City of Morro Bay and
Cayucos Sanitary District

OFFSHORE MONITORING AND REPORTING PROGRAM

SEMIANNUAL EFFLUENT SAMPLING

CHEMICAL AND BIOASSAY ANALYSIS RESULTS

JANUARY 2015

Marine Research Specialists

3140 Telegraph Rd., Suite A
Ventura, California 93003

Report to

City of Morro Bay and
Cayucos Sanitary District

955 Shasta Avenue
Morro Bay, California 93442
(805) 772-6272

MONITORING AND REPORTING PROGRAM

SEMIANNUAL EFFLUENT REPORT

CHEMICAL AND BIOASSAY ANALYSIS RESULTS

JANUARY 2015

Prepared by

Bonnie Luke
Douglas A. Coats

Marine Research Specialists

3140 Telegraph Rd., Suite A
Ventura, California 93003

Telephone: (805) 644-1180
Telefax: (805) 289-3935
E-mail: Marine@Rain.org

April 2015

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Bruce Keogh

Mr. Bruce Keogh
Wastewater Division Manager
City of Morro Bay

Date April 20, 2015

marine research specialists
3140 Telegraph Road, Suite A • Ventura, CA 93003 • (805) 644-1180

Bruce Keogh
Wastewater Division Manager
City of Morro Bay
955 Shasta Avenue
Morro Bay, CA 93442

14 April 2015

Reference: Semiannual Effluent Self-Monitoring Report for January through June 2015

Dear Mr. Keogh:

This self-monitoring report documents the chemical and bioassay analysis results for effluent samples collected in January 2015 as required by NPDES discharge permit CA0047881.[1] Analyses of effluent samples collected on 7 and 21 January 2015 were conducted in accordance with the monitoring requirements specified in the permit, including:

- Chronic bioassays and chemical analyses conducted on composite samples; and
- Nutrient compounds measured in a grab sample.

The three attachments to this report demonstrate that all chemical concentrations and toxicological endpoints were well within the limitations specified in the discharge permit. Attachment A compares the results of the analyses with the limitations established for each of the effluent parameters specified in the permit. The comparisons are based on the minimum-level (ML) reporting requirements of the permit, and all units have been converted to those used in the discharge monitoring report (DMR) that was submitted electronically in the Self-Monitoring Report 2.5 Module (eSMR 2.5) within the California Integrated Water Quality System (Attachment B). Attachment C collates the original laboratory reports, including raw data and results, pertinent QA/QC analyses, and chains of custody.

The comprehensive chemical and bioassay analyses of effluent samples collected in January 2015 augment data collected over the past two decades. Together, the measurements demonstrate the consistently benign character of the discharge from the MBSCD[2] treatment plant. The general lack of toxicity and chemical contaminants within the effluent samples reflects the absence of heavy industry within the collection area and the high performance of the treatment process. The concentrations of the few chemical compounds detected in the January 2015 samples were typical of wastewater derived from domestic sources, and all concentrations were considerably below the limits specified in the NPDES discharge permit.

Six chemicals that are monitored on a semiannual basis were detected in the January 2015 effluent. Of those, only three commonly occurring metals had concentrations high enough to be quantified above their respective MLs: copper, lead, and zinc. These metals enter the wastewater collection system through erosion of natural mineral deposits along the central California coast, and through corrosion of household plumbing systems. The concentrations of all three metals were an order of magnitude below levels deemed deleterious to marine organisms.

A chronic bioassay further affirmed the effluent's overall low toxicity. Chronic toxicity tests on the January 2015 composite effluent sample measured its effect on the development of larval red abalone (*Haliotis rufescens*) after exposure to a range of effluent dilutions. Although the larval abalone were highly sensitive

[1] Regional Water Quality Control Board (RWQCB) - Central Coast Region and the Environmental Protection Agency (EPA) – Region IX. 2009. Waste Discharge Requirements (Order No. R3-2008-0065) and National Pollutant Discharge Elimination System (Permit No. CA0047881) for the Morro Bay and Cayucos Wastewater Treatment Plant Discharges to the Pacific Ocean, Morro Bay, San Luis Obispo County. Effective 1 March 2009.

[2] City of Morro Bay and the Cayucos Sanitary District, joint owners of the wastewater treatment and disposal facility

to contaminants, adverse effects were not observed in effluent that was seven times more concentrated than that allowed by the discharge permit.

Semi-annual monitoring for the presence of four nutrient constituents within effluent is also required as part of the NPDES permit, although no discharge limits are imposed on their concentrations or mass loading to the marine environment. The nutrient concentrations within the January 2015 effluent grab sample are incorporated within the attachments to this document to satisfy reporting requirements. All the nutrient measurements reported in 2015 will be discussed and compared with other oceanic sources as part of the 2015 annual report.

Please contact the undersigned if you have questions regarding these results.

Sincerely,

Douglas A. Coats
for

Bonnie Luke
Program Manager

ATTACHMENT A

MINIMUM LEVEL REPORTING

ATTACHMENT A
Analytical Results for Effluent Samples Collected during January 2015

Chemical Compound or Parameter	Units	Method	Detection Limit [a]	Practical Quantification Limit [b]	Minimum Level [c]	Permit Limit [d]	Reported Value
Nutrients							
Nitrate (as N)	mg/L	300.0	—	0.1	—	—[e]	0.1 as measured
Urea (as N)	mg/L	Mulvenna & Savid	—	0.01	—	—	0.089 as measured
Ortho-Phosphate (as P)	mg/L	300.0	—	0.1	—	—	1.2 as measured
Dissolved Silica (Si02)	mg/L	200.7	—	0.5	—	—	11. as measured
Objectives for the Protection of Marine Aquatic Life							
Arsenic	mg/L	200.8	0.0007	0.002	0.002	0.67	DNQ 0.0014 Est. Conc.
Cadmium	mg/L	200.7	0.0011	0.01	0.01	0.13	ND
Chromium VI[f]	mg/L	200.7	0.0012	0.01	0.01	0.27	ND
Copper	mg/L	200.7	0.0012	0.01	0.01	0.14	0.024 as measured
Lead	mg/L	200.8	0.0001	0.001	0.0005	0.27	0.0015 as measured
Mercury	µg/L	245.1	0.033	0.2	0.2	5.29	ND
Nickel	mg/L	200.7	0.0023	0.01	0.02	0.67	DNQ 0.0046 Est. Conc.
Selenium	mg/L	200.8	0.00019	0.002	0.002	2.01	DNQ 0.0015 Est. Conc.
Silver	mg/L	200.7	0.0013	0.01	0.01	0.07	ND
Zinc	mg/L	200.7	0.0013	0.05	0.02	1.62	0.077 as measured
Cyanide	mg/L	335.4	0.0014	0.005	0.005	0.13	ND
Toxicity-Chronic: H. Rufescens	TUc	600/R-95/136	—	—	—	134.	17.9 as measured

[a] The Method Detection Limit (MDL) is the analysis- and instrument-specific minimum concentration at which the presence of a substance can be reported with 99% confidence. It is determined from an analysis of a sample in a matrix containing the analyte.

[b] The Practical Quantification Limit (PQL) is the analysis- and instrument-specific minimum concentration of a substance that can be routinely determined with a high degree of certainty (>99.9% confidence).

