	1	07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515		
Fipronil Sulfide	ND ug/kg	0.33	0.10	1	07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515		
Fipronil Sulfone	J0.14 ug/kg	0.33	0.10	1	07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515	3	
Tau-Fluvalinate	ND ug/kg	0.33	0.041	1	07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515		
Permethrin	2.3 ug/kg	0.33	0.11	1	07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515	3	
Tetramethrin	ND ug/kg	0.33	0.062	1	07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515		
Esfenvalerate-d6;#1 (SS)	102 %	70-130		1	07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515		
Esfenvalerate-d6;#2 (SS)	120 %	70-130		1	07/29/14 00:00	SPR 6555	08/08/14 07:19	SMS 3515		
Dried Sediment as Extracted	Analytical Method:	SM20-2540 G				Analyzed by:	CFG			
Solids, Percent	97 %	0.1	0.1	1		07/30/14 14:18	WGR 5525			

Lab ID	P070867005	Date Collected	7/22/2014 11:45	Matrix	Solid					
Sample ID	544MSH065	Date Received	7/22/2014 17:54	Results are expressed as dry weight values						
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual		
Client provided Data	Analytical Method:	Client Method				Analyzed by:	PJB			
Solids, Percent	25 %			1		07/22/14 11:45	CSV 1205			
TOC SO by EPA 9060 - Ref.Lab	Analytical Method:	EPA 9060				Analyzed by:	PJB			
Total Organic Carbon	4.6 %	0.40	0.040	1		08/06/14 13:00	SUB 1666			

Lab ID	P070867006	Date Collected	7/22/2014 10:15	Matrix	Solid					
Sample ID	544MSH062	Date Received	7/22/2014 17:54	Results are expressed as dry weight values						
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual		
Client provided Data	Analytical Method:	Client Method				Analyzed by:	PJB			
Solids, Percent	52 %			1		07/22/14 10:15	CSV 1205			
TOC SO by EPA 9060 - Ref.Lab	Analytical Method:	EPA 9060				Analyzed by:	PJB			
Total Organic Carbon	1.9 %	0.19	0.019	1		08/06/14 13:00	SUB 1666			

Lab ID	P070867007	Date Collected	7/22/2014 14:45	Matrix	Solid					
Sample ID	207WAL078	Date Received	7/22/2014 17:54	Results are expressed as dry weight values						
Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual		
Client provided Data	Analytical Method:	Client Method				Analyzed by:	PJB			
Solids, Percent	40 %			1		07/22/14 14:45	CSV 1205			
TOC SO by EPA 9060 - Ref.Lab	Analytical Method:	EPA 9060				Analyzed by:	PJB			
Total Organic Carbon	3.6 %	0.25	0.025	1		08/06/14 13:00	SUB 1666			



ENVIRONMENTAL ANALYSES

REVISED

ANALYTICAL RESULTS

Lab Order: P070867
 Project ID: CCCWP-SSID SEDIMENTS

Solid results are reported on a dry weight basis.

Lab ID P070867008 Date Collected 7/22/2014 11:45 Matrix Solid
Sample ID 207WAL060 Date Received 7/22/2014 17:54 Results are expressed as dry weight values

Parameters	Result Units	R. L.	MDL	DF Prepared	Batch	Analyzed	Batch	Qual
Client provided Data	Analytical Method:	Client Method				Analyzed by:	PJB	
Solids, Percent	69 %			1		07/22/14 11:45	CSV 1205	
TOC SO by EPA 9060 - Ref.Lab	Analytical Method:	EPA 9060				Analyzed by:	PJB	
Total Organic Carbon	1.0 %	0.14	0.014	1		08/06/14 13:00	SUB 1666	





REVISED

QUALITY CONTROL DATA

Lab Order: P070867
 Project ID: CCCWP-SSID SEDIMENTS

Analysis Description:	Pyrethroids+Fipronil Analysis,NCI,Solid	QC Batch:	SPR/6555
Analysis Method:	SW846 8270 Mod (GCMS-NCI-SIM)	QC Batch Method:	SW846 3540C Soxhlet Extraction

METHOD BLANK: 594644

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Allethrin	ND	0.25	0.050	ug/kg	
Bifenthrin	ND	0.25	0.10	ug/kg	1
Cyfluthrin	ND	0.25	0.11	ug/kg	
Lambda-Cyhalothrin	ND	0.25	0.060	ug/kg	
Cypermethrin	ND	0.25	0.10	ug/kg	
Deltamethrin:Tralomethrin	ND	0.25	0.12	ug/kg	
Esfenvalerate:Fenvalerate	ND	0.25	0.13	ug/kg	
Fenpropathrin	ND	0.25	0.070	ug/kg	
Fipronil	ND	0.25	0.10	ug/kg	
Fipronil Desulfinyl	ND	0.25	0.10	ug/kg	
Fipronil Sulfide	ND	0.25	0.10	ug/kg	
Fipronil Sulfone	ND	0.25	0.10	ug/kg	
Tau-Fluvalinate	ND	0.25	0.040	ug/kg	
Permethrin	ND	0.25	0.11	ug/kg	
Tetramethrin	ND	0.25	0.060	ug/kg	
Esfenvalerate-d6;#1 (SS)	81	70-130		%	
Esfenvalerate-d6;#2 (SS)	78	70-130		%	

LABORATORY CONTROL SAMPLE & LCSD: 594645 594646

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Allethrin	ug/kg	2.5	2.6	3	106	119	50-150	12	40	
Bifenthrin	ug/kg	2.5	2.6	2.7	104	108	50-150	3.4	40	7
Cyfluthrin	ug/kg	2.5	2.8	2.8	113	113	50-150	0.4	30	
Lambda-Cyhalothrin	ug/kg	2.5	2.4	2.7	96	107	50-150	11	30	
Cypermethrin	ug/kg	2.5	2.7	2.7	108	109	50-150	1.1	30	
Deltamethrin:Tralomethrin	ug/kg	5	5.6	4.6	112	92	50-150	19	30	
Esfenvalerate:Fenvalerate	ug/kg	5	5.7	5.3	114	107	50-150	6.5	30	
Fenpropathrin	ug/kg	2.5	2.6	2.8	103	110	50-200	6.4	40	
Fipronil	ug/kg	2.5	2.2	2.6	89	104	50-150	16	35	
Fipronil Desulfinyl	ug/kg	2.5	2.1	2.6	86	104	50-150	19	35	
Fipronil Sulfide	ug/kg	2.5	2.2	2.6	86	105	50-150	20	35	
Fipronil Sulfone	ug/kg	2.5	2.2	2.7	87	106	50-150	20	35	
Tau-Fluvalinate	ug/kg	2.5	1.9	1.8	78	72	1-122	8	50	
Permethrin	ug/kg	50	72	68	144	137	50-150	4.7	40	
Tetramethrin	ug/kg	2.5	2.3	2.5	91	100	50-150	9.6	50	
Esfenvalerate-d6;#1 (SS)	%				112	107	70-130	4.4		
Esfenvalerate-d6;#2 (SS)	%				120	105	70-130	13		





REVISED

QUALITY CONTROL DATA

Lab Order: P070867
 Project ID: CCCWP-SSID SEDIMENTS

Analysis Description:	Pyrethroids+Fipronil Analysis,NCI,Solid	QC Batch:	SPR/6555
Analysis Method:	SW846 8270 Mod (GCMS-NCI-SIM)	QC Batch Method:	SW846 3540C Soxhlet Extraction

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 594647 594648

Parameter	Units	P070925001		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
		Result	Spike Conc.								
Allethrin	ug/kg	0	2.5	0.86	0.89	35	36	50-185	3	40	10
Bifenthrin	ug/kg	0.36	2.5	3.3	3.4	119	123	25-200	3.5	40	8
Cyfluthrin	ug/kg	0	2.5	2.8	6.4	113	255	50-150	77	30	11
Lambda-Cyhalothrin	ug/kg	0	2.5	1.4	1.4	55	55	30-160	0.7	30	
Cypermethrin	ug/kg	0	2.5	2.7	2.7	108	110	50-170	1.5	30	
Deltamethrin:Tralomethrin	ug/kg	0	5	6.4	7.2	127	144	35-150	12	30	
Esfenvalerate:Fenvalerate	ug/kg	0	5	6	6.1	120	122	50-175	1.3	30	
Fenpropathrin	ug/kg	0	2.5	2.6	2.6	104	105	50-200	1.2	40	
Fipronil	ug/kg			1.7	1.4				15	35	
Fipronil Desulfinyl	ug/kg			1.9	1.7				12	35	
Fipronil Sulfide	ug/kg			1.8	1.5				15	35	
Fipronil Sulfone	ug/kg			2	1.9				8.7	35	
Tau-Fluvalinate	ug/kg	0	2.5	1.2	1.2	49	46	30-150	5.9	50	
Permethrin	ug/kg	0.42	50	82	81	162	160	40-200	1.2	40	
Tetramethrin	ug/kg	0	2.5	1.6	2	62	80	30-150	25	50	
Esfenvalerate-d6;#1 (SS)	%					113	113	70-130	0.7		
Esfenvalerate-d6;#2 (SS)	%					125	125	70-130	0		

Analysis Description:	Chlorinated Pesticides Analysis	QC Batch:	SPR/6556
Analysis Method:	SW846 8081	QC Batch Method:	SW846 3541

METHOD BLANK: 594791

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Aldrin	ND	0.0020	0.0009	mg/kg	
alpha-BHC	ND	0.0020	0.0009	mg/kg	
beta-BHC	ND	0.0020	0.0009	mg/kg	
delta-BHC	ND	0.0020	0.0007	mg/kg	
gamma-BHC (Lindane)	ND	0.0020	0.0007	mg/kg	
alpha-Chlordane (cis)	ND	0.0020	0.0010	mg/kg	
Chlordane	ND	0.0040	0.0030	mg/kg	
gamma-Chlordane (trans)	ND	0.0020	0.0010	mg/kg	
2,4'-DDD	ND	0.0020	0.0020	mg/kg	
2,4'-DDE	ND	0.0020	0.0020	mg/kg	
2,4'-DDT	ND	0.0020	0.0020	mg/kg	
4,4'-DDD	ND	0.0020	0.0008	mg/kg	
4,4'-DDE	ND	0.0020	0.0012	mg/kg	
4,4'-DDT	ND	0.0020	0.0010	mg/kg	
Dieldrin	ND	0.0020	0.0012	mg/kg	
Endosulfan I	ND	0.0020	0.0009	mg/kg	
Endosulfan II	ND	0.0020	0.0007	mg/kg	
Endosulfan sulfate	ND	0.0020	0.0009	mg/kg	
Endrin	ND	0.0020	0.0010	mg/kg	





ENVIRONMENTAL ANALYSES

REVISED

QUALITY CONTROL DATA

Lab Order: P070867
Project ID: CCCWP-SSID SEDIMENTS

Analysis Description:	Chlorinated Pesticides Analysis	QC Batch:	SPR/6556
Analysis Method:	SW846 8081	QC Batch Method:	SW846 3541

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Endrin aldehyde	ND	0.0020	0.0009	mg/kg	
Endrin ketone	ND	0.0020	0.0009	mg/kg	
Heptachlor	ND	0.0020	0.0006	mg/kg	
Heptachlor epoxide	ND	0.0020	0.0011	mg/kg	
Methoxychlor	ND	0.0020	0.0009	mg/kg	
Mirex	ND	0.020	0.0005	mg/kg	
Toxaphene	ND	0.04	0.02	mg/kg	
Decachlorobiphenyl (SS)	67	45-188		%	
Tetrachloro-m-xylene (SS)	39	64-114		%	12

LABORATORY CONTROL SAMPLE & LCSD: 594792 594793

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD	Qualifier
Aldrin	mg/kg	0.013	0.0098	0.009	73	68	67-109	7.9	60	
gamma-BHC (Lindane)	mg/kg	0.013	0.009	0.0086	67	64	57-106	4.4	52	
4,4'-DDT	mg/kg	0.013	0.0093	0.0092	70	69	52-139	0.9	59	
Dieldrin	mg/kg	0.013	0.01	0.01	75	76	63-111	1	19	
Endosulfan sulfate	mg/kg	0.013	0.01	0.0099	77	75	50-150	2.6	50	
Endrin	mg/kg	0.013	0.01	0.0099	77	74	55-127	3.2	18	
Heptachlor	mg/kg	0.013	0.0074	0.0076	55	57	52-149	2.7	98	
Methoxychlor	mg/kg	0.013	0.0078	0.0073	59	55	50-150	6.6	50	
Decachlorobiphenyl (SS)	%				86	76	45-188	12		
Tetrachloro-m-xylene (SS)	%				50	51	64-114	0.7	12	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 594794 594795

Parameter	Units	P070963003 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD	Qualifiers
Aldrin	mg/kg	0	0.013	0.012	0.012	93	93	67-109	0	24	
gamma-BHC (Lindane)	mg/kg	0	0.013	0.0099	0.01	75	76	57-106	1.6	29	
4,4'-DDT	mg/kg	0	0.013	0.0081	0.0075	61	56	52-139	7.4	46	
Dieldrin	mg/kg	0	0.013	0.014	0.013	101	101	63-111	0.7	24	
Endosulfan sulfate	mg/kg	0	0.013	0.013	0.013	99	95	50-150	4.7	30	
Endrin	mg/kg	0	0.013	0.013	0.013	98	95	55-127	3.1	23	
Heptachlor	mg/kg	0	0.013	0.0072	0.0073	54	55	52-149	2.2	52	
Methoxychlor	mg/kg	0	0.013	0.0094	0.0086	70	64	50-150	8.8	30	
Decachlorobiphenyl (SS)	%					95	86	10-200	10		
Tetrachloro-m-xylene (SS)	%					59	56	10-200	4.8		





REVISED

QUALITY CONTROL DATA

Lab Order: P070867
 Project ID: CCCWP-SSID SEDIMENTS

Analysis Description:	Chlorinated Pesticides Analysis	QC Batch:	SPR/6584
Analysis Method:	SW846 8081	QC Batch Method:	SW846 3540

METHOD BLANK: 598126

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Kepone	ND	0.02	0.009	mg/kg	
Decachlorobiphenyl (SS)	110	45-188		%	
Tetrachloro-m-xylene (SS)	83	64-114		%	

LABORATORY CONTROL SAMPLE & LCSD: 598127 598128

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% REC Limits	RPD	Max RPD Qualifier
Kepone	mg/kg	0.2	0.04	0.05	22	23	10-200	1.8	50
Decachlorobiphenyl (SS)	%				118	119	45-188	0.6	
Tetrachloro-m-xylene (SS)	%				88	95	64-114	8.2	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 598129 598130

Parameter	Units	P070867004 Result	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD Qualifiers
Kepone	mg/kg	0	0.01	0	0	RNC	RNC	10-200	0	50 13
Decachlorobiphenyl (SS)	%					5.3	4.5	10-200	15	
Tetrachloro-m-xylene (SS)	%					750	750	10-200	0	

Analysis Description:	TOC SO by EPA 9060 - Ref.Lab	QC Batch:	SUB/1666
Analysis Method:	EPA 9060	QC Batch Method:	EPA 9060

METHOD BLANK: 600437

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Total Organic Carbon	ND	0.10	0.010	%	

LABORATORY CONTROL SAMPLE: 600438

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% REC Limits	Qualifier
Total Organic Carbon	%	10	9.3	93	75-125	





ENVIRONMENTAL ANALYSES

REVISED

QUALITY CONTROL DATA

Lab Order: P070867
 Project ID: CCCWP-SSID SEDIMENTS

Analysis Description:	Dried Sediment as Extracted	QC Batch:	WGR/5525
Analysis Method:	SM20-2540 G	QC Batch Method:	SM20-2540 G

METHOD BLANK: 594819

Parameter	Blank Result	Reporting Limit	MDL	Units	Qualifiers
Solids, Percent	ND	0.1	0.1	%	

SAMPLE DUPLICATE: 594820

Parameter	Units	P070024013 Result	DUP Result	RPD	Max RPD	Qualifiers
Solids, Percent	%	8.8	8.8	0	20	





ENVIRONMENTAL ANALYSES

REVISED**QUALITY CONTROL DATA QUALIFIERS**

Lab Order: P070867
 Project ID: CCCWP-SSID SEDIMENTS

QUALITY CONTROL PARAMETER QUALIFIERS

Results Qualifiers: Report fields may contain codes and non-numeric data correlating to one or more of the following definitions:

NS - means not spiked and will not have recoveries reported for Analyte Spike Amounts

QC Codes Keys: These descriptors are used to help identify the specific QC samples and clarify the report.

MB - Method Blank

Method Blanks are reported to the same Method Detection Limits (MDLs) or Reporting Limits (RLs) as the analytical samples in the corresponding QC batch.

LCS/LCSD - Laboratory Control Spike / Laboratory Control Spike Duplicate

DUP - Duplicate of Original Sample Matrix

MS/MSD - Matrix Spike / Matrix Spike Duplicate

RPD - Relative Percent Difference

%Recovery - Spike Recovery stated as a percentage

- 1 Analyte(s) reported as 'ND' means not detected at or above the listed Method Detection Limits (MDL).
- 7 Sample diluted to bring concentration of target analyte(s) within the working range of the instrument, resulting in increased reporting limits.
- 8 Sample diluted due to a high concentration of non-target analyte(s), resulting in increased reporting limits.
- 10 Low Matrix Spike recovery(ies) due to possible matrix interferences in the QC sample. QC batch accepted based on LCS and RPD results.
- 11 Matrix spike recovery(ies) and RPD outside control limit. Sample result accepted based on LCS and Method Blank.
- 12 The data is acceptable when no more than one surrogate is outside the acceptance limits.
- 13 RNC = Recovery Not Calculated. Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries were not calculated due to matrix interferences concealing the added spike concentration.

**REVISED**

ENVIRONMENTAL ANALYSES

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Lab Order: P070867

Project ID: CCCWP-SSID SEDIMENTS

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
P070867005	544MSH065	Client Method	CSV/1205		
P070867006	544MSH062	Client Method	CSV/1205		
P070867007	207WAL078	Client Method	CSV/1205		
P070867008	207WAL060	Client Method	CSV/1205		
P070867001	544MSH065	SW846 3541	SPR/6556	SW846 8081	SEC/2174
P070867002	544MSH062	SW846 3541	SPR/6556	SW846 8081	SEC/2174
P070867003	207WAL078	SW846 3541	SPR/6556	SW846 8081	SEC/2174
P070867004	207WAL060	SW846 3541	SPR/6556	SW846 8081	SEC/2174
P070867001	544MSH065	SW846 3540	SPR/6584	SW846 8081	SEC/2176
P070867002	544MSH062	SW846 3540	SPR/6584	SW846 8081	SEC/2176
P070867003	207WAL078	SW846 3540	SPR/6584	SW846 8081	SEC/2176
P070867004	207WAL060	SW846 3540	SPR/6584	SW846 8081	SEC/2176
P070867001	544MSH065	SW846 3540C Soxhlet	SPR/6555	SW846 8270 Mod	SMS/3515
P070867002	544MSH062	SW846 3540C Soxhlet	SPR/6555	SW846 8270 Mod	SMS/3515
P070867003	207WAL078	SW846 3540C Soxhlet	SPR/6555	SW846 8270 Mod	SMS/3515
P070867004	207WAL060	SW846 3540C Soxhlet	SPR/6555	SW846 8270 Mod	SMS/3515
P070867005	544MSH065	EPA 9060	SUB/1666		
P070867006	544MSH062	EPA 9060	SUB/1666		
P070867007	207WAL078	EPA 9060	SUB/1666		
P070867008	207WAL060	EPA 9060	SUB/1666		
P070867001	544MSH065	SM20-2540 G	WGR/5525		
P070867002	544MSH062	SM20-2540 G	WGR/5525		
P070867003	207WAL078	SM20-2540 G	WGR/5525		
P070867004	207WAL060	SM20-2540 G	WGR/5525		



1885 N. KELLY ROAD • NAPA, CA 94558 • (707) 258-4000 • Fax (707) 226-1001 • www.caltestlabs.com

PAGE 1 OF 2
LAB ORDER # 1870867
P.O. # 030.001.0202

SAMPLE CHAIN OF CUSTODY

CLIENT: ADH Environmental
 ADDRESS: 3065 Porter St Ste. 101 Sausalito, CA 94965
 BILLING ADDRESS: Same as above
 CITY: Sausalito
 STATE: CA
 ZIP: 94965
 PROJECT #/PROJECT NAME: CCWMP-SS1D
 REPORT ATTN: Alessandro Huetl
 ANALYSES REQUESTED: Pyrethroids, Fipronil & deltamethrin, Organochlorine pesticides, Percent solids, Total Organic Carbon

PHONE #: 831.477.2003 FAX PHONE: 831.477.0895
 SAMPLE IDENTIFICATION SITE: Kevin Lewis
 TURN-AROUND TIME: STANDARD RUSH
 DUE DATE: _____

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYP	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. OF GRAB	REMARKS
-1	7-20-04	11:45	sed	2x8oz AG	4°C	544R00025US-01	-1	grab	X
-5				2x8oz AG		544R00025US-02			X
-9				1x8oz CG		544R00025US-03			X
-13				1x8oz CG		544R00025US-04			X
-2		10:15		2x8oz AG		544R00025DS-01	-2		X
-6		10:15		2x8oz AG		544R00025DS-02			X
-10				1x8oz CG		544R00025DS-03			X
-14				1x8oz CG		544R00025DS-04			X

By submittal of sample(s), client agrees to abide by the Terms and Conditions set forth on the reverse of this document.

RELINQUISHED BY: *Justin Rubin* DATE/TIME: 7-22-04 17:54 RECEIVED BY: *[Signature]*

RECEIVED BY: _____ DATE/TIME: _____

BD: BIO _____ WC _____ MET _____ SV _____ VOA _____

CC: AA _____ SV _____ VOA _____

SIL: HP _____ PT _____ QT _____ VOA _____

W/HNO₃ _____ H₂SO₄ _____ NaOH _____

PL: HNO₃ _____ H₂SO₄ _____ NaOH _____ HCL _____

COMMENTS: _____

TEMP: _____ °C SEALED: Y / N INTACT: Y / N

MATRIX: W = Aqueous Nondrinking Water, Digested Metals; ML = Low R.L.S., Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Product

CONTAINER TYPES: AL = Amber Liter; AHL = 500 ml Amber; PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4 oz BACT; BT = Brass Tube; VOA = 40 mL VOA; OTC = Other Type Container



Caltest
ANALYTICAL LABORATORY

1885 N. KELLY ROAD • NAPA, CA 94558 • (707) 258-4000 • Fax (707) 226-1001 • www.caltestlabs.com

PAGE 2 OF 2

LAB ORDER # 8070867

CLIENT: ADH Environmental

PROJECT #/PROJECT NAME: 030.001.0202 / cccwrp-5510

REPORT ATTN: Alessandro Huettl

ANALYSES REQUESTED: Pyrethroids, Fipronil, Degradates, Organochlorine pesticides, Percent solids, Total organic carbon

ADDRESS: 3065 Rafter St Ste 101 Sequel

CITY: CA STATE: CA ZIP: 95073

BILLING ADDRESS: same as above

PHONE #: 931-477-2003

FAX PHONE: 931-477-0895

SAMPLER (PRINT & SIGN NAME): Kevin Lewis

SIGNATURE: [Signature]

DUE DATE: _____

TURN-AROUND TIME: STANDARD RUSH

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. OR GRAB	REMARKS
-3	07-22-14	1445	Sed	2x8oz AG	4°C	207R0001105-01	-3	Comp X	
-7	1445	1445	1x8oz CG	2x8oz AG	207R0001105-02	207R0001105-03	X	X	
-11	1445	1445	1x8oz CG	2x8oz AG	207R0001105-03	207R0001105-04	X	X	
-15	1445	1445	1x8oz CG	2x8oz AG	207R0001105-01	207R0001105-02	X	X	
-14	1445	1445	1x8oz CG	2x8oz AG	207R0001105-03	207R0001105-04	X	X	
-12	1445	1445	1x8oz CG	2x8oz AG	207R0001105-02	207R0001105-03	X	X	
-10	1445	1445	1x8oz CG	2x8oz AG	207R0001105-04	207R0001105-01	X	X	

By submittal of sample(s), client agrees to abide by the Terms and Conditions set forth on the reverse of this document.

RELINQUISHED BY: [Signature] DATE/TIME: 07-22-14 17:55

RECEIVED BY: [Signature] DATE/TIME: _____

TEMP: _____ °C SEALED: Y ___ / N ___ INTACT: Y ___ / N ___

COMMENTS: _____

MATRIX: W = Aqueous Nondrinking Water, Digested Metals; ML = Low R.L.s. Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water, SL = Soil, Sludge, Solid; FP = Free Product

CONTAINER TYPES: AL = Amber Liter; AHL = 500 ml Amber; PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4 oz. BACT; BT = Brass Tube; VOA = 40 mL VOA; OTC = Other Type Container

Appendix I. Field Measurements and Data Sheets

Event Date	Station ID	Station Name	Water Temperature (C)	pH	O₂ (mg/l)	O₂ (%)	Specific Conductivity (µS/cm)
02/06/14	544MSH065	Dry Creek - US	10.64	7.67	10.09	90.8	2.732
02/06/14	544MSH062	Dry Creek - DS	10.55	7.40	10.09	94.3	2.374
02/28/14	207WAL078	Grayson Creek - US	13.50	6.60	9.42	91.2	0.314
02/28/14	207WAL060	Grayson Creek - DS	12.80	7.82	NR	100.9	0.166
02/28/14	544MSH065	Dry Creek - US	13.10	7.84	7.67	NR	NR
02/28/14	544MSH062	Dry Creek - DS	13.10	7.90	8.20	NR	NR
03/26/14	207WAL078	Grayson Creek - US	14.90	7.80	10.66	101.0	0.410
03/26/14	207WAL060	Grayson Creek - DS	15.59	8.20	11.62	116.1	0.294
07/22/14	544MSH065	Dry Creek - US	22.45	7.61	3.75	44.0	1683
07/22/14	544MSH062	Dry Creek - DS	21.66	7.80	5.28	60.6	1592
07/22/14	207WAL078	Grayson Creek - US	25.76	8.46	12.17	NR	1637
07/22/14	207WAL060	Grayson Creek - DS	21.20	8.30	16.60	NR	1219

US = Upstream; DS = Downstream; NR = Not Recorded

1380° ARLINGTON WAY BRENTWOOD,

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) - EventType=WQ					Entered in d-base (initial/date)		Pg of Pgs												
*StationCode: 544R000 25 MS		*Date (mm/dd/yyyy): 02 10 114		*Group: CCCWP - RMC/ADH		*Agency: CCCWP													
*Funding: CCCWP		ArrivalTime: 1230	DepartureTime: 1307	*SampleTime (1st sample): 12:50		*Protocol: RMC													
*ProjectCode: 030-001.0202		*Personnel: L. Paquette, B. Haeger		*Purpose (circle applicable): WaterChem WaterTox Habitat FieldMeas		*PurposeFailure:													
*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS		Lat (dd.ddddd): 37.921507	Long (ddd.ddddd): -121.721746	OCCUPATION METHOD: (Walk-in) Bridge RV Other													
GPS Device: I PHONE		Target: 37.921507 -121.721746		STARTING BANK (facing downstream): LB / RB / NA		Point of Sample (if integrated, then -88 in dbase)													
Datum: NAD83		Accuracy (ft/m):		*Actual: →															
Habitat Observations (CollectionMethod = Habitat_generic)				WADABILITY: Y/N/Unk	BEAUFORT SCALE (see attachment): 2	DISTANCE FROM BANK (m): 1 m		STREAM WIDTH (m): 2 m											
SITE ODOR: (None, Sulfides, Sewage, Petroleum, Smoke, Other)				WIND DIRECTION (from): SW	PRECIPITATION: (None, Fog, Drizzle, Rain, Snow)		WATER DEPTH (m): 30 cm												
SKY CODE: Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy				PRECIPITATION (last 24 hrs): Unknown, <1", >1", None		LOCATION (to sample): US DS WI / NA													
OTHER PRESENCE: (Vascular, Nonvascular, OllySheen, Foam, Trash, Other)				EVIDENCE OF FIRES: No, <1 year, <5 years		PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode): yes													
DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Gravel, Sand, Mud, Unk, Other				PRECIPITATION (last 24 hrs): Unknown, <1", >1", None		1: (RB / LB / BB / US / DS / ##)													
WATERCLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)		PRECIPITATION: (None, Fog, Drizzle, Rain, Snow)		PRECIPITATION (last 24 hrs): Unknown, <1", >1", None		2: (RB / LB / BB / US / DS / ##)													
WATERODOR: (None, Sulfides, Sewage, Petroleum, Mixed, Other)		PRECIPITATION (last 24 hrs): Unknown, <1", >1", None		EVIDENCE OF FIRES: No, <1 year, <5 years		3: (RB / LB / BB / US / DS / ##)													
WATERCOLOR: Colorless, Green, Yellow, Brown		PRECIPITATION (last 24 hrs): Unknown, <1", >1", None		EVIDENCE OF FIRES: No, <1 year, <5 years		3: (RB / LB / BB / US / DS / ##)													
OVERLAND RUNOFF (Last 24 hrs): none, light, moderate / heavy, unknown				PRECIPITATION (last 24 hrs): Unknown, <1", >1", None		3: (RB / LB / BB / US / DS / ##)													
OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs				PRECIPITATION (last 24 hrs): Unknown, <1", >1", None		3: (RB / LB / BB / US / DS / ##)													
Field Measurements (SampleType = FieldMeasure; Method = Field)																			
	Depth Collec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity (µS/cm)	Salinity (ppt)	Turbidity (ntu)									
SUBSURF/MID/BOTTOM/REP	10 cm			10.64	7.67	10.04	90.8	2.732											
SUBSURF/MID/BOTTOM/REP																			
SUBSURF/MID/BOTTOM/REP																			
Instrument:	YSI 556																		
Calib. Date:	2/6/14																		
Samples Taken (# of containers filled) - Method=Water_Grab				Field Dup YES / NO: (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)															
SAMPLE TYPE: Grab / Integrated		COLLECTION DEVICE: Indiv bottle (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other																	
	Depth Collec (m)	Inorganics	Bacteria	Chl a	TSS	SSC	TOC	Total Hg	Dissolved Mercury	Total Metals	Dissolved Metals	Organics	Toxicity	VOCS					
Sub/Surface	10 cm						1	1					TOX	10 x 1 gal					
Sub/Surface																			
COMMENTS: pyrethroid x1 Fipronil + degradates x1 Organochlorine pest x1																			

SWAMP Field Data Sheet (Water Chemistry & Dissolved Probs) - Event type=WO Entered in d-base (initial/date) Pg of Pgs

*StationCode: 544R000 25 D.S *Date (mm/dd/yyyy): 02/06/14 *Group: CCWP - RMC/ADH *Agency: CCWP
 *Funding: CCWP ArrivalTime: 13:12 DepartureTime: 13:50 *SampleTime (1st sample): 13:20 *Protocol: RMC
 *ProjectCode: 030.001.0202 *Personnel: Paquette, Haeger *Purpose (circle applicable): WaterChem WaterTox Habitat FieldMeas *PurposeFailure:
 *Location: Bank Thalweg Midchannel OpenWater *GPS/DGPS Lat (dd°dd'ddd"): _____ Long (ddd°ddd'ddd"): _____ OCCUPATION METHOD: Walk-In Bridge RV _____ Other _____
 GPS Device: I-PHONE *Actual: 37923005 - 121.714414 W STARTING BANK (facing downstream): LB / RB / NA
 Datum: NAD83 Accuracy (ft/m): NA Point of Sample (if Integrated (then BB) (idbase))

Habitat Observations (Collection Method = Habitat general) WADEABILITY: Y N / Unk BEAUFORT SCALE (see attachment): 3 DISTANCE FROM BANK (m): 275 STREAM WIDTH (m): 1.5
 SITE ODOR: None, Sulfides, Sewage, Petroleum, Smoke, Other WIND DIRECTION (from): SW  Aerial Zipline, Other jump culvert LOCATION (to sample): US (DS) WI /
 SKY CODE: Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquicode) 1: (RB / LB / BB / US / DS / ##) yes
 OTHER PRESENCE: Vascular, Nonvascular, Oily Sheen, Foam, Trash, Other 2: (RB / LB / BB / US / DS / ##)
 DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Gravel, Sand, Mud, Unk; Other 3: (RB / LB / BB / US / DS / ##)
 WATER CLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis) * PRECIPITATION: None, Fog, Drizzle, Rain, Snow
 WATER ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other PRECIPITATION (last 24 hrs): Unknown (<1", >1", None)
 WATER COLOR: Colorless, Green, Yellow, Brown EVIDENCE OF FIRES: No, <1 year, <5 years
 OVERLAND RUNOFF (Last 24 hrs): none, light, moderate / heavy, unknown
 OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs

Field Measurements (Sample type = Field Measure; Method = Field)

	Depth Collec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity (µS/cm)	Salinity (ppt)	Turbidity (ntu)
SUBSURF/MID/BOTTOM/REP	<u>0.1</u>			<u>10.55</u>	<u>7.4</u>	<u>10.09</u>	<u>94.3</u>	<u>2.374</u>		
SUBSURF/MID/BOTTOM/REP										
SUBSURF/MID/BOTTOM/REP										
Instrument:	<u>YSI 556</u>									
Calib. Date:	<u>2/6/14</u>									

Samples Taken (# of containers filled) Method = Water Grab Field Dup YES/NO (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)

SAMPLE TYPE: (Grab) Integrated	COLLECTION DEVICE: Indiv bottle (by hand) by pole, by bucket; Teflon tubing; Kemmer; Pole & Beaker; Other												
	Depth Collec (m)	Inorganics	Bacteria	Chlor	TSS/SSC	TOC/DOC	Total Nit	Dissolved Mercury	Total Metals	Dissolved Metals	Organics	Toxicity	VOAs
Sub/Surface	<u>0.1</u>				<u>1</u>	<u>1</u>						<u>10</u>	<u>3</u>
Sub/Surface												<u>x/gal</u>	

COMMENTS: pyrethroids x 1
fipronil + degradates x 1
Organochlorine pest. x 1



SAMPLE CHAIN OF CUSTODY

PAGE 17 OF 27 LAB ORDER #: 1020478
 P.O. # 1020481

CLIENT: ADH Environmental
 ADDRESS: 3065 Porter St CITY: Soquel CA
 BILLING ADDRESS: same

PROJECT # / PROJECT NAME
CCCWP-551D 030,001, 0202

REPORT ATTN: Alessandro Hnatt.
 STATE: CA ZIP: _____

ANALYSES REQUESTED

TOC
Pyrethroids
Fipronil (+ degradation)
organochlorine pesticides
SSC

TURN-AROUND TIME
 STANDARD
 RUSH

DUE DATE: _____

PHONE #: 8314772003 FAX PHONE: _____
 SAMPLER (PRINT & SIGN NAME): Lucile Paquette

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. OR GRAB	REMARKS
-1	2/6/14	13:20	storm water		ice HCl	544 R00025 DS-		grab x	
-2		12:50			ice HCl	544 R00025 US-		x	
-3		13:20			ice	544 R00025 DS-		x	
↓		13:20			ice			x	
142 5 4 2		13:20			ice			x	
		12:50			ice			x	
-4		12:50			ice	544 R00025 US		x	
↓		12:50			ice			x	
↓		12:50			ice			x	
↓		12:50			ice			x	

By submittal of sample(s), client agrees to abide by the Terms and Conditions set forth on the reverse of this document.

RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY
<u>Alessandro Hnatt</u>	<u>2-7-14 6:12</u>	<u>[Signature]</u>			

Samples: WC _____ MICRO _____ BIO _____ MET _____ SV _____ VOA _____ TEMP: _____ °C SEALED: Y / N INTACT: Y / N

FOR LAB USE ONLY

BD: BIO _____ WC _____ MET _____ COMMENTS _____

CC: AA _____ SV _____ VOA _____

SIL: HP _____ PT _____ QT _____ VOA _____

WHNO: _____ H₂SO₄ _____ NaOH _____

PIL: HNO₃ _____ H₂SO₄ _____ NaOH _____ HCL _____

MATRIX: W = Aqueous Nondrinking Water, Digested Metals; ML = Low R.L.s. Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Product

CONTAINER TYPES: AL = Amber Liter; AHL = 500 ml Amber; PT = Pint (Plastic); QT=Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4 oz. BACT; BT = Brass Tube; VOA = 40 mL VOA; OTC = Other Type Container

CALTEST LABS • 1885 N. KELLY ROAD • NAPA, CA 94558 • (707) 258-4000 • FAX (707) 220-1001 • WWW.CALTESTLABS.COM



Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
(707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Client Name: ADH Environmental					REQUESTED ANALYSIS																
Client Address: 3065 Porter St. Suite 101 Soquel CA 95073					Chronic Selenium capricornutum Chronic-Gerodaphnia tabata Chronic Pimephales promelas 10-day Hyalella azteca (water) 10-day Hyalella azteca (sediment)																
Phone: 8314772003 FAX: 8314770895																					
Project Manager: Alessandro Hnatl.																					
Project Name: CCCWP - SSID																					
Project # / P.O. Number: 030.001.0202 (task 2G)																					
Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container																	
				Number	Type																
544R00025 W			STRMW	1	gall. amber	x	x	x	x												
544R00025RS-W-01	2-6-14	20:50		10	gal amber																
544R00025US-W-01	2-6-14	20:50		10	gal amber																
4																					
5																					
6																					
7																					
8																					
9																					
10																					
12																					
Samples collected by:																					
Comments/Special Instruction: Note - Fathead minnow testing is to be performed using the standard EPA protocol (i.e., 4 replicates) Contract # 030.001.0202 SSID Study					RELINQUISHED BY:					RECEIVED BY:											
					Signature: <i>Justin Cecotti</i>					Signature: <i>Marlon Orive</i>											
					Print: <i>Justin Cecotti</i>					Print: <i>Marlon Orive</i>											
					Organization: <i>ADH</i>					Organization: <i>PER</i>											
					Date: <i>2-7-14</i> Time: <i>5:40</i>					Date: <i>02.07.14</i> Time: <i>1740</i>											
					RELINQUISHED BY:					RECEIVED BY:											
					Signature:					Signature:											
					Print:					Print:											
					Organization:					Organization:											
					Date:					Date:											
					Time:					Time:											

*Example Matrix Codes: (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other

SS1D
207R00011 USK

& Not wadeable in storm

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) Event Type=WO				Entered in d-base (Initial/date)		Pg 1 of 1 Pgs						
*Station Code: _____		*Date (mm/dd/yyyy): 2 12 8 14		*Group: ADH		*Agency: CCCWP						
*Funding: CCCWP SS1D		Arrival Time: 9:45	Departure Time: 10:30	*Sample Time (1st sample): 0955		*Protocol: RMC						
*Project Code: 030.001.0202		*Personnel: Sandlin, T. Ohman		*Purpose (circle applicable): (Water Chem) (Water Tox) (Habitat) (Field Meas)		*Purpose Failure: _____						
*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS	Lat (dd.ddddd):	Long (ddd.ddddd):	OCCUPATION METHOD: Walk-in (Bridge) RV _____ Other _____							
GPS Device: LG cell phone		Target:	Actual: 37.95275	- / 122.08150	STARTING BANK (facing downstream): LB / RB / NA							
Datum: NAD83		Accuracy (ft/m):		Point of Sample (if integrated then BB in d-base)								
Habitat Observations (Collection Method = Habitat generic)				WADEABILITY: <input checked="" type="checkbox"/> Y / <input type="checkbox"/> N / <input type="checkbox"/> Unk	BEAUFORT SCALE (see attachment): 0	DISTANCE above FROM CHANNEL BANK (m):	STREAM WIDTH (m): 10					
SITE ODOR: (None) Sulfides, Sewage, Petroleum, Smoke, Other				WIND DIRECTION (from):	PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode):	WATER DEPTH (m): 1.5	LOCATION (to sample): US / DS / WI / MA					
SKY CODE: Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy				OTHER PRESENCE: Vascular, Nonvascular, Oily Sheen, Foam, Trash, Other	PHOTO 1: (RB / LB / BB / US / DS / ##)	PHOTO 2: (RB / LB / BB / US / DS / ##)						
DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Gravel, Sand, Mud, Unk, Other				PRECIPITATION: None, Fog, Drizzle, Rain, Snow	PHOTO 3: (RB / LB / BB / US / DS / ##)							
WATER CLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)				PRECIPITATION (last 24 hrs): Unknown, <1", >1", None								
WATER ODOR: (None) Sulfides, Sewage, Petroleum, Mixed, Other				EVIDENCE OF FIRES: (No, <1 year, <5 years)								
WATER COLOR: Colorless, Green, Yellow, Brown, Turbid				OVERLAND RUNOFF (Last 24 hrs): none, light, moderate / heavy, unknown								
OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, (5-20cfs), 20-50cfs, 50-200cfs, >200cfs												
Field Measurements (Sample Type = Field Measure; Method = Field)												
Depth Collec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity (µS/cm)	Salinity (ppt)	Turbidity (ntu)			
SUBSURF/MID/BOTTOM/REP: 0.2		54	13.5	6.6	9.42	91.2	314					
SUBSURF/MID/BOTTOM/REP:				6.6								
SUBSURF/MID/BOTTOM/REP:												
Instrument: YSI 550												
Calib. Date:												
Samples Taken (# of containers filled) - Method = Water Grab				Field Dup YES / NO: (Sample Type = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)								
SAMPLE TYPE: Grab / Integrated		COLLECTION DEVICE: Indiv bottle (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other										
Depth Collec (m)	Inorganics	Bacteria	Chl a	TSS / SSC	TOC / DOC	Total Hg	Dissolved Mercury	Total Metals	Dissolved Metals	Organics	Toxicity	VOAs
Sub/Surface: 0.2				1	1.3300						10.1 µg/l	
Sub/Surface:												
COMMENTS:												
samples collected at walking bridge btwn Mercury way & Vineyard Dr. top of channel w/ grab pole												

channel 20' top width
8' bottom width

Tributary of Grayson

organochlorine pesticides (x2)
Pyrethroid Pesticides, Fipif Degradates (x2)