[c] The Minimum Level (ML) is the method-specific minimum concentration of a substance that can be quantitatively measured in a sample given the current analytical performance used by most certified laboratories within California, as specified in the 2005 Ocean Plan.

[d] The Permit Limit is the lowest, most-stringent threshold that is associated with the longest-duration averaging period. For limits established to protect marine aquatic life, the six-month median is the most stringent threshold. For other constituents, limits are imposed only on monthly averages.

[e] No permit limits have been established for nutrients.

[f] Total chromium concentration was reported rather than the concentration of the hexavalent oxidation state alone.

ATTACHMENT B

DISCHARGE MONITORING REPORTS

eSMR PDF
Summary: DMR

NPDES Permit #: CA0047881 **Facility:** MORRO BAY/CAYUCOS WWTP

DMR Parameters

Feature - LS: 001-S **Monitoring Period:** 01/01/2015 - 06/30/2015

Loc	Sea	Param	Param Text	Q1	Q2	C1	C2	C3	Excur Count	Analy Freq	Sample Type
1	0	00620	Nitrogen, nitrate total (as N)					0.1 mg/L Daily Maximum	0	Semiannual	GRAB
1	0	00720	Cyanide, total (as CN)			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum			
1	0	00955	Silica, dissolved (as SiO2)					11.0 mg/L Daily Maximum	0	Semiannual	GRAB
1	0	00978	Arsenic, total recoverable			NODI: Q 6 Month Median	NODI: Q Daily Maximum	NODI: Q Instantaneous Maximum			
1	0	00981	Selenium, total recoverable			NODI: Q 6 Month Median	NODI: Q Daily Maximum	NODI: Q Instantaneous Maximum			
1	0	01032	Chromium, hexavalent (as Cr)			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum			
1	0	01074	Nickel, total recoverable			NODI: Q 6 Month Median	NODI: Q Daily Maximum	NODI: Q Instantaneous Maximum			
1	0	01079	Silver total recoverable			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum			
1	0	01094	Zinc, total recoverable			0.077 mg/L 6 Month Median	0.077 mg/L Daily Maximum	0.077 mg/L Instantaneous Maximum	0	Semiannual	COMP24
1	0	01113	Cadmium, total recoverable			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum			

Feature - LS: 001-S **Monitoring Period:** 01/01/2015 - 06/30/2015

Loc	Sea	Param	Param Text	Q1	Q2	C1	C2	C3	Excur Count	Analy Freq	Sample Type
1	0	01114	Lead, total recoverable			0.0015 mg/L 6 Month Median	0.0015 mg/L Daily Maximum	0.0015 mg/L Instantaneous Maximum	0	Semiannual	COMP24
1	0	01119	Copper, total recoverable			0.024 mg/L 6 Month Median	0.024 mg/L Daily Maximum	0.024 mg/L Instantaneous Maximum	0	Semiannual	COMP24
1	0	04175	Phosphate, ortho (as P)					1.2 mg/L Daily Maximum	0	Semiannual	GRAB
1	0	71800	Urea					0.089 mg/L Daily Maximum	0	Semiannual	GRAB
1	0	71901	Mercury, total recoverable			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum			
1	0	TTK1D	Static 48Hr Chronic Macrocystis Pyrifera					NODI: 9 Daily Maximum			
1	0	TTK3R	Static 48Hr Chronic Haliotis Rufescens					17.9 tox chronic Daily Maximum	0	Semiannual	COMP24

ATTACHMENT C
LABORATORY REPORTS

Date of Report: 01/16/2015

Doug Coats

Marine Research Specialists
3140 Telegraph Road, Suite A
Suite A
Ventura, CA 93003-3238

Client Project:	[none]
BCL Project:	Semi-Annual Eff
BCL Work Order:	1500508
Invoice ID:	B193519

Enclosed are the results of analyses for samples received by the laboratory on 1/7/2015. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Contact Person: Tina Green
Client Services Manager

Authorized Signature

Table of Contents

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949.

Chain of Custody Form

Report To: Client: Marine Research Specialists	Project #:
Attn: Doug Coats	Project Name: MBCSD SemiAnn
Street Address: 3140 Telegraph Rd. Suite A	Global ID #:
City, State, Zip: Ventura, CA 93003	Sampler(s):
Phone: 805-644-1180	
Email Address: doug.coats@mrsenv.com	
Work Order# 15-00508	

Analysis Requested

Comments:
Metals: Silver, Arsenic, Cadmium, Chromium (Total), Copper, Mercury, Nickel, Lead, Selenium, and Zinc (EPA 200.7, 200.8, and 245.1)

Sample #	Description	Date Sampled	Time Sampled	Metals (See comments)	Cyanide (EPA 335.3)	Sample Matrix: Soil	Sludge	Drinking Water	Ground water	Waste Water	Other	Are there any tests with holding times less than or equal to 48 hours?	Notes
1	Comp Eff	1/07/15	1057	✓	✓					✓			see comments

Yes ☐ No ☐

CHK BY DISTRIBUTION
SUB-OUT ☐

Billing ☑ Same as above

Client:_____
Address:_____
City:_____ State_____ Zip_____
Attn:_____
PO#:_____

EDF Required? ☐ Yes ☐ No

Send Copy to State of CA? ☐ Yes ☐ No

Sample Disposal ☐ Return to Client ☐ Disposal by lab ☐ Archive Months_____

Special Reporting ☐ QC ☐ EDF ☐ Raw Data

1. Relinquished By	Date	Time	1. Relinquished By	Date	Time
[signature]	1/7/15	1100	[signature]	1.7.15	1100
2. Relinquished By	Date	Time	2. Relinquished By	Date	Time
[signature]	1-7-15	1745	[signature]	1.7.15	1745
3. Relinquished By	Date	Time	3. Relinquished By	Date	Time

BC Laboratories, Inc. – 4100 Atlas Court Bakersfield, Ca. 93308 661.327-4911 Fax: 661.327-1918

Page 1 of 1

15-00508

Analysis Effluent Samples to be collected from the Morro Bay Wastewater Treatment Plant on Wednesday, January 7, 2015

Analysis	Sample	Method
Level IIA QC Report concentrations that are detected above the MDL, but are below the PQL		
10 Metals:		
Ag Silver	Composite	EPA 200.7
As Arsenic	Composite	EPA 200.8
Cd Cadmium	Composite	EPA 200.7
Cr Chromium (Total)	Composite	EPA 200.7
Cu Copper	Composite	EPA 200.7
Hg Mercury	Composite	EPA 245.1
Ni Nickel	Composite	EPA 200.7
Pb Lead	Composite	EPA 200.8
Se Selenium	Composite	EPA 200.8
Zn Zinc	Composite	EPA 200.7
Cyanide	Composite	EPA 335.3

Invoice and Report to be sent to: Dr. Douglas A. Coats (Doug.Coats@mrsenv.com)
Marine Research Specialists
3140 Telegraph Rd., Suite A
Ventura, CA 93003
Telephone: (805) 644-1180

Samples to be collected from: Morro Bay Wastewater Treatment Plant
160 Atascadero Rd.
Morro Bay, CA 93442
Telephone: (805) 772-6272