E. Branch Grayson
207R00011 P5A

SSID 11DS

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) Event Type=Wo				Entered in d-base (initial/date)		Pg of Pgs								
*Station Code: _____		*Date (mm/dd/yyyy): 02 12 8 114		*Group: CCCCWP		*Agency: CCCCWP								
*Funding: CCCCWP		Arrival Time: 0830	Departure Time: _____	*Sample Time (1st sample): 0845		*Protocol: BWC								
*Project Code: 030001-0202		*Personnel: Sandra J. Thomas		*Purpose (circle applicable): WaterChem WaterTox Habitat Field Meas		*Purpose Failure: _____								
*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS	Lat (dd:ddddd)	Long (ddd:ddddd)	OCCUPATION METHOD: Walk-in Bridge R/V _____ Other _____									
GPS Device: LG Verizon Phone		Target: 3	Actual: 37.95826	-122.06645	STARTING BANK (facing downstream): LB / RB / NA									
Datum: NAD83		Accuracy (ft/m): 10ft		Point of Sample (if integrated, then #88 in dbase)										
Habitat Observations (Collection Method = Habitat generic)				WADEABILITY: Y / N / Unk	BEAUFORT SCALE (see attachment): 0	DISTANCE FROM BANK (m): 2m LB	STREAM WIDTH (m): 20							
SITE ODOR: (None) Sulfides, Sewage, Petroleum, Smoke, Other				WIND DIRECTION (from): NO	Aerial Zipline, Other	WATER DEPTH (m): 2'								
SKY CODE: Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy				PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode)	LOCATION (to sample): US / DS / WI / NA									
OTHER PRESENCE: Vascular, Nonvascular, Oily Sheen, Foam, Trash, Other				1: (RB / LB / BB / US / DS / #)										
DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Gravel, Sand, Mud, Unk, Other NOT in stream				down ramp										
WATER CLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)				PRECIPITATION: None, Fog, Drizzle, Rain, Snow		2: (RB / LB / BB / US / DS / #)								
WATER ODOR: (None) Sulfides, Sewage, Petroleum, Mixed, Other				PRECIPITATION (last 24 hrs): Unknown, <1", >1", None										
WATER COLOR: Colorless, Green, Yellow, Brown turbid				EVIDENCE OF FIRES: (No, <1 year, <5 years)		3: (RB / LB / BB / US / DS / #)								
OVERLAND RUNOFF (Last 24 hrs): none, light, moderate / heavy, unknown														
OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs														
Field Measurements (Sample Type = Field Measure, Method = Field)														
	Depth Collec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity (µS/cm)	Salinity (ppt)	Turbidity (ntu)				
SUBSURF/MID/BOTTOM/REP	0-3			12.77	7.82		100.9	0.166						
SUBSURF/MID/BOTTOM/REP														
SUBSURF/MID/BOTTOM/REP														
Instrument:	YSI 956													
Calib. Date:	2/27/14													
Samples Taken (# of containers filled) - Method=Water Grab				Field Dup YES / NO: (Sample Type = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)										
SAMPLE TYPE: Grab / Integrated		COLLECTION DEVICE: Individ bottle (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other												
	Depth Collec (m)	Inorganics	Bacteria	Chl a	TSS / SSC	TOC / DOC	Total Hg	Dissolved Mercury	Total Metals	Dissolved Metals	Organics	Toxicity	VOAs	
Sub/Surface	0-3				1	1x3vol								
Sub/Surface													10 x 1 Gal	
COMMENTS: sampled w/pole from Ant. H. ST FC channel ramp														

of organochlorine pesticides (x2)
Pyrethroid Pesticides, Fipronil, Degradates (x2)



1885 N. KELLY ROAD NAPA, CA 94558 (707) 258-4000 FAX (707) 226-1001

PAGE _____ OF _____

CHAIN OF CUSTODY

PROJECT NAME / PROJECT NUMBER: **CCCWP-SSID / 030.001.0202** P.O. NUMBER: _____ LAB ORDER # _____

CLIENT: **ADH Environmental** REPORT ATTN: **Alessandro Hnatt** ANALYSES REQUESTED: _____
 MAILING ADDRESS: **3065 Porter St., Suite 101, Soquel** STATE: **CA** ZIP: **95073**
 BILLING ADDRESS: **same as above** ATTN: **Alessandro Hnatt**
 PHONE NUMBER: **831-477-2003** FAX PHONE NUMBER: **831-477-0895** SAMPLER (PRINT & SIGN NAME): _____

TURN-AROUND TIME
 STANDARD
 RUSH
 DUE DATE: _____
 REMARKS

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX*	CONTAINER TYPE/ AMOUNT**	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GRAB	Organochlorine Pesticides	Pyrethroids Pesticides	Fipronil	Degradates	TOC	SSC	REMARKS
	2-28-14	0845	Strmwtr	2 x 1L AG	<6C	207R00011DS-W-01		Grab	x						
			Strmwtr	2 x 1L AG	<6C	207R00011DS-W-01		Grab		x	x	x			
			Strmwtr	3 x 40ml VOA	<6C, HCl	207R00011DS-W-01		Grab					x		
			Strmwtr	250 ml HDPE	<6C	207R00011DS-W-01		Grab						x	
		0955	Strmwtr	2 x 1L AG	<6C	207R00011US-W-01		Grab	x						
			Strmwtr	2 x 1L AG	<6C	207R00011US-W-01		Grab		x	x	x			
			Strmwtr	3 x 40ml VOA	<6C, HCl	207R00011US-W-01		Grab					x		
			Strmwtr	250 ml HDPE	<6C	207R00011US-W-01		Grab						x	

RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY

FOR LAB USE ONLY

Samples: WC MICRO BIO AA SV VOA pH? Y/N TEMP: SEALED: Y/N INTACT: Y/N

BD: BIO WC AA COMMENTS:

CC: AA SV VOA

SIL: HP PT QT VOA

W/HNO₃ H₂SO₄ NaOH

PIL: HNO₃ H₂SO₄ NaOH HCL

*MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.s, Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil Sludge, Solid; FP =

**CONTAINER TYPES: AL = Amber Liter; AHL = 500 ml Amber; PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4oz. BACT; BT = Brass Tube; VOA = 40ml VOA; OTC - Other Type Container

R PR M F

WHITE - LABORATORY YELLOW - CLIENT COPY TO ACCOMPANY FINAL REPORT PINK - CLIENT COPY AS RECEIPT




Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
 (707) 207-7760 FAX (707) 207-7916


CHAIN-OF-CUSTODY RECORD

Client Name: ADH Environmental				REQUESTED ANALYSIS																		
Client Address: 3065 Porter Street, Suite 101 Soquel, CA 95073				Chronic Selenastrum capricornutum Chronic Ceriodaphnia dubia Chronic Pimephales promelas 10-day Hyalella azteca (water) 10-day Hyalella azteca (sediment)																		
Phone: 831 477-2003 FAX:																						
Project Manager: Alessandro Hnatt																						
Project Name: CCCWP - SSID																						
Project # / P.O. Number: 030.001.0202																						
Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container																		
				Number	Type																	
1 207R00011DS-W-01	2-28-14	0845	STRMW	10	3.7L glass																	
2 207R00011US-W-01	2-28-14	0955	STRMW	10	3.7L glass																	
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
12																						
Samples collected by: Calvin Sandlin																						
Comments/Special Instruction:				RELINQUISHED BY:								RECEIVED BY:										
				Signature: Calvin Sandlin				Signature: [Signature]				Signature: [Signature]				Signature: [Signature]						
				Print: Calvin Sandlin				Print: [Print]				Print: V. Khadiryeva				Print: [Print]						
				Organization: ADH				Organization: [Org]				Organization: PER				Organization: [Org]						
				Date: 2-28-14 Time: 1143				Date: 2-28-14 Time: 1143				Date: 2-28-14 Time: 1143				Date: 2-28-14 Time: 1143						
				RELINQUISHED BY:								RECEIVED BY:										
				Signature:				Signature:				Signature:				Signature:						
				Print:				Print:				Print:				Print:						
				Organization:				Organization:				Organization:				Organization:						
				Date:				Time:				Date:				Time:						

*Example Matrix Codes: (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) - EventType=WQ						Entered in d-base (initial/date) <u>AW, MA, MA</u>		Pg of Pgs					
*StationCode: <u>544R00025-45-WQ</u>		*Date (mm/dd/yyyy): <u>02/28/14</u>		*Group: <u>CCCWP-ADH</u>		*Agency: <u>CCCWP</u>							
*Funding: <u>CCCWP</u>		ArrivalTime: <u>0955</u>	DepartureTime: <u>1030</u>	*SampleTime (1st sample): <u>1000</u>		*Protocol: <u>RMC</u>							
*ProjectCode: <u>030.001.0202</u>		*Personnel: <u>AW, MA</u>		*Purpose (circle applicable): <u>WaterChem</u> WaterTox Habitat FieldMeas		*PurposeFailure:							
*Location: Bank Thalweg <u>Midchannel</u> OpenWater		*GPS/DGPS	Lat (dd:ddddd)	Long (ddd:ddddd)	OCCUPATION METHOD: <u>Walk-in</u> Bridge R/V Other								
GPS Device: <u>iPhone</u>		Target: <u>37.92157</u>	- <u>-121.72174</u>	STARTING BANK (facing downstream): <u>LB</u> / RB / NA									
Datum: NAD83	Accuracy (ft/m):	*Actual:	-	Point of Sample (if integrated, then -88 in dbase)									
Habitat Observations (CollectionMethod = Habitat_generic)				WADEABILITY: <u>Y</u> N / Unk	BEAUFORT SCALE (see attachment): <u>1</u>	DISTANCE FROM BANK (m): <u>1m</u>	STREAM WIDTH (m): <u>108"</u>						
SITE ODOR: None, Sulfides, <u>Sewage</u> , Petroleum, Smoke, Other		WIND DIRECTION (from): <u>S</u>		FURTHER DOWNSTREAM LOCATION: None, bridge, Pipes, Concrete channel, Grade control, Culvert, Aerial Zipline, Other	LOCATION (to sample): <u>US/DS/WI</u>								
SKY CODE: Clear, <u>Partly Cloudy</u> , Overcast, Fog, Smoky, Hazy		OTHER PRESENCE: Vascular, <u>Nonvascular</u> , Oily Sheen, <u>Foam</u> , Trash, Other	DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Gravel, Sand, <u>Mud</u> , Unk, Other	PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode): <u>Yes</u>	1: (RB / LB / BB / US / DS / ##)								
WATERCLARITY: Clear (see bottom), Cloudy (>4" vis), <u>Murky (<4" vis)</u>		PRECIPITATION: <u>None</u> , Fog, Drizzle, Rain, Snow	2: (RB / LB / BB / US / DS) ##										
WATERODOR: None, Sulfides, <u>Sewage</u> , Petroleum, Mixed, Other		PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	3: (RB / LB / BB / US / DS) ##										
WATERCOLOR: Colorless, Green, Yellow, <u>Brown</u>		EVIDENCE OF FIRES: <u>No</u> <1 year, <5 years											
OVERLAND RUNOFF (Last 24 hrs): none, light, <u>moderate / heavy</u> , unknown													
OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, <u>1-5cfs</u> , 5-20cfs, 20-50cfs, 50-200cfs, >200cfs													
Field Measurements (SampleType = FieldMeasure; Method = Field)													
	Depth Collec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity (µS/cm)	Salinity (ppt)	Turbidity (ntu)			
SUBSURF/MID/BOTTOM/REP	<u>10cm</u>			<u>13.1°</u>	<u>7.84</u>	<u>7.67</u>							
SUBSURF/MID/BOTTOM/REP													
SUBSURF/MID/BOTTOM/REP													
Instrument:													
Calib. Date:													
Samples Taken (# of containers filled) - Method=Water Grab				Field Dup YES (NO) (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)									
SAMPLE TYPE: <u>Grab</u> / Integrated		COLLECTION DEVICE: Individ bottle <u>by hand</u> , by pole, by bucket; Teflon tubing; Kemmer; Pole & Beaker; Other											
	Depth Collec (m)	Inorganics	Bacteria	Chl-a	TSS / SSC	TOC / DOC	Total Hg	Dissolved Mercury	Total Metals	Dissolved Metals	Organics	Toxicity	VOAs
Sub/Surface	<u>1</u>				<u>1</u>	<u>1</u>						<u>109 AW</u>	
Sub/Surface												<u>Xigal</u>	
COMMENTS: <u>Water levels consistent through sampling. No Rain. collected up stream from the culvert that goes under the road. Approached from the LB looking down stream. Samples put on ice immediately.</u>													

collected pyrethroids, fipronil + degradates, organochlorine pesticides

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) - EventType=WQ					Entered in d-base (initial/date) <u>AW, MA 2-28-14</u>		Pg of Pgs										
*StationCode: <u>544R00025DS-W-02</u>			*Date (mm/dd/yyyy): <u>02 / 28 / 2014</u>		*Group: <u>CCCWP-ADH</u>		*Agency: <u>CCCWP</u>										
*Funding: <u>CCCWP</u>			ArrivalTime: <u>9:20 am</u>	DepartureTime: <u>9:50</u>	*SampleTime (1st sample): <u>9:30</u>		*Protocol: <u>RMC</u>										
*ProjectCode: <u>030.001.0202</u>			*Personnel: <u>MA, AW</u>		*Purpose (circle applicable): <u>WaterChem</u> WaterTox Habitat FieldMeas		*PurposeFailure:										
*Location: Bank Thalweg <u>Midchannel</u> OpenWater			*GPS/DGPS	Lat (dd:ddddd)	Long (ddd.ddddd)	OCCUPATION METHOD: <u>Walk-in</u> Bridge R/V Other											
GPS Device: <u>iPhone</u>			Target: <u>37.923005</u>	<u>-121.714414</u>	STARTING BANK (facing downstream): <u>LB</u> / RB / NA			Point of Sample (if integrated / then -88 in dbase)									
Datum: NAD83		Accuracy (ft / m):	*Actual:														
Habitat Observations (CollectionMethod = Habitat_generic)				WADEABILITY: <u>Y</u> N / Unk	BEAUFORT SCALE (see attachment): <u>1</u>	DISTANCE FROM BANK (m): <u>1m</u>	STREAM WIDTH (m): <u>116"</u>										
SITE ODOR: None, Sulfides, <u>Sewage</u> , Petroleum, Smoke, Other				WIND DIRECTION (from): <u>S</u>		Aerial Zipline, Other	WATER DEPTH (m): <u>16"</u>										
SKY CODE: Clear, <u>Partly Cloudy</u> , Overcast, Fog, Smoky, Hazy				PRECIPITATION: <u>None</u> , Fog, Drizzle, Rain, Snow	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode): <u>Yes</u>	LOCATION (to sample): US / DS / WI / MA										
OTHER PRESENCE: Vascular, Nonvascular, Oily Sheen, <u>Foam</u> , Trash, Other				DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Gravel, Sand, <u>Mud</u> , Unk, Other <u>rocks</u>	EVIDENCE OF FIRES: <u>No</u> , <1 year, <5 years	1: (RB / LB / BB / US / DS / ##)											
WATER CLARITY: Clear (see bottom), Cloudy (>4" vis), <u>Murky</u> (<4" vis)				2: (RB / LB / BB / US / DS / ##)	3: (RB / LB / BB / US / DS / ##)												
WATER ODOR: None, Sulfides, <u>Sewage</u> , Petroleum, Mixed, Other				OVERLAND RUNOFF (Last 24 hrs): none, light, <u>moderate</u> / heavy, unknown	OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, <u>1-5cfs</u> , 5-20cfs, 20-50cfs, 50-200cfs, >200cfs												
WATER COLOR: Colorless, Green, Yellow, <u>Brown</u>				Field Measurements (SampleType = FieldMeasure; Method = Field)													
	Depth Collec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity (µS/cm)	Salinity (ppt)	Turbidity (ntu)							
SUBSURF/MID/BOTTOM/REP	<u>10cm</u>			<u>13.1</u>	<u>7.9</u>	<u>8.2</u>											
SUBSURF/MID/BOTTOM/REP																	
SUBSURF/MID/BOTTOM/REP																	
Instrument:																	
Calib. Date:																	
Samples Taken (# of containers filled) - Method=Water_Grab				Field Dup YES / NO (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)													
SAMPLE TYPE: <u>Grab</u> / Integrated		COLLECTION DEVICE: <u>Indiv bottle (by hand) by pole, by bucket</u> ; Teflon tubing; Kemmer; Pole & Beaker; Other															
	Depth Collec (m)	Inorganics	Bacteria	Chl a	TSS / SSC	TOC / DOC	Total Hg	Dissolved Mercury	Total Metals	Dissolved Metals	Organics	Toxicity	VOAs				
Sub/Surface	<u>0.1m</u>				<u>1</u>	<u>1</u>						<u>10</u>					
Sub/Surface												<u>X 1gal</u>					
COMMENTS: <u>No rain while sampling. Water level maintained it's high and width. Samples taken from the LB looking down stream, above the control channel. samples put on ice immediately.</u>																	

collected Pyrethroids, F. pronil + Degradates, Organochlorine Pesticides



1885 N. KELLY ROAD NAPA, CA 94558 (707) 258-4000 FAX (707) 226-1001

PAGE _____ OF _____

CHAIN OF CUSTODY

PROJECT NAME / PROJECT NUMBER:
CCCWP-SSID / 030.001.0202

P.O. NUMBER

LAB ORDER #

CLIENT:

ADH Environmental

REPORT ATTN:

Alessandro Hnatt

ANALYSES REQUESTED

MAILING ADDRESS:

3065 Porter St., Suite 101, Soquel

STATE:

ZIP

CA

95073

BILLING ADDRESS:

same as above

ATTN:

Alessandro Hnatt

PHONE NUMBER:

831-477-2003

FAX PHONE NUMBER:

831-477-0895

SAMPLER (PRINT & SIGN NAME):

Organochlorine Pesticides
Pyrethroids Pesticides
Fipronil
Degradates
TOC
SSC

TURN-AROUND TIME

STANDARD

RUSH

DUE DATE:

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX*	CONTAINER TYPE/ AMOUNT**	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP or GRAB	Organochlorine Pesticides	Pyrethroids Pesticides	Fipronil	Degradates	TOC	SSC	REMARKS	
	2/28/14	1000	Strmwtr	2 x 1L AG	<6C	544R00025 JS-W-02		Grab	x							
			Strmwtr	2 x 1L AG	<6C	↓		Grab	x	x	x					
			Strmwtr	3 x 40ml VOA	<6C, HCl			Grab					x			
			Strmwtr	250 ml HDPE	<6C			Grab						x		
	2/28/14	0930	Strmwtr	2 x 1L AG	<6C	544R00025 JS-W-02		Grab	x							
			Strmwtr	2 x 1L AG	<6C	↓		Grab	x	x	x					
			Strmwtr	3 x 40ml VOA	<6C, HCl			Grab					x			
			Strmwtr	250 ml HDPE	<6C			Grab						x		

RELINQUISHED BY

DATE/TIME

RECEIVED BY

RELINQUISHED BY

DATE/TIME

RECEIVED BY

FOR LAB USE ONLY

Samples WC MICRO BIO AA SV VOA pH? Y/N TEMP: SEALED: Y/N INTACT: Y/N

BD	BIO	WC	AA											
CC	AA	SV	VOA											
SIL	HP	PT	QT	VOA										
	W/HNO ₃	H ₂ SO ₄	NaOH											
PIL	HNO ₃	H ₂ SO ₄	NaOH			HCL								

COMMENTS:

*MATRIX: AD = Aqueous Nondrinking Water
Digested Metals. FE = Low R.L.s. Aqueous
Nondrinking Water. Digested Metals. DW =
Drinking Water. SL = Soil Sludge. Solid. FP =

**CONTAINER TYPES: AL = Amber Litr. AHL =
500 ml Amber. PT = Pint (Plastic). QT = Quart
(Plastic). HG = Half Gallon (Plastic). SJ = Soil Jar
B4 = 4oz BACT. BT = Brass Tube. VOA = 40ml
VOA. OTC = Other Type Container

R _____ PR _____ M _____ F _____

WHITE LABORATORY - YELLOW CLIENT - GOV TO ACCOMPANY FINAL REPORT - PINK CLIENT COPY AS RECEIPT



Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
 (707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Client Name: ADH Environmental				REQUESTED ANALYSIS																		
Client Address:				Chronic Selenastrum capricornutum	Chronic Ceriodaphnia dubia	Chronic Pimephales promelas	10-day Survival Hyalella azteca (water)	10-day Hyalella azteca (sediment)														
Phone: FAX:																						
Project Manager:																						
Project Name: CCCWP-SSI																						
Project # / P.O. Number: 030.001.0202																						
Samples collected by:																						
Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container																		
				Number	Type																	
1 544R00025DS-W-02	2-28-14	0930	STRMW	10	1 gall. amber																	
2 544R00025US-W-02	2-28-14	1000	STRMW	19 AW	1 gal amber																	
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
12																						
Comments/Special Instruction: Note - Fathead minnow testing is to be performed using the standard EPA protocol (i.e., 4 replicates) contract # 030.001.0202 SSID study task 2y				RELINQUISHED BY:				RECEIVED BY:														
				Signature: Adam Wainscoat				Signature: [Signature]														
				Print: Adam Wainscoat				Print: C. Glower														
				Organization:				Organization: PED														
				Date: 2-28-14 Time: 1520				Date: 2/28/14 Time: 1520														
RELINQUISHED BY:				RECEIVED BY:																		
Signature:				Signature:																		
Print:				Print:																		
Organization:				Organization:																		
Date:				Date:																		
Time:				Time:																		

*Example Matrix Codes: (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other

VS

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) - Event Type=WQ				Entered in d-base (initial/date)		Pg 1 of 1 Pgs							
*StationCode: 207R0001103		*Date (mm/dd/yyyy): 03/25/14		*Group: ADH		*Agency: CCCWP							
*Funding: CCCWPSSFD		ArrivalTime: 12:00		DepartureTime: 13:25		*SampleTime (1st sample): 1240							
*ProjectCode: 030.001.0202		*Personnel: C. Sandia LA Dwyer		*Purpose (circle applicable): Water Chem Water Tox Habitat Field Meas		*Purpose Failure:							
*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS		Lat (dd/ddddd)		Long (ddd/ddddd)							
GPS Device: LG Cell Phone		Target:		-		OCCUPATION METHOD: Walk-in <u>Bridge</u> RV _____ Other _____							
Datum: NAD83		Accuracy (ft/m):		*Actual: 37.95275		- 122.08150							
Habitat Observations (Collection Method = Habitat generic)				-WADEABILITY: Y / (N) / Unk		BEAUFORT SCALE (see attachment): 0							
SITE ODOR: <u>None</u> , Sulfides, Sewage, Petroleum, Smoke, Other				WIND DIRECTION (from):		DISTANCE FROM BANK (m): <u>above channel</u>							
SKY CODE: <u>Clear, Partly Cloudy</u> , Overcast, Fog, Smoky, Hazy				WIND DIRECTION (from):		STREAM WIDTH (m): <u>8m</u>							
OTHER PRESENCE: <u>Vascular, Nonvascular, Oily Sheen, Foam, Trash, Other</u>				WIND DIRECTION (from):		WATER DEPTH (m): <u>1.0m</u>							
DOMINANT SUBSTRATE: <u>Bedrock, Concrete</u> , Cobble, Gravel, Sand, Mud, Unk, Other				WIND DIRECTION (from):		PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode)							
WATER CLARITY: <u>Clear</u> (see bottom), Cloudy (>4" vis), Murky (<4" vis)				PRECIPITATION: <u>None</u> , Fog, Drizzle, <u>Rain</u> , Snow		2: (RB / LB / BB / US / DS / #)							
WATER ODOR: <u>None</u> , Sulfides, Sewage, Petroleum, Mixed, Other				PRECIPITATION (last 24 hrs): <u>Unknown (<1")</u> , >1", None		3: (RB / LB / BB / US / DS / #)							
WATER COLOR: <u>Colorless</u> , Green, Yellow, Brown <u>4</u>				EVIDENCE OF FIRES: <u>No</u> , <1 year, <5 years									
OVERLAND RUNOFF (Last 24 hrs): <u>none</u> , <u>light</u> , moderate / heavy, unknown				OBSERVED FLOW: <u>NA</u> , Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, <u>5-20cfs</u> , 20-50cfs, 50-200cfs, >200cfs									
Field Measurements (Sample Type = Field Measure; Method = Field)													
	Depth Collec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity (µS/cm)	Salinity (ppt)	Turbidity (ntu)			
SUBSURF/MID/BOTTOM/REP	<u>0.2</u>	<u>1.1</u>	<u>SS</u>	<u>14.9</u>	<u>7.8</u>	<u>10.66</u>	<u>101</u>	<u>.410</u>	<u>.2</u>				
SUBSURF/MID/BOTTOM/REP													
SUBSURF/MID/BOTTOM/REP													
Instrument:													
Calib. Date:													
Samples Taken (# of containers filled): Method = Water Grab				Field Dup YES / NO: (Sample Type = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)									
SAMPLE TYPE: <u>Grab / Integrated</u>		COLLECTION DEVICE: <u>Indiv bottle, (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other</u>											
	Depth Collec (m)	Inorganics	Bacteria	Chl a	TSS / SSC	TOC / DOC	Total Hg	Dissolved Mercury	Total Metals	Dissolved Metals	Organics	Toxicity	VOAs
Sub/Surface	<u>0.2</u>					<u>1.3</u>					<u>4</u>	<u>10x1gal</u>	
Sub/Surface													
COMMENTS: <u>Samples collected e walking bridge between mercury way & vineyard top of channel with Grab pole</u>													

20' top width
8' to the water

Trib of Grayen

organochlorine pesticides (2x)
Pyrethroid Pesticides, FIP, Degradates (2x)

E Branch
SS10 IIDS, Grayson @ Ardith

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) - EventType=WQ					Entered in d-base (initial/date)			Pg 1 of 1 Pgs					
*StationCode: 207R500 IIDS		*Date (mm/dd/yyyy): 3/26/14		*Group: ADH			*Agency: CCCWP						
*Funding: CCCWP SS10		ArrivalTime: 13:45	DepartureTime: 14:30	*SampleTime (1st sample): 14:00			*Protocol: RMC						
*ProjectCode: 030.006.0202		*Personnel: C. Sandlin, L. Aldi		*Purpose (circle applicable): <input checked="" type="checkbox"/> WaterChem <input type="checkbox"/> WaterTox <input type="checkbox"/> Habitat <input type="checkbox"/> FieldMeas			*PurposeFailure:						
*Location: Bank Thalweg <input type="checkbox"/> Midchannel <input checked="" type="checkbox"/> OpenWater		*GPS/DGPS		Lat (dd.dddddd)		Long (ddd.ddddd)		OCCUPATION METHOD: <input checked="" type="checkbox"/> Walk-in <input type="checkbox"/> Bridge <input type="checkbox"/> RV <input type="checkbox"/> Other					
GPS Device: iPhone GPS location app		Target:		-		STARTING BANK (facing downstream): <input checked="" type="checkbox"/> LB / <input type="checkbox"/> RB / <input type="checkbox"/> NA							
Datum: NAD83		Accuracy (ft / m):		*Actual: 37.95995		-122.07304		Point of Sample (if Integrated, then -88 in dbase)					
Habitat Observations (CollectionMethod = Habitat_generic)				WADEABILITY: <input checked="" type="checkbox"/> N / <input type="checkbox"/> Unk	BEAUFORT SCALE (see attachment): 2	DISTANCE FROM BANK (m): 3m		STREAM WIDTH (m):					
SITE ODOR: <input checked="" type="checkbox"/> None <input type="checkbox"/> Sulfides, Sewage, Petroleum, Smoke, Other				WIND DIRECTION (from):		CROSS SECTION LOCATION: <input type="checkbox"/> None, <input type="checkbox"/> Bridge, <input type="checkbox"/> Pipes, <input type="checkbox"/> Concrete Channel, <input type="checkbox"/> Grade Control, <input type="checkbox"/> Culvert, <input type="checkbox"/> Aerial Zipline, Other		WATER DEPTH (m): 0.3					
SKY CODE: Clear, <input checked="" type="checkbox"/> Partly Cloudy, <input type="checkbox"/> Overcast, <input type="checkbox"/> Fog, <input type="checkbox"/> Smoky, <input type="checkbox"/> Hazy				PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode)	1: (RB / LB) / BB / US / DS / ##								
OTHER PRESENCE: Vascular, Nonvascular, Oily Sheen, Foam, Trash, Other <input checked="" type="checkbox"/> leg				2: (RB / LB) / BB / US / DS / ##									
DOMINANT SUBSTRATE: Bedrock, <input checked="" type="checkbox"/> Concrete, <input type="checkbox"/> Cobble, <input type="checkbox"/> Gravel, <input type="checkbox"/> Sand, <input type="checkbox"/> Mud, <input type="checkbox"/> Unk, Other				3: (RB / LB) / BB / US / DS / ##									
WATER CLARITY: Clear (see bottom), <input checked="" type="checkbox"/> Cloudy (>4" vis), <input type="checkbox"/> Murky (<4" vis)				PRECIPITATION: None, <input checked="" type="checkbox"/> Fog, <input type="checkbox"/> Drizzle, <input type="checkbox"/> Rain, <input type="checkbox"/> Snow									
WATER ODOR: <input checked="" type="checkbox"/> None <input type="checkbox"/> Sulfides, Sewage, Petroleum, Mixed, Other				PRECIPITATION (last 24 hrs): Unknown, <input checked="" type="checkbox"/> <1", <input type="checkbox"/> >1", <input type="checkbox"/> None									
WATER COLOR: Colorless, <input checked="" type="checkbox"/> Green, <input type="checkbox"/> Yellow, <input type="checkbox"/> Brown				EVIDENCE OF FIRES: <input checked="" type="checkbox"/> No, <input type="checkbox"/> <1 year, <input type="checkbox"/> <5 years									
OVERLAND RUNOFF (Last 24 hrs): none, <input checked="" type="checkbox"/> light, <input type="checkbox"/> moderate / heavy, <input type="checkbox"/> unknown													
OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), <input checked="" type="checkbox"/> 0.1-1cfs, <input type="checkbox"/> 1-5cfs, <input type="checkbox"/> 5-20cfs, <input type="checkbox"/> 20-50cfs, <input type="checkbox"/> 50-200cfs, <input type="checkbox"/> >200cfs													
Field Measurements (SampleType = FieldMeasure; Method = Field)													
	Depth Collec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity (µS/cm)	Salinity (ppt)	Turbidity (ntu)			
SUBSURF/MID/BOTTOM/REP	25	1.4	60	15.59	8.2	11.62	116.1	0.295	0.14				
SUBSURF/MID/BOTTOM/REP													
SUBSURF/MID/BOTTOM/REP													
Instrument:													
Calib. Date:													
Samples Taken (# of containers filled) - Method=Water Grab					Field Dup YES (NO) (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)								
SAMPLE TYPE: <input checked="" type="checkbox"/> Grab / <input type="checkbox"/> Integrated		COLLECTION DEVICE:			Indiv bottle (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other								
	Depth Collec (m)	Inorganics	Bacteria	Chl a	TSS (SSC)	DOC	Total Hg	Dissolved Mercury	Total Metals	Dissolved Metals	Organics	Toxicity	VOAs
Sub/Surface	02				1	1					4	1	
Sub/Surface					250 ml	3 x 40						10 x 1 gal	
COMMENTS:													
Samples from mid stream by hand													

Organochlorine Pesticides (x2)
Pyrethroid Pesticides, Fipronil, Bejradakas (x2)



1885 N. KELLY ROAD NAPA, CA 94558 (707) 258-4000 FAX (707) 226-1001

PAGE _____ OF _____

CHAIN OF CUSTODY

CLIENT: ADH Environmental		REPORT ATTN: Alessandro Hnatt	P.O. NUMBER	LAB ORDER # P031834
PROJECT NAME / PROJECT NUMBER: CCCWP-SSID / 030.001.0202				
MAILING ADDRESS: 3065 Porter St., Suite 101, Soquel		STATE: CA	ZIP: 95073	
BILLING ADDRESS: same as above		ATTN: Alessandro Hnatt		
PHONE NUMBER: 831-477-2003	FAX PHONE NUMBER: 831-477-0895	SAMPLER (PRINT & SIGN NAME):		

CALTEST LAB #	DATE SAMPLED	TIME SAMPLED	SAMPLE MATRIX*	CONTAINER TYPE/ AMOUNT**	PRESERVATIVE	SAMPLE IDENTIFICATION / SITE	CLIENT LAB #	COMP. or GRAB	ANALYSES REQUESTED					REMARKS	
									Organochlorine Pesticides	Pyrethroids Pesticides	Fipronil	Degradates	TOC		SSC
	3-26-14	14:00 (KL)	Strmwtr	2 x 1L AG	<6C	207R00011DS-W-01		Grab	x						
			Strmwtr	2 x 1L AG	<6C	207R00011DS-W-02		Grab		x	x	x			
			Strmwtr	3 x 40ml VOA	<6C, HCl	207R00011DS-W-02		Grab					x		
			Strmwtr	250 ml HDPE	<6C	207R00011DS-W-01		Grab						x	
		12:40 (KL)	Strmwtr	2 x 1L AG	<6C	207R00011US-W-01		Grab	x						
			Strmwtr	2 x 1L AG	<6C	207R00011US-W-01		Grab		x	x	x			
			Strmwtr	3 x 40ml VOA	<6C, HCl	207R00011US-W-01		Grab					x		
			Strmwtr	250 ml HDPE	<6C	207R00011US-W-01		Grab						x	
<i>1 glass Carboy</i>															
RELINQUISHED BY: <i>[Signature]</i>				DATE/TIME: 3/26/14		RECEIVED BY: <i>[Signature]</i>				RELINQUISHED BY:		DATE/TIME:		RECEIVED BY:	

FOR LAB USE ONLY	Samples: WC MICRO BIC AA SV VOA pH? Y/N TEMP: SEALED: Y/N INTACT: Y/N	*MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.s, Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil Sludge, Solid; FP =
	BD: BIO WC AA	**CONTAINER TYPES: AL = Amber Liter; AHL = 500 ml Amber; PT = Pint (Plastic); QT = Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4oz. BACT; BT = Brass Tube; VOA = 40ml VOA; OTC - Other Type Container
	CC: AA SV VOA	
	SIL: HP PT QT VOA	
	W/HNO ₃ H ₂ SO ₄ NaOH	
PIL: HNO ₃ H ₂ SO ₄ NaOH HCL		

WHITE LABORATORY YELLOW - CLIENT COPY TO ACCOMPANY FINAL REPORT PINK - CLIENT COPY AS RECEIPT



Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
(707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Client Name:				REQUESTED ANALYSIS											
Client Address:				Chronic Selenastrum capricornutum Chronic Ceriodaphnia dubia Chronic Pimephales promelas 10-day Survival Hyalella azteca (water) 10-day Hyalella azteca (sediment)											
Phone:															
Project Manager:															
Project Name:															
Project # / P.O. Number:															
Client Sample ID		Sample Date	Sample Time	Sample Matrix*	Container										
					Number	Type									
1	207R0001105-W-02		3-26-14	1600	STRMW	10	1 gall. amber								
2	207R0001105-W-01		3-26-14	1600	STRMW	10	1 gal Amber								
3															
4															
5															
6															
7															
8															
9															
10															
12															

Samples collected by:

Comments/Special Instruction: Note - Fathead minnow testing is to be performed using the standard EPA protocol (i.e., 4 replicates)	RELINQUISHED BY:		RECEIVED BY:				
	Signature: <i>[Signature]</i>		Signature: <i>[Signature]</i>				
	Print: LUCAS ALDINGER		Print: Y. Khadiyeva				
	Organization: TDOT		Organization: PER				
Date: 3-26-14		Time: 16:00		Date: 3/26/14		Time: 1600	
RELINQUISHED BY:		RECEIVED BY:					
Signature:		Signature:					
Print:		Print:					
Organization:		Organization:					
Date:		Time:		Date:		Time:	

*Example Matrix Codes: (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other


*New station code 544MS4062

Down stream location near 1007 Crescent Dr., Brentwood

SWAMP Field Data Sheet (Sediment Chemistry) - EventType=WQ					Entered in d-base (initial/date)			Pg 1 of 2 Pgs					
*StationID: 544R00025		*Date (mm/dd/yyyy): 07/22/2014		*Group: ADH		*Agency: ADH CCWP							
*Funding: CCCWP		ArrivalTime: 9:30	DepartureTime: 11:00	*SampleTime (1st sample): 10:15		*Protocol: RMC							
*ProjectCode:		*Personnel: J. Corrot, C. Sandin		*Purpose (circle applicable): <u>SedChem</u> SedTox Habitat Benthic		*PurposeFailure:							
*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS	Lat (dd.dddddd)	Long (ddd.dddddd)	OCCUPATION METHOD: (Walk-in) Bridge RV Other								
GPS Device: Verizon Lucid cell phone		Target:	37.92300	- 121.71441	STARTING BANK (facing downstream) (LB) RB / NA								
Datum: NAD83		Accuracy (ft/m): 19	Same as Water/Probe Collection? (YES) NO		Point of Sample (if integrated then -88 in dbase)								
Habitat Observations (CollectionMethod = Habitat generic) **Only complete Sed Observations (bolded) if WQ Observations are already recorded		WADEABILITY: <input checked="" type="checkbox"/> N / Unk	BEAUFORT SCALE see Attachment 2	WIND DIRECTION (from):	DISTANCE FROM BANK (m): 0.5	STREAM WIDTH (m): 1	WATER DEPTH (m): 0.25						
SITE ODOR: (None, Sulfides, Sewage, Petroleum, Smoke, Other)		HYDROMODIFICATION: None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Aerial Zipline, Other	PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode): yes	LOCATION (to sample): (US) / DS / WI / NA	1: (RB) / (LB) / BB / (US) / DS / ##								
SKY CODE: Clear, (Partly Cloudy), Overcast, Fog, Smoky, Hazy		PRECIPITATION: None, Fog, Drizzle, Rain, Snow	2: (RB) / (LB) / BB / (US) / DS / ##										
OTHER PRESENCE: (Vascular, Nonvascular, Oily Sheen, Foam, Trash, Other)		PRECIPITATION (last 24 hrs): (Unknown, <1", >1", None)	3: (RB) / (LB) / BB / (US) / DS / ##										
DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Boulder, Gravel, (Sand, Mud), Unk, Other		EVIDENCE OF FIRES: (No, <1 years, <5 years)											
SED ODOR: (None, Sulfides, Sewage, Petroleum, Mixed, Other)													
SED COLOR: Colorless, Green, Yellow, Brown (Black)													
SED COMPOSITION: (Silt/Clay, Fine Sand, Coarse Sand, Gravel, Cobble, Mixed, Hard Pan Clay)													
OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, (Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs)													
Samples Taken (# of containers filled) - Method = Sed Grab					Field Dup YES (NO) (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)								
COLLECTION DEVICE:		Scoop (SS / PC / PE), Core (SS / PC / PE), Grab (Van Veen / Eckman / Petite Ponar)			COLLECTION DEVICE AREA (m2):								
Sample Type:	Depth Collec (cm)	Equipment Used	Sediment Only (Y / N)	Grain Size/TOC	*1 Organics	*2 Metals/Hg/T	*3 Selenium	Toxicity	SWI	Archive Chemistry	Benthic Infauna	Benthic Coll. Area (m ²)	Sieve Size (mm)
Integrated Grab	2			1	2	2	1	3					
Integrated Grab													
Integrated Grab													
Integrated Grab													
COMMENTS:													
down stream location for SSID Study										*1 Pyrethroids, fipronil and degradates			
used kymor coated bucket and scoop										*2 organochlorine pesticides			
Sample taken @ 10:15										*3 percent solids			

* New station code ~~544MSH065~~ 544MSH062

Down stream location

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) - EventType=WQ				Entered in d-base (initial/date)		Pg 2 of 2 Pgs							
*StationID: 544R00025		*Date (mm/dd/yyyy): 07/22/2014		*Group: ADH 10:15		*Agency: ADHCCCWP							
*Funding: CCCWP		ArrivalTime: 9:30	DepartureTime: 11:00	*SampleTime (1st sample): 11:45		*Protocol: CCCWPRMC							
*ProjectCode:		*Personnel: J. Cerroli, C. Swilley		*Purpose (circle applicable): WaterChem WaterTox Habitat FieldMeas		*PurposeFailure: ADH							
*Location: Bank Thalweg (Midchannel) OpenWater		*GPS/DGPS	Lat (dd.ddddd)	Long (ddd.ddddd)	OCCUPATION METHOD: Walk-in Bridge R/V Other								
GPS Device: Verizon LCD Cell phone		Target: -37.92300	-121.71441	STARTING BANK (facing downstream): LB RB / NA									
Datum: NAD83	Accuracy (ft)m: 18	*Actual: -37.92288	-121.71410	Point of Sample (if Integrated, then -88 in dbase)									
Habitat Observations (CollectionMethod = Habitat_generic)				WADEABILITY: Y / N / Unk	BEAUFORT SCALE (see attachment): 2	DISTANCE FROM BANK (m): 0.5	STREAM WIDTH (m): 1						
SITE ODOR: None, Sulfides, Sewage, Petroleum, Smoke, Other				WIND DIRECTION (from): 	HYDROMODIFICATION: None, Bridge, Pipes, ConcreteChannel, GradeControl, Culvert, AerialZipline, Other			WATER DEPTH (m): 0.25					
SKY CODE: Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy				PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode): Yes				LOCATION (to sample): US DS / WI /					
OTHER PRESENCE: Vascular, Nonvascular, Oily Sheen, Foam, Trash, Other				DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Boulder, Gravel, Sand, Mud, Unk, Other				1: (RB / LB / BB / US / DS / ##)					
WATERCLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)				PRECIPITATION: None, Fog, Drizzle, Rain, Snow				2: (RB / LB / BB / US / DS / ##)					
WATERODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other				PRECIPITATION (last 24 hrs): Unknown, <1", >1", None				3: (RB / LB / BB / US / DS / ##)					
WATERCOLOR: Colorless, Green, Yellow, Brown				EVIDENCE OF FIRES: No, <1 year, <5 years									
OVERLAND RUNOFF (Last 24 hrs): none, light, moderate / heavy, unknown													
OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs													
Field Measurements (SampleType = FieldMeasure; Method = Field)													
	Depth Collec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity	Salinity (ppt)	Turbidity (ntu)			
SUBSURF/MID/BOTTOM/REP	4 inches	1.25 FPS		21.66	7.80	5.28 DO mg/L	60.6	1592	0.86				
SUBSURF/MID/BOTTOM/REP													
SUBSURF/MID/BOTTOM/REP													
Instrument: YSI 556													
Calib. Date: 07-27-14													
Samples Taken (# of containers filled) - Method=Water_Grab				Field Dup YES / NO: (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)									
SAMPLE TYPE: Grab / Integrated		COLLECTION DEVICE: Indiv bottle (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other											
	Depth Collec (m)	Inorganics	Bacteria	Chl a	TSS / SSC	TOC / DOC	Total Hg	Dissolved Metals	Total Metals	Dissolved Metals	Organi	Toxicity	VOAs
Sub/Surface													
Sub/Surface													
COMMENTS: Sunny and casually raining (very light rain) Scattered garbage in the water (aluminum cans, paper)								1.706 mS/cm		YSI Field measurements only			
								1592 US/cm					