Chain of Custody and Cooler Receipt Form for 1500508 Page 3 of 3

BC LABORATORIES INC. **COOLER RECEIPT FORM** Rev. No. 18 09/04/14 Page 1 Of 1

Submission #: 15-00508

SHIPPING INFORMATION	SHIPPING CONTAINER	FREE LIQUID
Federal Express ☐ UPS ☐ Hand Delivery ☐	Ice Chest ☒ None ☐ Box ☐	YES ☐ NO ☐
BC Lab Field Service ☒ Other ☐ (Specify)_____	Other ☐ (Specify)_____	

Refrigerant: Ice ☒ Blue Ice ☐ None ☐ Other ☐ Comments:

Custody Seals Ice Chest ☐ Intact? Yes ☐ No ☐ Containers ☐ Intact? Yes ☐ No ☐ None ☒ Comments:

All samples received? Yes ☒ No ☐ All samples containers intact? Yes ☒ No ☐ Description(s) match COC? Yes ☒ No ☐

☒ COC Received ☒ YES ☐ NO

Emissivity: 0.98 Container: PE Thermometer ID: 206 Date/Time: 1-7-15 1751

Temperature: (A) 0.7 °C / (C) °C Analyst Init: [illegible]

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
QT GENERAL MINERAL/ GENERAL										
PT PE UNPRESERVED										
QT INORGANIC CHEMICAL METALS										
PT INORGANIC CHEMICAL METALS	A									
PT CYANIDE	B									
PT NITROGEN FORMS										
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
PT TOTAL ORGANIC CARBON										
PT TOX										
PT CHEMICAL OXYGEN DEMAND										
PtA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK										
40ml VOA VIAL										
QT EPA 413.1, 413.2, 418.1										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608/8080										
QT EPA 515.1/8150										
QT EPA 525										
QT EPA 525 TRAVEL BLANK										
40ml EPA 547										
40ml EPA 531.1										
8oz Amber EPA 548										
QT EPA 549										
QT EPA 632										
QT EPA 8015M										
QT AMBER										
8 OZ. JAR										
32 OZ. JAR										
SOIL SLEEVE										
PCB VIAL										
PLASTIC BAG										
FERROUS IRON										
ENCORE										
SMART KIT										
Summa Canister										

Comments:_____

Sample Numbering Completed By: KLB Date/Time: 1/7/15 2016 {S:\WPDoc\WordPerfect\LAB_DOCS\FORMS\SAMREC}

A = Actual / C = Corrected

Marine Research Specialists
3140 Telegraph Road, Suite A
Suite A
Ventura, CA 93003-3238

Reported: 01/16/2015 11:36
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
1500508-01	**COC Number:**	---	**Receive Date:**	01/07/2015 17:45
	Project Number:	---	**Sampling Date:**	01/07/2015 10:57
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Comp Eff	**Lab Matrix:**	Water
	Sampled By:	---	**Sample Type:**	Wastewater

Marine Research Specialists
3140 Telegraph Road, Suite A
Suite A
Ventura, CA 93003-3238

Reported: 01/16/2015 11:36
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Water Analysis (General Chemistry)

BCL Sample ID: 1500508-01 | **Client Sample Name:** Comp Eff, 1/7/2015 10:57:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Total Cyanide	ND	mg/L	0.0050	0.0014	EPA-335.4	ND		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-335.4	01/08/15	01/08/15 12:13	TDC	KONE-1	1	BYA0490

Marine Research Specialists
3140 Telegraph Road, Suite A
Suite A
Ventura, CA 93003-3238

Reported: 01/16/2015 11:36
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Metals Analysis

BCL Sample ID: 1500508-01 | **Client Sample Name:** Comp Eff, 1/7/2015 10:57:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Total Mercury	ND	ug/L	0.20	0.033	EPA-245.1	ND		1
Total Recoverable Arsenic	**1.4**	**ug/L**	**2.0**	**0.70**	**EPA-200.8**	ND	**J**	2
Total Recoverable Cadmium	ND	ug/L	10	1.1	EPA-200.7	ND		3
Total Recoverable Chromium	ND	ug/L	10	1.2	EPA-200.7	ND		3
Total Recoverable Copper	**24**	**ug/L**	**10**	**1.2**	**EPA-200.7**	ND		3
Total Recoverable Lead	**1.5**	**ug/L**	**1.0**	**0.10**	**EPA-200.8**	ND		2
Total Recoverable Nickel	**4.6**	**ug/L**	**10**	**2.3**	**EPA-200.7**	ND	**J**	3
Total Recoverable Selenium	**1.5**	**ug/L**	**2.0**	**0.19**	**EPA-200.8**	ND	**J**	2
Total Recoverable Silver	ND	ug/L	10	1.3	EPA-200.7	ND		3
Total Recoverable Zinc	**77**	**ug/L**	**50**	**1.3**	**EPA-200.7**	ND		3

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-245.1	01/12/15	01/13/15 11:26	MEV	CETAC1	1	BYA0762
2	EPA-200.8	01/15/15	01/15/15 19:49	SRM	PE-EL2	1	BYA1205
3	EPA-200.7	01/14/15	01/14/15 17:49	JRG	PE-OP2	1	BYA1087

Marine Research Specialists
3140 Telegraph Road, Suite A
Suite A
Ventura, CA 93003-3238

Reported: 01/16/2015 11:36
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Water Analysis (General Chemistry)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BYA0490						
Total Cyanide	BYA0490-BLK1	ND	mg/L	0.0050	0.0014	

Marine Research Specialists
3140 Telegraph Road, Suite A
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Ventura, CA 93003-3238

Reported: 01/16/2015 11:36
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Water Analysis (General Chemistry)

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: BYA0490										
Total Cyanide	BYA0490-BS1	LCS	0.15511	0.15000	mg/L	103		90 - 110		

Marine Research Specialists
3140 Telegraph Road, Suite A
Suite A
Ventura, CA 93003-3238

Reported: 01/16/2015 11:36
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Water Analysis (General Chemistry)

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BYA0490	Used client sample: N										
Total Cyanide	DUP	**1500370-03**	**0.0016910**	**0.0018810**		**mg/L**	**10.6**		**10**		**J,A02**
	MS	**1500370-03**	**0.0016910**	**0.091277**	**0.10000**	**mg/L**		**89.6**		**90 - 110**	**Q03**
	MSD	**1500370-03**	**0.0016910**	**0.089540**	**0.10000**	**mg/L**	**1.9**	**87.8**	**10**	**90 - 110**	**Q03**

Marine Research Specialists
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Ventura, CA 93003-3238

Reported: 01/16/2015 11:36
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Metals Analysis

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BYA0762						
Total Mercury	BYA0762-BLK1	ND	ug/L	0.20	0.033	
QC Batch ID: BYA1087						
Total Recoverable Cadmium	BYA1087-BLK1	ND	ug/L	10	1.1	
Total Recoverable Chromium	BYA1087-BLK1	ND	ug/L	10	1.2	
Total Recoverable Copper	BYA1087-BLK1	ND	ug/L	10	1.2	
Total Recoverable Nickel	BYA1087-BLK1	ND	ug/L	10	2.3	
Total Recoverable Silver	BYA1087-BLK1	ND	ug/L	10	1.3	
Total Recoverable Zinc	BYA1087-BLK1	ND	ug/L	50	1.3	
QC Batch ID: BYA1205						
Total Recoverable Arsenic	BYA1205-BLK1	ND	ug/L	2.0	0.70	
Total Recoverable Lead	BYA1205-BLK1	ND	ug/L	1.0	0.10	
Total Recoverable Selenium	BYA1205-BLK1	ND	ug/L	2.0	0.19	

Marine Research Specialists
3140 Telegraph Road, Suite A
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Ventura, CA 93003-3238

Reported: 01/16/2015 11:36
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Metals Analysis

Quality Control Report - Laboratory Control Sample

Constituent	QC Sample ID	Type	Result	Spike Level	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
QC Batch ID: BYA0762										
Total Mercury	BYA0762-BS1	LCS	1.0125	1.0000	ug/L	101		85 - 115		
QC Batch ID: BYA1087										
Total Recoverable Cadmium	BYA1087-BS1	LCS	212.83	200.00	ug/L	106		85 - 115		
Total Recoverable Chromium	BYA1087-BS1	LCS	213.83	200.00	ug/L	107		85 - 115		
Total Recoverable Copper	BYA1087-BS1	LCS	404.95	400.00	ug/L	101		85 - 115		
Total Recoverable Nickel	BYA1087-BS1	LCS	429.18	400.00	ug/L	107		85 - 115		
Total Recoverable Silver	BYA1087-BS1	LCS	105.79	100.00	ug/L	106		85 - 115		
Total Recoverable Zinc	BYA1087-BS1	LCS	546.24	500.00	ug/L	109		85 - 115		
QC Batch ID: BYA1205										
Total Recoverable Arsenic	BYA1205-BS1	LCS	104.56	100.00	ug/L	105		85 - 115		
Total Recoverable Lead	BYA1205-BS1	LCS	103.94	100.00	ug/L	104		85 - 115		
Total Recoverable Selenium	BYA1205-BS1	LCS	105.34	100.00	ug/L	105		85 - 115		

Marine Research Specialists
3140 Telegraph Road, Suite A
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Ventura, CA 93003-3238

Reported: 01/16/2015 11:36
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Metals Analysis

Quality Control Report - Precision & Accuracy

Constituent	Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
QC Batch ID: BYA0762	Used client sample: N										
Total Mercury	DUP	1500405-02	ND	ND		ug/L			20		
	MS	1500405-02	ND	0.98750	1.0000	ug/L		98.8		70 - 130	
	MSD	1500405-02	ND	1.0075	1.0000	ug/L	2.0	101	20	70 - 130	
QC Batch ID: BYA1087	Used client sample: N										
Total Recoverable Cadmium	DUP	1500407-03	ND	ND		ug/L			20		
	MS	1500407-03	ND	208.14	200.00	ug/L		104		75 - 125	
	MSD	1500407-03	ND	218.80	200.00	ug/L	5.0	109	20	75 - 125	
Total Recoverable Chromium	DUP	1500407-03	4.8192	5.1950		ug/L	7.5		20		J
	MS	1500407-03	4.8192	214.33	200.00	ug/L		105		75 - 125	
	MSD	1500407-03	4.8192	225.50	200.00	ug/L	5.1	110	20	75 - 125	
Total Recoverable Copper	DUP	1500407-03	18.794	19.101		ug/L	1.6		20		
	MS	1500407-03	18.794	422.04	400.00	ug/L		101		75 - 125	
	MSD	1500407-03	18.794	446.04	400.00	ug/L	5.5	107	20	75 - 125	
Total Recoverable Nickel	DUP	1500407-03	ND	ND		ug/L			20		
	MS	1500407-03	ND	412.32	400.00	ug/L		103		75 - 125	
	MSD	1500407-03	ND	435.77	400.00	ug/L	5.5	109	20	75 - 125	
Total Recoverable Silver	DUP	1500407-03	ND	ND		ug/L			20		
	MS	1500407-03	ND	105.09	100.00	ug/L		105		75 - 125	
	MSD	1500407-03	ND	110.50	100.00	ug/L	5.0	111	20	75 - 125	
Total Recoverable Zinc	DUP	1500407-03	11.768	11.573		ug/L	1.7		20		J
	MS	1500407-03	11.768	538.08	500.00	ug/L		105		75 - 125	
	MSD	1500407-03	11.768	567.42	500.00	ug/L	5.3	111	20	75 - 125	
QC Batch ID: BYA1205	Used client sample: Y - Description: Comp Eff, 01/07/2015 10:57										
Total Recoverable Arsenic	DUP	1500508-01	1.4140	1.3950		ug/L	1.4		20		J
	MS	1500508-01	1.4140	109.99	100.00	ug/L		109		70 - 130	
	MSD	1500508-01	1.4140	111.02	100.00	ug/L	0.9	110	20	70 - 130	
Total Recoverable Lead	DUP	1500508-01	1.4580	1.4560		ug/L	0.1		20		
	MS	1500508-01	1.4580	113.13	100.00	ug/L		112		70 - 130	
	MSD	1500508-01	1.4580	110.36	100.00	ug/L	2.5	109	20	70 - 130	
Total Recoverable Selenium	DUP	1500508-01	1.4990	1.4950		ug/L	0.3		20		J
	MS	1500508-01	1.4990	103.53	100.00	ug/L		102		70 - 130	
	MSD	1500508-01	1.4990	105.48	100.00	ug/L	1.9	104	20	70 - 130	

Marine Research Specialists
3140 Telegraph Road, Suite A
Suite A
Ventura, CA 93003-3238

Reported: 01/16/2015 11:36
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Notes And Definitions

J	Estimated Value (CLP Flag)
MDL	Method Detection Limit
ND	Analyte Not Detected at or above the reporting limit
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
A02	The difference between duplicate readings is less than the PQL.
Q03	Matrix spike recovery(s) is(are) not within the control limits.

LABORATORY REPORT

Aquatic Testing Laboratories
"dedicated to providing quality aquatic toxicity testing"
4350 Transport Street, Unit 107
Ventura, CA 93003
(805) 650-0546 FAX (805) 650-0756
CA ELAP Cert. No.: 1775

Date: January 25, 2015

Client: Marine Research Specialists
3140 Telegraph Road, Suite A
Ventura, CA 93003
Attn: Doug Coats

Laboratory No.: A-15012202-001
Sample I.D.: Morro Bay Effluent

Sample Control: The sample was received by ATL within the recommended hold time, in a chilled state, and with the chain of custody records attached.

Date Sampled:	01/21/15 (composite)
Date Received:	01/22/15
Temp. Received:	1.9°C
Chlorine (TRC):	0.0 mg/l
Dates Tested:	01/22/15 to 01/24/15

Sample Analysis: The following analyses were performed on your sample:
Abalone Larval Development Short-Term Toxicity Test (EPA 600/R-95/136).

Attached are the test data generated from the analysis of your sample.