* New station code 544MSH065

up stream location Dry Creek at 1380 Arlington Way

SWAMP Field Data Sheet (Sediment Chemistry) - Event Type=WQ					Entered in d-base (initial/date)			Pg 1 of 2 Pgs					
*StationID: 544R00025		*Date (mm/dd/yyyy): 07/22/2014		*Group: ADH			*Agency: ADH/CCW						
*Funding: CCCWP		ArrivalTime: 11:10	DepartureTime: 12:00	*SampleTime (1st sample): 11:45			*Protocol: RMC						
*ProjectCode:		*Personnel: J. Cerini, C. Sandlin		*Purpose (circle applicable): SedChem SedTox Habitat Benthic			*PurposeFailure:						
*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS	Lat (dd.ddddd): 37.92157	Long (ddd.ddddd): -121.72174	OCCUPATION METHOD: Walk-in Bridge RV Other								
GPS Device: Verizon Lucid cellphone		Target:	37.92157	-121.72174	STARTING BANK (facing downstream): LB / RB / NA								
Datum: NAD83 Accuracy (ft/m): 18		*Actual:	37.921689	-121.72200	Point of Sample (if Integrated then #8 in dbase)								
Habitat Observations (Collection Method = Habitat_generic) **Only complete Sed Observations (bolded) if WQ Observations are already recorded		WADEABILITY: Y / N / Unk	BEAUFORT SCALE: see Attachment 2	DISTANCE FROM BANK (m): 0.75	STREAM WIDTH (m): 1.5								
SITE ODOR: None, Sulfides, Sewage, Petroleum, Smoke, Other		WIND DIRECTION (from): N	HYDROMODIFICATION: None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Aerial Zipline, Other	WATER DEPTH (m): 6 inches / 15 cm	LOCATION (to sample): US / DS / WI / NA								
SKY CODE: Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy		PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode):	PRECIPITATION: None, Fog, Drizzle, Rain, Snow	1: (RB / LB) / BB / US / DS / ##									
OTHER PRESENCE: Vascular, Nonvascular, Oily Sheen, Foam, Trash, Other		PRECIPITATION (last 24 hrs): Unknown <1", >1", None	2: (RB / LB) / BB / US / DS / ##										
DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Boulder, Gravel, Sand, Mud, Unk, Other		EVIDENCE OF FIRES: No, <1 years, <5 years	3: (RB / LB) / BB / US / DS / ##										
SED ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other		OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs											
SED COLOR: Colorless, Green, Yellow, Brown, Black		Samples Taken (# of containers filled) - Method=Sed_Grab											
SED COMPOSITION: Silt/Clay, Fine Sand, Coarse Sand, Gravel, Cobble, Mixed, Hard Pan Clay		Field Dup YES / NO: (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)											
COLLECTION DEVICE: Scoop (SS / PC / PE), Core (SS / PC / PE), Grab (Van Veen / Eckman / Petite Ponar)		COLLECTION DEVICE AREA (m2):											
Sample Type	Depth Collec (cm)	Equipment Used	Sediment Only (Y / N)	Grain Size/TOC	*1 Organics	*2 Metals/Hg/T	*3 Selenium	Toxicity	SWI	Archive Chemistry	Benthic Infauna	Benthic Coll. Area (m ²)	Sieve Size (mm)
Integrated Grab				1	2	2	1	3					
Integrated Grab													
Integrated Grab													
Integrated Grab													
COMMENTS:													
up stream location for SSID study						* 1 Pyrethroids, Fipronil, and degradates							
used Kynar coated bucket and scoop						* 2 organochlorine pesticides							
* Very light shower in morning, dry & hot in afternoon						* 3 percent solids							

* New station code 544MS4065

upstream location

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) - EventType=WQ				Entered in d-base (initial/date)		Pg 2 of 2 Pgs	
*StationID: 544R00025		*Date (mm/dd/yyyy): 07/22/2014		*Group: ADH		*Agency: ADH CCCWP	
*Funding: CCCWP		ArrivalTime: 11:10	DepartureTime: 12:00	*SampleTime (1st sample): 10:45 11:45		*Protocol: RMC	
*ProjectCode:		*Personnel: J. Lemire, C. Sandlin		*Purpose (circle applicable): WaterChem WaterTox Habitat FieldMeas		*PurposeFailure:	
*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS	Lat (dd dddd): 37.92157	Long (ddd dddd): -121.72174	OCCUPATION METHOD: (Walk-in) Bridge RV Other		
GPS Device:		Target:	37.92157	-121.72174	STARTING BANK (facing downstream): LB / RB / NA		
Datum: NAD83	Accuracy (ft/m):	*Actual:	37.921689	-121.72200	Point of Sample (if integrated, then -88 in dbase)		
Habitat Observations (CollectionMethod = Habitat_generic)				WADEABILITY: (Y) N / Unk	BEAUFORT SCALE (see attachment): 2	DISTANCE FROM BANK (m): 0.75	STREAM WIDTH (m): 1.5
SITE ODOR: None, Sulfides, Sewage, Petroleum, Smoke, Other				WIND DIRECTION (from): N	HYDROMODIFICATION: None, Bridge, Pipes, ConcreteChannel, GradeControl, Culvert, AerialZipline, Other	WATER DEPTH (m): 6 inches 15cm	
SKY CODE: Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy				PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode):		LOCATION (to sample): (US) DS / WI /	
OTHER PRESENCE: Vascular, Nonvascular, Oily Sheen, Foam, Trash, Other				DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Boulder, Gravel, Sand, Mud, Unk, Other		1: (RB / LB / BB / JS / DS / ##)	
WATERCLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)				PRECIPITATION: None, Fog, Drizzle, Rain, Snow		2: (RB / LB / BB / US / DS) ##	
WATERODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other				PRECIPITATION (last 24 hrs): Unknown, <1", >1", None		3: (RB / LB / BB / US / DS) ##	
WATERCOLOR: Colorless, Green, Yellow, Brown				EVIDENCE OF FIRES: No, <1 year, <5 years			
OVERLAND RUNOFF (Last 24 hrs): none, light, moderate / heavy, unknown							
OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs							

Field Measurements (SampleType = FieldMeasure; Method = Field)										
	Depth Collec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity	Salinity (ppt)	Turbidity (ntu)
SUBSURF/MID/BOTTOM/REP	4 inches	0.5		22.45	7.61	3.7500	44.0	1683	89	
SUBSURF/MID/BOTTOM/REP										
SUBSURF/MID/BOTTOM/REP										
Instrument:	YSI 550									
Calib. Date:	07-22									

Samples Taken (# of containers filled) - Method=Water_Grab													
SAMPLE TYPE: Grab / Integrated		COLLECTION DEVICE: Indiv bottle (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other											
	Depth Collec (m)	Inorganics	Bacteria	Chl a	TSS/SSC	TOC/DOC	Total Hg	Dissolved Metals	Total Metals	Dissolved Metals	Organi	Toxicity	VOAs
Sub/Surface													
Sub/Surface													

COMMENTS: light rain this morning

1.770 m/s/cm
1683 us/cm

* New station code 207WAL060

down stream East Branch Grayson Creek @ Ardith Lane

SWAMP Field Data Sheet (Sediment Chemistry) - Event Type=WQ					Entered in d-base (initial/date)			Pg 1 of 2 Pgs					
*StationID: 207R00011		*Date (mm/dd/yyyy): 07 12 14		*Group: ADH Environmental			*Agency: CCCWP						
*Funding: CCCWP		ArrivalTime: 10:15	DepartureTime: 12:30	*SampleTime (1st sample): 11:45			*Protocol: RMC						
*ProjectCode:		*Personnel: K. Lew B. Haeger		*Purpose (circle applicable): SedChem, SedTox, Habitat, Benthic			*PurposeFailure:						
*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS	Lat (dd.dddddd)	Long (ddd.dddddd)	OCCUPATION METHOD: (Walk-in) Bridge RV Other								
GPS Device: Garmin etrex 20		Target:	37.95995	- 122.07304	STARTING BANK (facing downstream): (LB) / RB / NA								
Datum: NAD83 Accuracy (ft/m): 2.14		*Actual:	37.95850	- 122.06634	Point of Sample (if integrated, then -88 in dbase)								
Habitat Observations (Collection Method = Habitat generic) **Only complete Sed Observations (bolded) if WQ Observations are already recorded		WADEABILITY: <input checked="" type="checkbox"/> N / Unk	BEAUFORT SCALE see Attachment	1	DISTANCE FROM BANK (m): 0.8	STREAM WIDTH (m): 1.6	WATER DEPTH (m): 3-						
SITE ODOR: None, Sulfides, Sewage, Petroleum, Smoke, Other		WIND DIRECTION (from): NW	PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode):	1: (RB / (LB) / BB / (US) / DS) / ##	HYDROMODIFICATION: None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Aerial Zipline, Other								
SKY CODE: Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy		DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Boulder, Gravel, Sand, Mud, Unk, Other	PRECIPITATION: None, Fog, Drizzle, Rain, Snow	2: (RB / (LB) / BB / US / (DS) / ##)	LOCATION (to sample): US / DS / WI / NA								
OTHER PRESENCE: Vascular, Nonvascular, Oily Sheen, Foam, Trash, Other		SEDODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	3: (RB / (LB) / BB / US / DS) / ##	EVIDENCE OF FIRES: No, <1 years, <5 years								
SED COLOR: Colorless, Green, Yellow, Brown		OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs											
Samples Taken (# of containers filled) - Method=Sed Grab					Field Dup YES / NO: (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)								
COLLECTION DEVICE: Scoop (SS / PC / PE), Core (SS / PC / PE), Grab (Van Veen / Eckman / Petite Ponar)					COLLECTION DEVICE AREA (m ²):								
Sample Type	Depth Collec (cm)	Equipment Used	Sediment Only (Y / N)	Grain Size / TOC	*1 Organics	*2 Metals/HgT	*3 Selenium	Toxicity	SWI	Archive Chemistry	Benthic Infauna	Benthic Coll. Area (m ²)	Sieve Size (mm)
Integrated Grab	2			1	2	2	1	3					
Integrated Grab													
Integrated Grab													
Integrated Grab													
COMMENTS:													
down stream location for SSID study							*1 Pyrethroids, fipronil, and degradates						
used kynar coated scoop and bucket							*2 organochlorine pesticides						
							*3 Percent Solids						

*New station code 207WAL060

down stream East Branch Grayson Creek @ Ardith Lane

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) - EventType=WQ				Entered in d-base (initial/date)		Pg 2 of 2 Pgs							
*StationID: 207R00011		*Date (mm/dd/yyyy): 07 / 22 / 2014		*Group: ADH		*Agency: CCCWP							
*Funding: CCCWP		ArrivalTime: 10:15	DepartureTime: 12:30	*SampleTime (1st sample): 11:45		*Protocol: RMC							
*ProjectCode:		*Personnel: K. Lewis, C. Gendlin		*Purpose (circle applicable): WaterChem WaterTox Habitat <u>FieldMeas</u>		*PurposeFailure:							
*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS	Lat (dd.dddddd)	Long (ddd.dddddd)	OCCUPATION METHOD: <u>Walk-in</u> Bridge R/V _____ Other _____								
GPS Device: <u>Garmin etrex 20</u>		Target:	37.95995	- 122.07304	STARTING BANK (facing downstream): <u>LB</u> / RB / NA								
Datum: NAD83		Accuracy (ft m): 14	*Actual:	37.95850	Point of Sample (if Integrated, then -88 in dbase)								
Habitat Observations (CollectionMethod = Habitat_generic)				WADAABILITY: <u>Y</u> / N / Unk	BEAUFORT SCALE (see attachment): 1	DISTANCE FROM BANK (m): 0.4	STREAM WIDTH (m): 1.6						
SITE ODOR: <u>None</u> , Sulfides, Sewage, Petroleum, Smoke, Other _____				WIND DIRECTION (from): <u>NW</u>	HYDROMODIFICATION: None, Bridge, Pipes, <u>ConcreteChannel</u> , GradeControl, Culvert, AerialZipline, Other	WATER DEPTH (m): <u>3</u>							
SKY CODE: Clear, <u>Partly Cloudy</u> , Overcast, Fog, Smoky, Hazy						LOCATION (to sample): US / DS / WI /							
OTHER PRESENCE: <u>Vascular</u> , <u>Nonvascular</u> , OilySheen, Foam, <u>Trash</u> , Other _____					PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode):								
DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Boulder, Gravel, <u>Sand</u> , Mud, Unk, Other _____					1: (RB / <u>LB</u> / BB / <u>US</u> / ##)								
WATERCLARITY: <u>Clear</u> (see bottom), Cloudy (>4" vis), Murky (<4" vis)				PRECIPITATION: <u>None</u> , Fog, Drizzle, Rain, Snow		2: (RB / <u>LB</u> / BB / US / <u>DS</u> / ##)							
WATERODOR: <u>None</u> , Sulfides, Sewage, Petroleum, Mixed, Other _____				PRECIPITATION (last 24 hrs): <u>Unknown</u> , <1", >1", None		3: (RB / <u>LB</u> / <u>BB</u> / US / DS / ##)							
WATERCOLOR: <u>Colorless</u> , Green, Yellow, Brown				EVIDENCE OF FIRES: <u>No</u> , <1 year, <5 years									
OVERLAND RUNOFF (Last 24 hrs): <u>none</u> , light, moderate / heavy, unknown													
OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), <u>0.1-1cfs</u> , 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs													
Field Measurements (SampleType = FieldMeasure; Method = Field)													
	Depth Collec (m)	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity	Salinity (ppt)	Turbidity (ntu)			
SUBSURF/MID/ <u>BOTTOM</u> /REP	0.02			21.2	8.30	16.6		1219					
SUBSURF/MID/ <u>BOTTOM</u> /REP													
SUBSURF/MID/ <u>BOTTOM</u> /REP													
Instrument: <u>YSI 556</u>													
Calib. Date: <u>07-22-14</u>													
Samples Taken (# of containers filled) - Method=Water_Grab				Field Dup YES / NO: (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)									
SAMPLE TYPE: <u>Grab / Integrated</u>		COLLECTION DEVICE:		Indiv bottle (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other _____									
	Depth Collec (m)	Inorganics	Bacteria	Chl a	TSS/SSC	TOC/DOC	Total Hg	Dissolved Metals	Total Metals	Dissolved Metals	Organi	Toxicity	VOAs
Sub/Surface													
Sub/Surface													
COMMENTS: <u>Sediment chemistry and tox samples only. Stream water field measurements taken</u>													

* New station code 207WAL078

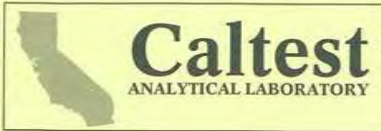
UP stream Trib of Grayson @ Footbridge between Mercury Way + Vineyard Ct.

SWAMP Field Data Sheet (Sediment Chemistry) - Event Type=WQ					Entered in d-base (initial/date)			Pg 1 of 2 Pgs					
*StationID: 207R00011		*Date (mm/dd/yyyy): 07 / 22 / 2014		*Group: AOH			*Agency: CCCWP						
*Funding: CCCWP		ArrivalTime: 12:45	DepartureTime: 15:15	*SampleTime (1st sample): 14:45			*Protocol: RMC						
*ProjectCode:		*Personnel: K. Lewis, B. Hager		*Purpose (circle applicable): SedChem SedTox Habitat Benthic			*PurposeFailure:						
*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS	Lat (dd.dddddd)	Long (ddd.dddddd)	OCCUPATION METHOD: Walk-in Bridge RV Other								
GPS Device: Garmin etrex 20		Target:	37.95275	-122.08150	STARTING BANK (facing downstream): LB RB NA								
Datum: NAD83 Accuracy (ft/m): 14		*Actual:	37.95280	-122.08155	Point of Sample (if Integrated, then -88 in dbase)								
Habitat Observations (CollectionMethod = Habitat generic) **Only complete Sed Observations (bolded) if WQ Observations are already recorded		WADEABILITY: Y / N / Unk	BEAUFORT SCALE see Attachment	1	DISTANCE FROM BANK (m): 0.5	STREAM WIDTH (m): 1.0							
SITE ODOR: None, Sulfides, Sewage, Petroleum, Smoke, Other		WIND DIRECTION (from): NW	PRECIPITATION: None, Fog, Drizzle, Rain, Snow	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	HYDROMODIFICATION: None, Bridge, Pipes, Concrete Channel, Grade Control, Culvert, Aerial Zipline, Other								
SKY CODE: Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy		PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode):	EVIDENCE OF FIRES: No, <1 years, <5 years	OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs	LOCATION (to sample): US / DS / WI / NA								
OTHER PRESENCE: Vascular, Nonvascular, Oily Sheen, Foams, Trash, Other		PRECIPITATION: None, Fog, Drizzle, Rain, Snow	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	EVIDENCE OF FIRES: No, <1 years, <5 years	1: (RB / LB) BB / US / DS / ##								
DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Boulder, Gravel, Sand, Mud, Unk, Other		PRECIPITATION: None, Fog, Drizzle, Rain, Snow	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	EVIDENCE OF FIRES: No, <1 years, <5 years	2: (RB / LB) BB / US / DS / ##								
SED ODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other		PRECIPITATION: None, Fog, Drizzle, Rain, Snow	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	EVIDENCE OF FIRES: No, <1 years, <5 years	3: (RB / LB) BB / US / DS / ##								
SED COLOR: Colorless, Green, Yellow, Brown		PRECIPITATION: None, Fog, Drizzle, Rain, Snow	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	EVIDENCE OF FIRES: No, <1 years, <5 years	3: (RB / LB) BB / US / DS / ##								
SED COMPOSITION: Silt/Clay, Fine Sand, Coarse Sand, Gravel, Cobble, Mixed, Hard Pan Clay		PRECIPITATION: None, Fog, Drizzle, Rain, Snow	PRECIPITATION (last 24 hrs): Unknown, <1", >1", None	EVIDENCE OF FIRES: No, <1 years, <5 years	3: (RB / LB) BB / US / DS / ##								
SAMPLES TAKEN (# of containers filled) - Method=Sed Grab		Field Dup YES / NO (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)											
COLLECTION DEVICE: Scoop (SS / PC / PE), Core (SS / PC / PE), Grab (Van Veen / Eckman / Petite Ponar)		COLLECTION DEVICE AREA (m2):											
Sample Type	Depth Collec (cm)	Equipment Used	Sediment Only (Y / N)	Grain Size/TOC	Organics	Metals/Hg/T	Selenium	Toxicity	SWI	Archive Chemistry	Benthic Infauna	Benthic Coll. Area (m ²)	Sieve Size (mm)
Integrated Grab	2			1	*1	*2	*3	3					
Integrated Grab													
Integrated Grab													
Integrated Grab													
COMMENTS:													
up stream location for SS10 study used Kyinr coated scoop and bucket					*1 Pyrethroids, Fipronil and Degredates *2 organochlorine pesticides *3 Percent Solids								

* New station code 207WAL078

up stream Trib of Grayson @ Footbridge between Mercury Way + Vineyard Ct

SWAMP Field Data Sheet (Water Chemistry & Discrete Probe) - EventType=WQ				Entered in d-base (initial/date)		Pg 2 of 2 Pgs							
*StationID: 207A00011		*Date (mm/dd/yyyy): 07 / 22 / 2014		*Group: ADH		*Agency: ECCWP							
*Funding: ECCWP		ArrivalTime: 12:45	DepartureTime: 15:15	*SampleTime (1st sample): 14:45		*Protocol: RMC							
*ProjectCode:		*Personnel: K. Lewis, B. Haeger		*Purpose (circle applicable): WaterChem WaterTox Habitat FieldMeas		*PurposeFailure:							
*Location: Bank Thalweg Midchannel OpenWater		*GPS/DGPS	Lat (dd.dddd)	Long (ddd.ddddd)	OCCUPATION METHOD: Walk-in Bridge RV Other								
GPS Device: Garmin etrex 20		Target:	37.95275	- 122.08150	STARTING BANK (facing downstream): LB / RB / NA								
Datum: NAD83	Accuracy (ft/m): 14	*Actual:	37.95280	- 122.08155	Point of Sample (if Integrated, then -88 in dbase)								
Habitat Observations (CollectionMethod = Habitat_generic)				WADEABILITY: Y N / Unk	BEAUFORT SCALE (see attachment): NW	DISTANCE FROM BANK (m): 0.5	STREAM WIDTH (m): 1.0						
SITE ODOR: None, Sulfides, Sewage, Petroleum, Smoke, Other		WIND DIRECTION (from): NW	HYDROMODIFICATION: None, Bridge, Pipes, ConcreteChannel, GradeControl, Culvert, AerialZipline, Other	LOCATION (to sample): US / DS / WI /									
SKY CODE: Clear, Partly Cloudy, Overcast, Fog, Smoky, Hazy		OTHER PRESENCE: Vascular, Nonvascular, Oily Sheen, Foam, Trash, Other		PHOTOS (RB & LB assigned when facing downstream; RENAME to StationCode_yyyy_mm_dd_uniquecode):		1: (RB / LB / BB / US / DS / ##)							
DOMINANT SUBSTRATE: Bedrock, Concrete, Cobble, Boulder, Gravel, Sand, Mud, Unk, Other				WATERCLARITY: Clear (see bottom), Cloudy (>4" vis), Murky (<4" vis)		PRECIPITATION: None, Fog, Drizzle, Rain, Snow							
WATERODOR: None, Sulfides, Sewage, Petroleum, Mixed, Other				PRECIPITATION (last 24 hrs): Unknown, <1", >1", None		2: (RB / LB / BB / US / DS / ##)							
WATERCOLOR: Colorless, Green, Yellow, Brown				EVIDENCE OF FIRES: No, <1 year, <5 years		3: (RB / LB / BB / US / DS / ##)							
OVERLAND RUNOFF (Last 24 hrs): none, light, moderate / heavy, unknown				OBSERVED FLOW: NA, Dry Waterbody Bed, No Obs Flow, Isolated Pool, Trickle (<0.1cfs), 0.1-1cfs, 1-5cfs, 5-20cfs, 20-50cfs, 50-200cfs, >200cfs									
Field Measurements (SampleType = FieldMeasure; Method = Field)													
	Depth Collec (m) cm	Velocity (fps)	Air Temp (°C)	Water Temp (°C)	pH	O ₂ (mg/L)	O ₂ (%)	Specific Conductivity	Salinity (ppt)	Turbidity (ntu)			
SUBSURF/MID/BOTTOM/REP	2			25.76	8.46	12.17		1637					
SUBSURF/MID/BOTTOM/REP													
SUBSURF/MID/BOTTOM/REP													
Instrument: YSI 556													
Calib. Date: 07-22-14													
Samples Taken (# of containers filled) - Method=Water_Grab				Field Dup YES / NO: (SampleType = Grab / Integrated; LABEL_ID = FieldQA; create collection record upon data entry)									
SAMPLE TYPE: Grab / Integrated		COLLECTION DEVICE:		Indiv bottle (by hand, by pole, by bucket); Teflon tubing; Kemmer; Pole & Beaker; Other									
	Depth Collec (m)	Inorganics	Bacteria	Chl a	TSS / SSC	TOC / DOC	Total Hg	Dissolved Metals	Total Metals	Dissolved Metals	Organi	Toxicity	VOAs
Sub/Surface													
Sub/Surface													
COMMENTS: water field measurements only-													



SAMPLE CHAIN OF CUSTODY

PAGE 1 OF 2 LAB ORDER #: 1070867 P.O.# 030.001.0202

CLIENT: ADH Environmental ADDRESS: 3065 Porter St Ste. 101 City: Sausalito, CA 94965 BILLING ADDRESS: same as above

PROJECT #/PROJECT NAME: CCCWP-SSID REPORT ATTN: Alessandro Hhatt

Table with columns for ANALYSES REQUESTED (Pyrethroids, Organochlorine Pesticides, Total Organic Carbon, etc.) and TURN-AROUND TIME (STANDARD, RUSH).

PHONE #: 831.477.2003 FAX PHONE: 831.477.0895 SAMPLER (PRINT & SIGN NAME): Kevin Lewis

Main data table with columns: CALTEST #, DATE SAMPLED, TIME SAMPLED, MATRIX, CONTAINER AMOUNT/TYPE, PRESERVATIVE, SAMPLE IDENTIFICATION SITE, CLIENT LAB #, COMP. or GRAB, and REMARKS. Includes handwritten entries for samples 544R00025US-01 to 544R00025DS-04.

By submittal of sample(s), client agrees to abide by the Terms and Conditions set forth on the reverse of this document.

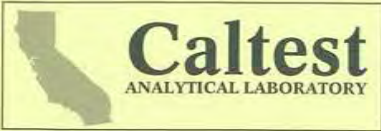
Table for RELINQUISHED BY, DATE/TIME, and RECEIVED BY with handwritten signatures and dates.

FOR LAB USE ONLY section containing fields for Samples, BD, CC, SIL, W/HNO, H2SO4, NaOH, PIL, and COMMENTS.

MATRIX: W = Aqueous Nondrinking Water, Digested Metals; ML = Low R.L.s, Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Product. CONTAINER TYPES: AL = Amber Liter; AHL = 500 ml Amber; PT = Pint (Plastic); QT=Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4 oz. BACT; BT = Brass Tube; VOA = 40 mL.VOA; OTC = Other Type Container

REV. 2/13

WHITE - ORIGINAL TO LABORATORY YELLOW - CLIENT COPY AS RECEIPT



SAMPLE CHAIN OF CUSTODY

LAB ORDER #: PO70867

PAGE 2 OF 2

CLIENT: ADH Environmental
 ADDRESS: 3065 Porter St Ste 101 CITY: Soquel STATE: CA ZIP: 95073
 BILLING ADDRESS: same as above
 PHONE #: 831-477-2003 FAX PHONE: 831-477-0895 SAMPLER (PRINT & SIGN NAME): Kevin Lewis

PROJECT #/ PROJECT NAME: 030.001.0202 / CCCWP-SS10
 REPORT ATTN: Alessandra Hnatk

ANALYSES REQUESTED
 Pyrethroids, Fipronil, Neoprene
 Organochlorine pesticides
 Percent solids
 Total organic carbon
 TURN-AROUND TIME
 STANDARD
 RUSH
 DUE DATE: _____
 New site IDs

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	* Refer to Remarks SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. or GRAB	ANALYSES REQUESTED							REMARKS	
	07-22-14	1445	Sed	2x8oz AG	4°C	207R00011US-01		Comp	X								207R00 207WAL078
		1445		2x8oz AG		207R00011US-02				X							207WAL078
		1445		1x8oz CG		207R00011US-03					X						207WAL078
		1445		1x8oz CG		207R00011US-04						X					207WAL078
		1145		2x8oz AG		207R00011DS-01			X								207WAL060
		1145		2x8oz AG		207R00011DS-02				X							207WAL060
		1145		1x8oz CG		207R00011DS-03					X						207WAL060
		1145		1x8oz CG		207R00011DS-04						X					207WAL060

By submittal of sample(s), client agrees to abide by the Terms and Conditions set forth on the reverse of this document.

RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY
<u>BROHAEGER</u>	<u>07-22-14 17:55</u>	<u>[Signature]</u>			

FOR LAB USE ONLY

Samples: WC _____ MICRO _____ BIO _____ MET _____ SV _____ VOA _____ TEMP: _____ °C SEALED: Y / N INTACT: Y / N

BD: BIO _____ WC _____ MET _____ COMMENTS

CC: AA _____ SV _____ VOA _____

SIL: HP _____ PT _____ QT _____ VOA _____

W/HNO _____ H₂SO₄ _____ NaOH _____

PIL: HNO _____ H₂SO₄ _____ NaOH _____ HCL _____

MATRIX: W = Aqueous Nondrinking Water, Digested Metals; ML = Low R.L.s, Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Product

CONTAINER TYPES: AL = Amber Liter; AHL = 500 ml Amber; PT = Pint (Plastic); QT=Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4 oz. BACT; BT = Brass Tube; VOA = 40 mL.VOA; OTC = Other Type Container

WHITE - ORIGINAL TO LABORATORY YELLOW - CLIENT COPY AS RECEIVED REV. 2/13



Pacific EcoRisk
 2250 Cordelia Rd., Fairfield, CA 94534
 (707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Results To: Alessandro Hnatt	Invoice To: ADH Environmental	REQUESTED ANALYSIS			
Address: ADH Environmental 3065 Porter St Ste.101 Sausalito, CA 94073	Address: " "				
Phone: 831-477-2003	Phone: " "	TOX - 1 species (10-Dry Hy-116k Aztecs (Sediment))			
Attn: Alessandro Hnatt	Attn: " "				
E-mail: adh@adhenvironmental.com	E-mail: " "				
Project Name: CCCWP - SSID					
P.O.#/Ref: 030.001.0202					

Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Grab/Comp	Container							
					Number	Type						
1 544R00025 US ①	07-22-14	11:45	Sed	grab	CP	grab clear glass	X					
2 544R00025 DS ②	↓	10:15		↓	CP	grab 1gal X3	X					
3 207R00011 US ③	↓	10:15 (24)		↓	CP	grab 1gal X3	X					
4 207R00011 DS ④	↓	10:15 (31)		↓	CP	grab 1gal X3	X					
5		11:45										
6												
7												
8												
9												
10												

Samples Collected By:		
Comments/Special Instruction: preserved at 4°C * Please amend sample ID's as follows: ① 544R00025US to 544MSH065 ② 544R00025DS to 544MSH062 ③ 207R00011US to 207WAL078 ④ 207R00011DS to 207WAL060	RELINQUISHED BY:	RECEIVED BY:
	Signature: <i>[Signature]</i>	Signature: <i>Molly Alar</i>
	Print: <i>Brian Pfeifer</i>	Print: <i>Molly Alar</i>
	Organization: <i>ADH</i>	Organization: <i>PER</i>
	Date: <i>07-22-14</i> Time: <i>17:15</i>	Date: <i>7/22/14</i> Time: <i>17:15</i>
	RELINQUISHED BY:	RECEIVED BY:
	Signature:	Signature:
	Print:	Print:
	Organization:	Organization:
	Date:	Date:
	Time:	Time:

*Example Matrix Codes: (EFF - Effluent) (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other

Appendix J. TIE Laboratory Reports

Alessandro D. Hnatt
 ADH Environmental
 3065 Porter Street, Suite 101
 Soquel, CA 95073

April 8, 2014

Alessandro:

I have enclosed one copy of our report “Evaluation of the Chronic Toxicity of Contra Costa Clean Water Program Stormwater Samples” for the samples that were collected February 6, 2014. Briefly, both of the samples collected were toxic to *Hyalella azteca*. There was an 81.3% reduction in survival in the 544R00025US sample and an 87.5% reduction in survival in the 544R00025DS sample.

In response to these observations, a targeted TIE was performed the downstream stormwater sample (544R00025DS) in an attempt to identify suspected cause(s) of toxicity. The results of this testing are presented below:

Effects of TIE treatments on the toxicity of CCCWP stormwater sample to <i>Hyalella azteca</i>				
TIE Treatment	Mean % Survival			Effects of TIE Treatment?
	Control/Blank	50% Effluent	100% Effluent	
Baseline	100		16	toxicity present
PBO	100	0	0	<i>increase</i> in toxicity
Carboxylesterase	92.5		98	toxicity removed
BSA	100		46	partial reduction of toxicity

The following trends (changes in sample toxicity relative to the untreated water sample [Baseline] test) were observed:

- The addition of PBO to the test solutions increased toxicity to *H. azteca* survival (survival decreased from 16% to complete mortality). These results suggest that compounds which are *detoxified* by the cytochrome-P450 system (e.g., pyrethroid insecticides) were contributing to sample toxicity;
- The addition of carboxylesterase decreased the survival toxicity (from 16% survival to 98% survival), suggesting that type I and type II pyrethroids are contributing to the toxicity (Weston and Amweg 2007). However, it should be noted that the esterase control treatment (BSA) also reduced toxicity, suggesting that some of the reduced toxicity was due the presence of large organic molecules. The use of carboxylesterase as a TIE treatment is still experimental and these results need to be used judiciously and in conjunction with other TIE treatment (e.g., PBO); and

- There was partial toxicity removal as a result of BSA addition, since BSA does not cleave the ester bond in type I and type II pyrethroids, evidence of greater reduction in toxicity in the esterase treatment than seen in the BSA treatment is indicative of type I and type II pyrethroids as a the cause of the stormwater toxicity.

The weight of evidence from the TIE performed on the downstream stormwater sample suggests that the toxicity was likely due to pyrethroid insecticides.

If you have any questions regarding the performance and interpretation of these tests, feel free to contact my colleague Eddie Kalombo or myself at (707) 207-7760.

Sincerely,

Stephen L. Clark
Vice President/Special Projects Director



Pacific EcoRisk is accredited in accordance with NELAP (ORELAP ID 4043). Pacific EcoRisk certifies that the test results reported herein conform to the most current NELAP requirements for parameters for which accreditation is required and available. Any exceptions to NELAP requirements are noted, where applicable, in the body of the report. This report shall not be reproduced, except in full, without the written consent of Pacific EcoRisk. This testing was performed under Lab Order 19397.

Evaluation of the Chronic Toxicity of Contra Costa Clean Water Program Stormwater Samples

Samples collected February 6, 2014

Prepared For:

ADH Environmental
3065 Porter Street, Suite 101
Soquel, CA 95073

Prepared By:

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534

April 2014



Evaluation of the Chronic Toxicity of Contra Costa Clean Water Program Stormwater Samples

Samples collected February 6, 2014

Table of Contents

	Page
1. INTRODUCTION	1
2. CHRONIC TOXICITY TEST PROCEDURES	1
2.1 Sample Receipt and Handling.....	1
2.2 Survival Toxicity Testing of Stormwater Samples with <i>Hyalella azteca</i>	2
2.2.1 Reference Toxicant Testing of the <i>Hyalella azteca</i>	3
2.3 Follow-Up Toxicity Identification Evaluation (TIE) Procedures.....	3
2.3.1 TIE Fractionation Method Blanks.....	3
2.3.2 Baseline	3
2.3.3 Piperonyl Butoxide (PBO) Addition	3
2.3.4 Carboxylesterase Addition	4
3. RESULTS	5
3.1 Effects of the CCCWP Stormwater on <i>Hyalella azteca</i>	5
3.2. Performance of the Follow-Up Targeted TIE.....	5
3.2.1 Results of Targeted Phase I TIE of the ‘544R00025DS’ Stormwater Sample	5
4. AQUATIC TOXICITY DATA QUALITY CONTROL	7
4.1 Maintenance of Acceptable Test Conditions	7
4.2 Negative Control Testing.....	7
4.3 Positive Control Testing	7
4.3.1 Reference Toxicant Toxicity to <i>Hyalella azteca</i>	7
4.4 Concentration Response Relationships.....	8
5. SUMMARY & CONCLUSIONS.....	9
6. LITERATURE CITED	10



Appendices

- Appendix A Chain-of-Custody Record for the Collection and Delivery of the CCCWP Stormwater Samples
- Appendix B Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of CCCWP Stormwater Samples to *Hyalella azteca*
- Appendix C Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of CCCWP Stormwater to *Hyalella azteca* – Follow-Up Toxicity Identification Evaluation (TIE): 544R00025DS
- Appendix D Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Hyalella azteca*



1. INTRODUCTION

Under contract to ADH Environmental, and in support of the Bay Area Stormwater Management Agencies Association (BASMAA) Regional Monitoring Coalition ongoing monitoring efforts, Pacific EcoRisk (PER) has been contracted to evaluate the toxicity of stormwater samples collected for the Contra Costa Clean Water Program (CCCWP). This evaluation consist of performing the following US EPA toxicity tests:

- 10-day survival test with the freshwater amphipod *Hyalella azteca*.

These toxicity tests were conducted on stormwater samples collected on February 6, 2014. In order to assess the sensitivity of the test organisms to toxic stress, a reference toxicant test was also performed. As a result of the magnitude of toxicity observed, and at the request of the ADH Environmental, PER conducted a targeted Phase 1 Toxicity Identification Evaluation (TIE). This report describes the performance and results of these tests.

2. CHRONIC TOXICITY TEST PROCEDURES

The methods used in conducting testing with *H. azteca* followed a test protocol that is based on a modification of the US EPA guidelines, “Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates” (EPA/600/R-99/064).

2.1 Sample Receipt and Handling

On February 6, ADH collected stormwater samples into appropriately-cleaned containers, which were transported, on ice and under chain-of-custody, to the PER testing laboratory in Fairfield, CA. Upon receipt at the testing laboratory, aliquots of each sample were collected for analysis of initial water quality characteristics (Table 1), with the remainder of each sample being stored at 0-6°C except when being used to prepare test solutions.

The chain-of-custody record for the collection and delivery of these stormwater samples is provided as Appendix A.

Table 1. Initial water quality characteristics of the CCCWP stormwater samples.

Date Sample Received	Sample ID	Temp (°C)	pH	D.O. (mg/L)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (µS/cm)	Total Ammonia (mg/L N)
2/7/14	544R00025US-W-01	1.9	7.61	8.3	122	424	1836	<1.0
2/7/14	544R00025DS-W-01	1.9	7.66	10.6	118	420	1823	<1.0



2.2 Survival Toxicity Testing of Stormwater Samples with *Hyaella azteca*

This test consists of exposing the amphipods to the stormwater samples for 10 days, after which effects on survival are evaluated. The specific procedures used in this testing are described below.

The *H. azteca* used in this testing were obtained from a commercial supplier (Chesapeake Cultures, VA). Upon receipt at the PER laboratory, the organisms were maintained at 23°C in aerated aquaria containing Standard Artificial Medium (SAM-5S) water (Borgmann 1996) prior to their use in this test. During this pre-test period, the organisms were fed the alga *Selenastrum capricornutum* and Yeast-Cerophyll®-Trout (YCT) food amended with *Spirulina*.

The Lab Control water for these tests consisted of SAM-5S water. The stormwater samples were tested at the 100% concentration only. “New” water quality characteristics (pH, D.O., and conductivity) were measured on the test solutions prior to use in these tests.

There were 5 replicates for each test treatment, each replicate consisting a 250-mL glass beaker containing 100 mL of test solution. These tests were initiated by allocating ten 8-day old *H. azteca*, into each replicate, followed by the addition of 1.5 mL of *Spirulina* amended YCT. The replicate beakers were placed into a temperature-controlled room at 23°C, under cool-white fluorescent lighting on a 16L:8D photoperiod.

Each day of the tests, each replicate beaker was examined and the number of surviving organisms determined; ‘old’ water quality characteristics were measured in one randomly-selected beaker at each test treatment at this time. On Days 2, 4, 6, and 8 of the test, the organisms were fed 1.5 mL of *Spirulina* amended YCT in each test chamber.

On Day 5 of the 10-day tests, fresh test solutions were prepared and characterized, as before. Each replicate was examined, with any dead animals, uneaten food, wastes, and other detritus being removed. The number of live organisms in each replicate was determined and then approximately 80% of the test media in each beaker was carefully poured out and replaced with fresh test solution. “Old” water quality characteristics (pH, D.O., and conductivity) were measured on the old test solution that had been discarded from one randomly-selected replicate at each treatment.

After 10 days of exposure, the tests were terminated and the number of live organisms in each replicate was recorded. The resulting survival data were analyzed to evaluate any impairment due to the stormwater samples; all statistical analyses were performed using CETIS® statistical software.



2.2.1 Reference Toxicant Testing of the *Hyaella azteca*

In order to assess the sensitivity of the *H. azteca* test organisms to toxic stress, a reference toxicant test was performed. The reference toxicant test was performed as a 96-hr waterborne exposure to Control water spiked with KCl at test concentrations of 0, 0.1, 0.2, 0.4, 0.8 and 1.6 g/L. The resulting survival data were statistically analyzed to determine key dose-response point estimates (e.g., EC₅₀); all statistical analyses were made using the CETIS[®] software. This response endpoint was then compared to the ‘typical response’ range established by the mean \pm 2 SD of the point estimates generated by the 20 most recent previous reference toxicant tests performed by this lab.

2.3 Follow-Up Toxicity Identification Evaluation (TIE) Procedures

At the direction of the client, a Phase I TIE “targeted” was performed to identify if pyrethroid insecticides were the cause of toxicity.

The goal of the Phase I TIE fractionation procedures is to determine the class of compounds (e.g., organics, metals, ammonia, etc.) responsible for sample toxicity. This is achieved by performing physical and chemical manipulations (or treatments) on the sample. Changes in toxicity that result from the TIE treatments help characterize the physical-chemical nature of the compound(s) responsible for the observed toxicity, which in turn can be used to identify the compound(s) responsible for the toxicity. The specific treatments used in this targeted TIE are described below.

2.3.1 TIE Fractionation Method Blanks

As part of the TIE process, a method blank is prepared for each treatment and then tested to determine whether any of the TIE treatment procedures contribute any artifactual toxicity to the manipulated sample. The method blanks consisted of aliquots of Control water subjected to each of the TIE test treatments (discussed below).

2.3.2 Baseline

The Baseline test is simply a re-test of the untreated stormwater sample to confirm the persistence of toxicity during the concurrent TIE testing, and to provide a “benchmark” of toxicity against which to evaluate toxicity removal by the TIE treatments. The Baseline test was performed as described in Section 2.2.

2.3.3 Piperonyl Butoxide (PBO) Addition

This TIE treatment can help identify toxicity caused by toxicants subject to metabolic activation/detoxification by the cytochrome-P450 system:

- an increase in toxicity after PBO treatment is indicative of a contaminant that is typically *detoxified* by the cytochrome-P450 enzyme system (e.g., carbamates, pyrethroids [Amweg and Weston 2007], etc.), whereas



- a decrease in toxicity after PBO treatment is indicative of a contaminant that is *activated* by the cytochrome-P450 system [e.g., organophosphate (OP) pesticides].

The simultaneous presence of compounds that are detoxified *and* compounds that are activated by the cytochrome-P450 system (e.g., the co-occurrence of both OP-pesticides and pyrethroid pesticides) may cancel each other out. The PBO treatment consisted of addition of PBO to the stormwater sample at 50% and 100% dilution (and method blank) at a concentration of 50 µg/L. This test was then performed as described in Section 2.2.

2.3.4 Carboxylesterase Addition

The use of carboxylesterase to hydrolyze pyrethroids (via cleaving of the ester bond) has been proposed as a simple, mechanistic-based method to selectively identify pyrethroid-associated toxicity. Carboxylesterase is an enzyme that degrades type I and type II pyrethroids and has been used in recent studies to help identify pyrethroid-associated toxicity (Wheelock et al. 2004; Weston and Amweg 2007). It should be noted that this treatment is still experimental in nature and should be used in conjunction with other pyrethroid-targeted TIE treatments (e.g., PBO addition and temperature adjustment) via a weight-of-evidence approach.

Carboxylesterase may also alleviate toxicity by acting as dissolved organic matter (DOM) and providing complexation substrate to other hydrophobic compounds thus reducing the bioavailability of the toxicant; to control for the DOM effect, a bovine serum albumin (BSA) test was performed. Since BSA does not cleave the ester bond in type I and type II pyrethroids, pyrethroid-induced toxicity would be evident by a greater reduction in toxicity in the esterase treatment than seen in the BSA treatments. Any reductions in toxicity above and beyond that observed for aeration and/or BSA would be indicative of type I and type II pyrethroids as the cause of the toxicity.

These carboxylesterase treatment consisted of addition of carboxylesterase to the water sample (and method blank) at a carboxylesterase concentration of 73 mg/L (or 1.25 Units/mL); the corresponding BSA test consisted of addition of BSA to the water sample (and method blank) at a concentration of 73 mg/L. The carboxylesterase and BSA tests were performed as described in Section 2.2.

Note – Anomalous mortalities due to hypoxia (low D.O.) occurred in the one carboxylesterase blank replicate. This replicate was removed from statistical analysis.



3. RESULTS

3.1 Effects of the CCCWP Stormwater on *Hyaella azteca*

The results for these tests are summarized below in Table 2. There were significant reductions in *H. azteca* survival in the upstream and downstream 544R00025 stormwater samples. The test data and summary of statistical analyses for these tests are presented in Appendix B.

Test Initiation Date (Time)	Treatment/Sample ID	10-Day Mean % Survival
3/7/13 (1855)	Lab Control	96
	544R00025US	18*
	544R00025DS	12*

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

3.2 Performance of the Follow-Up Targeted TIE

3.2.1 Results of Targeted Phase I TIE of the “544R00025DS” Stormwater Sample

The results for this Phase I TIE are summarized below in Table 3. The following trends (changes in sample toxicity relative to the untreated water sample [Baseline] test) were observed:

- The addition of PBO to the test solutions increased toxicity to *H. azteca* survival (survival decreased from 16% survival to complete mortality). These results suggest that compounds which are *detoxified* by the cytochrome-P450 system (e.g., pyrethroid insecticides) were contributing to sample toxicity;
- The addition of carboxylesterase decreased the survival toxicity (from 16% survival to 98% Survival), suggesting that type I and type II pyrethroids are contributing to the toxicity (Weston and Amweg 2007). However, it should be noted that the esterase control treatment (BSA) also reduced toxicity, suggesting that some of the reduced toxicity was due the presence of large organic molecules. The use of carboxylesterase as a TIE treatment is still experimental and these results need to be used judiciously and in conjunction with other TIE treatment (e.g., PBO); and
- There was partial toxicity removal as a result of BSA addition, since BSA does not cleave the ester bond in type I and type II pyrethroids, evidence of greater reduction in toxicity in the esterase treatment than seen in the BSA treatment is indicative of type I and type II pyrethroids as a the cause of the stormwater toxicity.

The test data and the summary of statistical analyses for these tests are presented in Appendix C.



TIE Treatment	Mean % Survival			Effects of TIE Treatment?
	Control/Blank	50% Effluent	100% Effluent	
Baseline	100		16*	toxicity present
PBO	100	0*	0*	<i>increase</i> in toxicity
Carboxylesterase	92.5 ^a		98	toxicity removed
BSA	100		46*	partial reduction of toxicity

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

a - Anomalous mortalities due to hypoxia (low D.O.) occurred in the one carboxylesterase blank replicate. This replicate was removed from statistical analysis.



4. AQUATIC TOXICITY DATA QUALITY CONTROL

Four QC measures were assessed during the toxicity testing:

- Maintenance of acceptable test conditions;
- Negative Control testing;
- Positive Control (reference toxicant) testing; and
- Concentration Response Relationship assessment.

4.1 Maintenance of Acceptable Test Conditions

All test conditions (e.g., pH, D.O., temperature, etc.) were within acceptable limits for these tests. All analyses were performed according to laboratory Standard Operating Procedures.

4.2 Negative Control Testing

The responses at the Lab Control treatments were acceptable.

4.3 Positive Control Testing

4.3.1 Reference Toxicant Toxicity to *Hyalella azteca*

The results of this test are presented in Table 4. The EC₅₀ of 0.57 g/L is slightly above the “typical response” upper threshold value of 0.54 g/L KCl, suggesting that these organisms may have been slightly less sensitive to toxicant stress than is typical and that the survival responses in the accompanying stormwater tests should be interpreted judiciously.

The test data and summary of statistical analyses for this test are presented in Appendix D.

Table 4. Reference toxicant testing: Effects of KCl on <i>Hyalella azteca</i> survival.	
KCl Treatment (g/L)	Mean% Survival
Control	100
0.1	100
0.2	100
0.4	100
0.8	0*
1.6	0*
Summary of Statistics	
EC ₅₀ =	0.57 g/L KCl
“Typical response” range (mean ±2 SD)	0.26 – 0.54 g/L KCl

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.



4.4 Concentration Response Relationships

The concentration-response relationships for the reference toxicant tests were evaluated as per EPA guidelines (EPA-821-B-00-004), and were determined to be acceptable.



5. SUMMARY & CONCLUSIONS

Toxicity of CCCWP Stormwater to *Hyalella azteca*

There were significant reductions in *H. azteca* survival in the upstream (US) and downstream (DS) 544R00025 stormwater samples.

Targeted Phase I TIE of the “544R00025DS” Stormwater Sample

A targeted TIE was performed on the downstream stormwater sample (544R00025DS). The following trends (changes in sample toxicity relative to the untreated water sample [Baseline] test) were observed:

- The addition of PBO to the test solutions increased toxicity to *H. azteca* survival (survival decreased from 16% survival to complete mortality). These results suggest that compounds which are *detoxified* by the cytochrome-P450 system (e.g., pyrethroid insecticides) were contributing to sample toxicity;
- The addition of carboxylesterase decreased the survival toxicity (from 16% survival to 98% Survival), suggesting that type I and type II pyrethroids are contributing to the toxicity (Weston and Amweg 2007). However, it should be noted that the esterase control treatment (BSA) also reduced toxicity, suggesting that some of the reduced toxicity was due the presence of large organic molecules. The use of carboxylesterase as a TIE treatment is still experimental and these results need to be used judiciously and in conjunction with other TIE treatment (e.g., PBO); and
- There was partial toxicity removal as a result of BSA addition, since BSA does not cleave the ester bond in type I and type II pyrethroids, evidence of greater reduction in toxicity in the esterase treatment than seen in the BSA treatment is indicative of type I and type II pyrethroids as a the cause of the stormwater toxicity.

The weight of evidence from the TIE performed on the downstream stormwater sample suggests that the toxicity was likely due to pyrethroid insecticides.



6. LITERATURE CITED

Amweg EL, Weston DP (2007) Whole sediment toxicity identification evaluation tools for pyrethroid insecticides: I. Piperonyl butoxide addition. *Environ. Toxicol. Chem.* 26:2389-2396.

Wheelock CE, Miller JL, Miller MJ, Gee SJ, Shan G, Hammock B (2004) Development of toxicity identification evaluation procedures for pyrethroid detection using esterase activity. *Environ. Toxicol. Chem.* 23:2699–2708.

Weston DP, Amweg EL (2007) Whole sediment toxicity identification evaluation tools for pyrethroid insecticides: II. Esterase addition. *Environ. Toxicol. Chem.* 26:2397-2404.

Weston DP, You J, Harwood AD, Lydy MJ (2009) Whole sediment toxicity identification evaluation tools for pyrethroid insecticides: III. Temperature Manipulation. *Environ. Toxicol. Chem.* 28:173-180.

Weston DP, Lydy MJ (2010) Focused toxicity identification evaluations to rapidly identify the cause of toxicity in environmental samples. *Chemosphere.* 78:368-374.



Appendix A

Chain-of-Custody Record for the Collection and Delivery of the CCCWP Stormwater Samples





Pacific EcoRisk

2250 Cordelia Rd., Fairfield, CA 94534
 (707) 207-7760 FAX (707) 207-7916

CHAIN-OF-CUSTODY RECORD

Client Name: ADH Environmental				REQUESTED ANALYSIS																				
Client Address: 3065 Porter St. Suite 101 Soquel CA 95073				Chronic Selenium capricornitum Chronic Genodephmia tabia Chronic Pimeprates promelas 10-day Hyalella azteca (water) 10-day Hyalella azteca (sediment)																				
Phone: 831 477 2603 FAX: 831 477 0895																								
Project Manager: Alessandro Hnatl.																								
Project Name: CCCWP - SSID																								
Project # / P.O. Number: 030.001.0202 (Task 2G)																								
Sample Date					Sample Time		Sample Matrix*		Container Number		Container Type													
1	544R00025 W					STRMW		1 gall. amber				x	x	x	x									
2	544R00025PS-W-01			2-6-14	20:50			10 gal amber								X								
3	544R00025US-W-01			2-6-14	20:50			10 gal amber								X								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
12																								
Samples collected by:																								
Comments/Special Instruction: Note - Fathead minnow testing is to be performed using the standard EPA protocol (i.e., 4 replicates) Contract # 030.001.0202 SSID Study				RELINQUISHED BY:						RECEIVED BY:														
				Signature: Justin Cecutti						Signature: Marlon Orive														
				Print: Justin Cecutti						Print: Marlon Orive														
				Organization: ADH						Organization: PER														
				Date: 2-7-14 Time: 5:40						Date: 02.07.14 Time: 1740														
				RELINQUISHED BY:						RECEIVED BY:														
Signature:						Signature:																		
Print:						Print:																		
Organization:						Organization:																		
Date:						Date:																		
Time:						Time:																		

*Example Matrix Codes: (FW = Freshwater); (SW = Saltwater); (WW = Wastewater); (STRMW = Stormwater); (SED = Sediment); or other

Appendix B

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the CCCWP Stormwater Samples to *Hyalella azteca*



CETIS Summary Report

Report Date: 02 Mar-14 16:09 (p 1 of 1)
 Test Code: ADH_0207_HA_C1 | 08-6541-7375

Hyalella Survival and Growth Test Pacific EcoRisk

Batch ID: 10-6599-0950	Test Type: Survival-Growth (10 day)	Analyst: Eddie Kalombo
Start Date: 07 Feb-14 18:55	Protocol: GCML	Diluent: Not Applicable
Ending Date: 17 Feb-14 09:05	Species: Hyalella azteca	Brine: Not Applicable
Duration: 9d 14h	Source: Chesapeake Cultures, Inc.	Age: 8

Sample Code	Sample Notes
544R00025US	Upstream Sample
544R00025DS	Downstream Sample

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
ADH_0207_HA_C1	15-4211-5762	07 Feb-14 18:55	07 Feb-14 18:55	NA (23.3 °C)	ADH Environmental, Inc.	19397
544R00025US	10-7678-2817	06 Feb-14 20:50	07 Feb-14 17:40	22h (1.9 °C)		
544R00025DS	17-0680-4397	06 Feb-14 20:50	07 Feb-14 17:40	22h (1.9 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
ADH_0207_HA_C1	Sediment	CCCWP	LABQA		
544R00025US	Stormwater	CCCWP	544R00025US-W-01		
544R00025DS	Stormwater	CCCWP	544R00025DS-W-01		

Survival Rate Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect	
ADH_0207_HA_C1	5	0.96	0.94	0.98	0.9	1	0.0245	0.0548	5.71%	0.0%	
544R00025US	5	0.18	0.149	0.211	0.1	0.3	0.0374	0.0837	46.5%	81.3%	
544R00025DS	5	0.12	0.0888	0.151	0	0.2	0.0374	0.0837	69.7%	87.5%	

Survival Rate Detail						
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
ADH_0207_HA_C1	1	0.9	1	1	0.9	
544R00025US	0.2	0.3	0.1	0.2	0.1	
544R00025DS	0.1	0.2	0.1	0	0.2	

Survival Rate Binomials						
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	
ADH_0207_HA_C1	10/10	9/10	10/10	10/10	9/10	
544R00025US	2/10	3/10	1/10	2/10	1/10	
544R00025DS	1/10	2/10	1/10	0/10	2/10	

CETIS Analytical Report

Report Date: 02 Mar-14 16:09 (p 1 of 2)
 Test Code: ADH_0207_HA_C1 | 08-6541-7375

Hyalella Survival and Growth Test				Pacific EcoRisk	
Analysis ID:	17-7335-5517	Endpoint:	Survival Rate	CETIS Version:	CETISv1.8.5
Analyzed:	02 Mar-14 16:09	Analysis:	Parametric-Two Sample	Official Results:	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	7.52%	

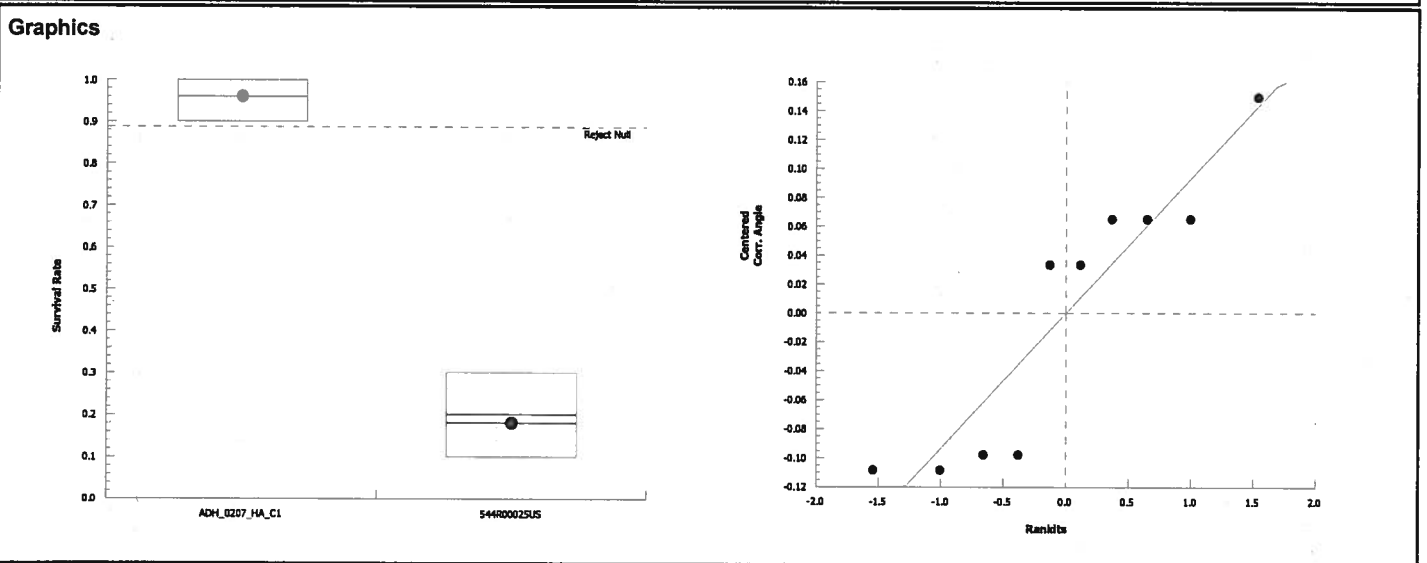
Equal Variance t Two-Sample Test									
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
ADH_0207_HA_C1		544R00025US	14.5	1.86	0.118	8	<0.0001	CDF	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.101034	2.101034	1	210	<0.0001	Significant Effect
Error	0.07996342	0.009995428	8			
Total	2.180998		9			

Distributional Tests					
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.51	23.2	0.6999	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.845	0.741	0.0510	Normal Distribution

Survival Rate Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
ADH_0207_HA_C1	5	0.96	0.892	1	1	0.9	1	0.0245	5.71%	0.0%
544R00025US	5	0.18	0.0761	0.284	0.2	0.1	0.3	0.0374	46.5%	81.3%

Angular (Corrected) Transformed Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
ADH_0207_HA_C1	5	1.35	1.24	1.46	1.41	1.25	1.41	0.0399	6.63%	0.0%
544R00025US	5	0.43	0.294	0.566	0.464	0.322	0.58	0.049	25.5%	68.1%



10 Day Acute *Hyaella azteca* Toxicity Test Data

Client: ADH / CCCWP
 Test Material: 544R00025 U/S (up-stream)
 Test ID#: 55256 Project #: 19397
 Test Date: 2-7-14

Organism Log#: 7930 Age: 8 days
 Organism Supplier: Chesapeake
 Control/Diluent: SAM-5 Hyaella Water
 Control Water Batch: 54

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Lab Control	23.3	7.84		9.1		389	10	10	10	10	10	Date: 2-7-14 Sample ID: 34018 34017
100%	23.3	7.61		8.1		1835	10	10	10	10	10	Test Solution Prep: MK New WQ: MK
Meter ID	430	PH15		RD04		EL04						Initiation Time: MK Initiation Signoff: MK
Lab Control	23.2						10	9	10	10	10	Date: 2/8/14 Count Time: 140
100%	23.2						9	10	10	10	10	Count Signoff: KB Old WQ: MA
Meter ID	43A					RD06						
Lab Control	23.4						10	9	10	10	9	Date: 2/9/14 Count Time: 1030
100%	23.4						8	7	6	10	9	Count Signoff: MK Old WQ: ADP
Meter ID	43B					RD04						Feed: MK
Lab Control	23.7						10	9	10	10	9	Date: 2/10/14 Count Time: 1030
100%	23.7						7	7	5	8	6	Count Signoff: MK Old WQ: D.M.S.
Meter ID	43A					RD04						
Lab Control	23.4						10	9	10	10	9	Date: 2/11/14 Count Time: 1005
100%	23.4						7	7	5	8	6	Count Signoff: MK Old WQ: ADP
Meter ID	43A					RA05						Feed: ADP
Lab Control	23.1	8.11	7.75	8.8	8.1	461	10	9	10	10	9	Date: 2-12-14 Sample ID: 34017
100%	23.1	7.85	7.73	10.1	7.5	1926	6	6	4	7	5	Test Solution Prep: MK New WQ: MK
Meter ID	43A	PH16	PH16	RD05	RD06	EL04						Renewal Time: 1345 Renewal Signoff: MK Old WQ: MK
Lab Control	23.1						10	9	10	10	9	Date: 2-13-14 Count Time: 1015
100%	23.1						4	4	4	5	5	Count Signoff: MK Old WQ: MK
Meter ID	43A					RD07						Feed: MK
Lab Control	23.3						10	9	10	10	9	Date: 2/14/14 Count Time: 915
100%	23.3						3	4	2	3	3	Count Signoff: MK Old WQ: MK
Meter ID	43A					RD05						
Lab Control	23.2						10	9	10	10	9	Date: 2/16/14 Count Time: 900
100%	23.2						2	4	1	2	1	Count Signoff: MK Old WQ: LH
Meter ID	43A					RD07						Feed: MK
Lab Control	23.1						10	9	10	10	9	Date: 2/16/14 Count Time: 1105
100%	23.1						2	4	1	2	1	Count Signoff: MK Old WQ: MK
Meter ID	43A					RD07						
Lab Control	23.1		7.50				10	9	10	10	9	Date: 2-17-14 Termination Time: 0905
100%	23.1		7.74				2	3	1	2	1	Termination Signoff: MK Old WQ: D.M.S.
Meter ID	43A		PH14			RD04	EL04					

CETIS Analytical Report

Report Date: 02 Mar-14 16:09 (p 2 of 2)
 Test Code: ADH_0207_HA_C1 | 08-6541-7375

Hyalella Survival and Growth Test			Pacific EcoRisk		
Analysis ID: 09-0015-3719	Endpoint: Survival Rate	CETIS Version: CETISv1.8.5			
Analyzed: 02 Mar-14 16:09	Analysis: Parametric-Two Sample	Official Results: Yes			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.26%	

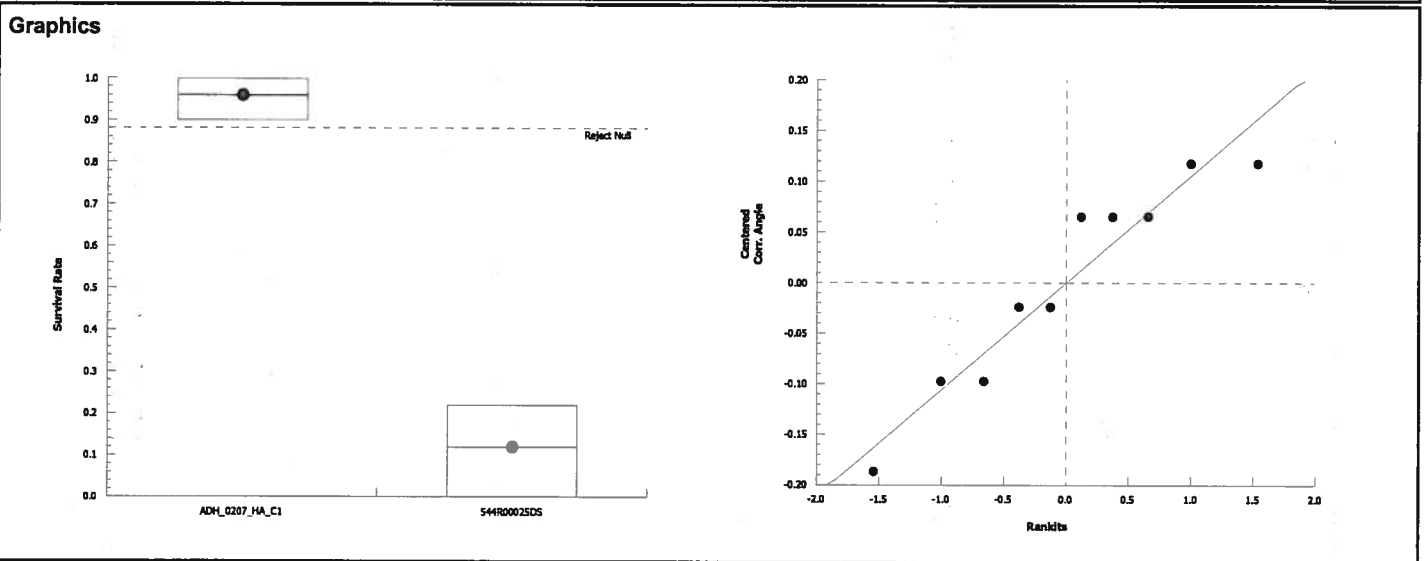
Equal Variance t Two-Sample Test									
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
ADH_0207_HA_C1		544R00025DS	14.5	1.86	0.129	8	<0.0001	CDF	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.504565	2.504565	1	209	<0.0001	Significant Effect
Error	0.0957804	0.01197255	8			
Total	2.600346		9			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	2.01	23.2	0.5170	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.91	0.741	0.2836	Normal Distribution	

Survival Rate Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
ADH_0207_HA_C1	5	0.96	0.892	1	1	0.9	1	0.0245	5.71%	0.0%
544R00025DS	5	0.12	0.0161	0.224	0.1	0	0.2	0.0374	69.7%	87.5%

Angular (Corrected) Transformed Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
ADH_0207_HA_C1	5	1.35	1.24	1.46	1.41	1.25	1.41	0.0399	6.63%	0.0%
544R00025DS	5	0.346	0.189	0.503	0.322	0.159	0.464	0.0565	36.5%	74.3%



10 Day Acute *Hyaella azteca* Toxicity Test Data

Client: ADH / CCCWP
 Test Material: 544R00025 D/S (down-stream)
 Test ID#: 55260 Project #: 19397
 Test Date: 2-7-14

Organism Log#: 7930 Age: 8 days
 Organism Supplier: Cheapealce
 Control/Diluent: SAM-5 Hyaella Water
 Control Water Batch: 54

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Lab Control	23.3	7.86		9.1		389	10	10	10	10	10	Date: 2-7-14 Sample ID: 34018 Test Solution Prep: <u>EM</u> New WQ: <u>AS</u> Initiation Time: <u>1855</u> Initiation Signoff: <u>MM</u>
100%	23.3	7.66		10.6		1823	10	10	10	10	10	
Meter ID	43A	PH15		R004		EC04						
Lab Control	23.2				8.3		10	9	10	10	10	Date: 2/8/14 Count Time: <u>140</u> Count Signoff: <u>MM</u> Old WQ: <u>MM</u>
100%	23.2				7.9		8	10	10	10	10	
Meter ID	43A				R006							
Lab Control	23.4				5.9		10	9	10	10	9	Date: 2/9/14 Count Time: <u>1030</u> Count Signoff: <u>MM</u> Old WQ: <u>MM</u> Feed: <u>MM</u>
100%	23.4				5.8		6	10	10	9	9	
Meter ID	43A				R004							
Lab Control	23.7				7.0		10	9	10	10	9	Date: 2/10/14 Count Time: <u>1030</u> Count Signoff: <u>MM</u> Old WQ: <u>P.M.S.</u>
100%	23.7				5.1		5	8	9	7	9	
Meter ID	43A				R004							
Lab Control	23.4				7.3		10	9	10	10	9	Date: 2/11/14 Count Time: <u>1205</u> Count Signoff: <u>MM</u> Old WQ: <u>MM</u> Feed: <u>MM</u>
100%	23.4				5.7		5	8	9	7	9	
Meter ID	43A				R005							
Lab Control	23.1	8.11	7.75	8.8	8.1	461	10	9	10	10	9	Date: 2-12-14 Sample ID: 34018 Test Solution Prep: <u>EM</u> New WQ: <u>AS</u> Renewal Time: <u>1345</u> Renewal Signoff: <u>MM</u> Old WQ: <u>MM</u>
100%	23.1	7.92	7.79	10.2	7.0	1909	3	7	8	7	7	
Meter ID	43A	PH16	PH16	R005	R006	EC04						
Lab Control	23.1				7.2		10	9	10	10	9	Date: 2-13-14 Count Time: <u>1015</u> Count Signoff: <u>MM</u> Old WQ: <u>MM</u> Feed: <u>MM</u>
100%	23.1				5.4		2	6	5	4	5	
Meter ID	43A				R007							
Lab Control	23.3				4.6		10	9	10	10	9	Date: 2/14/14 Count Time: <u>915</u> Count Signoff: <u>MM</u> Old WQ: <u>MM</u>
100%	23.3				3.6		2	6	4	2	3	
Meter ID	43A				R005							
Lab Control	23.2				5.0		10	9	10	10	9	Date: 2/15/14 Count Time: <u>900</u> Count Signoff: <u>MM</u> Old WQ: <u>LH</u> Feed: <u>MM</u>
100%	23.2				3.6		2	4	4	1	3	
Meter ID	43A				R007							
Lab Control	23.1				5.4		10	9	10	10	9	Date: 2/16/14 Count Time: <u>1105</u> Count Signoff: <u>MM</u> Old WQ: <u>MM</u>
100%	23.1				6.1		2	3	1	1	2	
Meter ID	43A				R007							
Lab Control	23.1		7.50		9.6	441	10	9	10	10	9	Date: 2-17-14 Termination Time: <u>0905</u> Termination Signoff: <u>MM</u> Old WQ: <u>P.M.S.</u>
100%	23.1		7.89		6.3	2008	1	2	1	0	2	
Meter ID	43A		PH19		R004	EC04						

Appendix C

Test Data and Summary of Statistics for the Evaluation of the Chronic Toxicity of the CCCWP Stormwater to *Hyalella azteca* – Follow-Up Toxicity Identification Evaluation (TIE): 544R00025DS

10 Day Acute *Hyalella azteca* Toxicity Test Data

Client: ADH/CCCWP
 Test Material: 544R00025DS-W-01
 Test ID#: 55383 Project #: 19397
 Test Date: 2/15/14

Organism Log#: 7966 Age: 7-8 d.
 Organism Supplier: Chesapeake
 Control/Diluent: SAM-5 Hyalella Water
 Control Water Batch: 81

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Lab Control	23.2	7.81		8.4		428	10	10	10	10	10	Date: 2/15/14 Sample ID: 34018 Test Solution Prep: <u>JK</u> New WQ: <u>FOLB</u> Initiation Time: <u>1630</u> Initiation Signoff: <u>JK</u>
100%	23.2	7.84		8.7		1921	10	10	10	10	10	
Meter ID	43A	PH18		RD04		EC09						
Lab Control	23.1				8.2		10	10	10	10	10	Date: 2.16.14 Count Time: 1100 Count Signoff: <u>JK</u> Old WQ: <u>JK</u>
100%	23.1				7.0		10	10	9	10	10	
Meter ID	43A				RD04							
Lab Control	23.3				5.0		10	10	10	10	10	Date: 2-17-14 Count Time: 1210 Count Signoff: <u>JK</u> Old WQ: <u>JK</u> Feed: <u>JK</u>
100%	23.3				5.3		9	10	9	10	10	
Meter ID	43A				RD05							
Lab Control	23.2				5.6		10	10	10	10	10	Date: 2/18/14 Count Time: 1100 Count Signoff: <u>JK</u> Old WQ: <u>CP</u>
100%	23.2				6.1		8	9	7	10	10	
Meter ID	43A				RD04							
Lab Control	23.3				7.8		10	10	10	10	10	Date: 2/19/14 Count Time: 1400 Count Signoff: <u>MK</u> Old WQ: <u>AS</u> Feed: <u>MK</u>
100%	23.3				7.7		8	8	4	8	7	
Meter ID	43A				RD07							
Lab Control	23.2	8.11	7.84	9.0	8.0	430	10	10	10	10	10	Date: 2/20/14 Sample ID: 34018 Test Solution Prep: <u>JK</u> New WQ: <u>AS</u> Renewal Time: <u>1655</u> Renewal Signoff: <u>JK</u> Old WQ: <u>CP</u>
100%	23.2	7.91	8.12	9.6	7.5	1904	7	5	4	5	2	
Meter ID	43A	PH9	PH15	RD07	RD05	EC04						
Lab Control	22.9				3.2		10	10	10	10	10	Date: 2/21/14 Count Time: 1300 Count Signoff: <u>JK</u> Old WQ: <u>JK</u> Feed: <u>JK</u>
100%	22.9				4.5		5	5	2	0	0	
Meter ID	43A				RD07							
Lab Control	23.1				4.5		10	10	10	10	10	Date: 2/22/14 Count Time: 900 Count Signoff: <u>JK</u> Old WQ: <u>MK</u>
100%	23.1				4.0		5	2	2	-	-	
Meter ID	43A				RD05							
Lab Control	23.1				6.2		10	10	10	10	10	Date: 2/23/14 Count Time: 1030 Count Signoff: <u>JK</u> Old WQ: <u>FEAR?</u> Feed: <u>JK</u>
100%	23.4				6.0		4	2	2	-	-	
Meter ID	43A				RD07							
Lab Control	23.1				5.6		10	10	10	10	10	Date: 2/24/14 Count Time: 1430 Count Signoff: <u>JK</u> Old WQ: <u>CP</u>
100%	23.1				4.7		4	2	2	-	-	
Meter ID	43A				RD04							
Lab Control	23.2		7.80		5.7	477	10	10	10	10	10	Date: 2/25/14 Termination Time: 1100 Termination Signoff: <u>JK</u> Old WQ: <u>CP</u>
100%	23.2		7.88		6.0	2177	4	2	2	-	-	
Meter ID	43A		PH16		RD04	EC06						

10 Day Acute *Hyaella azteca* Toxicity Test Data

Client: ADH /CCCWP
 Test Material: 544R00025DS-W-01 + PBO
 Test ID#: 55383 Project #: 19397
 Test Date: 2/15/14

Organism Log#: 7966 Age: 7-8d
 Organism Supplier: Chesapeake
 Control/Diluent: SAM 5 Hyaella Water
 Control Water Batch: 81

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
PBO Blank	23.2	7.90		8.6		420	10	10	10	10	10	Date: 2/15/14 Sample ID: 34104 Test Solution Prep: CP New WQ: FCB Initiation Time: 1630 Initiation Signoff: CP
50%	23.2	7.92		8.6		1165	10	10	10	10	10	
100%	23.2	7.90		8.6		1882	10	10	10	10	10	
Meter ID	43K	PH18		FD04		EC09						
PBO Blank	23.1				8.1		10	10	10	10	10	Date: 2-16-14 Count Time: 1100 Count Signoff: MK Old WQ: CP Feed: MK
50%	23.1				7.1		10	10	10	10	10	
100%	23.1				7.0		10	10	10	10	10	
Meter ID	42A				RD04							
PBO Blank	23.3				5.2		10	10	10	10	10	Date: 2-17-14 Count Time: 1310 Count Signoff: MK Old WQ: CP Feed: MK
50%	23.3				6.0		7	7	10	7	9	
100%	23.3				6.4		7	5	6	3	5	
Meter ID	43A				RD07							
PBO Blank	23.2				5.8		10	10	10	10	10	Date: 2/18/14 Count Time: 1100 Count Signoff: MK Old WQ: CP Feed: MK
50%	23.2				6.0		7	6	10	6	9	
100%	23.2				6.2		5	5	6	3	4	
Meter ID	43A				RD04							
PBO Blank	23.3				7.4		10	10	10	10	10	Date: 2/19/14 Count Time: 1400 Count Signoff: MK Old WQ: CP Feed: MK
50%	23.3				7.2		6	5	7	3	7	
100%	23.3				7.2		3	1	1	0	1	
Meter ID	43A				RD07							
PBO Blank	23.2	8.12	7.73	9.0	6.7	411	10	10	10	10	10	Date: 2/20/14 Sample ID: 3405 Test Solution Prep: CP New WQ: AS Renewal Time: 1655 Renewal Signoff: CP Old WQ: CP Feed: MK
50%	23.2	7.96	7.80	9.1	6.9	1199	0	0	0	0	1	
100%	23.2	7.97	7.94	9.1	7.4	1506	0	0	0	0	1	
Meter ID	43A	PH19	PH15	RD07	RD05	EC04						
PBO Blank	22.9				4.5		10	10	10	10	10	Date: 2/21/14 Count Time: 1800 Count Signoff: MK Old WQ: CP Feed: MK
50%	22.9				6.3		0	-	-	-	0	
100%	22.9				6.9		-	-	-	-	0	
Meter ID	43A				RD07							
PBO Blank	23.1				2.7		10	10	10	10	10	Date: 2/22/14 Count Time: 900 Count Signoff: MK Old WQ: MK
50%	23.1				-		-	-	-	-	-	
100%	23.1				-		-	-	-	-	-	
Meter ID	43A				RD05							
PBO Blank	23.1				5.9		10	10	10	10	10	Date: 2/23/14 Count Time: 1030 Count Signoff: MK Old WQ: CP Feed: MK
50%	-				-		-	-	-	-	-	
100%	-				-		-	-	-	-	-	
Meter ID	43A				RD07							
PBO Blank	23.1				5.7		10	10	10	10	10	Date: 2/24/14 Count Time: 1430 Count Signoff: MK Old WQ: CP
50%	-				-		-	-	-	-	-	
100%	-				-		-	-	-	-	-	
Meter ID	43A				RD04							
PBO Blank	23.2		7.88		5.7	455	10	10	10	10	10	Date: 2/25/14 Termination Time: 1000 Termination Signoff: CP Old WQ: CP
50%	23.2		-		-	-	-	-	-	-	-	
100%	23.2		-		-	-	-	-	-	-	-	
Meter ID	43A		PH16		RD04	EC06						

10 Day Acute *Hyaella azteca* Toxicity Test Data

Client: ADH /CCCWP
 Test Material: 544R00025DS-W-01 + Carboxyl Esterase
 Test ID#: 55383 Project #: 19397
 Test Date: 2/15/14

Organism Log#: 7966 Age: 7-8d
 Organism Supplier: Chesapeake
 Control/Diluent: SAM5 Hyaella Water
 Control Water Batch: 81

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
Carboxyl esterase Blank	23.2	8.02		8.7		423	10	10	10	10	10	Date: 2/15/14 Sample ID: 34018 Test Solution Prep: PR New WQ: Fours Initiation Time: 1630 Initiation Signoff: PR
100%	23.2	7.92		8.6		1869	10	10	10	10	10	
Meter ID	43A	PH18		RD04		EC09						
Carboxyl esterase Blank	23.1				4.6		10	10	10	10	10	Date: 2.16.14 Count Time: 1100 Count Signoff: BNL Old WQ: BNL
100%	23.1				2.0		10	10	10	10	10	
Meter ID	43A				RD04							
Carboxyl esterase Blank	23.3				3.9		10	10	9	10	10	Date: 2/17/14 Count Time: 1210 Count Signoff: PR Old WQ: PR Feed: PR
100%	23.3				2.4		9	10	10	10	10	
Meter ID	43A				RD05							
Carboxyl esterase Blank	23.2				4.6		10	10	9	10	10	Date: 2/18/14 Count Time: 1100 Count Signoff: PR Old WQ: CP
100%	23.2				5.2		9	10	10	10	10	
Meter ID	43A				RD04							
Carboxyl esterase Blank	23.3				5.1		10	9	9	10	10	Date: 2/19/14 Count Time: 400 Count Signoff: MK Old WQ: AS Feed: MK
100%	23.3				7.1		9	10	10	10	10	
Meter ID	43A				RD07							
Carboxyl esterase Blank	23.2	8.07	7.65	9.1	5.5	417	10	9	9	10	10	Date: 2/20/14 Sample ID: 34018 Test Solution Prep: PR New WQ: AS Renewal Time: 1655 Renewal Signoff: PR Old WQ: CP
100%	23.2	7.99	7.81	9.0	5.7	1906	9	10	10	10	10	
Meter ID	43A	PH19	PH15	RD07	RD05	EC09						
Carboxyl esterase Blank	22.9				3.4		10	9	9	10	10	Date: 2/21/14 Count Time: 1900 Count Signoff: PR Old WQ: PR Feed: PR
100%	22.9				6.4		9	10	10	10	10	
Meter ID	43A				RD07							
Carboxyl esterase Blank	23.1				1.7		10	9	9	10	10	Date: 2/22/14 Count Time: 900 Count Signoff: PR Old WQ: MK
100%	23.1				7.6		9	10	10	10	10	
Meter ID	43A				RD05							
Carboxyl esterase Blank	23.1				7.4		1	9	9	10	10	Date: 2/23/14 Count Time: 1030 Count Signoff: PR Old WQ: PR Feed: PR
100%	23.1				7.7		9	10	10	10	10	
Meter ID	43A				RD07							
Carboxyl esterase Blank	23.1				7.4		1	9	9	10	10	Date: 2/24/14 Count Time: 1430 Count Signoff: CJD Old WQ: CP
100%	23.1				7.7		9	10	10	10	10	
Meter ID	43A				RD04							
Carboxyl esterase Blank	23.2		8.02		6.7	523	1	9	9	9	10	Date: 2/25/14 Termination Time: 1100 Termination Signoff: CJD Old WQ: CP
100%	23.2		8.20		7.3	2201	9	10	10	10	10	
Meter ID	43A		PH16		RD04	EC06						

10 Day Acute *Hyaella azteca* Toxicity Test Data

Client: ADH /CCCWP
 Test Material: 544R00025DS-W-01 + BSA
 Test ID#: 55383 Project #: 19397
 Test Date: 2/15/14

Organism Log#: 7966 Age: 78 d
 Organism Supplier: Chesapeake
 Control/Diluent: SAM 5 Hyaella Water
 Control Water Batch: 81