Result Summary:

Test	NOEC	TUc
Abalone Development:	5.6%	17.9

Quality Control: Reviewed and approved by:

Joseph A. LeMay
Laboratory Director

ABALONE LARVAL DEVELOPMENT SHORT-TERM TOXICITY TEST

Lab No.: A-15012202-001
Client/ID: Morro Bay WWTP

Date tested: 01/22/15 - 01/24/15

TEST SUMMARY

Species: *Haliotis rufescens.*
Protocol: EPA/600/R-95/136.
Test type: Static.
Test chamber: glass beakers.
Temperature: 15 +/- 1°C.
Number of embryos per chamber: 1600 (approx.).
QA/QC Batch No.: RT-150122 (ran concurrently)

Source: Cultured Abalone Farms.
Dilution water: Lab seawater.
Endpoints: NOEC.
Test volume: 200 ml.
Aeration: None.
Number of replicates: 5.

RESULTS SUMMARY

Sample Concentration	Percent Normal Development	
Control (Brine)	94.9%	
Control (Dilution)	95.4%	
3.2%	94.4%	
5.6%	94.0%	
10.0%	6.8%	*
18.0%	0.8%	*
32.0%	0%	*
* Statistically significantly less than control at P = 0.05 level		

CHRONIC TOXICITY

NOEC	5.6%
TUc	17.9

QA/QC TEST ACCEPTABILITY

Parameter	Result
Average control normality ≥80%	PASSED (95.4%)
%MSD <20% relative to control	PASSED (%MSD = 5.1%)
Please see RT-150122 report for additional test acceptability criteria.	

Abalone Larval Development Test-Proportion Normal

Start Date:	1/22/2015 16:30	Test ID:	15012202ab
End Date:	1/24/2015 16:30	Lab ID:	CAATL-Aquatic Testing Labs
Sample Date:	1/21/2015 09:35	Protocol:	EPAW 95-EPA/600/R-95/136
Comments:			

Sample ID:	Mprro Bay				
Sample Type:	EFF1-POTW				
Test Species:	HR-Haliotis rufescens				

Conc-%	1	2	3	4	5
B-Control	0.9439	0.9810	0.8860	0.9623	0.9725
D-Control	0.9720	0.9018	0.9364	0.9815	0.9808
3.2	0.9375	0.9714	0.9099	0.9813	0.9196
5.6	0.9643	0.8983	0.9450	0.9123	0.9818
10	0.0377	0.0484	0.1207	0.0561	0.0796
18	0.0000	0.0000	0.0000	0.0000	0.0374
32	0.0000	0.0000	0.0000	0.0000	0.0000

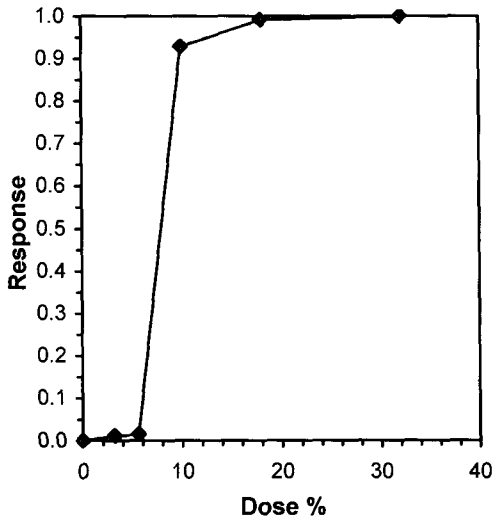
			Transform: Arcsin Square Root					1-Tailed			Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
B-Control	0.9491	0.9944	1.3540	1.2263	1.4323	5.943	5					
D-Control	0.9545	1.0000	1.3673	1.2520	1.4343	5.876	5	*			0.9538	1.0000
3.2	0.9440	0.9890	1.3404	1.2659	1.4336	5.489	5	0.588	2.300	0.1050	0.9433	0.9890
5.6	0.9403	0.9852	1.3333	1.2462	1.4355	5.842	5	0.744	2.300	0.1050	0.9396	0.9851
*10	0.0685	0.0718	0.2595	0.1955	0.3548	24.167	5	24.269	2.300	0.1050	0.0689	0.0722
*18	0.0075	0.0078	0.0789	0.0500	0.1946	81.901	5	28.224	2.300	0.1050	0.0079	0.0083
32	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	5				0.0000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.9434	0.918	0.2602	-1.0736
Bartlett's Test indicates equal variances (p = 0.99)	0.35057	13.2767		
The control means are not significantly different (p = 0.80)	0.26161	2.306		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test Treatments vs D-Control	5.6	10	7.48331	17.8571	0.05135	0.05353	2.102	0.00521	8.2E-19	4, 20

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05	5.7693	0.2929	4.4186	5.8610	-5.5600
IC10	6.0103	0.0716	5.7619	6.1005	-0.6302
IC15	6.2513	0.0675	6.0243	6.3400	-0.5988
IC20	6.4923	0.0636	6.2821	6.5795	-0.5596
IC25	6.7333	0.0601	6.5358	6.8191	-0.5114
IC40	7.4563	0.0519	7.2897	7.5454	-0.3092
IC50	7.9383	0.0491	7.7799	8.0294	-0.1429



ABALONE CHRONIC BIOASSAY

Aquatic Testing Laboratories

Lab No.: A-15012202-001
Client ID: MRS - Morro Bay Effluent

Start Date: 01/22/2015

WATER QUALITY READINGS

	Initial Readings				24 Hrs		Final Readings			
Sample	Temp (°C)	DO (mg/l)	pH	Salinity (o/oo)	Temp (°C)	pH	Temp (°C)	DO (mg/l)	pH	Salinity (o/oo)
Control (brine)	14.4	8.1	8.1	34	15.0	8.0	14.7	7.7	8.0	34
Control (lab)	14.3	8.2	8.1	34	14.8	8.0	14.6	7.6	8.0	34
3.2%	14.4	8.3	8.1	34	14.8	8.0	14.8	7.5	8.0	34
5.6%	14.4	8.3	8.1	34	14.9	8.0	14.9	7.4	8.0	34
10%	14.4	8.3	8.1	34	14.9	8.0	15.0	7.2	8.0	34
18%	14.5	8.2	8.1	34	15.0	8.1	15.0	6.8	8.0	34
32%	14.5	8.3	8.1	34	15.1	8.1	15.2	6.0	8.0	34

Sample as received: Chlorine: <0.1 mg/l; pH: 7.9; Salinity: <1 ppt; Temp: 14.9 °C; DO: 8.6 mg/l.