Treatment	Temp (°C)	pH		D.O. (mg/L)		Conductivity (µS/cm)	# Live Organisms					SIGN-OFF
		new	old	new	old		A	B	C	D	E	
BSA Blank	23.2	8.00		8.6		413	10	10	10	10	10	Date: 2/15/14 Sample ID: 34018 Test Solution Prep: <u>YR</u> New WQ: <u>FOUS</u> Initiation Time: 1630 Initiation Signoff: <u>YR</u>
100%	23.2	7.94		8.6		1890	10	10	10	10	10	
Meter ID	43A	PH18		R004		EC09						
BSA Blank	23.1				6.1		10	10	10	10	10	Date: 2.16.14 Count Time: 1100 Count Signoff: <u>YR</u> Old WQ: <u>YR</u>
100%	23.1				2.9		10	10	10	10	10	
Meter ID	43A				R004							
BSA Blank	23.3				5.0		10	10	10	10	10	Date: 2-17-14 Count Time: 1230 Count Signoff: <u>YR</u> Old WQ: <u>YR</u> Feed: <u>YR</u>
100%	23.3				2.6		10	10	8	10	10	
Meter ID	43A				R005							
BSA Blank	23.2				4.4		10	10	10	10	10	Date: 2/18/14 Count Time: 1100 Count Signoff: <u>YR</u> Old WQ: <u>CP</u>
100%	23.2				4.7		10	10	8	10	10	
Meter ID	43A				R004							
BSA Blank	23.3				4.4		10	10	10	10	10	Date: 2/19/14 Count Time: 1400 Count Signoff: <u>YR</u> Old WQ: <u>AS</u> Feed: <u>YR</u>
100%	23.3				6.0		8	6	7	8	8	
Meter ID	43A				R009							
BSA Blank	23.2	8.15	7.58	9.2	4.3	409	10	10	10	10	10	Date: 2/20/14 Sample ID: 34018 Test Solution Prep: <u>YR</u> New WQ: <u>AS</u> Renewal Time: 1655 Renewal Signoff: <u>YR</u> Old WQ: <u>CP</u>
100%	23.2	7.93	7.81	9.1	5.3	1912	10	6	3	6	8	
Meter ID	43A	PH19	PH15	R007	R005	EC04						
BSA Blank	22.9				3.4		10	10	10	10	10	Date: 2/21/14 Count Time: 1800 Count Signoff: <u>YR</u> Old WQ: <u>YR</u> Feed: <u>YR</u>
100%	22.9				5.7		4	6	3	6	8	
Meter ID	43A				R007							
BSA Blank	23.1				1.8		10	10	10	10	10	Date: 2/22/14 Count Time: 900 Count Signoff: <u>YR</u> Old WQ: <u>YR</u>
100%	23.1				7.0		4	5	3	6	7	
Meter ID	43A				R005							
BSA Blank	23.1				7.4		10	10	10	10	10	Date: 2/23/14 Count Time: 1030 Count Signoff: <u>YR</u> Old WQ: <u>YR</u> Feed: <u>YR</u>
100%	23.1				7.7		4	5	2	6	7	
Meter ID	43A				R007							
BSA Blank	23.1				7.2		10	10	10	10	10	Date: 2/24/14 Count Time: 1450 Count Signoff: <u>YR</u> Old WQ: <u>CP</u>
100%	23.1				7.5		4	5	1	6	7	
Meter ID	43A				R004							
BSA Blank	23.2		8.09		6.9	522	10	10	10	10	10	Date: 2/25/14 Termination Time: 1100 Termination Signoff: <u>YR</u> Old WQ: <u>CP</u>
100%	23.2		8.18		6.9	2201	4	5	1	6	7	
Meter ID	43A		PH16		R004	EC06						

Appendix D

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Hyaella azteca*



CETIS Summary Report

Report Date: 15 Feb-14 15:46 (p 1 of 1)
 Test Code: 55244 | 12-2780-2249

Hyalella 96-h Acute Survival Test **Pacific EcoRisk**

Batch ID: 19-8480-8516	Test Type: Survival (96h)	Analyst: Cassy Glover
Start Date: 07 Feb-14 17:40	Protocol: EPA-821-R-02-012 (2002)	Diluent: SAM-5S
Ending Date: 11 Feb-14 16:55	Species: Hyalella azteca	Brine: Not Applicable
Duration: 95h	Source: Chesapeake Cultures, Inc.	Age: 8

Sample ID: 12-2997-3710	Code: KCI	Client: Reference Toxicant
Sample Date: 07 Feb-14 17:40	Material: Potassium chloride	Project: 22049
Receive Date: 07 Feb-14 17:40	Source: Reference Toxicant	
Sample Age: NA (23.3 °C)	Station: In House	

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
04-8301-8359	96h Survival Rate	0.4	0.8	0.5657	NA		Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
04-4756-7462	96h Survival Rate	EC50	0.566	0.454	0.704		Binomial/Graphical

96h Survival Rate Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
0.1		10	1	1	1	1	1	0	0	0.0%	0.0%
0.2		10	1	1	1	1	1	0	0	0.0%	0.0%
0.4		10	1	1	1	1	1	0	0	0.0%	0.0%
0.8		10	0	0	0	0	0	0	0		100.0%
1.6		10	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
0.1		1	1	1	1	1	1	1	1	1	1
0.2		1	1	1	1	1	1	1	1	1	1
0.4		1	1	1	1	1	1	1	1	1	1
0.8		0	0	0	0	0	0	0	0	0	0
1.6		0	0	0	0	0	0	0	0	0	0

96h Survival Rate Binomials

C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.4		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.8		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
1.6		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

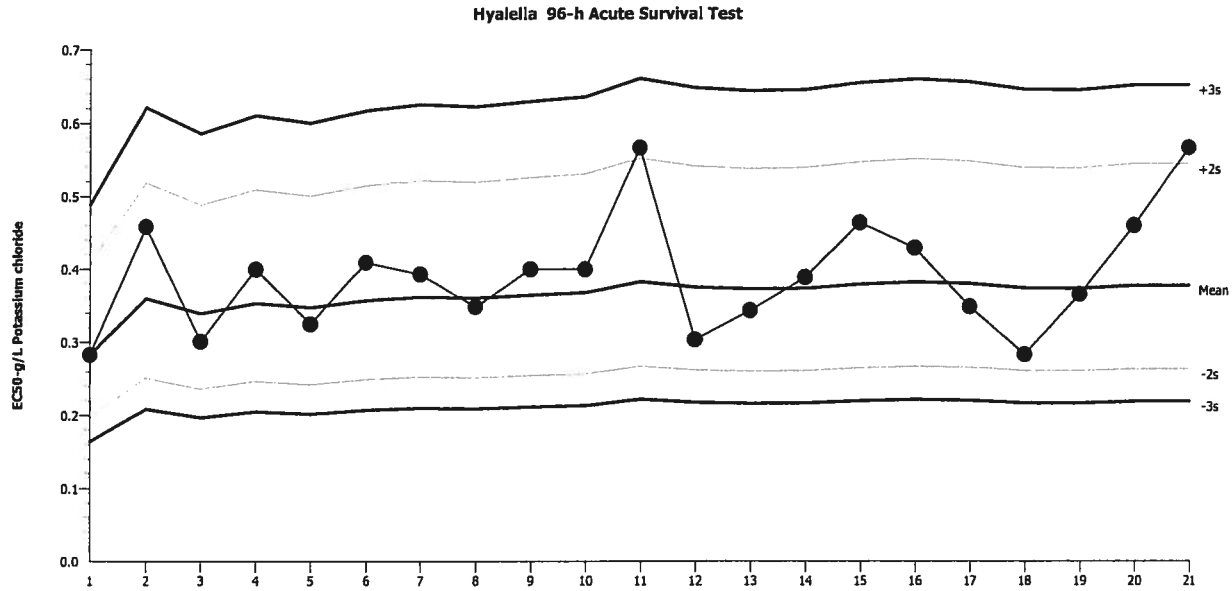
Hyalella 96-h Acute Survival Test

Pacific EcoRisk

Test Type: Survival (96h)
Protocol: Ali Protocols

Organism: Hyalella azteca (Freshwater Amphip)
Endpoint: 96h Survival Rate

Material: Potassium chloride
Source: Reference Toxicant-REF



Mean: 0.3773 Count: 20 -2s Warning Limit: 0.2621 -3s Action Limit: 0.2185
Sigma: NA CV: 20.00% +2s Warning Limit: 0.5429 +3s Action Limit: 0.6513

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Jul	25	16:30	0.2828	-0.09443	-1.583			00-1823-9671	20-7751-0916
2			26	14:30	0.4583	0.08108	1.07			11-2447-7250	10-1665-7756
3		Aug	15	16:50	0.3009	-0.07641	-1.243			00-1985-9655	15-6499-7663
4			22	15:50	0.4	0.02273	0.3215			03-4648-2331	16-3196-9760
5			23	15:30	0.3249	-0.05237	-0.8211			15-2391-2292	08-1418-9228
6		Sep	12	16:00	0.4092	0.0319	0.446			15-4907-0534	08-4072-9838
7			15	16:05	0.3931	0.01586	0.2263			20-8032-4728	11-2664-4219
8		Oct	10	14:15	0.3482	-0.02905	-0.4402			17-8638-2812	17-1370-8594
9			27	15:00	0.4	0.02273	0.3215			07-6368-8256	01-2718-7046
10		Nov	6	15:40	0.4	0.02273	0.3215			15-7026-7439	19-7036-5835
11			20	17:00	0.5657	0.1884	2.226	(+)		01-7958-1543	09-3590-7589
12			21	16:55	0.3031	-0.07412	-1.202			17-4328-3485	11-7628-5959
13		Dec	11	17:45	0.3429	-0.0344	-0.5254			06-4892-3798	02-7681-8091
14	2014	Jan	22	15:30	0.3887	0.01145	0.1643			15-1323-9580	12-5039-1906
15			23	12:20	0.4634	0.08616	1.13			12-4927-8114	03-4534-5077
16			24	13:50	0.4287	0.05144	0.7023			04-8256-1553	14-6784-2933
17			29	12:45	0.3482	-0.02905	-0.4402			02-0910-9206	20-3009-8021
18			30	13:00	0.2828	-0.09443	-1.583			07-7453-2234	19-6136-6595
19			31	15:00	0.3651	-0.01214	-0.1796			07-3562-2451	09-8419-3354
20		Feb	4	16:00	0.4595	0.08221	1.083			07-2556-9878	06-3437-8862
21			7	17:40	0.5657	0.1884	2.226	(+)		12-2780-2249	04-4756-7462

96 Hour *Hyalella azteca* Reference Toxicant Test Data

Client: Reference Toxicant
 Test Material: Potassium Chloride
 Test ID#: 55244 Project #: 22049
 Test Date: 2-7-14 Randomization: 10.6.3
 Feeding To Time: 0800 Initials: ns

Organism Log #: 79.30 Age: 8 days
 Organism Supplier: Onscape
 Control/Diluent: SAM-5 Hyalella Water
 Control Water Batch: 54
 Feeding T46 Time: 1100 Initials: Jm

Treatment (g/L)	Temp (°C)	pH	D.O. (mg/L)	Conductivity (µS/cm)	# Live Animals										Sign-Off
					A	B	C	D	E	F	G	H	I	J	
Control	23.3	8.01	9.0	443	1	1	1	1	1	1	1	1	1	1	Test Solution Prep: <u>SM</u>
0.1	23.3	7.93	9.0	601	1	1	1	1	1	1	1	1	1	1	New WQ: <u>A</u>
0.2	23.3	7.91	9.0	761	1	1	1	1	1	1	1	1	1	1	Initiation Date: <u>2-7-14</u>
0.4	23.3	7.85	9.2	1157	1	1	1	1	1	1	1	1	1	1	Initiation Time: <u>1740</u>
0.8	23.3	7.81	9.5	1901	1	1	1	1	1	1	1	1	1	1	Initiation Signoff: <u>Jm</u>
1.6	23.3	7.76	10.2	3320	1	1	1	1	1	1	1	1	1	1	RT Batch #: <u>14</u>
Meter ID	43A	PH19	RD07	EC09											
Control	23.2				1	1	1	1	1	1	1	1	1	1	Count Date: <u>2/8/14</u>
0.1	23.2				1	1	1	1	1	1	1	1	1	1	Count Time: <u>1100</u>
0.2	23.2				1	1	1	1	1	1	1	1	1	1	Count Signoff: <u>WD</u>
0.4	23.2				1	1	1	1	1	1	1	1	1	1	
0.8	23.2				1	1	1	0	0	0	0	0	0	0	
1.6	23.2				0	0	0	0	0	0	0	0	0	0	
Meter ID	43A														
Control	23.3				1	1	1	1	1	1	1	1	1	1	Count Date: <u>2-9-14</u>
0.1	23.3				1	1	1	1	1	1	1	1	1	1	Count Time: <u>1055</u>
0.2	23.3				1	1	1	1	1	1	1	1	1	1	Count Signoff: <u>Jm</u>
0.4	23.3				1	1	1	1	1	1	1	1	1	1	
0.8	23.3				0	0	0	-	-	-	-	-	-	-	
1.6	-				-	-	-	-	-	-	-	-	-	-	
Meter ID	43A														
Control	23.7				1	1	1	1	1	1	1	1	1	1	Count Date: <u>2/10/14</u>
0.1	23.7				1	1	1	1	1	1	1	1	1	1	Count Time: <u>1115</u>
0.2	23.7				1	1	1	1	1	1	1	1	1	1	Count Signoff: <u>MK</u>
0.4	23.7				1	1	1	1	1	1	1	1	1	1	
0.8	-				-	-	-	-	-	-	-	-	-	-	
1.6	-				-	-	-	-	-	-	-	-	-	-	
Meter ID	43A														
Control	23.4	7.86	9.8	445	1	1	1	1	1	1	1	1	1	1	Termination Date: <u>2/11/14</u>
0.1	23.4	7.87	9.5	613	1	1	1	1	1	1	1	1	1	1	Termination Time: <u>1655</u>
0.2	23.4	7.86	9.3	769	1	1	1	1	1	1	1	1	1	1	Termination Signoff: <u>AW</u>
0.4	23.4	7.85	9.1	1170	1	1	1	1	1	1	1	1	1	1	Old WQ: <u>AW</u>
0.8	-	7.85	9.0	1900	-	-	-	-	-	-	-	-	-	-	
1.6	-	7.82	8.7	3330	-	-	-	-	-	-	-	-	-	-	
Meter ID	43A	PH19	RD07	EC04											

Alessandro D. Hnatt
 ADH Environmental
 3065 Porter Street, Suite 101
 Soquel, CA 95073

September 9, 2014

Alessandro:

I have enclosed one copy of our report “Evaluation of the Chronic Toxicity of Contra Costa Clean Water Program Ambient Sediment Samples” for the samples that were collected July 22, 2014. The results of this testing are summarized below:

Toxicity summary for CCCWP-SSID ambient sediment samples to <i>Hyalella azteca</i> .		
Sample Station	Toxicity Present Relative to Lab Control treatment?	
	Survival	Growth
207WAL078	Yes	Yes
207WAL060	Yes	no
544MSH065	Yes	Yes
544MSH062	Yes	Yes

In response to the observed reduction in survival and growth, a targeted TIE was performed on the upstream stormwater sample (544MSH065) in an attempt to identify suspected cause(s) of toxicity. The results of this testing are presented below:

Effects of TIE treatments on the toxicity of CCCWP-SSID ambient sediment sample to <i>Hyalella azteca</i> .					
TIE Treatment	Toxicity Present Relative to Lab Control treatment?				
	Mean % Survival		Weight		Effects of TIE Treatment?
	Control/Blank	100%	Control/Blank	100%	
Baseline	96.7	6.7*	0.13	0.03*	toxicity present
Aeration	96.7	13.3*	0.12	0.08	toxicity present
PBO	96.7	0*	0.12	N/A	increase in toxicity
Carboxylesterase	100	76.7	0.15	0.09*	reduction of toxicity

*The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

There was still a statistically significant reduction in *H. azteca* survival and growth in the test of the untreated sediment, indicating that the toxicity that had been observed in the initial testing of this sample was persistent. The following trends (changes in sample toxicity relative to the untreated water sample [Baseline] test) were observed:

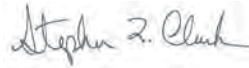
- The addition of PBO to the test solutions increased toxicity to *H. azteca* survival (survival decreased from 6.7% to complete mortality). These results suggest that compounds which are *detoxified* by the cytochrome-P450 system (e.g., pyrethroid insecticides) were contributing to sample toxicity; and

- The addition of carboxylesterase removed the significant reduction in survival (increased from 6.7% survival to 76.7% survival), suggesting that type I and type II pyrethroids are contributing to the toxicity (Weston and Amweg 2007). The use of carboxylesterase as a TIE treatment is still experimental and these results need to be used judiciously and in conjunction with other TIE treatment (e.g., PBO).

The weight of evidence from the TIE performed on the upstream ambient sediment sample suggests that the toxicity was likely due to pyrethroid insecticides.

If you have any questions regarding the performance and interpretation of these tests, feel free to contact my colleague Eddie Kalombo or myself at (707) 207-7760.

Sincerely,



Digitally signed by
com.apple.idms.appleid.prd.75733
96d6a2f514d2b446864737862394
d70787541673d3d
Date: 2014.09.10 09:52:50 -08'00'

Stephen L. Clark
Vice President/Special Projects Director



Pacific EcoRisk is accredited in accordance with NELAP (ORELAP ID 4043). Pacific EcoRisk certifies that the test results reported herein conform to the most current NELAP requirements for parameters for which accreditation is required and available. Any exceptions to NELAP requirements are noted, where applicable, in the body of the report. This report shall not be reproduced, except in full, without the written consent of Pacific EcoRisk. This testing was performed under Lab Order 19397.



Evaluation of the Chronic Toxicity of Contra Costa Clean Water Program Ambient Sediment Samples

Samples collected July 22, 2014

Prepared For:

ADH Environmental
3065 Porter Street, Suite 101
Soquel, CA 95073

Prepared By:

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534

September 2014



PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

Evaluation of the Chronic Toxicity of Contra Costa Clean Water Program Ambient Sediment Samples

Samples collected July 22, 2014

Table of Contents

	Page
1. INTRODUCTION	1
2. CHRONIC TOXICITY TEST PROCEDURES	1
2.1 Sample Receipt and Handling.....	1
2.2 Sediment Toxicity Testing with <i>Hyalella azteca</i>	2
2.2.1 Reference Toxicant Testing of the <i>Hyalella azteca</i>	3
2.3 Follow-Up Bulk Sediment Toxicity Identification Evaluation (TIE) Procedures	4
2.3.1 TIE Fractionation Method Blanks.....	4
2.3.2 Baseline	4
2.3.3 Piperonyl Butoxide (PBO) Addition	4
2.3.4 Carboxylesterase Addition	5
2.3.5 Aeration Treatment.....	5
3. RESULTS	6
3.1 Effects of the CCCWP Ambient Sediment on <i>Hyalella azteca</i>	6
3.2. Performance of the Follow-Up Targeted TIE.....	7
3.2.1 Results of Targeted Phase I TIE of the ‘544MSH065’ Ambient Sediment Sample ...	7
4. AQUATIC TOXICITY DATA QUALITY CONTROL.....	8
4.1 Maintenance of Acceptable Test Conditions	8
4.2 Negative Control Testing.....	8
4.3 Positive Control Testing	8
4.3.1 Reference Toxicant Toxicity to <i>Hyalella azteca</i>	8
4.4 Concentration Response Relationships.....	9
5. SUMMARY & CONCLUSIONS.....	10
6. LITERATURE CITED	11

Appendices

- Appendix A Chain-of-Custody Record for the Collection and Delivery of the CCCWP Ambient Sediment Samples
- Appendix B Test Data and Summary of Statistics for the Evaluation of the Toxicity of the CCCWP Ambient Sediment Samples to *Hyaella azteca*
- Appendix C Test Data and Summary of Statistics for the Evaluation of the Toxicity of the CCCWP Ambient Sediment Samples to *Hyaella azteca* – Follow-Up Toxicity Identification Evaluation (TIE): 544MSH065
- Appendix D Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Hyaella azteca*

1. INTRODUCTION

Under contract to ADH Environmental, and in support of the Bay Area Stormwater Management Agencies Association (BASMAA) Regional Monitoring Coalition ongoing monitoring efforts, Pacific EcoRisk (PER) has been contracted to evaluate the toxicity of stormwater samples collected for the Contra Costa Clean Water Program (CCCWP). This evaluation consist of performing the following US EPA toxicity test:

- 10-day survival and growth sediment toxicity test with the amphipod *Hyaletella azteca*.

This toxicity test was conducted on ambient sediment samples collected on July 22, 2014. In order to assess the sensitivity of the test organisms to toxic stress, a reference toxicant test was also performed. As a result of the magnitude of toxicity observed, and at the request of the ADH Environmental, PER conducted a targeted Phase I Toxicity Identification Evaluation (TIE) on one of the samples that exhibited toxicity to *H. azteca*. This report describes the performance and results of these tests.

2. CHRONIC TOXICITY TEST PROCEDURES

The methods used in conducting the chronic toxicity tests followed the guidance established by the following publications and EPA manuals:

- “Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, Second Edition” (EPA/600/R-99/064);
- Methods for Aquatic Toxicity Identification Evaluations Phase I Toxicity Characterization Procedures (EPA/600/66-91/003);
- Sediment Toxicity Identification Evaluation (TIE) Phases I, II, and III General Document (EPA/600/R-07/080);
- Amweg EL, Weston DP. 2007. Whole Sediment Toxicity Identification Evaluation Tools for Pyrethroid Insecticides: I. Piperonyl Butoxide Addition. *Environmental Toxicology and Chemistry* 26(11): 2389-2396; and
- Weston DP, Amweg EL. 2007. Whole Sediment Toxicity Identification Evaluation Tools for Pyrethroid Insecticides: II. Esterase Addition. *Environmental Toxicology and Chemistry* 26(11): 2397-2404.

2.1 Sample Receipt and Handling

On July 22, ADH collected ambient sediment samples into appropriately-cleaned containers, which were transported, on ice and under chain-of-custody, to the PER testing laboratory in Fairfield, CA. Upon receipt at the testing laboratory, aliquots of each sample were collected for analysis of initial water quality characteristics (Table 1), with the remainder of each sample being stored at 0-6°C except when being used to prepare test solutions.

The chain-of-custody record for the collection and delivery of these stormwater samples is provided as Appendix A.

Sample ID	Sediment Sample Collection Date	Sample Receipt Date
544MSH065	7/22/14 (1145)	7/22/14 (1715)
544MSH062	7/22/14 (1015)	7/22/14 (1715)
207WAL078	7/22/14 (1445)	7/22/14 (1715)
207WAL060	7/22/14 (1145)	7/22/14 (1715)

2.2 Sediment Toxicity Testing with *Hyalella azteca*

The freshwater sediment toxicity test with *Hyalella azteca* consists of exposing the amphipods to the sediment for 10 days, after which effects on survival and growth are evaluated. The specific procedures used in this testing are described below.

The *Hyalella azteca* used in this testing were obtained from a commercial supplier (Aquatic Biosystems, Fort Collins, CO). Upon receipt at the laboratory, the amphipods were placed into HDPE tanks containing SAM-5S water at 23°C, and were fed the alga *Selenastrum capricornutum* and Yeast-Cerophyll®-Trout (YCT) food amended with *Spirulina*.

Each site sediment was tested at the 100% concentration only. The Control treatment sediment consisted of a composite of reference site sediments that has been maintained under culture at the PER lab for >3 months. There were 8 replicates for each test treatment. Each replicate container consisted of a 300 mL tall-form glass beaker with a 3 cm ribbon of 540 µm mesh NITEX attached to the top of the beaker with silicone sealant. Each sediment sample was homogenized immediately prior to introduction of the sediments into the test replicates. Approximately 100 mL of sediment was then loaded into each of the test replicate containers. Each of the test replicates was carefully filled with clean overlying SAM-5S water. The test replicates with sediments and clean overlying water were established 24 hrs prior to the introduction of the amphipods.

After this initial 24 hr period, the overlying water in each replicate was flushed with one volume of fresh control water (approximately 150 mL). For each test treatment, a small aliquot of the renewed overlying water was then collected from each of the 8 replicates and composited for measurement of “initial” water quality characteristics (pH, dissolved oxygen [D.O.], conductivity, alkalinity, hardness, and total ammonia). Then, ten 12-13 day-old amphipods were randomly allocated into each replicate, followed by the addition of 1.0 mL of YCT food. The test replicates were then returned to the temperature-controlled rooms. At the time of test initiation for each set of tests, 8 replicates of 10 randomly-selected organisms were collected, dried, and

weighed (described below) to determine the mean dry weight of the test organisms at test initiation.

Each day, for the following 9 days, each test replicate was examined for the presence of any dead amphipods. A small aliquot of the overlying water in each of the 8 replicates was then collected and composited as before for measurement of “old” D.O., after which each replicate was flushed with one volume of fresh water. Another small aliquot of the overlying water in each of the 8 replicates was then collected and composited as before for measurement of “new” D.O., after which each replicate was fed 1.0 mL of YCT, and then replaced within the temperature-controlled room.

After 10 days exposure, an aliquot of overlying water was collected from each replicate and composited for analysis of the “final” water quality characteristics. The sediments in each replicate container were then carefully sorted and sieved and the number of surviving amphipods determined. The surviving organisms were euthanized in methanol and transferred to small pre-weighed pans, which were placed into a drying oven at 100°C. After drying for ~24 hrs, the pans were transferred to a desiccator to cool, and then weighed to the nearest 0.01 mg to determine the mean dry weight per surviving organism for each replicate. The resulting survival and growth (mean dry weight) data were then analyzed to evaluate any impairment due to the sediments; all statistical analyses were performed using the CETIS[®] statistical package (TidePool Scientific, McKinleyville, CA).

2.2.1 Reference Toxicant Testing of the *Hyalella azteca*

In order to assess the sensitivity of the *H. azteca* test organisms to toxic stress, a reference toxicant test was performed. The reference toxicant test was performed as a 96-hr waterborne exposure to Control water spiked with KCl at test concentrations of 0, 0.1, 0.2, 0.4, 0.8 and 1.6 g/L. The resulting survival data were statistically analyzed to determine key dose-response point estimates (e.g., EC₅₀); all statistical analyses were made using the CETIS[®] software. This response endpoint was then compared to the ‘typical response’ range established by the mean \pm 2 SD of the point estimates generated by the 20 most recent previous reference toxicant tests performed by this lab.

2.3 Follow-Up Bulk Sediment Toxicity Identification Evaluation (TIE) Procedures

At the direction of the client, a Phase I TIE “targeted” was performed to identify if pyrethroid insecticides were the cause of toxicity.

The goal of the Phase I TIE fractionation procedures is to determine the class of compounds (e.g., organics, metals, ammonia, etc.) responsible for sample toxicity. This is achieved by performing physical and chemical manipulations (or treatments) on the sediment sample. Changes in toxicity that result from the TIE treatments help characterize the physical-chemical nature of the compound(s) responsible for the observed toxicity, which in turn can be used to identify the compound(s) responsible for the toxicity. The specific treatments used in this targeted TIE are described below.

2.3.1 TIE Fractionation Method Blanks

As part of the TIE process, a method blank is prepared for each treatment and then tested to determine whether any of the TIE treatment procedures contribute any artifactual toxicity to the manipulated sample. The method blanks were prepared by treating aliquots of Control sediment with each of the fractionation test treatments (discussed below).

2.3.2 Baseline

The Baseline test is simply a re-test of the untreated bulk sediment sample to confirm the persistence of toxicity during the concurrent TIE testing, and to provide a “benchmark” of toxicity against which to evaluate toxicity removal by the TIE treatments. The Baseline test and TIE fractionation treatment test sediments were tested with *Hyalella azteca* as described in Section 2.2, with the exception that there were 3 replicates for each test treatment, each replicate consisting a 100-mL glass beaker containing 30 mL of sediment with 10 *Hyalella azteca* per replicate. All statistical analyses were performed using CETIS[®] statistical software.

2.3.3 Piperonyl Butoxide (PBO) Addition

This TIE treatment can help identify toxicity caused by toxicants subject to metabolic activation/detoxification by the cytochrome-P450 system:

- an increase in toxicity after PBO treatment is indicative of a contaminant that is typically *detoxified* by the cytochrome-P450 enzyme system (e.g., carbamates, pyrethroids [Amweg and Weston 2007], etc.), whereas
- a decrease in toxicity after PBO treatment is indicative of a contaminant that is *activated* by the cytochrome-P450 system [e.g., organophosphate (OP) pesticides].

The simultaneous presence of compounds that are detoxified *and* compounds that are activated by the cytochrome-P450 system (e.g., the co-occurrence of both OP-pesticides and pyrethroid pesticides) may cancel each other out. The PBO treatment consisted of addition of PBO to the bulk sediment overlying water (and method blank) at a concentration of 25 µg/L. This test was then performed as described in Section 2.2.

2.3.4 Carboxylesterase Addition

The use of carboxylesterase to hydrolyze pyrethroids (via cleaving of the ester bond) has been proposed as a simple, mechanistic-based method to selectively identify pyrethroid-associated toxicity. Carboxylesterase is an enzyme that degrades type I and type II pyrethroids and has been used in recent studies to help identify pyrethroid-associated toxicity (Wheelock et al. 2004; Weston and Amweg 2007). It should be noted that this treatment is still experimental in nature and should be used in conjunction with other pyrethroid-targeted TIE treatments (e.g., PBO addition and temperature adjustment) via a weight-of-evidence approach.

The carboxylesterase treatment consisted of addition of carboxylesterase to the sediment test overlying water (and method blank) at a carboxylesterase concentration of 73 mg/L (or 1.25 Units/mL). The carboxylesterase test was performed as described in Section 2.2.

2.3.5 Aeration Treatment

The aeration treatment is designed to characterize effluent toxicity that can be attributed to volatile, sublutable, or oxidizable compounds. Using a pipette connected to an air-delivery system, the sediment test overlying water (and method blank) was for the duration of the test. Aeration also can have the physical effect of removing surface-active agents. Surface-active agent compounds congregate on the liquid/gas interface of the air bubbles and are carried to the surface of the solution where they can adhere to the sides of the container or are released into the atmosphere. A method blank was prepared in a similar fashion. The aeration treatment was included in this TIE since the original toxicity tests had to be aerated due to low dissolved oxygen in the overlying water at test initiation. The aeration treatment toxicity testing was performed as described in Section 2.2.

3. RESULTS

3.1 Effects of the CCCWP Ambient Sediment on *Hyalella azteca*

The results for these tests are summarized below in Table 2. There were significant reductions in *H. azteca* survival in all of the samples, and significant reductions in growth in the 207WAL078, 544MSH065, and 544MSH062 ambient sediment samples. There was no reduction in growth in the 207WAL060 ambient sediment sample.

The test data and summary of statistical analyses for these tests are presented in Appendix B.

Table 2. Effects of CCCWP ambient sediment on <i>Hyalella azteca</i> .		
Sample Station	Toxicity Present Relative to Lab Control treatment?	
	% Survival	Weight (mg)
Control	100	0.086
207WAL078 (207R00011US)	97.1* (2.9% reduction)	0.070* (18.5% reduction)
207WAL060 (207R00011DS)	90* (10% reduction)	0.088
544MSH065 (544R00025US)	3.75* (96.3% reduction)	0.006* (92.7% reduction)
544MSH062 (544R00025DS)	48.8* (51.2% reduction)	0.035* (59% reduction)

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

3.2 Performance of the Follow-Up Targeted TIE

3.2.1 Results of Targeted Phase I TIE of the “544MSH065” Ambient Sediment Sample

The results for this Phase I TIE are summarized below in Table 3. The following trends (changes in sample toxicity relative to the untreated water sample [Baseline] test) were observed:

- There was still a statistically significant reduction in *H. azteca* survival and growth in the test of the untreated sediment, indicating that the toxicity that had been observed in the initial testing of this sample was persistent;
- The addition of PBO to the test solutions increased toxicity to *H. azteca* survival (survival decreased from 6.7% to complete mortality). These results suggest that compounds which are *detoxified* by the cytochrome-P450 system (e.g., pyrethroid insecticides) were contributing to sample toxicity; and
- The addition of carboxylesterase removed the significant reduction in survival (increased from 6.7% survival to 76.7% survival), suggesting that type I and type II pyrethroids are contributing to the toxicity (Weston and Amweg 2007). The use of carboxylesterase as a TIE treatment is still experimental and these results need to be used judiciously and in conjunction with other TIE treatments (e.g., PBO).

The test data and the summary of statistical analyses for these tests are presented in Appendix C.

TIE Treatment	Toxicity Present Relative to Lab Control treatment?				Effects of TIE Treatment?
	Mean % Survival		Weight		
	Control/Blank	100%	Control/Blank	100%	
Baseline	96.7	6.7*	0.13	0.03*	toxicity persistent
Aeration	96.7	13.3*	0.12	0.08	toxicity present
PBO	96.7	0*	0.12	N/A	<i>increase</i> in toxicity
Carboxylesterase	100	76.7	0.15	0.09*	reduction of toxicity

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

4. AQUATIC TOXICITY DATA QUALITY CONTROL

Four QC measures were assessed during the toxicity testing:

- Maintenance of acceptable test conditions;
- Negative Control testing;
- Positive Control (reference toxicant) testing; and
- Concentration Response Relationship assessment.

4.1 Maintenance of Acceptable Test Conditions

All test conditions (e.g., pH, D.O., temperature, etc.) were within acceptable limits for these tests. As the dissolved oxygen measurements were below 2.5 mg/L immediately prior to test initiation, all of the samples except for the 544MSH062 sample were aerated during testing. All analyses were performed according to laboratory Standard Operating Procedures.

4.2 Negative Control Testing

The responses at the Lab Control treatments were acceptable.

4.3 Positive Control Testing

4.3.1 Reference Toxicant Toxicity to *Hyalella azteca*

The results of this test are presented in Table 4. The EC₅₀ for this test was consistent with the “typical response” range established by the reference toxicant test database for this species, indicating that these organisms were responding to toxic stress in a typical fashion. The test data and summary of statistical analyses for this test are presented in Appendix D.

Table 4. Reference toxicant testing: Effects of KCl on <i>Hyalella azteca</i> survival.	
KCl Treatment (g/L)	Mean% Survival
Control	100
0.1	100
0.2	100
0.4	40*
0.8	0*
1.6	0*
Summary of Statistics	
EC ₅₀ =	0.37 g/L KCl
“Typical response” range (mean ±2 SD)	0.27 – 0.60 g/L KCl

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.

4.4 Concentration Response Relationships

The concentration-response relationships for the reference toxicant tests were evaluated as per EPA guidelines (EPA-821-B-00-004), and were determined to be acceptable.

5. SUMMARY & CONCLUSIONS

There were significant reductions in *H. azteca* survival in all of the samples, and significant reductions in growth in the 207WAL078, 544MSH065, and 544MSH062 ambient sediment samples. There was no reduction in growth in the 207WAL060 ambient sediment sample.

Based on the magnitude of the reduction in survival observed for the 544MSH065 sample, a targeted TIE was performed on the sample. The following trends (changes in sample toxicity relative to the untreated water sample [Baseline] test) were observed:

- There was still a statistically significant reduction in *H. azteca* survival and growth in the test of the untreated sediment, indicating that the toxicity that had been observed in the initial testing of this sample was persistent;
- The addition of PBO to the test solutions increased toxicity to *H. azteca* survival (survival decreased from 6.7% to complete mortality). These results suggest that compounds which are *detoxified* by the cytochrome-P450 system (e.g., pyrethroid insecticides) were contributing to sample toxicity; and
- The addition of carboxylesterase removed the significant reduction in survival (increased from 6.7% survival to 76.7% survival), suggesting that type I and type II pyrethroids are contributing to the toxicity (Weston and Amweg 2007). The use of carboxylesterase as a TIE treatment is still experimental and these results need to be used judiciously and in conjunction with other TIE treatment (e.g., PBO).

The weight of evidence from the TIE performed on the upstream ambient sediment sample suggests that the toxicity was likely due to pyrethroid insecticides.

6. LITERATURE CITED

Amweg EL, Weston DP. 2007. Whole sediment toxicity identification evaluation tools for pyrethroid insecticides: I. Piperonyl butoxide addition. *Environ. Toxicol. Chem.* 26:2389-2396.

Wheelock CE, Miller JL, Miller MJ, Gee SJ, Shan G, Hammock B. 2004. Development of toxicity identification evaluation procedures for pyrethroid detection using esterase activity. *Environ. Toxicol. Chem.* 23:2699–2708.

Weston DP, Amweg EL. 2007. Whole sediment toxicity identification evaluation tools for pyrethroid insecticides: II. Esterase addition. *Environ. Toxicol. Chem.* 26:2397-2404.

Appendix A

Chain-of-Custody Record for the Collection and Delivery of the CCCWP Ambient Sediment Samples



Appendix B

Test Data and Summary of Statistics for the Evaluation of the Toxicity of the CCCWP Ambient Sediment Samples to *Hyalella azteca*



CETIS Summary Report

Report Date: 14 Aug-14 13:27 (p 1 of 2)
 Test Code: 544MSH062 | 12-4174-5973

Hyalella Survival and Growth Test Pacific EcoRisk

Batch ID: 09-9010-4697	Test Type: Survival-Growth (10 day)	Analyst: Tamara Luna
Start Date: 27 Jul-14 16:40	Protocol: GCML	Diluent: Not Applicable
Ending Date: 06 Aug-14 12:00	Species: Hyalella azteca	Brine: Not Applicable
Duration: 9d 19h	Source: Chesapeake Cultures, Inc.	Age: 12

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	07-2024-9688	27 Jul-14 16:40	27 Jul-14 16:40	NA (23 °C)	ADH Environmental, Inc.	19397
207WAL078	10-3577-9053	22 Jul-14 14:45	22 Jul-14 17:15	5d 2h (0.6 °C)		
207WAL060	14-8088-4311	22 Jul-14 11:45	22 Jul-14 17:15	5d 5h (1 °C)		
544MSH065	12-0131-0279	22 Jul-14 14:45	22 Jul-14 17:15	5d 2h (0.6 °C)		
544MSH062	03-6621-9776	22 Jul-14 10:15	22 Jul-14 17:15	5d 6h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Sediment	ADH Environmental, Inc.	LABQA		
207WAL078	Sediment	ADH Environmental, Inc.	207WAL078		
207WAL060	Sediment	ADH Environmental, Inc.	207WAL060		
544MSH065	Sediment	ADH Environmental, Inc.	544MSH065		
544MSH062	Sediment	ADH Environmental, Inc.	544MSH062		

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	8	0.0857	0.0705	0.101	0.066	0.113	0.00644	0.0182	21.2%	0.0%
207WAL078	7	0.0699	0.0619	0.0779	0.054	0.0789	0.00326	0.00862	12.3%	18.5%
207WAL060	8	0.0875	0.071	0.104	0.0667	0.12	0.00701	0.0198	22.6%	-2.09%
544MSH065	8	0.00625	-0.00853	0.021	0	0.05	0.00625	0.0177	283.0%	92.7%
544MSH062	8	0.0352	0.0165	0.0538	0	0.055	0.00787	0.0223	63.3%	59.0%

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	8	1	1	1	1	1	0	0	0.0%	0.0%
207WAL078	7	0.971	0.926	1	0.9	1	0.0184	0.0488	5.02%	2.86%
207WAL060	8	0.9	0.855	0.945	0.8	1	0.0189	0.0535	5.94%	10.0%
544MSH065	8	0.0375	0	0.126	0	0.3	0.0375	0.106	283.0%	96.2%
544MSH062	8	0.488	0.218	0.757	0	0.9	0.114	0.323	66.2%	51.2%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	0.066	0.078	0.069	0.091	0.075	0.113	0.112	0.082
207WAL078	0.078	0.07	0.054	0.0644	0.074	0.0789	0.07	
207WAL060	0.0967	0.12	0.089	0.075	0.0667	0.071	0.11	0.072
544MSH065	0	0	0	0.05	0	0	0	0
544MSH062	0.04	0.04	0	0.048	0.055	0	0.0483	0.05

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	1	1	1	1	1	1	1	1
207WAL078	1	1	0.9	1	1	1	0.9	
207WAL060	0.9	1	0.9	0.9	0.8	0.9	0.9	0.9
544MSH065	0	0	0	0.3	0	0	0	0
544MSH062	0.7	0.6	0	0.5	0.6	0	0.6	0.9

CETIS Summary Report

Report Date: 14 Aug-14 13:27 (p 2 of 2)

Test Code: 544MSH062 | 12-4174-5973

Hyalella Survival and Growth Test								Pacific EcoRisk
Survival Rate Binomials								
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	10/10	10/10	10/10	10/10	10/10	10/10	10/10	10/10
207WAL078	10/10	10/10	9/10	10/10	10/10	10/10	9/10	
207WAL060	9/10	10/10	9/10	9/10	8/10	9/10	9/10	9/10
544MSH065	0/10	0/10	0/10	3/10	0/10	0/10	0/10	0/10
544MSH062	7/10	6/10	0/10	5/10	6/10	0/10	6/10	9/10

10-Day *Hyaella azteca* Sediment Toxicity Test Data

Client: ADH Environmental
 Project#: 19397
 Test ID#: 58103

Org. Supplier: ABS
 Org. Log #: 8379
 Org. Age/Size: 12-13 days

Day	Date	Test Material				Water Quality Measurements			Sign-off:
		Control				Parameter	Value	Meter ID	
0	7/27/14	# Live Organisms				pH	7.69	PH21	AM Change: <u>DMS</u>
		A 10	B 10	C 10	D 10	D.O. (mg/L)	7.8	R009	WQ: <u>DMS</u>
		E 10	F 10	G 10	H 10	Conductivity (µS/cm)	458	EC09	Initiation Time: <u>1640</u>
						Alkalinity (mg/L)	✓ 46		Initiation Counts: <u>JM</u>
						Hardness (mg/L)	✓ 126		Confirmation Counts: <u>PR</u>
				Ammonia (mg/L)	11.00	DP3800	PM Feed: <u>JM</u>		
				Temp. (°C)	23.0	84A			
1	7/28/14	# of Mortalities				Old D.O. (mg/L)	7.4	R009	AM Change: <u>KK</u> WQ: <u>KK</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.4	R009	Mortality Counts: <u>KK</u>
		E <u>KMP 80</u>	F 0	G 0	H 0	Temp. (°C)	23.4	84A	PM Change: <u>KMP</u> PM Feed: <u>KMP</u>
						Old D.O. (mg/L)	7.0	R009	AM Change: <u>KK</u> WQ: <u>KK</u>
2	7/29/14	# of Mortalities				New D.O. (mg/L)	8.4	R009	Mortality Counts: <u>KK</u>
		A 0	B 0	C 0	D 0	Temp. (°C)	23.2	84A	PM Change: <u>OK</u> PM Feed: <u>OK</u>
		E 0	F 0	G 0	H 0	Old D.O. (mg/L)	7.8	R007	AM Change: <u>KK</u> WQ: <u>KK</u>
						New D.O. (mg/L)	8.1	R007	Mortality Counts: <u>KK</u>
3	7/30/14	# of Mortalities				Temp. (°C)	23.3	84A	PM Change: <u>OK</u> PM Feed: <u>OK</u>
		A 0	B 0	C 0	D 0	Old D.O. (mg/L)	6.2	R004	AM Change: <u>APP</u> WQ: <u>APP</u>
		E 0	F 0	G 0	H 0	New D.O. (mg/L)	7.3	R004	Mortality Counts: <u>APP</u>
						Temp. (°C)	22.6	84A	PM Change: <u>APP</u> PM Feed: <u>APP</u>
4	7-31-14	# of Mortalities				Old D.O. (mg/L)	7.4	R004	AM Change: <u>KMP</u> WQ: <u>KMP</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.6	R004	Mortality Counts: <u>KMP</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.3	84A	PM Change: <u>KK</u> PM Feed: <u>KK</u>
						Old D.O. (mg/L)	7.4	R007	AM Change: <u>KMP</u> WQ: <u>KMP</u>
5	8/1/14	# of Mortalities				New D.O. (mg/L)	7.5	R007	Mortality Counts: <u>KMP</u>
		A 0	B 0	C 0	D 0	Temp. (°C)	22.7	84A	PM Change: <u>KMP</u> PM Feed: <u>KMP</u>
		E 0	F 0	G 0	H 0	Old D.O. (mg/L)	7.8	R011	AM Change: <u>DMS</u> WQ: <u>DMS</u>
						New D.O. (mg/L)	8.1	R011	Mortality Counts: <u>PR</u>
6	8/2/14	# of Mortalities				Temp. (°C)	23.3	84A	PM Change: <u>DMS</u> PM Feed: <u>SM</u>
		A 0	B 0	C 0	D 0	Old D.O. (mg/L)	7.3	R011	AM Change: <u>TK</u> WQ: <u>TK</u>
		E 0	F 0	G 0	H 0	New D.O. (mg/L)	7.4	R011	Mortality Counts: <u>TK</u>
						Temp. (°C)	22.8	84A	PM Change: <u>LS</u> PM Feed: <u>LS</u>
7	8/3/14	# of Mortalities				Old D.O. (mg/L)	7.0	R009	AM Change: <u>DMS</u> WQ: <u>DMS</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.8	R009	Mortality Counts: <u>DMS</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.0	84A	PM Change: <u>DMS</u> PM Feed: <u>DMS</u>
						pH	7.57	PH16	WQ: <u>FBNS</u>
10	1	# Alive				D.O. (mg/L)	7.4	R009	Termination Counts: <u>FA</u>
		A 10	B 10	C 10	D 10	Conductivity (µS/cm)	436	EC06	Termination Time: <u>1200</u>
		E 10	F 10	G 10	H 10	Alkalinity (mg/L)	✓ 53		
						Hardness (mg/L)	✓ 122		
						Ammonia (mg/L)	11.00	DP3800	
				Temp. (°C)	22.8	84A			

***Hyalella azteca* Weight Data Sheets**

Client: ADH Environmental Test Init Date: 7.27.14 Balance ID: 8AL01
 Sample ID: Control Tare Wt Date: 8.2.14 Sign-Off: VK
 Test ID: 58103 Final Wt Date: 8.7.14 Sign-Off: AKK
 Project #: 19397

Pan	Concentration Replicate	Initial Weight. (mg)	Final Weight. (mg)	# organisms	Ave Weight (mg)
1	A	61.77	62.43	10	0.066
2	B	68.97	69.75	10	0.078
3	C	67.88	68.57	10	0.069
4	D	66.18	67.09	10	0.091
5	E	72.72	73.47	10	0.075
6	F	68.77	69.90	10	0.113
7	G	66.47	67.59	10	0.112
8	H	65.78	66.60	10	0.082
QA		59.73	59.73		

CETIS Analytical Report

Report Date: 14 Aug-14 13:27 (p 5 of 8)
 Test Code: 544MSH062 | 12-4174-5973

Hyalella Survival and Growth Test Pacific EcoRisk

Analysis ID: 03-4183-9143	Endpoint: Survival Rate	CETIS Version: CETISv1.8.7
Analyzed: 14 Aug-14 13:26	Analysis: Nonparametric-Two Sample	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.28%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		207WAL078	48	NA	1	13	<0.0001	Exact	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.008094273	0.008094273	1	2.77	0.1197	Non-Significant Effect
Error	0.0379419	0.002918608	13			
Total	0.04603618		14			

Distributional Tests

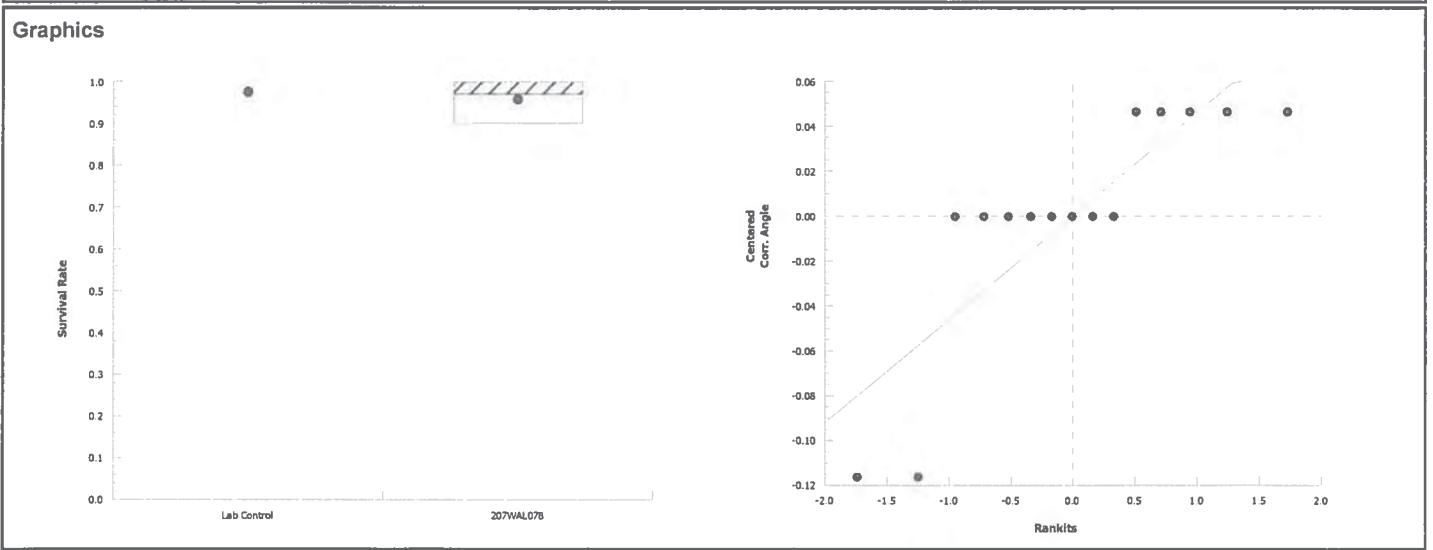
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.49E+13	9.16	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.713	0.833	0.0003	Non-normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	1	1	1	1	1	1	0	0.0%	0.0%
207WAL078	7	0.971	0.926	1	1	0.9	1	0.0184	5.02%	2.86%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
207WAL078	7	1.37	1.29	1.44	1.41	1.25	1.41	0.0301	5.82%	3.3%



10-Day *Hyaella azteca* Sediment Toxicity Test Data

Client: ADH Environmental
 Project#: 19397
 Test ID#: 58110

Org. Supplier: ABS
 Org. Log #: 8379
 Org. Age/Size: D-13days

Day	Date	Test Material				Water Quality Measurements			Sign-off:
		207WAL078 207R00011US MF				Parameter	Value	Meter ID	
0	7/27/14	# Live Organisms				pH	7.57	PH21	AM Change: <u>DMS</u>
		A 10	B 10	C 10	D 10	D.O. (mg/L)	6.3	R004	WQ: <u>DMS</u>
		E 10	F 10	G 10	H 10	Conductivity (µS/cm)	505	EC04	Initiation Time: <u>1640</u>
						Alkalinity (mg/L)	✓ 93		Initiation Counts: <u>JM</u>
						Hardness (mg/L)	✓ 142		Confirmation Counts: <u>0</u>
				Ammonia (mg/L)	41.00	DP3800	PM Feed: <u>JM</u>		
				Temp. (°C)	23.0	84A			
1	7/28/14	# of Mortalities				Old D.O. (mg/L)	8.10	R009	AM Change: <u>UK</u> WQ: <u>UK</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.7	R009	Mortality Counts: <u>UK</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.4	84A	PM Change: <u>KMP</u> PM Feed: <u>KMP</u>
						Old D.O. (mg/L)	7.4	R009	AM Change: <u>UK</u> WQ: <u>UK</u>
						New D.O. (mg/L)	7.7	R009	Mortality Counts: <u>UK</u>
				Temp. (°C)	22.9	84A	PM Change: <u>UK</u> PM Feed: <u>UK</u>		
2	7/29/14	# of Mortalities				Old D.O. (mg/L)	7.7	R007	AM Change: <u>UK</u> WQ: <u>UK</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	8.0	R007	Mortality Counts: <u>UK</u>
		E 6	F 0	G 0	H 0	Temp. (°C)	23.3	84A	PM Change: <u>UK</u> PM Feed: <u>UK</u>
						Old D.O. (mg/L)	8.42	8.300	AM Change: <u>APF</u> WQ: <u>APF</u>
						New D.O. (mg/L)	8.2	R004	Mortality Counts: <u>APF</u>
				Temp. (°C)	22.8	84A	PM Change: <u>APF</u> PM Feed: <u>APF</u>		
5	8/1/14	# of Mortalities				Old D.O. (mg/L)	7.7	R004	AM Change: <u>KMP</u> WQ: <u>KMP</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.9	R004	Mortality Counts: <u>KMP</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.3	84A	PM Change: <u>UK</u> PM Feed: <u>UK</u>
						Old D.O. (mg/L)	7.8	R007	AM Change: <u>KMP</u> WQ: <u>KMP</u>
						New D.O. (mg/L)	8.3	R007	Mortality Counts: <u>KMP</u>
				Temp. (°C)	22.7	84A	PM Change: <u>KMP</u> PM Feed: <u>KMP</u>		
7	8/3/14	# of Mortalities				Old D.O. (mg/L)	7.4	R011	AM Change: <u>DMS</u> WQ: <u>DMS</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.8	R011	Mortality Counts: <u>F0MS</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.3	84A	PM Change: <u>DMS</u> PM Feed: <u>SM</u>
						Old D.O. (mg/L)	7.7	R011	AM Change: <u>FS</u> WQ: <u>FS</u>
						New D.O. (mg/L)	7.8	R011	Mortality Counts: <u>FS</u>
				Temp. (°C)	22.8	84A	PM Change: <u>ES</u> PM Feed: <u>CS</u>		
9	8/5/14	# of Mortalities				Old D.O. (mg/L)	7.4	R009	AM Change: <u>DMS</u> WQ: <u>DMS</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.7	R009	Mortality Counts: <u>DMS</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.0	84A	PM Change: <u>DMS</u> PM Feed: <u>DMS</u>
						pH	7.81	PH16	WQ: <u>F0MS</u>
						D.O. (mg/L)	7.9	R004	Termination Counts: <u>FS</u>
10	8/6/14	# Alive				Conductivity (µS/cm)	550	EC06	Termination Time: <u>1200</u>
		A 10	B 10	C 9	D 10	Alkalinity (mg/L)	✓ 123		
		E 10	F 10	G -	H 9	Hardness (mg/L)	✓ 162		
						Ammonia (mg/L)	1.92	DP3800	
						Temp. (°C)	22.8	84A	

CETIS Analytical Report

Report Date: 14 Aug-14 13:27 (p 1 of 8)
 Test Code: 544MSH062 | 12-4174-5973

Hyalella Survival and Growth Test			Pacific EcoRisk		
-----------------------------------	--	--	-----------------	--	--

Analysis ID: 13-5730-6806	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed: 14 Aug-14 13:26	Analysis: Parametric-Two Sample	Official Results: Yes

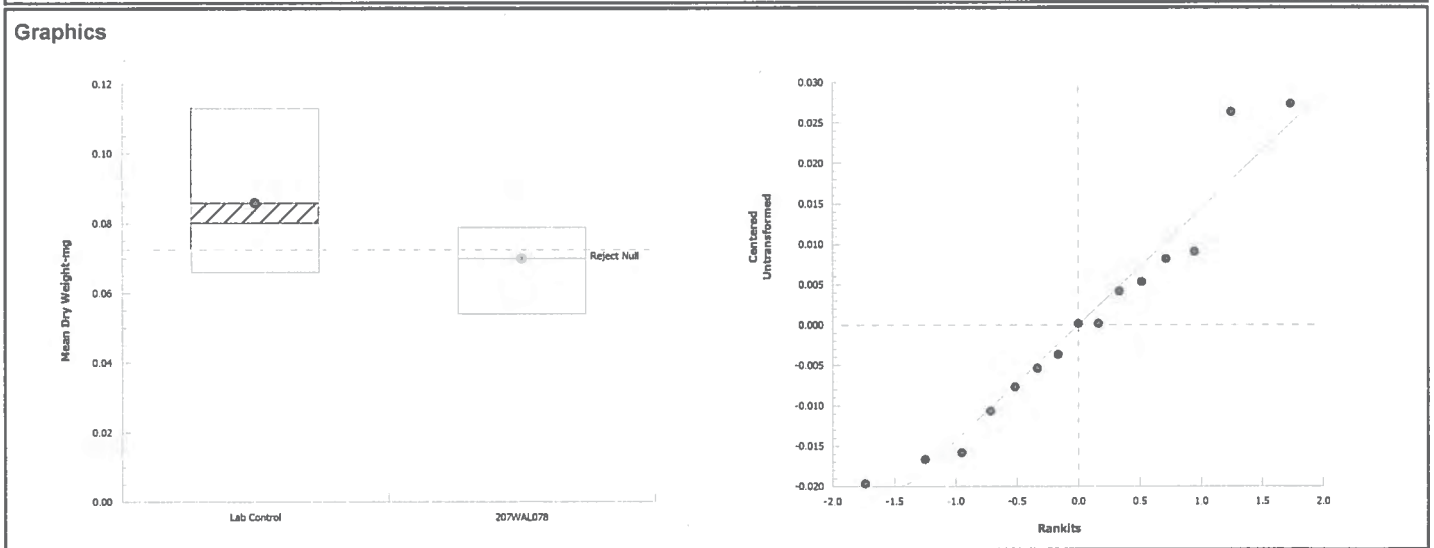
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	15.6%	

Sample Code	vs Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control	207WAL078	2.1	1.77	0.013	13	0.0279	CDF	Significant Effect

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0009373499	0.0009373499	1	4.41	0.0559	Non-Significant Effect
Error	0.002765303	0.0002127156	13			
Total	0.003702653		14			

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.46	10.8	0.0879	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.938	0.833	0.3628	Normal Distribution

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	0.0857	0.0705	0.101	0.08	0.066	0.113	0.00644	21.2%	0.0%
207WAL078	7	0.0699	0.0619	0.0779	0.07	0.054	0.0789	0.00326	12.3%	18.5%



***Hyalella azteca* Weight Data Sheets**

Client: ADH Environmental Test Init Date: 7.27.14 Balance ID: BAL 01
 Sample ID: 207WAL078 Tare Wt Date: 8.2.14 Sign-Off: VK
 Test ID: 58110 Final Wt Date: 8.7.14 Sign-Off: RKK
 Project #: 19397

Pan	Concentration Replicate	Initial Weight. (mg)	Final Weight. (mg)	# organisms	Ave Weight (mg)
17	A	59.83	60.61	10	0.078
18	B	71.48	72.18	10	0.070
19	C	62.62	63.16	9	0.054
20	D	64.66	65.24	10	0.064
21	E	68.57	69.31	10	0.074
22	F	66.31	67.02	10	0.079
23	G	70.98	71.08	—	—
24	H	58.52	59.02	9	0.07
QA \		59.73	59.74		

CETIS Analytical Report

Report Date: 14 Aug-14 13:27 (p 6 of 8)
 Test Code: 544MSH062 | 12-4174-5973

Hyalella Survival and Growth Test	Pacific EcoRisk
-----------------------------------	-----------------

Analysis ID: 12-4833-5624	Endpoint: Survival Rate	CETIS Version: CETISv1.8.7
Analyzed: 14 Aug-14 13:26	Analysis: Nonparametric-Two Sample	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.33%	

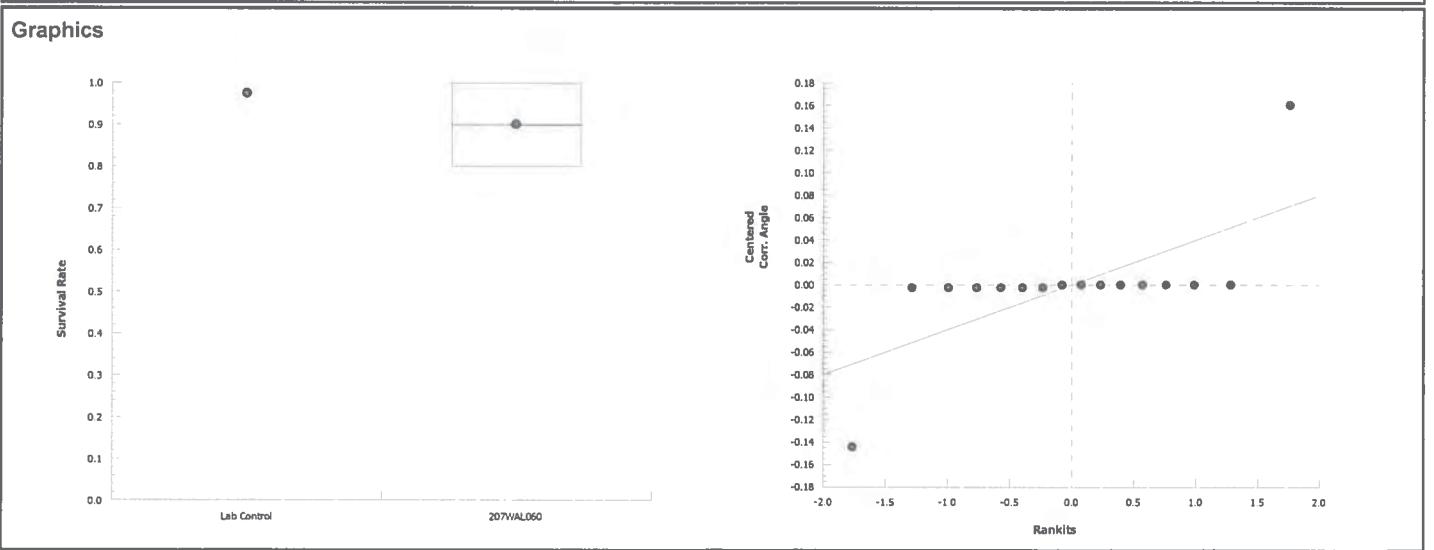
Wilcoxon Rank Sum Two-Sample Test									
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		207WAL060	40	NA	1	14	0.0007	Exact	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1028308	0.1028308	1	30.9	<0.0001	Significant Effect
Error	0.0466386	0.003331328	14			
Total	0.1494694		15			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	2.63E+13	8.89	<0.0001	Unequal Variances	
Distribution	Shapiro-Wilk W Normality	0.528	0.841	<0.0001	Non-normal Distribution	

Survival Rate Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	1	1	1	1	1	1	0	0.0%	0.0%
207WAL060	8	0.9	0.855	0.945	0.9	0.8	1	0.0189	5.94%	10.0%

Angular (Corrected) Transformed Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
207WAL060	8	1.25	1.18	1.32	1.25	1.11	1.41	0.0289	6.52%	11.4%



10-Day *Hyaella azteca* Sediment Toxicity Test Data

Client: ADH Environmental
 Project#: 19397
 Test ID#: 58112

Org. Supplier: ABS
 Org. Log #: 8379
 Org. Age/Size: 12-13 days

Day	Date	Test Material				Water Quality Measurements			Sign-off:
		207WAL060	207R00011D5 MF			Parameter	Value	Meter ID	
0	7/27/14	# Live Organisms				pH	7.57	PH21	AM Change: <u>DMS</u>
		A 10	B 10	C 10	D 10	D.O. (mg/L)	6.7	RD04	WQ: <u>DMS</u>
		E 10	F 10	G 10	H 10	Conductivity (µS/cm)	479	EC04	Initiation Time: <u>1640</u>
						Alkalinity (mg/L)	✓ 86		Initiation Counts: <u>JM</u>
						Hardness (mg/L)	✓ 155		Confirmation Counts: <u>PP</u>
				Ammonia (mg/L)	1.00	PR300	PM Feed: <u>JM</u>		
				Temp. (°C)	23.0	84A			
1	7/28/14	# of Mortalities				Old D.O. (mg/L)	8.1	RD09	AM Change: <u>LR</u> WQ: <u>LR</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.7	RD09	Mortality Counts: <u>LR</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.4	84A	PM Change: <u>KMP</u> PM Feed: <u>KMP</u>
2	7/29/14	# of Mortalities				Old D.O. (mg/L)	8.0	RD05	AM Change: <u>VR</u> WQ: <u>VR</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.9	RD05	Mortality Counts: <u>VR</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	22.9	84A	PM Change: <u>VR</u> PM Feed: <u>VR</u>
3	7/30/14	# of Mortalities				Old D.O. (mg/L)	7.7	RD07	AM Change: <u>VR</u> WQ: <u>LR</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.9	RD07	Mortality Counts: <u>VR</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.3	84A	PM Change: <u>VR</u> PM Feed: <u>VR</u>
4	7-31-14	# of Mortalities				Old D.O. (mg/L)	4.4	RD01	AM Change: <u>APF</u> WQ: <u>APF</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.9	RD01	Mortality Counts: <u>APF</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	22.8	84A	PM Change: <u>APF</u> PM Feed: <u>APF</u>
5	8/1/14	# of Mortalities				Old D.O. (mg/L)	4.9	RD04	AM Change: <u>KMP</u> WQ: <u>KMP</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	6.2	RD04	Mortality Counts: <u>KMP</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.3	84A	PM Change: <u>VR</u> PM Feed: <u>VR</u>
6	8/2/14	# of Mortalities				Old D.O. (mg/L)	5.4	RD07	AM Change: <u>KMP</u> WQ: <u>KMP</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	0.58	RD07	Mortality Counts: <u>KMP</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	22.7	84A	PM Change: <u>KMP</u> PM Feed: <u>KMP</u>
7	8/3/14	# of Mortalities				Old D.O. (mg/L)	6.4	RD11	AM Change: <u>DMS</u> WQ: <u>DMS</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	6.6	RD11	Mortality Counts: <u>FOUS</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.3	84A	PM Change: <u>DMS</u> PM Feed: <u>SM</u>
8	8/4/14	# of Mortalities				Old D.O. (mg/L)	8.0	RD11	AM Change: <u>TEM</u> WQ: <u>TEM</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.5	RD11	Mortality Counts: <u>TEM</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	22.8	84A	PM Change: <u>CS</u> PM Feed: <u>CS</u>
9	8/5/14	# of Mortalities				Old D.O. (mg/L)	8.0	RD04	AM Change: <u>DMS</u> WQ: <u>DMS</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	8.1	RD04	Mortality Counts: <u>DMS</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.0	84A	PM Change: <u>DMS</u> PM Feed: <u>DMS</u>
10	8/6/14	# Alive				pH	7.88	PH16	WQ: <u>FOUS</u>
		A 9	B 10	C 9	D 9	D.O. (mg/L)	8.1	RD04	Termination Counts: <u>BUM</u>
		E 8	F 9	G 9	H 9	Conductivity (µS/cm)	534	EC06	Termination Time: <u>1200</u>
						Alkalinity (mg/L)	✓ 112		
						Hardness (mg/L)	✓ 183		
				Ammonia (mg/L)	1.17	PR300			
				Temp. (°C)	22.8	84A			

CETIS Analytical Report

Report Date: 14 Aug-14 13:27 (p 2 of 8)
 Test Code: 544MSH062 | 12-4174-5973

Hyaella Survival and Growth Test Pacific EcoRisk

Analysis ID: 17-0742-7162	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed: 14 Aug-14 13:26	Analysis: Parametric-Two Sample	Official Results: Yes

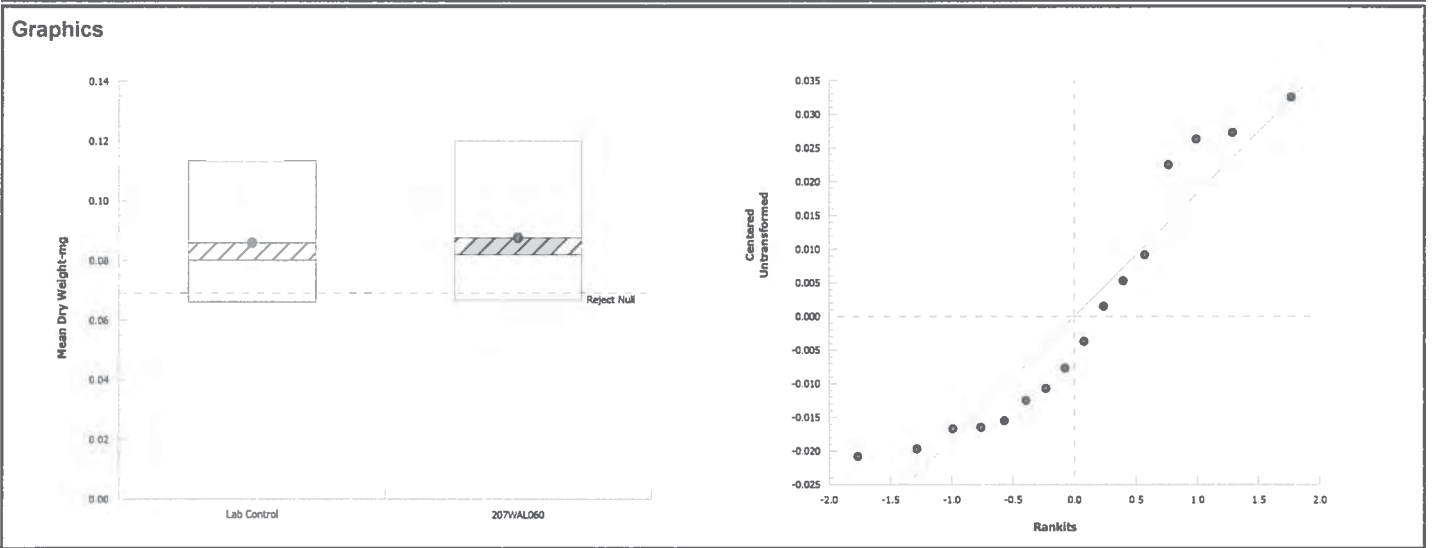
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	19.5%	

Equal Variance t Two-Sample Test									
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		207WAL060	-0.188	1.76	0.017	14	0.5733	CDF	Non-Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.283993E-05	1.283993E-05	1	0.0354	0.8534	Non-Significant Effect
Error	0.005071048	0.0003622177	14			
Total	0.005083888		15			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	1.19	8.89	0.8275	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.885	0.841	0.0464	Normal Distribution	

Mean Dry Weight-mg Summary										
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	0.0857	0.0705	0.101	0.08	0.066	0.113	0.00644	21.2%	0.0%
207WAL060	8	0.0875	0.071	0.104	0.082	0.0667	0.12	0.00701	22.6%	-2.09%



***Hyalella azteca* Weight Data Sheets**

Client: ADH Environmental Test Init Date: 7.27.14 Balance ID: BAL01
 Sample ID: 207WAL060 Tare Wt Date: 8.2.14 Sign-Off: VK
 Test ID: 58112 Final Wt Date: 8.7.14 Sign-Off: isa
 Project #: 19397

Pan	Concentration Replicate	Initial Weight. (mg)	Final Weight. (mg)	# organisms	Ave Weight (mg)
25	A	78.08	78.95	9	0.0967
26	B	63.53	64.73	10	0.120
27	C	71.21	72.10	9	0.089
28	D	65.26	66.00	9	0.076
29	E	80.44	81.04	8	0.0667
30	F	64.91	65.62	9	0.071
31	G	67.69	68.68	9	0.110
32	H	90.64	91.36	9	0.072
QA2		71.05	71.05		

CETIS Analytical Report

Report Date: 14 Aug-14 13:27 (p 7 of 8)
 Test Code: 544MSH062 | 12-4174-5973

Hyalella Survival and Growth Test						Pacific EcoRisk
-----------------------------------	--	--	--	--	--	-----------------

Analysis ID: 16-9643-3210	Endpoint: Survival Rate	CETIS Version: CETISv1.8.7
Analyzed: 14 Aug-14 13:26	Analysis: Nonparametric-Two Sample	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.19%	

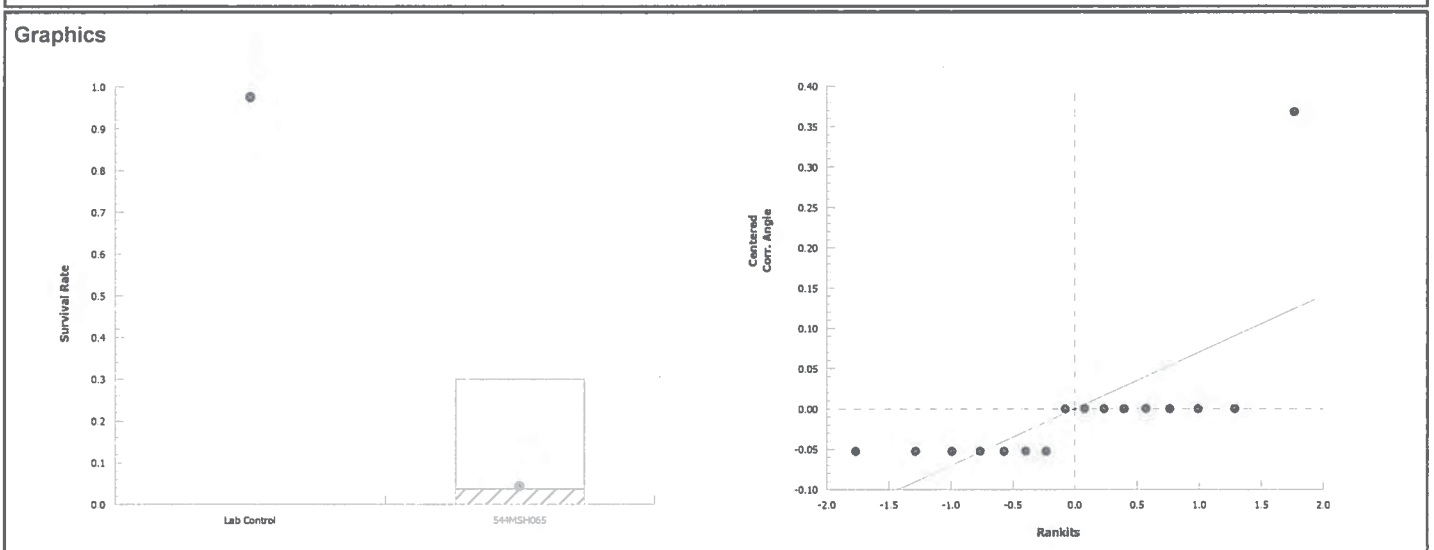
Wilcoxon Rank Sum Two-Sample Test									
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		544MSH065	36	NA	0	14	<0.0001	Exact	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.766035	5.766035	1	521	<0.0001	Significant Effect
Error	0.1549824	0.01107017	14			
Total	5.921017		15			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	8.72E+13	8.89	<0.0001	Unequal Variances	
Distribution	Shapiro-Wilk W Normality	0.469	0.841	<0.0001	Non-normal Distribution	

Survival Rate Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Lab Control	8	1	1	1	1	1	1	0	0.0%	0.0%	
544MSH065	8	0.0375	0	0.126	0	0	0.3	0.0375	283.0%	96.2%	

Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Lab Control	8	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%	
544MSH065	8	0.211	0.087	0.336	0.159	0.159	0.58	0.0526	70.4%	85.0%	



10-Day *Hyaella azteca* Sediment Toxicity Test Data

Client: ADH Environmental
 Project#: 19397
 Test ID#: 58114

Org. Supplier: ABS
 Org. Log #: 8379
 Org. Age/Size: 12-13 days

Day	Date	Test Material				Water Quality Measurements			Sign-off:
		544MSH065 544R000256 MF				Parameter	Value	Meter ID	
0	7/27/14	# Live Organisms				pH	7.52	PH21	AM Change: <u>DM5</u>
		A 10	B 10	C 10	D 10	D.O. (mg/L)	7.1	R009	WQ: <u>DM5</u>
		E 10	F 10	G 10	H 10	Conductivity (µS/cm)	495	EC09	Initiation Time: <u>1640</u>
						Alkalinity (mg/L)	✓ 79		Initiation Counts: <u>DM</u>
						Hardness (mg/L)	✓ 142		Confirmation Count: <u>DM</u>
				Ammonia (mg/L)	✓ 1.00	DP3800	PM Feed: <u>DM</u>		
								Temp. (°C)	23.0
1	7/28/14	# of Mortalities						Old D.O. (mg/L)	8.1
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	8.2	R009	Mortality Counts: <u>UK</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.4	84A	PM Change: <u>KMP</u> PM Feed: <u>KMP</u>
						Old D.O. (mg/L)	8.2	R009	AM Change: <u>UK</u> WQ: <u>UK</u>
				Temp. (°C)	22.9				
				2	7/29/14	# of Mortalities			
A 0	B 0	C 0	D 0			New D.O. (mg/L)	7.8	R007	Mortality Counts: <u>UK</u>
E 0	F 0	G 0	H 0			Temp. (°C)	84A	84A	PM Change: <u>UK</u> PM Feed: <u>UK</u>
						Old D.O. (mg/L)	6.7	APF-R004	AM Change: <u>APF</u> WQ: <u>APF</u>
				Temp. (°C)	22.8				
				3	8/1/14	# of Mortalities			
A 0	B 0	C 0	D 0			New D.O. (mg/L)	8.1	R004	Mortality Counts: <u>KMP</u>
E 0	F 0	G 0	H 0			Temp. (°C)	23.3	84A	PM Change: <u>UK</u> PM Feed: <u>UK</u>
						Old D.O. (mg/L)	7.8	R007	AM Change: <u>KMP</u> WQ: <u>KMP</u>
				Temp. (°C)	22.7				
				4	8/2/14	# of Mortalities			
A 0	B 0	C 0	D 0			New D.O. (mg/L)	8.3	R011	Mortality Counts: <u>FOVB</u>
E 0	F 0	G 0	H 0			Temp. (°C)	23.3	84A	PM Change: <u>DM5</u> PM Feed: <u>SM</u>
						Old D.O. (mg/L)	7.7	R011	AM Change: <u>TBL</u> WQ: <u>TBL</u>
				Temp. (°C)	22.8				
				5	8/5/14	# of Mortalities			
A 0	B 0	C 0	D 0			New D.O. (mg/L)	8.3	R004	Mortality Counts: <u>DM5</u>
E 0	F 0	G 0	H 0			Temp. (°C)	23.0	84A	PM Change: <u>DM5</u> PM Feed: <u>DM5</u>
						pH	7.87	PH16	WQ: <u>FOVB</u>
				Conductivity (µS/cm)	521				
								Alkalinity (mg/L)	✓ 93
								Hardness (mg/L)	✓ 162
								Ammonia (mg/L)	1.84
								Temp. (°C)	22.8

CETIS Analytical Report

Report Date: 14 Aug-14 13:27 (p 3 of 8)
 Test Code: 544MSH062 | 12-4174-5973

Hyalella Survival and Growth Test Pacific EcoRisk

Analysis ID: 19-1115-8945	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.8.7	
Analyzed: 14 Aug-14 13:26	Analysis: Nonparametric-Two Sample	Official Results: Yes	

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	18.4%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		544MSH065	36	NA	0	14	<0.0001	Exact	Significant Effect

ANOVA Table

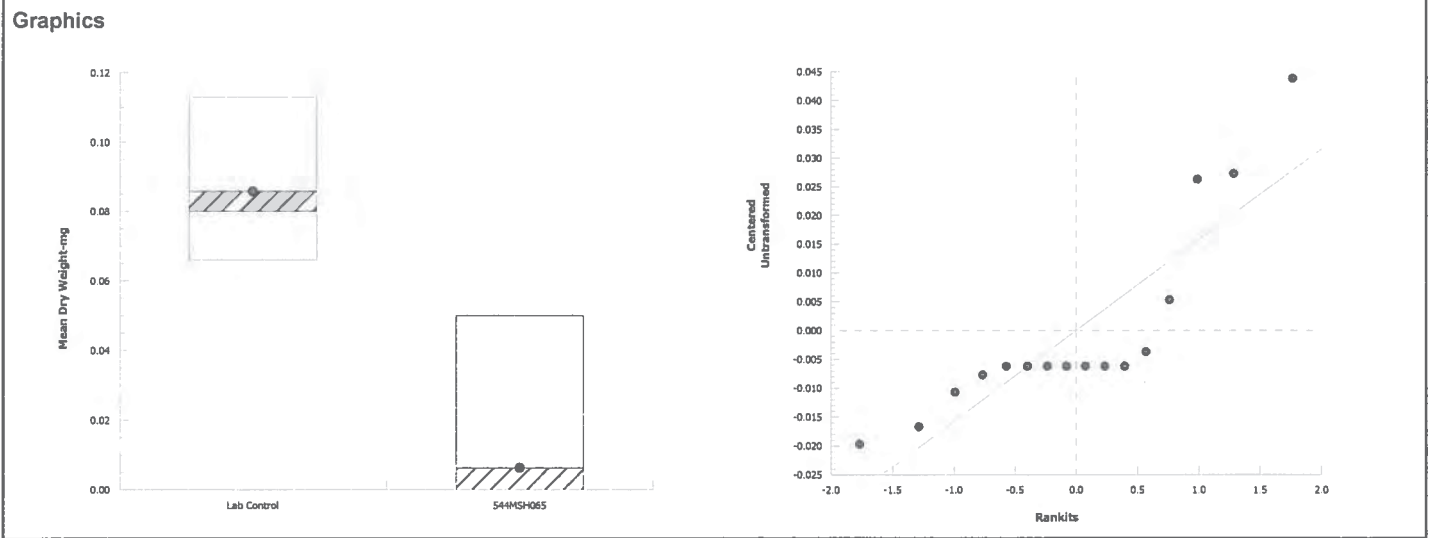
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02528073	0.02528073	1	78.5	<0.0001	Significant Effect
Error	0.004507259	0.000321947	14			
Total	0.02978799		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.06	8.89	0.9405	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.767	0.841	0.0010	Non-normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	0.0857	0.0705	0.101	0.08	0.066	0.113	0.00644	21.2%	0.0%
544MSH065	8	0.00625	-0.00853	0.021	0	0	0.05	0.00625	283.0%	92.7%



Hyalella azteca Weight Data Sheets

Client: ADH Environmental Test Init Date: 7.27.14 Balance ID: BAL01
 Sample ID: 544MSH065 Tare Wt Date: 8.2.14 Sign-Off: VK
 Test ID: 58114 Final Wt Date: 8.7.14 Sign-Off: SKK
 Project #: 19397

Pan	Concentration Replicate	Initial Weight. (mg)	Final Weight. (mg)	# organisms	Ave Weight (mg)
33	A	64.92	—	0	—
34	B	67.81	—	0	—
35	C	66.49	—	0	—
36	D	132.81	132.96	2	0.050
37	E	72.82	—	0	—
38	F	67.50	—	0	—
39	G	70.67	—	0	—
40	H	60.03	—	0	—
QA 2		71.05	71.05		

CETIS Analytical Report

Report Date: 14 Aug-14 13:27 (p 8 of 8)
 Test Code: 544MSH062 | 12-4174-5973

Hyalella Survival and Growth Test						Pacific EcoRisk	
-----------------------------------	--	--	--	--	--	-----------------	--

Analysis ID: 12-1339-0826	Endpoint: Survival Rate	CETIS Version: CETISv1.8.7
Analyzed: 14 Aug-14 13:26	Analysis: Nonparametric-Two Sample	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	15.3%	