Initial readings: _____ Date/Time: 1-22-15 1600

Final readings: _____ Date/Time: 1-24-15 1630

MICROSCOPIC EXAMINATION

Beaker No.	Sample Conc.	Number Normal	Number Abnormal	Beaker No.	Sample Conc.	Number Normal	Number Abnormal	Beaker No.	Sample Conc.	Number Normal	Number Abnormal
1	B	101	6	13	10	6	118	25	10	6	101
2	3.2	105	7	14	5.6	106	12	26	3.2	105	2
3	10	4	102	15	18	0	100	27	C	106	2
4	32	0	100	16	B	101	13	28	18	0	100
5	18	0	100	17	5.6	103	6	29	B	106	3
6	5.6	108	4	18	3.2	101	10	30	5.6	108	2
7	C	104	3	19	10	14	102	31	18	4	103
8	18	0	100	20	32	0	100	32	C	102	2
9	3.2	102	3	21	C	103	7	33	32	0	100
10	B	103	2	22	B	102	4	34	3.2	103	9
11	32	0	100	23	5.6	104	10	35	10	9	104
12	C	101	11	24	32	0	100				

Microscopic examination: Analyst: _____ Date: 1-25-15 Time: 0800

Aquatic Testing Laboratories

ABALONE CHRONIC BIOASSAY

Lab No.: A-15012202-001
Client ID: MRS - Morro Bay Effluent

Start Date: 01/22/2015

RANDOMIZATION WORKSHEET

Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Notes
1	B	13	10	25	10	Add 1600 fertilized eggs per 200 ml test volume.
2	3.2	14	5.6	26	3.2	
3	10	15	18	27	C	
4	32	16	B	28	18	
5	18	17	5.6	29	B	
6	5.6	18	3.2	30	5.6	
7	C	19	10	31	18	
8	18	20	32	32	C	
9	3.2	21	C	33	32	
10	B	22	B	34	3.2	
11	32	23	5.6	35	10	
12	C	24	32			

Analyst: _____ Date: 1-22-15 Time: 1400

Aquatic
Testing
Laboratories

CHAIN OF CUSTODY

CHAIN OF CUSTODY

Client: City of Morro Bay

Address: Wastewater Treatment Plant
160 Atascadero Road
Morro Bay, CA 93442

Project Manager: Doug Coats - MRS

Phone: (805) 644-1180

Fax: (805) 289-3935

Purchase Order No:

Aquatic Testing Laboratories

4350 Transport Street, Unit 107
Ventura, CA 93003
(805) 650-0546 Fax (805) 650-0756

Sample ID	Sample Date	Sample Time	Sample Type *	Chlorine (TRC)**	Number of Containers	Testing Requested
Comp. Eff.	1/21/15	0935	E	<.05	1 (one gallon)	Abalone Chronic

Special Instructions:

**** Note: Total residual chlorine must be taken immediately after sample collection if sample is a chlorinated effluent.**

* **L** - Liquid, **S** - Solid, **SS** - Semi-Solid/sludge, **RW** - Receiving Water, **GW** - Ground Water, **E** - Effluent

CUSTODY TRANSFERS

Relinquished by (signature)	Received by (signature)	Date (mm/dd/yy)	Time (hh:mm)	Sample Intact? (Yes, No)	Temperature Received (°C)
	Fed Ex	21 JAN 15	1400	—	—
Fed Ex		1-22-15	1010	Yes	1.90

Aquatic
Testing
Laboratories

REFERENCE TOXICANT DATA

ABALONE LARVAL DEVELOPMENT
SHORT-TERM TOXICITY TEST
* REFERENCE TOXICANT *

Aquatic Testing Laboratories

QA/QC Batch No.: RT-150122 Date tested: 01/22/15 - 01/24/15

TEST SUMMARY

Species: *Haliotis rufescens.*
Protocol: EPA/600/R-95/136.
Test type: Static.
Test chamber: Plastic beakers.
Temperature: 15 +/- 1°C.
Number of embryos per chamber: 1600 (approx.).
Reference Toxicant: $ZnSO_4(7H_2O)$.

Source: Cultured Abalone Farm.
Dilution water: Lab seawater.
Endpoints: NOEC, IC25 at 48 hrs.
Test volume: 200 ml.
Aeration: None.
Number of replicates: 5.
Ref. Tox. source: Mallinckrodt.
Lot No.: 8872 KCXG

RESULTS SUMMARY

SAMPLE CONCENTRATION	PERCENT NORMAL DEVELOPMENT
Control	95.4%
10 µg/l	95.7%
18 µg/l	94.3%
32 µg/l	28.3% *
56 µg/l	0% *
100 µg/l	0% *
* Statistically significantly less than control at P = 0.05 level	

CHRONIC TOXICITY

NOEC	18 µg/l
IC25	22.8 µg/l

QA/QC TEST ACCEPTABILITY

Parameter	Result
Average control normality ≥80%	Yes (95.4%)
56 µg/l treatment response significantly less than control response	Yes (NOEC = 18 µg/l)
%MSD <20% relative to control	Yes (%MSD = 7.2%)

Abalone Larval Development Test-Proportion Normal

Start Date:	1/22/2015 16:30	Test ID:	RT150122ab	Sample ID:	REF-Ref Toxicant
End Date:	1/24/2015 16:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	ZNSO-Zinc sulfate
Sample Date:	1/22/2015	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	HR-Haliotis rufescens

Comments:

Conc-ug/L	1	2	3	4	5
D-Control	0.9722	0.9099	0.9810	0.9633	0.9444
10	0.9810	0.9434	0.9545	0.9905	0.9160
18	0.9478	0.9204	0.9035	0.9714	0.9730
32	0.4444	0.1100	0.2710	0.3333	0.2545
56	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000

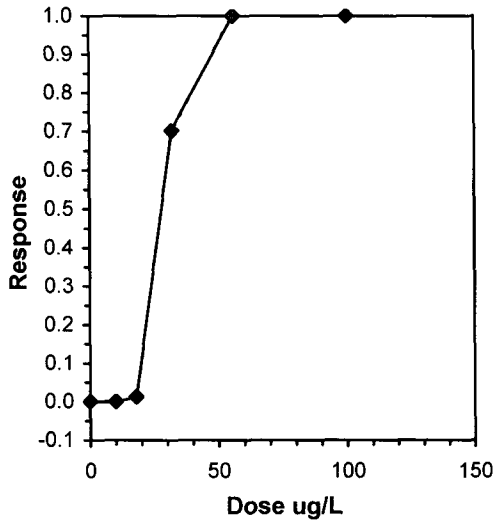
			Transform: Arcsin Square Root					1-Tailed			Isotonic	
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	0.9542	1.0000	1.3625	1.2659	1.4323	4.783	5				0.9549	1.0000
10	0.9571	1.0030	1.3737	1.2767	1.4731	5.743	5	-0.188	2.230	0.1329	0.9549	1.0000
18	0.9432	0.9885	1.3373	1.2549	1.4056	5.055	5	0.423	2.230	0.1329	0.9427	0.9872
*32	0.2827	0.2962	0.5519	0.3381	0.7297	25.932	5	13.599	2.230	0.1329	0.2857	0.2992
56	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	5				0.0000	0.0000
100	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	5				0.0000	0.0000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.97064	0.905	-0.3958	1.00054
Bartlett's Test indicates equal variances (p = 0.34)	3.33997	11.3449		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test Treatments vs D-Control	18	32	24		0.06921	0.07231	0.81303	0.00888	2.7E-10	3, 16