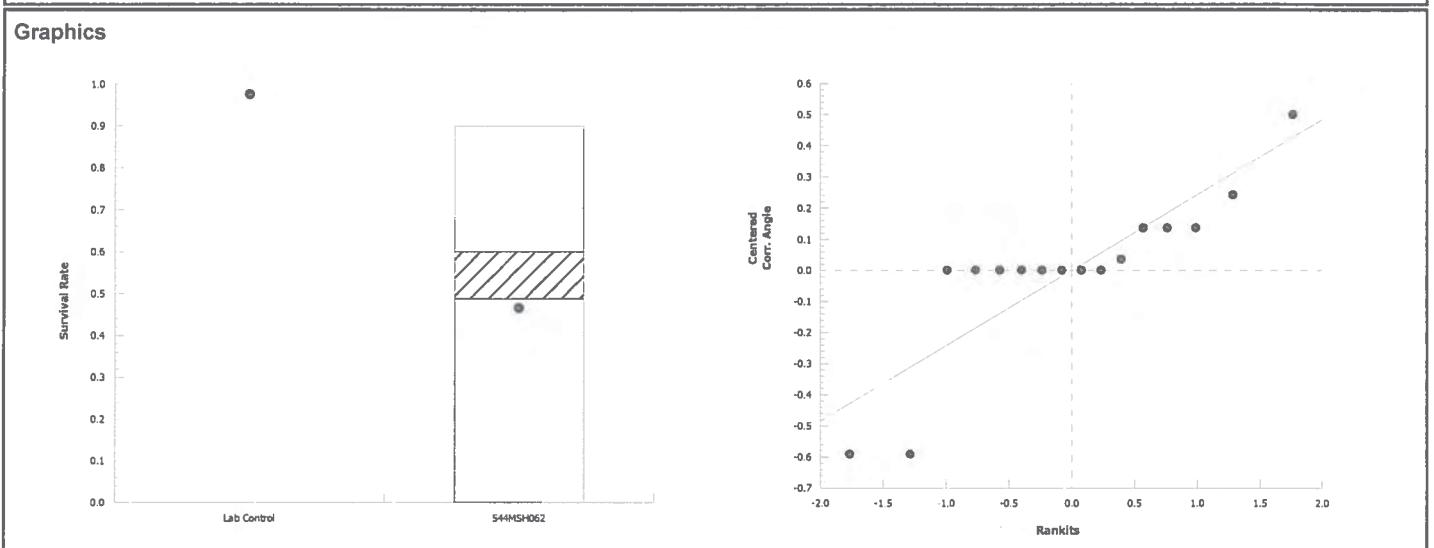
Wilcoxon Rank Sum Two-Sample Test									
Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		544MSH062	36	NA	0	14	<0.0001	Exact	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.75214	1.75214	1	23.1	0.0003	Significant Effect
Error	1.063089	0.0759349	14			
Total	2.815228		15			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	5.98E+14	8.89	<0.0001	Unequal Variances	
Distribution	Shapiro-Wilk W Normality	0.778	0.841	0.0014	Non-normal Distribution	

Survival Rate Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Lab Control	8	1	1	1	1	1	1	0	0.0%	0.0%	
544MSH062	8	0.488	0.218	0.757	0.6	0	0.9	0.114	66.2%	51.2%	

Angular (Corrected) Transformed Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Lab Control	8	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%	
544MSH062	8	0.75	0.424	1.08	0.886	0.159	1.25	0.138	51.9%	46.9%	



10-Day *Hyaella azteca* Sediment Toxicity Test Data

Client: ADH Environmental
 Project#: 19397
 Test ID#: 58116

Org. Supplier: ABS
 Org. Log #: 8379
 Org. Age/Size: 12-13 days

Day	Date	Test Material				Water Quality Measurements			Sign-off:
		544MSH062 544R00025DS MF				Parameter	Value	Meter ID	
0	7/27/14	# Live Organisms				pH	7.65	PH21	AM Change: <u>DM.S</u>
		A 10	B 10	C 10	D 10	D.O. (mg/L)	7.6	R004	WQ: <u>DM.S</u>
		E 10	F 10	G 10	H 10	Conductivity (µS/cm)	547	EC04	Initiation Time: <u>1640</u>
						Alkalinity (mg/L)	✓ 78		Initiation Counts: <u>DM</u>
						Hardness (mg/L)	✓ 151		Confirmation Counts: <u>PD</u>
				Ammonia (mg/L)	11.00	0R3800	PM Feed: <u>DM</u>		
				Temp. (°C)	23.0	84A			
1	7/28/14	# of Mortalities				Old D.O. (mg/L)	7.4	R009	AM Change: <u>VK</u> WQ: <u>VK</u>
		A 0 ^{KMP}	B 0	C 0	D 0	New D.O. (mg/L)	7.1	R009	Mortality Counts: <u>VK</u>
		E 0 ^{KMP}	F 0 ^{KMP}	G 0	H 0	Temp. (°C)	23.4	84A	PM Change: <u>KMP</u> PM Feed: <u>KMP</u>
						Old D.O. (mg/L)	7.8	R009	AM Change: <u>OK</u> WQ: <u>OK</u>
2	7/29/14	# of Mortalities				New D.O. (mg/L)	7.9	R005	Mortality Counts: <u>VK</u>
		A 0	B 0	C 0	D 0	Temp. (°C)	22.9	84A	PM Change: <u>VK</u> PM Feed: <u>VK</u>
		E 0	F 0	G 0	H 0	Old D.O. (mg/L)	7.8	R007	AM Change: <u>VK</u> WQ: <u>VK</u>
						New D.O. (mg/L)	7.9	R007	Mortality Counts: <u>VK</u>
3	7/30/14	# of Mortalities				Temp. (°C)	23.3	84A	PM Change: <u>VK</u> PM Feed: <u>VK</u>
		A 0	B 0	C 0	D 0	Old D.O. (mg/L)	6.6	R004	AM Change: <u>AKF</u> WQ: <u>AKF</u>
		E 0	F 0	G 0	H 0	New D.O. (mg/L)	7.5	R004	Mortality Counts: <u>AKF</u>
						Temp. (°C)	22.8	84A	PM Change: <u>AKF</u> PM Feed: <u>AKF</u>
4	7-31-14	# of Mortalities				Old D.O. (mg/L)	7.5	R004	AM Change: <u>KMP</u> WQ: <u>KMP</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.6	R004	Mortality Counts: <u>KMP</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.3	84A	PM Change: <u>VK</u> PM Feed: <u>VK</u>
						Old D.O. (mg/L)	7.4	R007	AM Change: <u>KMP</u> WQ: <u>KMP</u>
5	8/1/14	# of Mortalities				New D.O. (mg/L)	7.0	R007	Mortality Counts: <u>KMP</u>
		A 0	B 0	C 0	D 0	Temp. (°C)	22.7	84A	PM Change: <u>KMP</u> PM Feed: <u>KMP</u>
		E 0	F 0	G 0	H 0	Old D.O. (mg/L)	6.8	R011	AM Change: <u>DM.S</u> WQ: <u>DM.S</u>
						New D.O. (mg/L)	7.5	R011	Mortality Counts: <u>FOVB</u>
6	8/2/14	# of Mortalities				Temp. (°C)	23.3	84A	PM Change: <u>DM.S</u> PM Feed: <u>SM</u>
		A 0	B 0	C 0	D 0	Old D.O. (mg/L)	6.6	R011	AM Change: <u>TEM</u> WQ: <u>TEM</u>
		E 0	F 0	G 0	H 0	New D.O. (mg/L)	7.0	R011	Mortality Counts: <u>TEM</u>
						Temp. (°C)	22.8	84A	PM Change: <u>ES</u> PM Feed: <u>ES</u>
7	8/3/14	# of Mortalities				Old D.O. (mg/L)	6.9	R004	AM Change: <u>DM.S</u> WQ: <u>DM.S</u>
		A 0	B 0	C 0	D 0	New D.O. (mg/L)	7.5	R004	Mortality Counts: <u>DM.S</u>
		E 0	F 0	G 0	H 0	Temp. (°C)	23.0	84A	PM Change: <u>DM.S</u> PM Feed: <u>DM.S</u>
						pH	7.67	PH16	WQ: <u>FOVB</u>
8	8/6/14	# Alive				D.O. (mg/L)	7.2	R004	Termination Counts: <u>AKF</u>
		A 7	B 6	C 0	D 5	Conductivity (µS/cm)	457	EC06	Termination Time: <u>1200</u>
		E 6	F 0	G 6	H 9	Alkalinity (mg/L)	✓ 72		
						Hardness (mg/L)	✓ 180		
						Ammonia (mg/L)	11.00	DP3800	
				Temp. (°C)	22.8	84A			

CETIS Analytical Report

Report Date: 14 Aug-14 13:27 (p 4 of 8)
 Test Code: 544MSH062 | 12-4174-5973

Hyalella Survival and Growth Test						Pacific EcoRisk
-----------------------------------	--	--	--	--	--	-----------------

Analysis ID: 03-8499-8034	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed: 14 Aug-14 13:26	Analysis: Parametric-Two Sample	Official Results: Yes

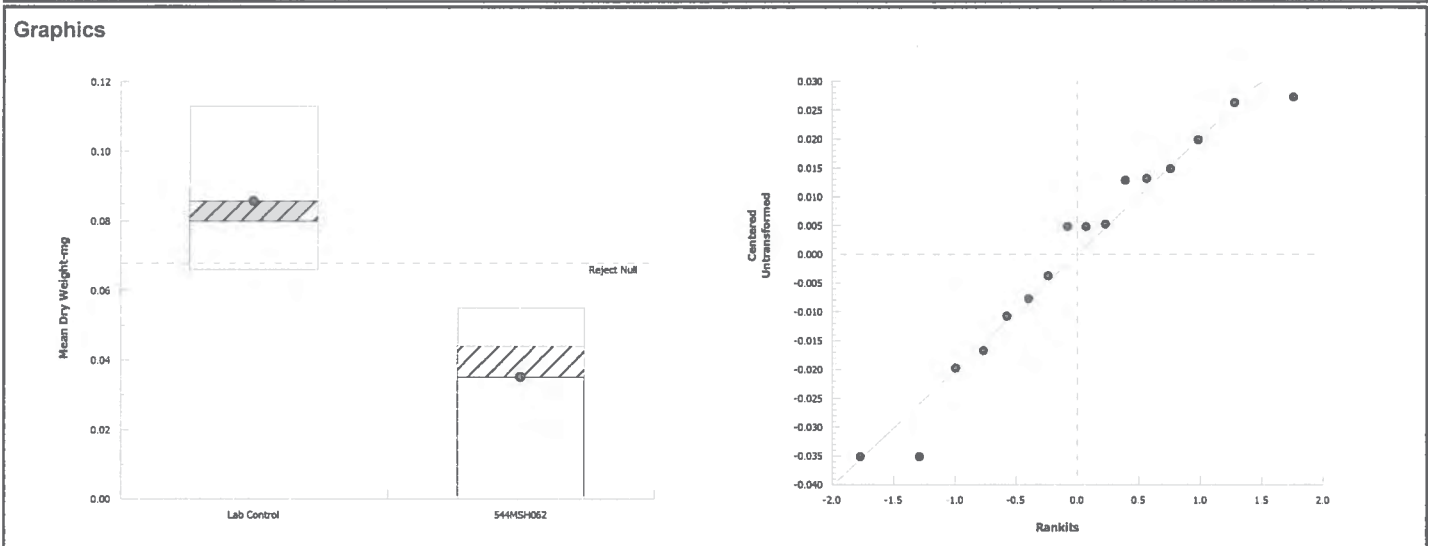
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	20.9%	

Equal Variance t Two-Sample Test									
Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		544MSH062	4.97	1.76	0.018	14	0.0001	CDF	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0102347	0.0102347	1	24.7	0.0002	Significant Effect
Error	0.005791049	0.0004136464	14			
Total	0.01602575		15			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	1.5	8.89	0.6079	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.944	0.841	0.4013	Normal Distribution	

Mean Dry Weight-mg Summary											
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect	
Lab Control	8	0.0857	0.0705	0.101	0.08	0.066	0.113	0.00644	21.2%	0.0%	
544MSH062	8	0.0352	0.0165	0.0538	0.044	0	0.055	0.00787	63.3%	59.0%	



***Hyalella azteca* Weight Data Sheets**

Client: ADH Environmental Test Init Date: 7.27.14 Balance ID: BAL01
 Sample ID: 544MSH062 Tare Wt Date: 8.2.14 Sign-Off: VK
 Test ID: 58116 Final Wt Date: 8.7.14 Sign-Off: REN
 Project #: 19397

Pan	Concentration Replicate	Initial Weight. (mg)	Final Weight. (mg)	# organisms	Ave Weight (mg)
41	A	74.39	74.67	7	0.040
42	B	68.30	68.54	6	0.040
43	C	65.51	—	0	—
44	D	55.86	56.10	5	0.048
45	E	70.15	70.48	6	0.035
46	F	67.76	—	0	—
47	G	71.99	72.28	6	0.0483
48	H	61.70	62.15	9	0.050
QA 2		71.05	71.05		

Appendix C

Test Data and Summary of Statistics for the Evaluation of the Toxicity of the CCCWP Ambient Sediment Samples to *Hyalella azteca* – Follow-Up Toxicity Identification Evaluation (TIE): 544MSH065



CETIS Summary Report

Report Date: 08 Sep-14 14:58 (p 1 of 1)
 Test Code: 58801 | 11-1351-5332

Hyalella Survival and Growth Test Pacific EcoRisk

Batch ID: 02-8200-7394	Test Type: Survival-Growth (10 day)	Analyst: Padrick Anderson
Start Date: 09 Aug-14 15:00	Protocol: EPA/600/R-99/064 (2000)	Diluent: Not Applicable
Ending Date: 19 Aug-14 12:00	Species: Hyalella azteca	Brine: Not Applicable
Duration: 9d 21h	Source: Aquatic Biosystems, CO	Age: 12

Sample ID: 13-3721-7571	Code: Baseline	Client: ADH Environmental, Inc.
Sample Date: 22 Jul-14 11:45	Material: Sediment	Project: 19397
Receive Date: 22 Jul-14 17:15	Source: ADH Environmental, Inc. (ADH ENVIRO)	
Sample Age: 18d 3h (0 °C)	Station: 544MSH065	

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-3759-4452	Mean Dry Weight-mg	<100	100	NA	45.4%	>1	Equal Variance t Two-Sample Test
10-2182-1396	Survival Rate	<100	100	NA	16.8%	>1	Equal Variance t Two-Sample Test

Mean Dry Weight-mg Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Control Sed	3	0.134	0.0894	0.179	0.116	0.152	0.0105	0.0181	13.5%	0.0%
100		3	0.0267	-0.0881	0.141	0	0.08	0.0267	0.0462	173.0%	80.2%

Survival Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Control Sed	3	0.967	0.823	1	0.9	1	0.0333	0.0577	5.97%	0.0%
100		3	0.0667	0	0.354	0	0.2	0.0667	0.115	173.0%	93.1%

Mean Dry Weight-mg Detail				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	Control Sed	0.116	0.152	0.135
100		0	0	0.08

Survival Rate Detail				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	Control Sed	1	0.9	1
100		0	0	0.2

Survival Rate Binomials				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	Control Sed	10/10	9/10	10/10
100		0/10	0/10	2/10

CETIS Analytical Report

Report Date: 08 Sep-14 08:31 (p 2 of 2)
 Test Code: 58801 | 11-1351-5332

Hyalella Survival and Growth Test						Pacific EcoRisk
-----------------------------------	--	--	--	--	--	-----------------

Analysis ID: 10-2182-1396	Endpoint: Survival Rate	CETIS Version: CETISv1.8.7
Analyzed: 08 Sep-14 8:31	Analysis: Parametric-Two Sample	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	16.8%	Fails survival rate

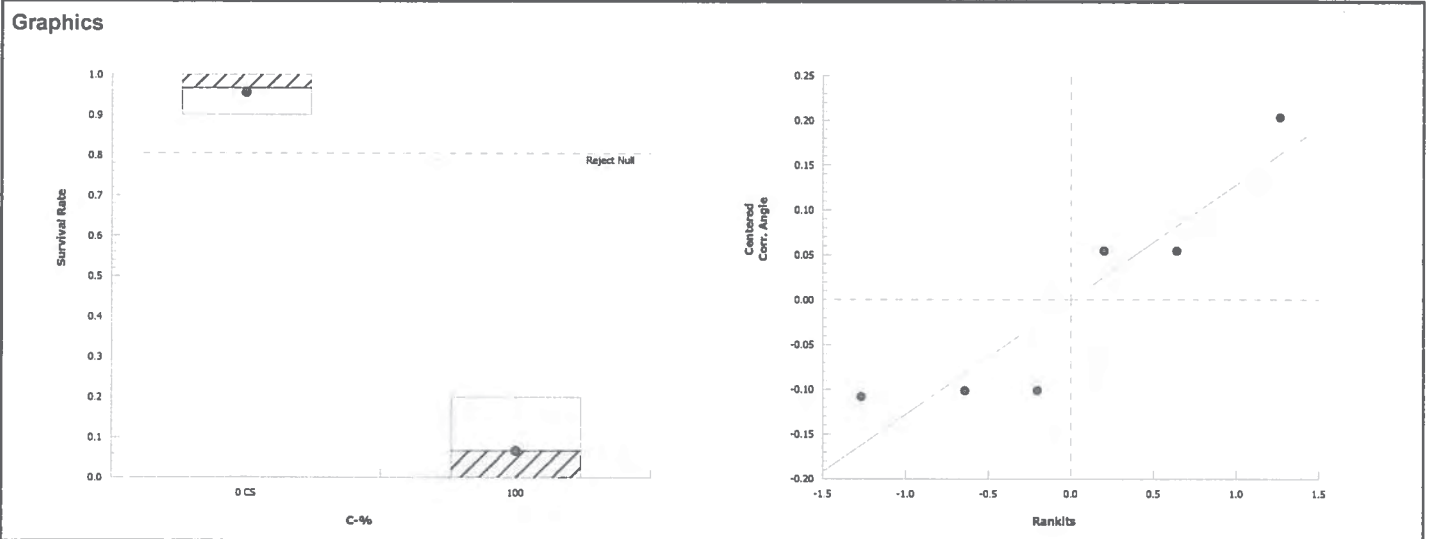
Equal Variance t Two-Sample Test									
Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control Sed		100*	9.52	2.13	0.246	4	0.0003	CDF	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.806068	1.806068	1	90.7	0.0007	Significant Effect
Error	0.07966898	0.01991724	4			
Total	1.885737		5			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	3.5	199	0.4445	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.836	0.43	0.1207	Normal Distribution	

Survival Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Control Sed	3	0.967	0.823	1	1	0.9	1	0.0333	5.97%	0.0%
100		3	0.0667	0	0.354	0	0	0.2	0.0667	173.0%	93.1%

Angular (Corrected) Transformed Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Control Sed	3	1.36	1.12	1.59	1.41	1.25	1.41	0.0543	6.93%	0.0%
100		3	0.26	-0.177	0.698	0.159	0.159	0.464	0.102	67.6%	80.8%



CETIS Analytical Report

Report Date: 08 Sep-14 08:31 (p 1 of 2)
 Test Code: 58801 | 11-1351-5332

Hyalella Survival and Growth Test		Pacific EcoRisk	
-----------------------------------	--	-----------------	--

Analysis ID: 18-3759-4452	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed: 08 Sep-14 8:31	Analysis: Parametric-Two Sample	Official Results: Yes

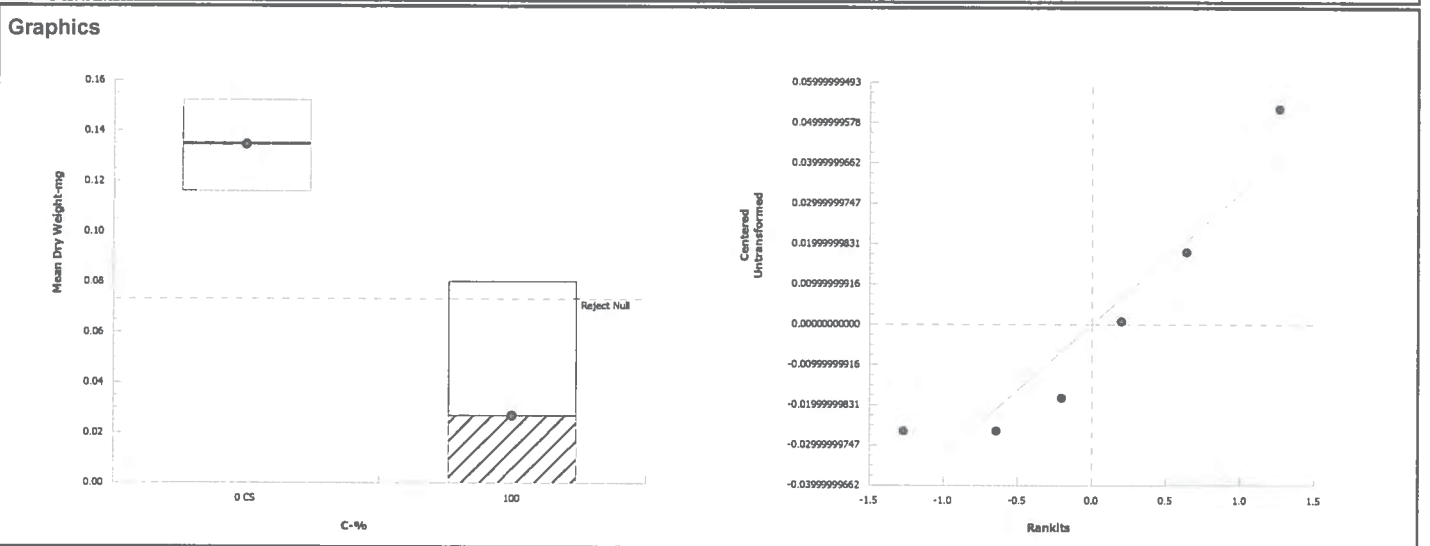
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	45.4%	Fails mean dry weight-mg

Equal Variance t Two-Sample Test									
Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control Sed		100*	3.76	2.13	0.061	4	0.0099	CDF	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01741217	0.01741217	1	14.1	0.0198	Significant Effect
Error	0.004923207	0.001230802	4			
Total	0.02233537		5			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	6.5	199	0.2667	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.874	0.43	0.2431	Normal Distribution	

Mean Dry Weight-mg Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Control Sed	3	0.134	0.0894	0.179	0.135	0.116	0.152	0.0105	13.5%	0.0%
100		3	0.0267	-0.0881	0.141	0	0	0.08	0.0267	173.0%	80.2%



10-Day Freshwater Sediment Toxicity Test Data

Client: ADH/RMC Project #: 19397
 Species: Hyalella azteca Test ID#: 58801

Organism Supplier/Log Number: ABS/ 8422
 Organism Age/Size: 12/13 days
 Control Water: SAM-5

Treatment =	Control				100% - 544R00025US				Sign-offs:
Day 0	New D.O. 7.9				New D.O. 6.7				Initiation Time: 1500
Date: 8-9-14	Meter ID R11								WQ: <i>mm</i>
Temp. (°C) = 23.0	A	B	C		A	B	C	Initiation Counts: <i>mm</i>	
Feed: <i>MM</i>	10	10	10		10	10	10	Confirmation Counts: <i>MM</i>	
Day 1	Old D.O. 7.6	New D.O. 7.6		Old D.O. 7.5	New D.O. 7.5			AM Change: <i>mm</i>	
Date: 8.10.14	Meter ID R011	Meter ID R011						WQ: <i>mm</i>	
Temp. (°C) = 22.8	A	B	C		A	B	C	PM Change: <i>mm</i>	
Feed: <i>mm</i>	0	0	0		0	0	0	Mortality Counts: <i>mm</i>	
Day 2	Old D.O. 8.4	New D.O. 8.4		Old D.O. 8.5	New D.O. 8.5			AM Change: <i>mm</i>	
Date: 8.11.14	Meter ID R007	Meter ID R007						WQ: <i>mm</i>	
Temp. (°C) = 23.0	A	B	C		A	B	C	PM Change: <i>mm</i>	
Feed: <i>mm</i>	0	0	0		0	0	0	Mortality Counts: <i>mm</i>	
Day 3	Old D.O. 8.6	New D.O. 8.7		Old D.O. 8.6	New D.O. 8.7			AM Change: <i>mm</i>	
Date: 8.12.14	Meter ID R009	Meter ID R009						WQ: <i>mm</i>	
Temp. (°C) = 22.9	A	B	C		A	B	C	PM Change: <i>mm</i>	
Feed: <i>mm</i>	0	0	0		0	0	0	Mortality Counts: <i>mm</i>	
Day 4	Old D.O. 8.7	New D.O. 8.7		Old D.O. 8.7	New D.O. 8.7			AM Change: <i>mm</i>	
Date: 8.13.14	Meter ID R011	Meter ID R011						WQ: <i>mm</i>	
Temp. (°C) = 22.9	A	B	C		A	B	C	PM Change: <i>mm</i>	
Feed: <i>mm</i>	0	0	0		0	0	0	Mortality Counts: <i>mm</i>	
Day 5	Old D.O. 8.4	New D.O. 8.5		Old D.O. 8.1	New D.O. 8.5			AM Change: <i>mm</i>	
Date: 8.14.14	Meter ID R007	Meter ID R007						WQ: <i>mm</i>	
Temp. (°C) = 22.8	A	B	C		A	B	C	PM Change: <i>mm</i>	
Feed: <i>mm</i>	0	0	0		0	0	0	Mortality Counts: <i>mm</i>	
Day 6	Old D.O. 8.4	New D.O. 8.4		Old D.O. 8.2	New D.O. 8.3			AM Change: <i>mm</i>	
Date: 8-15-14	Meter ID R009	Meter ID R009						WQ: <i>mm</i>	
Temp. (°C) = 23.1	A	B	C		A	B	C	PM Change: <i>mm</i>	
Feed: <i>MM</i>	0	0	0		0	0	0	Mortality Counts: <i>mm</i>	
Day 7	Old D.O. 8.5	New D.O. 8.5		Old D.O. 8.3	New D.O. 8.3			AM Change: <i>mm</i>	
Date: 8-16-14	Meter ID R011	Meter ID R011						WQ: <i>mm</i>	
Temp. (°C) = 22.7	A	B	C		A	B	C	PM Change: <i>mm</i>	
Feed: <i>mm</i>	0	0	0		0	0	0	Mortality Counts: <i>mm</i>	
Day 8	Old D.O. 8.4	New D.O. 8.6		Old D.O. 8.3	New D.O. 8.6			AM Change: <i>mm</i>	
Date: 8.17.14	Meter ID R011	Meter ID R011						WQ: <i>mm</i>	
Temp. (°C) = 22.8	A	B	C		A	B	C	PM Change: <i>mm</i>	
Feed: <i>mm</i>	0	0	0		0	0	0	Mortality Counts: <i>mm</i>	
Day 9	Old D.O. 8.6	New D.O. 8.8		Old D.O. 8.4	New D.O. 8.8			AM Change: <i>mm</i>	
Date: 8.18.14	Meter ID R011	Meter ID R011						WQ: <i>mm</i>	
Temp. (°C) = 22.9	A	B	C		A	B	C	PM Change: <i>mm</i>	
Feed: <i>mm</i>	0	0	0		0	0	0	Mortality Counts: <i>mm</i>	
Day 10	Old D.O. 8.3	New D.O. 8.3		Old D.O. 7.9	New D.O. 7.9			Termination Counts: <i>mm</i>	
Date: 8.19.14	Meter ID R007	Meter ID R007						WQ: <i>mm</i>	
Temp. (°C) = 22.9	# Alive/Replicate				# Alive/Replicate				
	A	B	C		A	B	C		
	10	9	10		0	0	2		

CETIS Summary Report

Report Date: 08 Sep-14 14:56 (p 1 of 1)
 Test Code: 58801a | 03-7045-9434

Hyalella Survival and Growth Test Pacific EcoRisk

Batch ID: 01-2600-7207	Test Type: Survival-Growth (10 day)	Analyst: Padrick Anderson
Start Date: 09 Aug-14 15:00	Protocol: EPA/600/R-99/064 (2000)	Diluent: Not Applicable
Ending Date: 19 Aug-14 12:00	Species: Hyalella azteca	Brine: Not Applicable
Duration: 9d 21h	Source: Aquatic Biosystems, CO	Age: 12

Sample ID: 08-9875-5755	Code: Aeration	Client: ADH Environmental, Inc.
Sample Date: 22 Jul-14 11:45	Material: Sediment	Project: 19397
Receive Date: 22 Jul-14 17:15	Source: ADH Environmental, Inc. (ADH ENVIRO)	
Sample Age: 18d 3h (0 °C)	Station: 544MSH065	

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
02-6734-8419	Mean Dry Weight-mg	100	>100	NA	83.5%	1	Equal Variance t Two-Sample Test
01-7668-1575	Survival Rate	<100	100	NA	20.2%	>1	Equal Variance t Two-Sample Test

Mean Dry Weight-mg Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Aeration Blank	3	0.119	0.103	0.134	0.114	0.126	0.00362	0.00627	5.28%	0.0%
100		3	0.0844	-0.115	0.284	0	0.16	0.0464	0.0804	95.2%	28.9%

Survival Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Aeration Blank	3	0.967	0.823	1	0.9	1	0.0333	0.0577	5.97%	0.0%
100		3	0.133	0	0.513	0	0.3	0.0882	0.153	115.0%	86.2%

Mean Dry Weight-mg Detail				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	Aeration Blank	0.126	0.114	0.116
100		0.16	0	0.0933

Survival Rate Detail				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	Aeration Blank	1	0.9	1
100		0.1	0	0.3

Survival Rate Binomials				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	Aeration Blank	10/10	9/10	10/10
100		1/10	0/10	3/10

Hyalella Survival and Growth Test Pacific EcoRisk

Analysis ID: 01-7668-1575 Endpoint: Survival Rate CETIS Version: CETISv1.8.7
 Analyzed: 08 Sep-14 8:36 Analysis: Parametric-Two Sample Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	20.2%	Fails survival rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Aeration Blank		100*	7.49	2.13	0.286	4	0.0008	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.512935	1.512935	1	56.2	0.0017	Significant Effect
Error	0.1077692	0.0269423	4			
Total	1.620704		5			

Distributional Tests

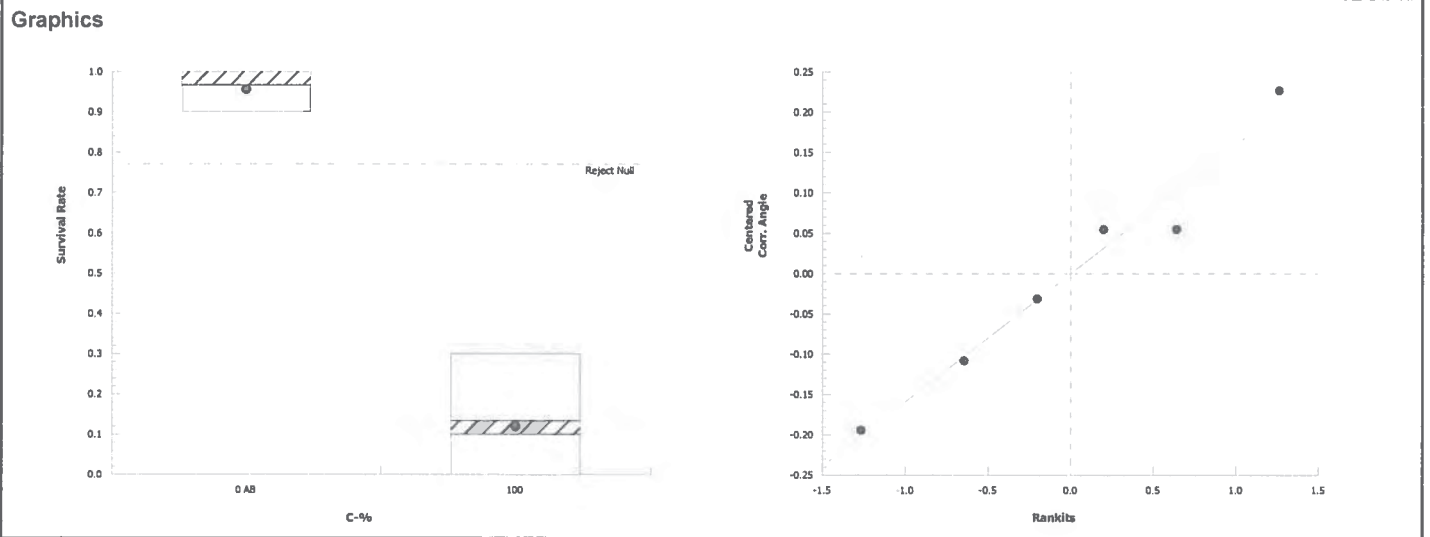
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	5.09	199	0.3286	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.974	0.43	0.9162	Normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Aeration Blank	3	0.967	0.823	1	1	0.9	1	0.0333	5.97%	0.0%
100		3	0.133	0	0.513	0.1	0	0.3	0.0882	115.0%	86.2%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Aeration Blank	3	1.36	1.12	1.59	1.41	1.25	1.41	0.0543	6.93%	0.0%
100		3	0.353	-0.174	0.881	0.322	0.159	0.58	0.123	60.0%	74.0%



CETIS Analytical Report

Report Date: 08 Sep-14 08:37 (p 1 of 2)
 Test Code: 58801a | 03-7045-9434

Hyalella Survival and Growth Test Pacific EcoRisk

Analysis ID: 02-6734-8419 Endpoint: Mean Dry Weight-mg CETIS Version: CETISv1.8.7
 Analyzed: 08 Sep-14 8:37 Analysis: Parametric-Two Sample Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	83.5%	Passes mean dry weight-mg

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Aeration Blank		100	0.738	2.13	0.099	4	0.2506	CDF	Non-Significant Effect

ANOVA Table

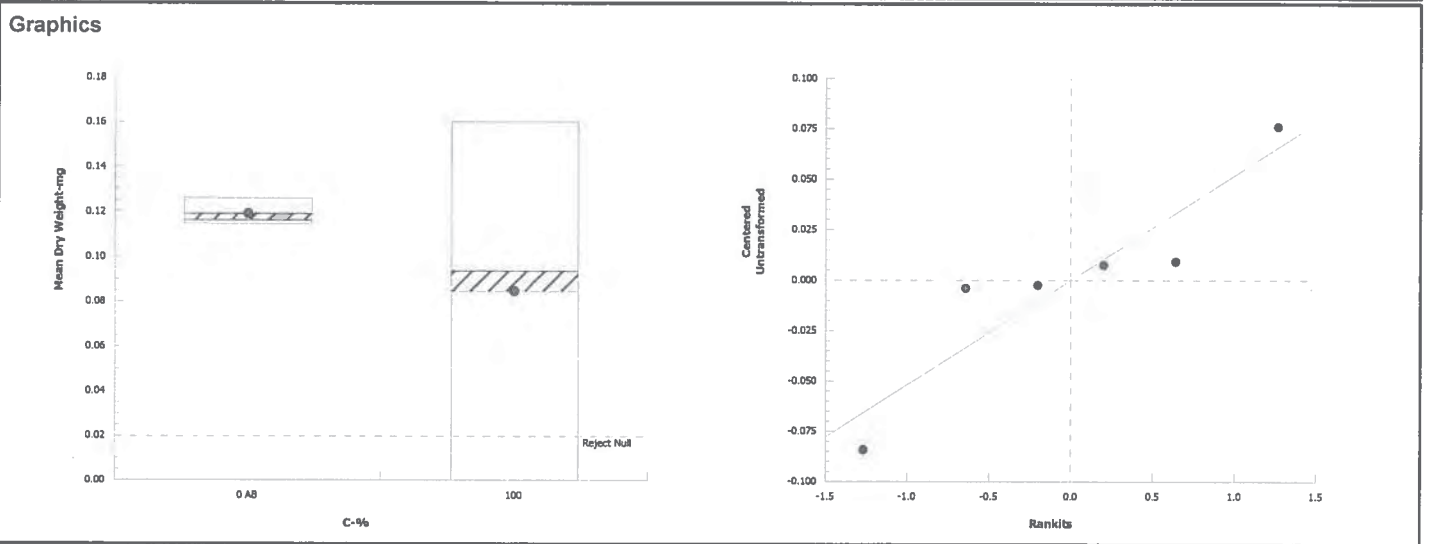
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001771875	0.001771875	1	0.545	0.5012	Non-Significant Effect
Error	0.0129977	0.003249426	4			
Total	0.01476958		5			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	164	199	0.0121	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.889	0.43	0.3119	Normal Distribution

Mean Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Aeration Blank	3	0.119	0.103	0.134	0.116	0.114	0.126	0.00362	5.28%	0.0%
100		3	0.0844	-0.115	0.284	0.0933	0	0.16	0.0464	95.2%	28.9%



10-Day Freshwater Sediment Toxicity Test Data

Client: ADH/RMC Project #: 19397
 Species: Hyalella azteca Test ID#: 58801

Organism Supplier/Log Number: ABS/ 8422
 Organism Age/Size: 12/13 days
 Control Water: SAM-S

Treatment =	Aeration Blank			544R00025US + Aeration			Sign-offs:
Day 0	New D.O. 8.2			New D.O. 7.6			Initiation Time: 1500
Date: 8/9/14	Meter ID RD11						WQ: mm
Temp. (°C) = 23.0	A 10	B 10	C 10	A 10	B 10	C 10	Initiation Counts: mm
Feed: mm							Confirmation Counts: mm
Day 1	Old D.O. 7.4	New D.O. 7.4		Old D.O. 7.4	New D.O. 7.4		AM Change: ECU
Date: 8.10.14	Meter ID RD11	Meter ID RD11					WQ: ECU
Temp. (°C) = 22.8	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: -
Feed: ECU							Mortality Counts: ECU
Day 2	Old D.O. 8.2	New D.O. 8.4		Old D.O. 8.1	New D.O. 8.4		AM Change: ECU
Date: 8.11.14	Meter ID RD07	Meter ID RD07					WQ: ECU
Temp. (°C) = 23.0	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: -
Feed: ECU							Mortality Counts: ECU
Day 3	Old D.O. 8.3	New D.O. 8.7		Old D.O. 8.4	New D.O. 8.7		AM Change: ECU
Date: 8.12.14	Meter ID RD09	Meter ID RD09					WQ: ECU
Temp. (°C) = 22.9	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: -
Feed: ECU							Mortality Counts: ECU
Day 4	Old D.O. 8.3	New D.O. 8.7		Old D.O. 8.1	New D.O. 8.7		AM Change: ECU
Date: 8.13.14	Meter ID RD11	Meter ID RD11					WQ: ECU
Temp. (°C) = 22.9	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: -
Feed: ECU							Mortality Counts: ECU
Day 5	Old D.O. 8.0	New D.O. 8.5		Old D.O. 7.8	New D.O. 8.5		AM Change: ECU
Date: 8.14.14	Meter ID RD07	Meter ID RD07					WQ: ECU
Temp. (°C) = 22.8	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: -
Feed: ECU							Mortality Counts: ECU
Day 6	Old D.O. 8.3	New D.O. 8.3		Old D.O. 7.9	New D.O. 7.7		AM Change: mm
Date: 8/15/14	Meter ID RD09	Meter ID RD09					WQ: mm
Temp. (°C) = 23.1	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: -
Feed: mm							Mortality Counts: mm
Day 7	Old D.O. 8.3	New D.O. 8.4		Old D.O. 8.1	New D.O. 8.1		AM Change: mm
Date: 8.16.14	Meter ID RD11	Meter ID RD11					WQ: mm
Temp. (°C) = 22.7	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: -
Feed: mm							Mortality Counts: mm
Day 8	Old D.O. 8.3	New D.O. 8.6		Old D.O. 8.3	New D.O. 8.6		AM Change: ECU
Date: 8.17.14	Meter ID RD11	Meter ID RD11					WQ: ECU
Temp. (°C) = 22.8	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: -
Feed: ECU							Mortality Counts: ECU
Day 9	Old D.O. 8.2	New D.O. 8.8		Old D.O. 8.2	New D.O. 8.8		AM Change: ECU
Date: 8.18.14	Meter ID RD11	Meter ID RD11					WQ: ECU
Temp. (°C) = 22.9	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: -
Feed: ECU							Mortality Counts: ECU
Day 10	Old D.O. 8.3			Old D.O. 7.7			Termination
Date: 8.19.14	Meter ID RD07						Counts: ECU
Temp. (°C) = 22.9	# Alive/Replicate			# Alive/Replicate			WQ: ECU
	A 10	B 9	C 10	A 1	B 0	C 3	

CETIS Summary Report

Report Date: 08 Sep-14 14:57 (p 1 of 1)
 Test Code: 58801b | 19-5160-7963

Hyalella Survival and Growth Test **Pacific EcoRisk**

Batch ID: 01-2914-6876	Test Type: Survival-Growth (10 day)	Analyst: Padrick Anderson
Start Date: 09 Aug-14 15:00	Protocol: EPA/600/R-99/064 (2000)	Diluent: Not Applicable
Ending Date: 19 Aug-14 12:00	Species: Hyalella azteca	Brine: Not Applicable
Duration: 9d 21h	Source: Aquatic Biosystems, CO	Age: 12

Sample ID: 15-8148-7129	Code: PBO @ 25 ug/L	Client: ADH Environmental, Inc.
Sample Date: 22 Jul-14 11:45	Material: Sediment	Project: 19397
Receive Date: 22 Jul-14 17:15	Source: ADH Environmental, Inc. (ADH ENVIRO)	
Sample Age: 18d 3h (0 °C)	Station: 544MSH065	

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-4552-3379	Mean Dry Weight-mg	<100	100	NA	15.2%	>1	Equal Variance t Two-Sample Test
17-7973-1725	Survival Rate	<100	100	NA	7.35%	>1	Equal Variance t Two-Sample Test

Mean Dry Weight-mg Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	PBO 25 Blank	3	0.116	0.0802	0.151	0.1	0.128	0.00825	0.0143	12.4%	0.0%
100		3	0	0	0	0	0	0	0		100.0%

Survival Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	PBO 25 Blank	3	0.967	0.823	1	0.9	1	0.0333	0.0577	5.97%	0.0%
100		3	0	0	0	0	0	0	0		100.0%

Mean Dry Weight-mg Detail				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	PBO 25 Blank	0.128	0.1	0.119
100		0	0	0

Survival Rate Detail				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	PBO 25 Blank	1	0.9	1
100		0	0	0

Survival Rate Binomials				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	PBO 25 Blank	10/10	9/10	10/10
100		0/10	0/10	0/10