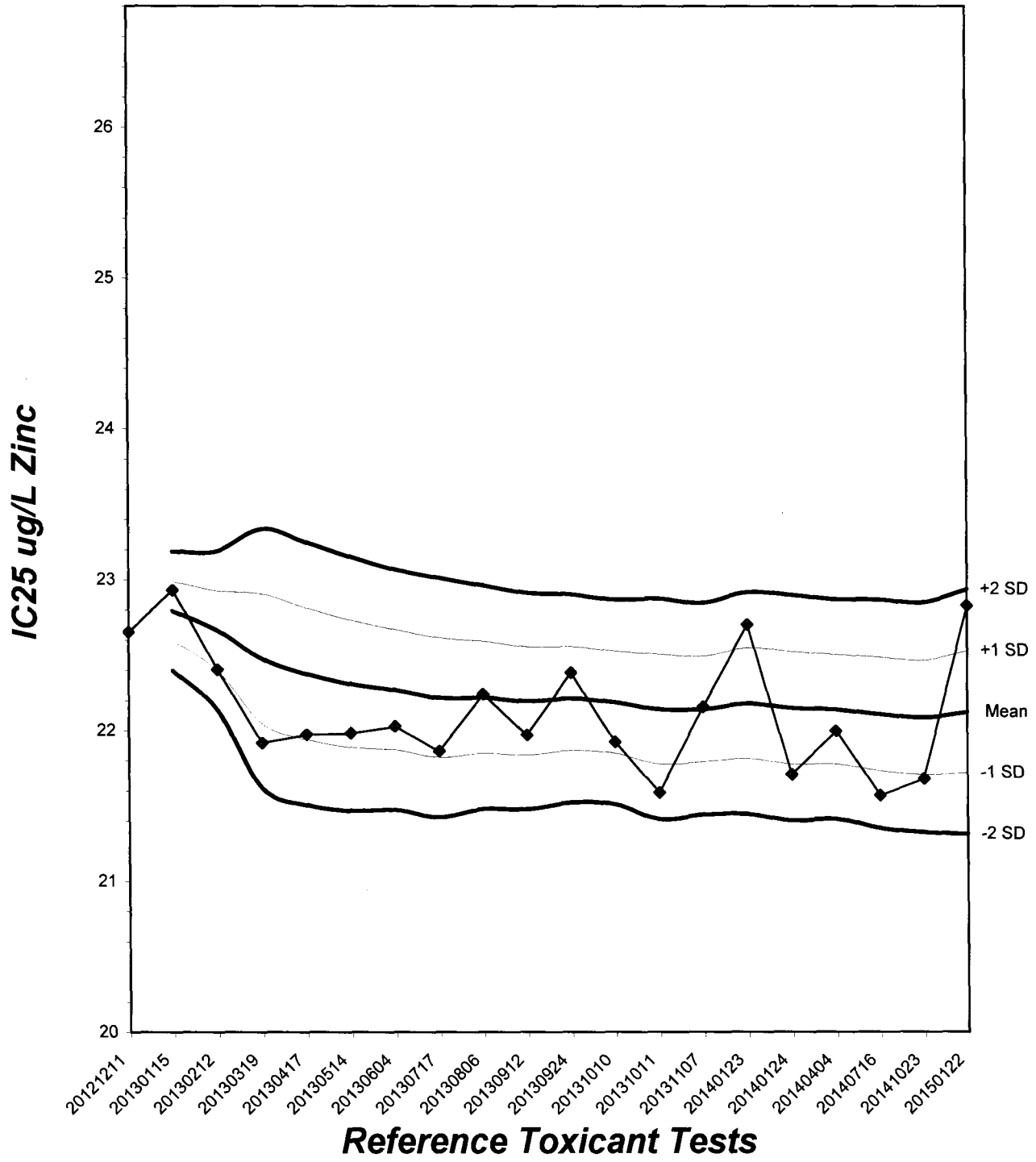
Linear Interpolation (200 Resamples)

Point	ug/L	SD	95% CL(Exp)		Skew
IC05	18.757	0.304	17.752	19.281	-0.7989
IC10	19.774	0.304	18.810	20.496	-0.2035
IC15	20.792	0.333	19.668	21.752	0.1049
IC20	21.809	0.376	20.651	22.994	0.3407
IC25	22.827	0.427	21.654	24.218	0.4851
IC40	25.879	0.613	24.314	27.989	0.6130
IC50	27.914	0.749	25.961	30.530	0.6103



Abalone Larval Development Laboratory Control Chart

CV% = 1.83



ABALONE CHRONIC BIOASSAY
Reference Toxicant - Zinc Sulfate

Aquatic Testing Laboratories

QA/QC No.: RT-150122

Start Date: 01/22/2015

WATER QUALITY READINGS

	Initial Readings				24 Hr		Final Readings			
Sample	Temp (°C)	DO (mg/l)	pH	Salinity (o/oo)	Temp (°C)	pH	Temp (°C)	DO (mg/l)	pH	Salinity (o/oo)
Control	15.0	8.3	8.1	34	15.3	8.0	14.9	7.8	8.1	34
10 µg/l Zn	15.4	8.2	8.1	34	15.0	8.0	14.8	8.0	8.1	34
18 µg/l Zn	15.3	8.2	8.1	34	14.8	8.0	14.7	8.0	8.1	34
32 µg/l Zn	15.4	8.2	8.1	34	14.7	8.0	14.8	8.0	8.1	34
56 µg/l Zn	15.4	8.2	8.1	34	14.8	8.0	14.8	8.0	8.1	34
100 µg/l Zn	15.2	8.2	8.1	34	14.7	8.0	14.8	8.1	8.1	34

Control and dilutions made with laboratory reference seawater filtered to 0.2 µm.

Initial readings: _____ Date/Time: 1-22-15 1600 Final readings: _____ Date/Time: 1-24-15 1630

MICROSCOPIC EXAMINATION

Beaker No.	Sample Conc.	Number Normal	Number Abnormal	Beaker No.	Sample Conc.	Number Normal	Number Abnormal	Beaker No.	Sample Conc.	Number Normal	Number Abnormal
1	56	0	100	11	10	100	6	21	10	104	1
2	C	105	3	12	56	0	100	22	32	38	76
3	18	109	6	13	10	105	5	23	18	102	3
4	100	0	100	14	56	0	100	24	100	0	100
5	10	103	2	15	C	103	2	25	10	109	10
6	32	48	60	16	100	0	100	26	32	28	82
7	C	101	10	17	18	103	11	27	C	102	6
8	18	104	9	18	32	29	78	28	100	0	100
9	32	11	89	19	C	105	4	29	56	0	100
10	100	0	100	20	56	0	100	30	18	108	3

Microscopic examination: Analyst: _____ Date: 1-25-15 Time: 0800

ABALONE CHRONIC BIOASSAY
Reference Toxicant - Zinc Sulfate

Aquatic Testing Laboratories

QA/QC No.: RT-150122

Start Date: 01/22/2015

RANDOMIZATION WORKSHEET

Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Beaker No.	Sample Conc.
1	56	11	10	21	10
2	C	12	56	22	32
3	18	13	10	23	18
4	100	14	56	24	100
5	10	15	C	25	10
6	32	16	100	26	32
7	C	17	18	27	C
8	18	18	32	28	100
9	32	19	C	29	56
10	100	20	56	30	18

Notes

Number Males used: 4

Number females used: 5

Time H_2O_2 added: 12:00

Time water changed: 14:30

Time spawned: ♂ 15:15 ♀ 15:45

Time placed in test: 16:30

Add 1600 fertilized eggs per 200 ml..