CETIS Analytical Report

Report Date: 08 Sep-14 08:44 (p 2 of 2)
 Test Code: 58801b | 19-5160-7963

Hyalella Survival and Growth Test						Pacific EcoRisk	
Analysis ID:	17-7973-1725	Endpoint:	Survival Rate	CETIS Version:	CETISv1.8.7		
Analyzed:	08 Sep-14 8:42	Analysis:	Parametric-Two Sample	Official Results:	Yes		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	7.35%	Fails survival rate

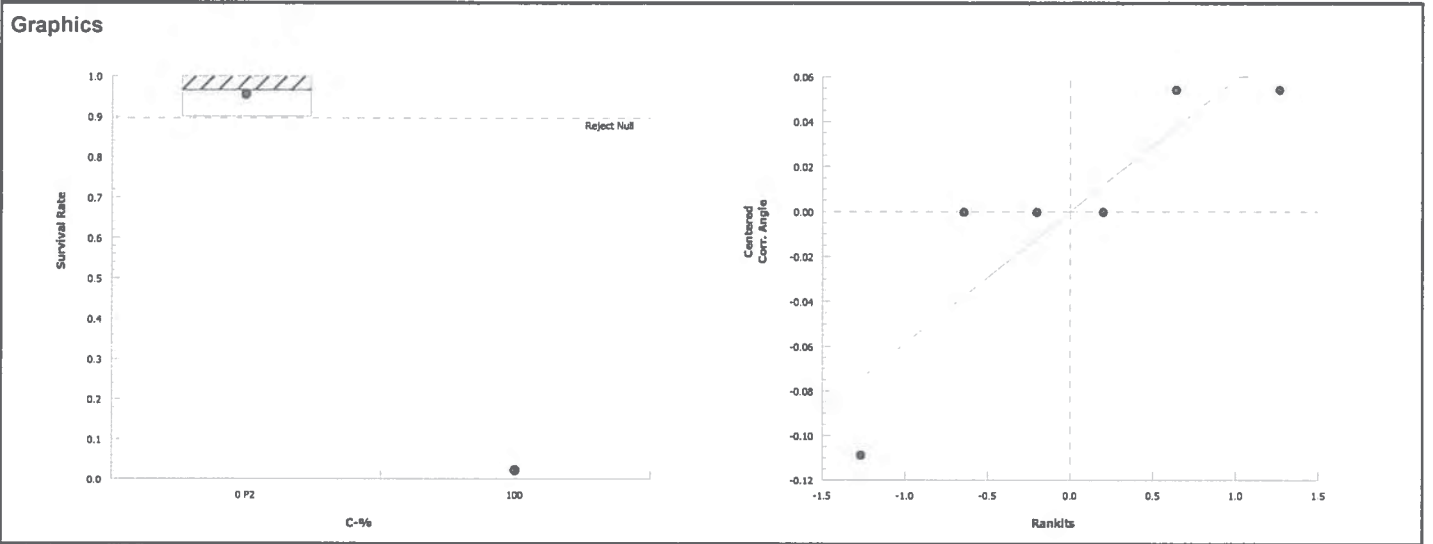
Equal Variance t Two-Sample Test									
Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
PBO 25 Blank		100*	22.1	2.13	0.116	4	<0.0001	CDF	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.156087	2.156087	1	487	<0.0001	Significant Effect
Error	0.01770622	0.004426555	4			
Total	2.173793		5			

Distributional Tests					
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	98.5	0.4226	Equal Variances
Variances	Levene Equality of Variance	16	21.2	0.0161	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.814	0.43	0.0778	Normal Distribution

Survival Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	PBO 25 Blank	3	0.967	0.823	1	1	0.9	1	0.0333	5.97%	0.0%
100		3	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	PBO 25 Blank	3	1.36	1.12	1.59	1.41	1.25	1.41	0.0543	6.93%	0.0%
100		3	0.159	0.159	0.159	0.159	0.159	0.159	0	0.0%	88.3%



Analyst:  QA: 

Hyalella Survival and Growth Test Pacific EcoRisk

Analysis ID: 18-4552-3379	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed: 08 Sep-14 8:44	Analysis: Parametric-Two Sample	Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	15.2%	Fails mean dry weight-mg

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
PBO 25 Blank		100*	14	2.13	0.018	4	<0.0001	CDF	Significant Effect

ANOVA Table

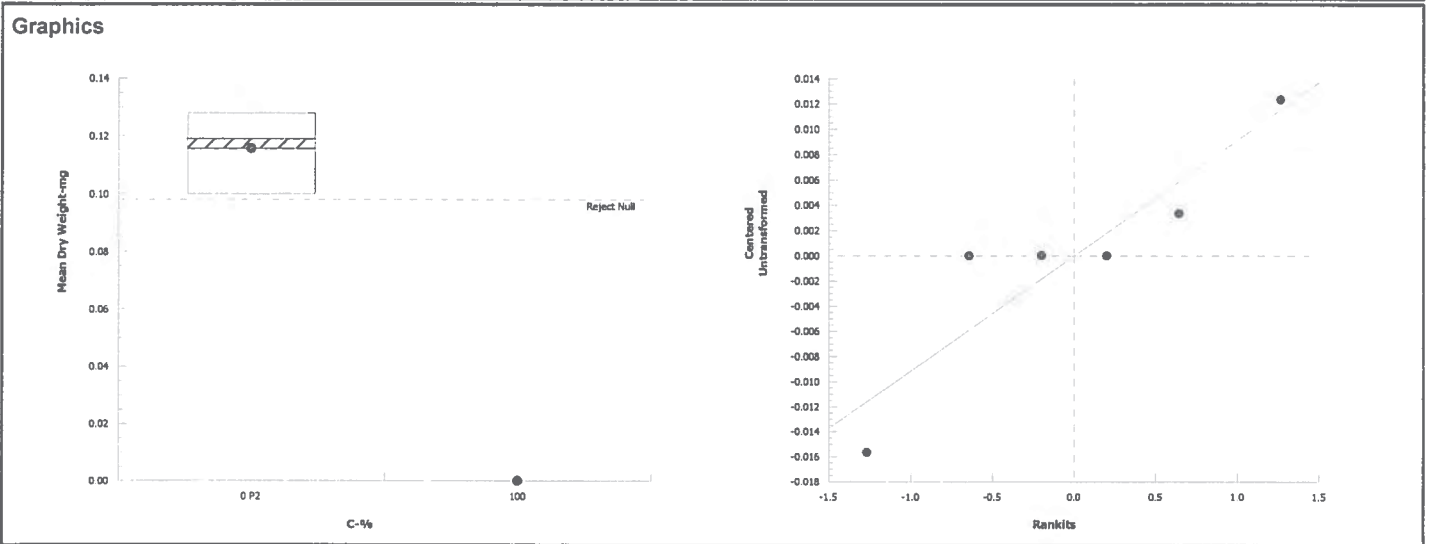
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02006811	0.02006811	1	196	0.0002	Significant Effect
Error	0.0004086705	0.0001021676	4			
Total	0.02047678		5			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	7.84	98.5	0.1074	Equal Variances
Variances	Levene Equality of Variance	8.04	21.2	0.0471	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.878	0.43	0.2586	Normal Distribution

Mean Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	PBO 25 Blank	3	0.116	0.0802	0.151	0.119	0.1	0.128	0.00825	12.4%	0.0%
100		3	0	0	0	0	0	0	0		100.0%



10-Day Freshwater Sediment Toxicity Test Data

Client: ADH/RMC Project #: 19397
 Species: Hyaella azteca Test ID#: 58801

Organism Supplier/Log Number: ABS/8422
 Organism Age/Size: 12/13 days
 Control Water: SAM-S

Treatment =	25 µg/L PBO Blank			544R00025US + 25 µg/L PBO			Sign-offs:
Day 0	New D.O. 8.1			New D.O. 5.9			Initiation Time: 1500
Date: 8.9.14	Meter ID RD11						WQ: <i>mm</i>
Temp. (°C) = 23.0	A 10	B 10	C 10	A 10	B 10	C 10	Initiation Counts: <i>mm</i>
Feed: <i>mm</i>							Confirmation Count: <i>mm</i>
Day 1	Old D.O. 7.2	New D.O. 7.4		Old D.O. 7.1	New D.O. 7.4		AM Change: <i>mm</i>
Date: 8.10.14	Meter ID RD11	Meter ID RD11					WQ: <i>mm</i>
Temp. (°C) = 22.8	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: <i>mm</i>
Feed: <i>mm</i>							Mortality Counts: <i>mm</i>
Day 2	Old D.O. 8.1	New D.O. 8.2		Old D.O. 8.1	New D.O. 8.2		AM Change: <i>mm</i>
Date: 8.11.14	Meter ID	Meter ID					WQ: <i>mm</i>
Temp. (°C) = 23.0	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: <i>mm</i>
Feed: <i>mm</i>							Mortality Counts: <i>mm</i>
Day 3	Old D.O. 8.3	New D.O. 8.7		Old D.O. 8.2	New D.O. 8.7		AM Change: <i>mm</i>
Date: 8.12.14	Meter ID RD09	Meter ID RD09					WQ: <i>mm</i>
Temp. (°C) = 22.9	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: <i>mm</i>
Feed: <i>mm</i>							Mortality Counts: <i>mm</i>
Day 4	Old D.O. 8.2	New D.O. 8.5		Old D.O. 8.1	New D.O. 8.5		AM Change: <i>mm</i>
Date: 8.13.14	Meter ID RD11	Meter ID RD11					WQ: <i>mm</i>
Temp. (°C) = 22.9	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: <i>mm</i>
Feed: <i>mm</i>							Mortality Counts: <i>mm</i>
Day 5	Old D.O. 7.7	New D.O. 8.0		Old D.O. 7.8	New D.O. 8.0		AM Change: <i>mm</i>
Date: 8.14.14	Meter ID RD07	Meter ID RD07					WQ: <i>mm</i>
Temp. (°C) = 22.8	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: <i>mm</i>
Feed: <i>mm</i>							Mortality Counts: <i>mm</i>
Day 6	Old D.O. 8.1	New D.O. 8.2		Old D.O. 7.9	New D.O. 7.8		AM Change: <i>mm</i>
Date: 8/15/14	Meter ID RD09	Meter ID RD09					WQ: <i>mm</i>
Temp. (°C) = 23.1	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: <i>mm</i>
Feed: <i>mm</i>							Mortality Counts: <i>mm</i>
Day 7	Old D.O. 8.3	New D.O. 8.2		Old D.O. 8.2	New D.O. 8.1		AM Change: <i>mm</i>
Date: 8/16/14	Meter ID RD11	Meter ID RD11					WQ: <i>mm</i>
Temp. (°C) = 22.7	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: <i>mm</i>
Feed: <i>mm</i>							Mortality Counts: <i>mm</i>
Day 8	Old D.O. 8.3	New D.O. 8.2		Old D.O. 8.2	New D.O. 8.2		AM Change: <i>mm</i>
Date: 8.17.14	Meter ID RD11	Meter ID RD11					WQ: <i>mm</i>
Temp. (°C) = 22.8	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: <i>mm</i>
Feed: <i>mm</i>							Mortality Counts: <i>mm</i>
Day 9	Old D.O. 8.1	New D.O. 8.7		Old D.O. 8.0	New D.O. 8.7		AM Change: <i>mm</i>
Date: 8.18.14	Meter ID RD11	Meter ID RD11					WQ: <i>mm</i>
Temp. (°C) = 22.9	A 0	B 0	C 0	A 0	B 0	C 0	PM Change: <i>mm</i>
Feed: <i>mm</i>							Mortality Counts: <i>mm</i>
Day 10	Old D.O. 8.2			Old D.O. 7.6			Termination
Date: 8.19.14	Meter ID RD07						Counts: <i>mm</i>
Temp. (°C) = 22.9	# Alive/Replicate			# Alive/Replicate			WQ: <i>mm</i>
	A 10	B 9	C 10	A 0	B 0	C 0	

CETIS Summary Report

Report Date: 08 Sep-14 14:59 (p 1 of 1)
 Test Code: 58801c | 03-7775-1808

Hyalella Survival and Growth Test **Pacific EcoRisk**

Batch ID: 06-0653-7694	Test Type: Survival-Growth (10 day)	Analyst: Padrick Anderson
Start Date: 09 Aug-14 15:00	Protocol: EPA/600/R-99/064 (2000)	Diluent: Not Applicable
Ending Date: 09 Aug-14 12:00	Species: Hyalella azteca	Brine: Not Applicable
Duration: NA	Source: Aquatic Biosystems, CO	Age: 12

Sample ID: 16-4939-1953	Code: Carboxylesteras	Client: ADH Environmental, Inc.
Sample Date: 22 Jul-14 11:45	Material: Sediment	Project: 19397
Receive Date: 22 Jul-14 17:15	Source: ADH Environmental, Inc. (ADH ENVIRO)	
Sample Age: 18d 3h (0 °C)	Station: 544MSH065	

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
01-6200-3848	Mean Dry Weight-mg	<100	100	NA	18.7%	>1	Equal Variance t Two-Sample Test
16-9849-8596	Survival Rate	100	>100	NA	22.0%	1	Equal Variance t Two-Sample Test


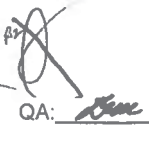
Mean Dry Weight-mg Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Carboxylesteras	3	0.149	0.0966	0.202	0.132	0.173	0.0123	0.0212	14.2%	0.0%
100		3	0.0893	0.0693	0.109	0.08	0.0944	0.00464	0.00804	9.01%	40.2%

Survival Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Carboxylesteras	3	1	1	1	1	1	0	0	0.0%	0.0%
100		3	0.767	0.193	1	0.5	0.9	0.133	0.231	30.1%	23.3%

Mean Dry Weight-mg Detail				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	Carboxylesteras	0.132	0.143	0.173
100		0.08	0.0944	0.0933

Survival Rate Detail				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	Carboxylesteras	1	1	1
100		0.5	0.9	0.9

Survival Rate Binomials				
C-%	Control Type	Rep 1	Rep 2	Rep 3
0	Carboxylesteras	10/10	10/10	10/10
100		5/10	9/10	9/10

Analyst:  QA: 

Hyalella Survival and Growth Test				Pacific EcoRisk			
Analysis ID: 16-9849-8596	Endpoint: Survival Rate			CETIS Version: CETISv1.8.7			
Analyzed: 08 Sep-14 8:49	Analysis: Parametric-Two Sample			Official Results: Yes			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	22.0%	Passes survival rate

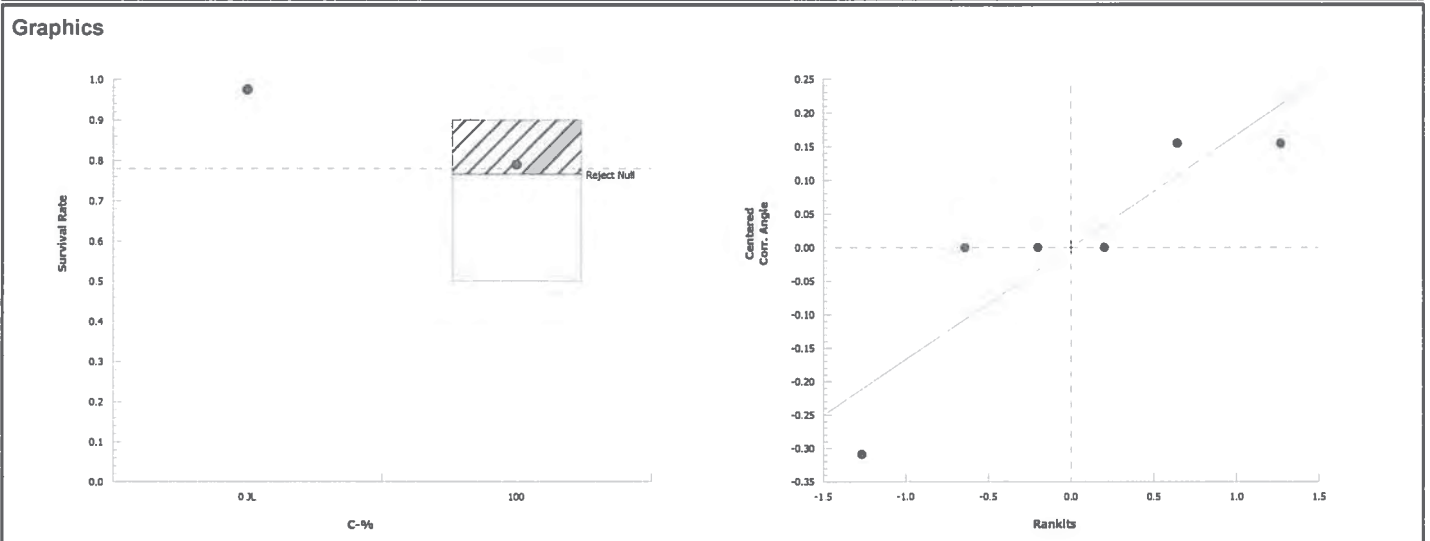
Equal Variance t Two-Sample Test									
Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Carboxylesterase BI		100	2.05	2.13	0.329	4	0.0546	CDF	Non-Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.151228	0.151228	1	4.22	0.1091	Non-Significant Effect
Error	0.1433127	0.03582818	4			
Total	0.2945407		5			

Distributional Tests					
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	98.5	0.4226	Equal Variances
Variances	Levene Equality of Variance	16	21.2	0.0161	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.814	0.43	0.0778	Normal Distribution

Survival Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Carboxylesteras	3	1	1	1	1	1	1	0	0.0%	0.0%
100		3	0.767	0.193	1	0.9	0.5	0.9	0.133	30.1%	23.3%

Angular (Corrected) Transformed Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Carboxylestera	3	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
100		3	1.09	0.43	1.76	1.25	0.785	1.25	0.155	24.5%	22.5%



CETIS Analytical Report

Report Date: 08 Sep-14 08:49 (p 1 of 2)
 Test Code: 58801c | 03-7775-1808

Hyalella Survival and Growth Test			Pacific EcoRisk		
Analysis ID: 01-6200-3848	Endpoint: Mean Dry Weight-mg	CETIS Version: CETISv1.8.7			
Analyzed: 08 Sep-14 8:49	Analysis: Parametric-Two Sample	Official Results: Yes			

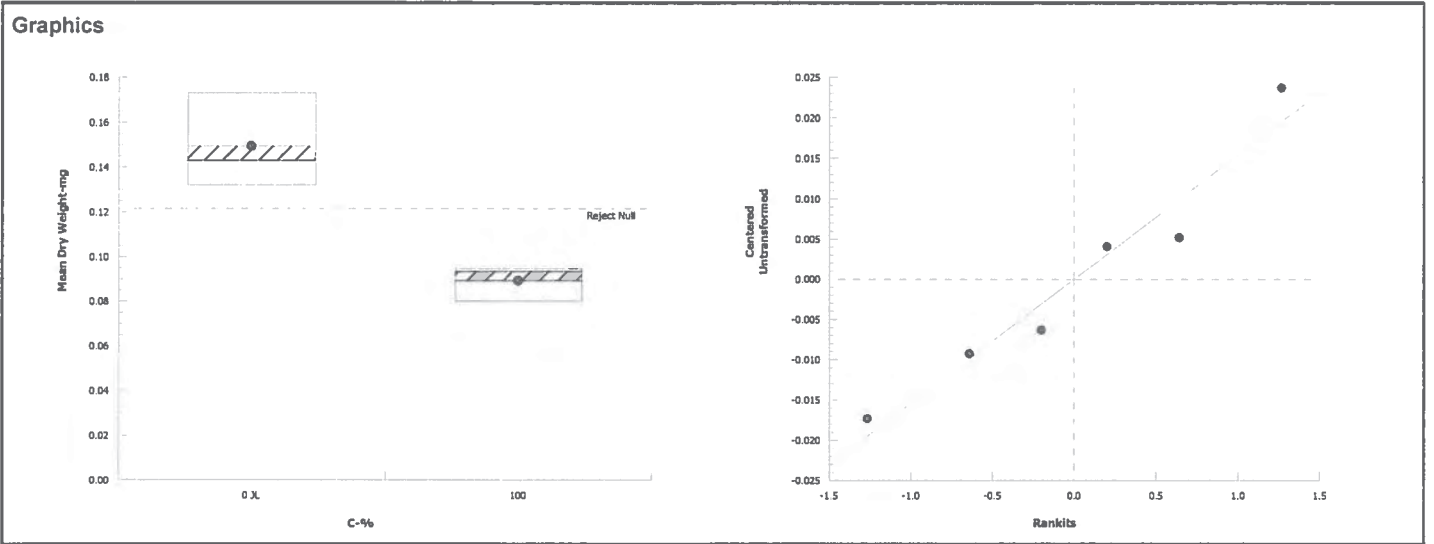
Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	18.7%	Fails mean dry weight-mg

Equal Variance t Two-Sample Test									
Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Carboxylesterase BI		100*	4.59	2.13	0.028	4	0.0051	CDF	Significant Effect

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00541335	0.00541335	1	21	0.0101	Significant Effect
Error	0.001029894	0.0002574735	4			
Total	0.006443244		5			

Distributional Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variances	Variance Ratio F	6.97	199	0.2510	Equal Variances	
Distribution	Shapiro-Wilk W Normality	0.953	0.43	0.7677	Normal Distribution	

Mean Dry Weight-mg Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Carboxylesteras	3	0.149	0.0966	0.202	0.143	0.132	0.173	0.0123	14.2%	0.0%
100		3	0.0893	0.0693	0.109	0.0933	0.08	0.0944	0.00464	9.01%	40.2%



10-Day Freshwater Sediment Toxicity Test Data

Client: ADH/RMC Project #: 19397
 Species: Hyalella azteca Test ID#: 58801

Organism Supplier/Log Number: ABS/8422
 Organism Age/Size: 12/13 days
 Control Water: SAM-5

Treatment =	Carboxylesterase Blank				544R00025US + Carboxylesterase				Sign-offs:
Day 0	New D.O. <u>8.0</u>				New D.O. <u>6.9</u>				Initiation Time: <u>1500</u>
Date: <u>8/9/14</u>	Meter ID <u>RD11</u>								WQ: <u>mm</u>
Temp. (°C) = <u>22.6</u>	A	B	C		A	B	C	Initiation Counts: <u>mm</u>	
Feed: <u>mm</u>	<u>10</u>	<u>10</u>	<u>10</u>		<u>10</u>	<u>10</u>	<u>10</u>	Confirmation Count: <u>mm</u>	
Day 1	Old D.O. <u>7.5</u>	New D.O. <u>7.4</u>			Old D.O. <u>7.3</u>	New D.O. <u>7.4</u>		AM Change: <u>mm</u>	
Date: <u>8.10.14</u>	Meter ID <u>RD11</u>	Meter ID <u>RD11</u>							WQ: <u>mm</u>
Temp. (°C) = <u>22.8</u>	A	B	C		A	B	C	PM Change: <u>-</u>	
Feed: <u>mm</u>	<u>0</u>	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	Mortality Counts: <u>mm</u>	
Day 2	Old D.O. <u>8.2</u>	New D.O. <u>8.1</u>			Old D.O. <u>8.3</u>	New D.O. <u>8.1</u>		AM Change: <u>mm</u>	
Date: <u>8.11.14</u>	Meter ID	Meter ID							WQ: <u>mm</u>
Temp. (°C) = <u>23.0</u>	A	B	C		A	B	C	PM Change: <u>-</u>	
Feed: <u>mm</u>	<u>-</u>	<u>-</u>	<u>-</u>		<u>-</u>	<u>-</u>	<u>-</u>	Mortality Counts: <u>mm</u>	
Day 3	Old D.O. <u>8.1</u>	New D.O. <u>8.6</u>			Old D.O. <u>8.1</u>	New D.O. <u>8.6</u>		AM Change: <u>mm</u>	
Date: <u>8.12.14</u>	Meter ID <u>RD09</u>	Meter ID <u>RD09</u>							WQ: <u>mm</u>
Temp. (°C) = <u>22.9</u>	A	B	C		A	B	C	PM Change: <u>-</u>	
Feed: <u>mm</u>	<u>0</u>	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	Mortality Counts: <u>mm</u>	
Day 4	Old D.O. <u>8.0</u>	New D.O. <u>8.4</u>			Old D.O. <u>7.9</u>	New D.O. <u>8.4</u>		AM Change: <u>mm</u>	
Date: <u>8.13.14</u>	Meter ID	Meter ID <u>RD11</u>							WQ: <u>mm</u>
Temp. (°C) = <u>22.9</u>	A	B	C		A	B	C	PM Change: <u>-</u>	
Feed: <u>mm</u>	<u>0</u>	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	Mortality Counts: <u>mm</u>	
Day 5	Old D.O. <u>7.8</u>	New D.O. <u>7.3</u>			Old D.O. <u>7.8</u>	New D.O. <u>7.3</u>		AM Change: <u>mm</u>	
Date: <u>8.14.14</u>	Meter ID <u>RD07</u>	Meter ID <u>RD07</u>							WQ: <u>mm</u>
Temp. (°C) = <u>22.8</u>	A	B	C		A	B	C	PM Change: <u>-</u>	
Feed: <u>mm</u>	<u>0</u>	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	Mortality Counts: <u>mm</u>	
Day 6	Old D.O. <u>7.8</u>	New D.O. <u>7.9</u>			Old D.O. <u>7.8</u>	New D.O. <u>7.8</u>		AM Change: <u>mm</u>	
Date: <u>8/15/14</u>	Meter ID <u>RD09</u>	Meter ID <u>RD09</u>							WQ: <u>mm</u>
Temp. (°C) = <u>23.1</u>	A	B	C		A	B	C	PM Change: <u>mm</u>	
Feed: <u>mm</u>	<u>0</u>	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	Mortality Counts: <u>mm</u>	
Day 7	Old D.O. <u>8.0</u>	New D.O. <u>7.9</u>			Old D.O. <u>7.9</u>	New D.O. <u>7.9</u>		AM Change: <u>mm</u>	
Date: <u>8.16.14</u>	Meter ID <u>RD11</u>	Meter ID <u>RD11</u>							WQ: <u>mm</u>
Temp. (°C) = <u>22.7</u>	A	B	C		A	B	C	PM Change: <u>-</u>	
Feed: <u>mm</u>	<u>0</u>	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	Mortality Counts: <u>mm</u>	
Day 8	Old D.O. <u>8.1</u>	New D.O. <u>8.2</u>			Old D.O. <u>7.9</u>	New D.O. <u>8.2</u>		AM Change: <u>mm</u>	
Date: <u>8.17.14</u>	Meter ID <u>RD11</u>	Meter ID <u>RD04</u>							WQ: <u>mm</u>
Temp. (°C) = <u>22.8</u>	A	B	C		A	B	C	PM Change: <u>-</u>	
Feed: <u>mm</u>	<u>0</u>	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	Mortality Counts: <u>mm</u>	
Day 9	Old D.O. <u>8.0</u>	New D.O. <u>8.5</u>			Old D.O. <u>7.8</u>	New D.O. <u>8.5</u>		AM Change: <u>mm</u>	
Date: <u>8.18.14</u>	Meter ID <u>RD11</u>	Meter ID <u>RD11</u>							WQ: <u>mm</u>
Temp. (°C) = <u>22.9</u>	A	B	C		A	B	C	PM Change: <u>-</u>	
Feed: <u>mm</u>	<u>0</u>	<u>0</u>	<u>0</u>		<u>0</u>	<u>0</u>	<u>0</u>	Mortality Counts: <u>mm</u>	
Day 10	Old D.O. <u>7.8</u>				Old D.O. <u>7.3</u>			Termination	
Date: <u>8.19.14</u>	Meter ID <u>RD07</u>								Counts: <u>mm</u>
Temp. (°C) = <u>22.9</u>	# Alive/Replicate				# Alive/Replicate				WQ: <u>mm</u>
	A	B	C		A	B	C		
	<u>10</u>	<u>10</u>	<u>10</u>		<u>5</u>	<u>9</u>	<u>9</u>		

***Hyalella azteca* Weight Data Sheets**

Client: ADH/RMC Project #: 19397 Balance ID: BAL01
 Sample ID: 544R00025US Tare Wt Date: 8/11/14 Sign-Off: Fous
 Test ID #: 58801 Final Wt Date: 8/20/14 Sign-Off: CJG

Pan	Concentration Replicate	Initial Weight. (mg)	Final Weight. (mg)	# organisms	Ave Weight (mg)
1	Control A	65.27	66.43	10	0.116
2	B	63.46	64.83	9	0.152
3	C	61.79	63.14	10	0.135
4	Aeration Blank A	65.23	66.49	10	0.126
5	B	63.52	64.55	9	0.114
6	C	64.09	65.25	10	0.116
7	25 µg/L PBO Blank A	64.29	65.57	10	0.128
8	B	63.34	64.24	9	0.100
9	C	63.69	64.88	10	0.119
10	Carboxylesterase A	66.79	68.17 68.11	10	0.132
11	Blank B	66.10	67.53	10	0.143
12	C	60.70	62.43	10	0.173
13	100% 544R00025US A	67.02	—	0	—
14	B	58.19	—	0	—
15	C	63.45	63.61	2	0.080
16	544R00025US + Aeration A	66.25	66.41	1	0.160
17	B	66.92	—	0	—
18	C	65.50	65.78	3	0.093
19	544R00025US + 25 µg/L PBO A	59.77	—	0	—
20	B	61.26	—	0	—
21	C	68.48	—	0	—
22	544R00025US + Carboxylesterase A	63.24	63.64	5	0.080
23	B	63.27	64.12	9	0.094
24	C	61.65	62.49	9	0.093
QA 1		65.74	65.75		—
QA 2		66.66	66.64		—

Freshwater Sediment Test Water Quality Characteristics

Client: ADH/RMCSpecies: Hyallela azteca

Initial Water Quality Characteristics for Overlying Water

Date: 8-9-14

Site	pH	D.O. (mg/L)	Conductivity (μ S/cm)	Alkalinity	Hardness	Total Ammonia	Test ID #
Control	8.36	7.9	504	65 ✓	138 ✓	<1.00	58801
Aeration Blank	8.33	8.2	574	72 ✓	140 ✓	<1.00	
25 μ L PBO Blank	8.34	8.1	546	61 ✓	133 ✓	<1.00	
Carboxylesterase Blank	8.31	8.0	567	78 ✓	170 ✓	<1.00	
100% - 544R0025US	7.79	6.7	690	138 ✓	169 ✓	<1.00	
544R0025US + Aeration	8.15	7.6	724	155 ✓	187 ✓	1.02	
544R0025US + 25 μ L PBO	7.92	5.9	659	144 ✓	164 ✓	1.07	
544R0025US + Carboxylesterase	8.19	6.9	762	179 ✓	197 ✓	2.16	
Meter ID	PH 21	RD11	EC10	— ✓	— ✓	DR3800	
Sign-off	MM	MM	MM	MM	MM	MM	

Final Water Quality Characteristics for Overlying Water

Date: 8.19.14

Site	pH	D.O. (mg/L)	Conductivity (μ S/cm)	Alkalinity	Hardness	Total Ammonia	
Control	7.73	8.3	457	52 ✓	149 ✓	<1.00	
Aeration Blank	7.79	8.3	442	53 ✓	143 ✓	<1.00	
25 μ L PBO Blank	7.83	8.2	438	44 ✓	182 ✓	<1.00	
Carboxylesterase Blank	7.82	7.8	502	82 ✓	165 ✓	7.47	
100% - 544R0025US	8.06	7.9	561	79 ✓	198 ✓	1.57	
544R0025US + Aeration	8.06	7.7	509	81 ✓	160 ✓	1.26	
544R0025US + 25 μ L PBO	8.07	7.6	550	97 ✓	193 ✓	1.18	
544R0025US + Carboxylesterase	8.00	7.3	575	109 ✓	275 ✓	8.15	
Meter ID	PH 21	RD07	EC04	— ✓	— ✓	DR3800	
Sign-off	MM	MM	MM	MM	MM	MM	

Appendix D

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Hyalella azteca*



CETIS Summary Report

Report Date: 02 Aug-14 08:09 (p 1 of 1)
 Test Code: 58640 | 10-7064-3733

Hyalella 96-h Acute Survival Test Pacific EcoRisk

Batch ID: 01-9707-2882	Test Type: Survival (96h)	Analyst: Michelle Kawaguchi
Start Date: 27 Jul-14 16:00	Protocol: EPA-821-R-02-012 (2002)	Diluent: SAM-5S
Ending Date: 31 Jul-14 14:35	Species: Hyalella azteca	Brine: Not Applicable
Duration: 95h	Source: Chesapeake Cultures, Inc.	Age: 10

Sample ID: 11-9072-4585	Code: KCI	Client: Reference Toxicant
Sample Date: 27 Jul-14 16:00	Material: Potassium chloride	Project: 22820
Receive Date: 27 Jul-14 16:00	Source: Reference Toxicant	
Sample Age: NA (23 °C)	Station: In House	

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
19-6365-8524	96h Survival Rate	0.2	0.4	0.2828	NA		Fisher Exact/Bonferroni-Holm Test

Point Estimate Summary							
Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
19-9425-5682	96h Survival Rate	EC50	0.373	0.301	0.463		Spearman-Kärber

96h Survival Rate Summary											
C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	10	1	1	1	1	1	0	0	0.0%	0.0%
0.1		10	1	1	1	1	1	0	0	0.0%	0.0%
0.2		10	1	1	1	1	1	0	0	0.0%	0.0%
0.4		10	0.4	0.207	0.593	0	1	0.163	0.516	129.0%	60.0%
0.8		10	0	0	0	0	0	0	0		100.0%
1.6		10	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail											
C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1	1	1	1	1	1	1	1	1	1
0.1		1	1	1	1	1	1	1	1	1	1
0.2		1	1	1	1	1	1	1	1	1	1
0.4		1	0	1	0	1	0	0	0	1	0
0.8		0	0	0	0	0	0	0	0	0	0
1.6		0	0	0	0	0	0	0	0	0	0

96h Survival Rate Binomials											
C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water Contr	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0.4		1/1	0/1	1/1	0/1	1/1	0/1	0/1	0/1	1/1	0/1
0.8		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
1.6		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

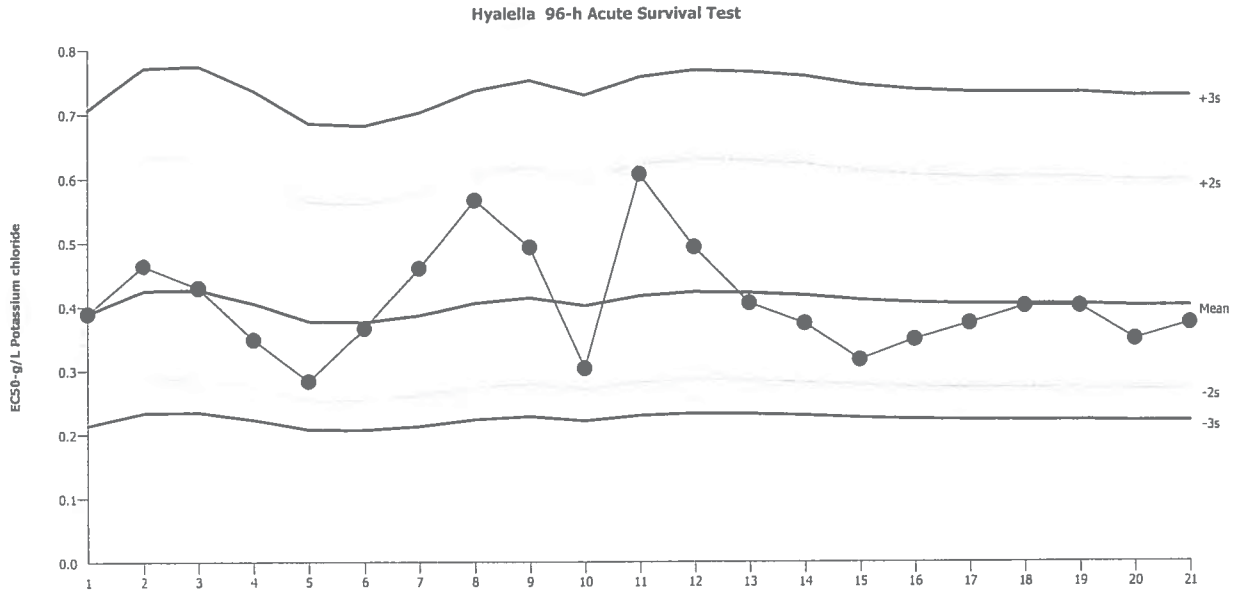
Hyalella 96-h Acute Survival Test

Pacific EcoRisk

Test Type: Survival (96h)
Protocol: EPA-821-R-02-012 (2002)

Organism: Hyalella azteca (Freshwater Amphip)
Endpoint: 96h Survival Rate

Material: Potassium chloride
Source: Reference Toxicant-REF



Mean: 0.4002 Count: 20 -2s Warning Limit: 0.2687 -3s Action Limit: 0.2202
 Sigma: NA CV: 22.00% +2s Warning Limit: 0.5961 +3s Action Limit: 0.7275

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2014	Jan	22	15:30	0.3887	-0.01152	-0.1466			15-1323-9580	12-5039-1906
2			23	12:20	0.4634	0.06319	0.7359			12-4927-8114	03-4534-5077
3			24	13:50	0.4287	0.02847	0.345			04-8256-1553	14-6784-2933
4			29	12:45	0.3482	-0.05202	-0.6989			02-0910-9206	20-3009-8021
5			30	13:00	0.2828	-0.1174	-1.743			07-7453-2234	19-6136-6595
6			31	15:00	0.3651	-0.0351	-0.4608			07-3562-2451	09-8419-3354
7		Feb	4	16:00	0.4595	0.05924	0.693			07-2556-9878	06-3437-8862
8			7	17:40	0.5657	0.1654	1.737			12-2780-2249	04-4756-7462
9			15	17:00	0.4925	0.09222	1.041			20-0080-3088	01-2359-2306
10			20	15:45	0.3031	-0.09709	-1.395			05-7047-7703	05-1521-5106
11			27	18:10	0.6063	0.2061	2.085	(+)		00-8786-3488	13-6064-7851
12			28	18:20	0.4925	0.09222	1.041			17-7114-0796	13-7617-1964
13		Mar	1	17:30	0.4048	0.004573	0.05703			13-0688-9437	00-6627-1218
14			27	13:00	0.3732	-0.02702	-0.3509			08-8207-4257	13-7765-3936
15		Apr	19	16:00	0.3162	-0.08406	-1.184			08-9365-8733	12-7246-8879
16		May	17	15:20	0.3482	-0.05202	-0.6989			10-0231-2264	05-8112-0401
17			30	14:30	0.3732	-0.02702	-0.3509			07-8466-6021	10-2686-8051
18		Jun	5	16:40	0.4	-0.00024	-0.00297			21-3469-3919	07-7147-2954
19		Jul	20	16:00	0.4	-0.00024	-0.00297			05-0442-5035	13-8903-6798
20			24	14:15	0.3482	-0.05202	-0.6989			11-0314-5496	07-7675-6316
21			27	16:00	0.3732	-0.02702	-0.3509			10-7064-3733	19-9425-5682

96 Hour *Hyalella azteca* Reference Toxicant Test Data

Client: Pacific EcoRisk
 Test Material: Potassium Chloride
 Test ID#: 58640 Project #: 22820
 Test Date: 7-27-14 Randomization: 10.6.9
 Feeding T0 Time: 0830 Initials: CP

Organism Log #: 8387 Age: 9-10 12 days
 Organism Supplier: Chesapeake Cultures
 Control/Diluent: SAM-5
 Control Water Batch: 127
 Feeding T46 Time: 0950 Initials: MA

Treatment (g/L)	Temp (°C)	pH	D.O. (mg/L)	Conductivity (µS/cm)	# Live Animals											Sign-Off
					A	B	C	D	E	F	G	H	I	J		
Control	23.0	8.02	6.7	403												Test Solution Prep: <u>CP</u>
0.1	23.0	7.99	7.0	770 ⁶⁴⁴ ₉₂												New WQ: <u>10R</u>
0.2	23.0	8.02	7.0	771												Initiation Date: <u>7/27/14</u>
0.4	23.0	7.99	7.3	1177												Initiation Time: <u>1600</u>
0.8	23.0	7.95	7.6	1882												Initiation Signoff: <u>MA</u>
1.6	23.0	7.87	8.9	3310												RT Batch #: <u>14</u>
Meter ID	43A	PH15	R009	EC09												
Control	23.2															Count Date: <u>7/28/14</u>
0.1	23.2															Count Time: <u>0915</u>
0.2	23.2															Count Signoff: <u>CP</u>
0.4	23.2															
0.8	23.2				0	0	0	0	0	1	0	0	0	0	0	
1.6	23.2				0	0	0	0	0	0	0	0	0	0	0	
Meter ID	43A															
Control	23.3															Count Date: <u>7/29/14</u>
0.1	23.3															Count Time: <u>0945</u>
0.2	23.3															Count Signoff: <u>MA</u>
0.4	23.3					0					0					
0.8	—				0	0	0	0	0	0	0	0	0	0	0	
1.6	—				0	0	0	0	0	0	0	0	0	0	0	
Meter ID	43A															
Control	23.1															Count Date: <u>7/30/14</u>
0.1	23.1															Count Time: <u>1025</u>
0.2	23.1															Count Signoff: <u>MA</u>
0.4	23.1					—		0		0	0	—		0		
0.8	—				—	—	—	—	—	—	—	—	—	—	—	
1.6	—				—	—	—	—	—	—	—	—	—	—	—	
Meter ID	43A															
Control	23.0	7.59	7.6	556												Termination Date: <u>7/31/14</u>
0.1	23.0	7.53	7.7	779												Termination Time: <u>1435</u>
0.2	23.0	7.58	7.6	908												Termination Signoff: <u>AW5</u>
0.4	23.0	7.65	7.4	1338		—		—		—	—	—		—		Old WQ: <u>A</u>
0.8	—	7.81	7.6	2203	—	—	—	—	—	—	—	—	—	—	—	
1.6	—	7.84	7.7	3860	—	—	—	—	—	—	—	—	—	—	—	
Meter ID	43A	PH21	R011	EC08												