Time glutaraldehyde added: 16:30

Analyst: [signature] Date: 1-22-15 Time: 1400

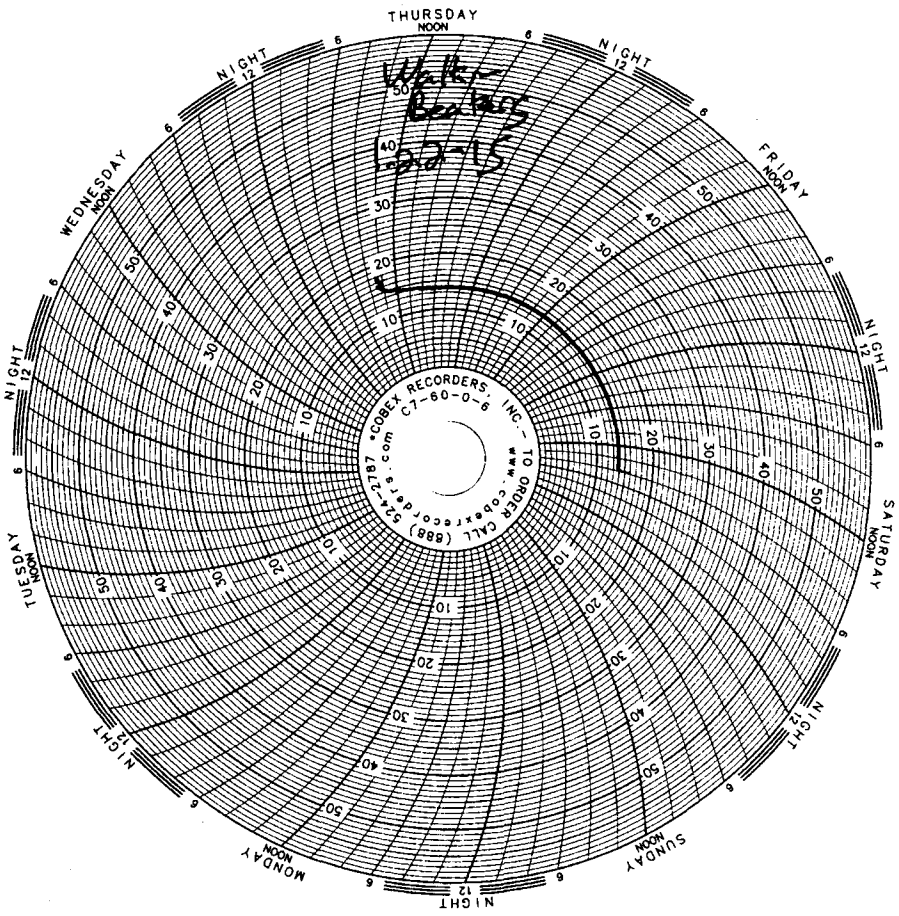
Aquatic Testing Laboratories

Test Temperature Chart

Test No: RT-150122

Date Tested: 01/22/15 to 01/24/15

Acceptable Range: 15 +/- 1°C



Dr. Doug Coats/Bonnie Luke
Marine Research Specialists
3140 Telegraph Road Suite A
Ventura CA, 93003
805.772.6272

Monterey Bay Analytical Services
4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS
www.MBASinc.com
ELAP Certification Number: 2385

Tuesday, January 27, 2015

Lab Number: AB25462

Collection Date/Time: 1/7/2015 10:50 Sample Collector: CHAVIRA N

Submittal Date/Time: 1/8/2015 10:55 Sample ID MBCSD SEMI ANN

Sample Description: Grab Eff A.R.S. E1-E3

Analyte	Method	Unit	Result	Qual	PQL	Date Analyzed	Analyst:
Nitrate as NO3-N	EPA300.0	mg/L	**0.1**		0.1	1/8/2015	MW
o-Phosphate-P	EPA300.0	mg/L	**1.2**		0.1	1/8/2015	MW
Silica as SiO2, Total	EPA200.7	mg/L	**11**		0.5	1/14/2015	MW
Urea-N	Mulvenna&Savid	µg/L	**89**		10	1/26/2015	MW

Sample Comments:

Report Approved by:

David Holland, Laboratory Director

mg/L: Milligrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit J = Result is less than PQL

H = Analyzed ouside of hold time E = Analysis performed by External Laboratory; See Report attachments.

D = Method deviates from standard method due to insufficient sample for MS/MSD

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MontereyBayAnalytical@usa.net

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All units expressed in mg/L **20150108**

300.0 QC Report

		NO3-N	PO4-P
Spike amount		**2**	**2**
	ICVB	0.00	0.00
	ICV	2.35	1.82
	Rec 90-110%	117.46	91.06
	ICVL	0.17	0.13
	Rec 50-150%	85.67	66.53
Sample ID	**AB25450**	19.25	0.00
	MS	21.40	2.13
	Rec 80-120%	107.39	106.27
	MSD	21.18	2.29
	Rec 80-120%	96.24	114.55
	Diff 10%	1.05	7.50
	CCV	1.99	1.76
	Rec 90-110%	99.42	88.13
	Diff 10%	16.63	3.27
	CCVB	0.00	0.00

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Urea QC Summary

Date Analyzed: 1/26/15 @14:00

	Value (µg/L)	Result (µg/L)	% Rec	Duplicate (µg/L)	% Rec	% RPD	Aceptance Criteria	
							% Rec	%RPD
ICVB	---	0	---	0	---	---	<10	
LCSL	10	12	120	12	120	0	80-120	20
QCS (Absolute #051509)	47	52	110.6	53	112.8	1.90	85-115	20

Spiked Sample ID	Sample (µg/L)	Spiked (µg/L)	MS (µg/L)	MSD (µg/L)	MS % Rec	MSD % Rec	MS-MSD % RPD	Acceptance Criteria %	
								MS/MSD	RPD
AB25700	ND	100	101	98	101.0	98.0	3.02	80-120	20
AB25717	24	100	128	139	104.0	115.0	8.24	80-120	20
AB25723	51	100	159	156	108.0	105.0	1.90	80-120	20

	Value (µg/L)	Result (µg/L)	% Rec	% RPD	Aceptance Criteria	
					% Rec	%RPD
LCS	100	108	108.0	NA	85-115	20
LCS	100	112	112.0	3.64	85-115	20
LCS	100	110	110.0	1.83	85-115	20

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; SS = Second Source;
RPD = Relative Percent Difference; Rec = Recovery

Batch # 20150114 EPA 200.7

Analyte/		IC	Prep	LCS	%Rec	LCSD	%Rec	%Diff	IC Verification			QCS (95-105%)		
WL	Range	Blank	Blank	Value	85-115%	Value	85-115%		Value	Result	%Rec	Value	Result	%Rec
Si 251.611	0.5-200ppm	-0.22	-0.25	50.4	100.9%	49.9	99.8%	1.1%	50	50.4	100.8%	107	103.11	96.4%
Si 252.411	0.5-200ppm	-0.16	-0.17	50.2	100.3%	49.7	99.3%	1.0%	50	50.3	100.6%	107	102.78	96.1%

Sample ID AB25465

Analyte/	Sample	MS	%Rec	MSD	%Rec	%Diff	CCV (90-110%)			%Diff	CC
WL	Value	Value	70-130%	Value	70-130%		Value	Result	%Rec	10%	Blank
Si 251.611	29.5	80.5	101.9%	80.6	102.2%	0.2%	50	51.7	103.5%	2.6%	-0.13
Si 252.411	29.2	79.5	100.6%	79.8	101.3%	0.4%	50	51.2	102.5%	1.8%	-0.12