City of Morro Bay and
Cayucos Sanitary District

OFFSHORE MONITORING AND REPORTING PROGRAM

SEMIANNUAL EFFLUENT SAMPLING

CHEMICAL AND BIOASSAY ANALYSIS RESULTS

JANUARY 2013

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 2013

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

January 2013

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 Jan 25, 2013

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

25 January 2013

Reference: Semiannual Effluent Self-Monitoring Report for January through June 2013

Dear Mr. Keogh:

This self-monitoring report documents the chemical and bioassay analysis results for effluent samples collected in January 2013 as required by NPDES discharge permit CA0047881.[1] Analyses of effluent samples collected on 9 and 14 January 2013 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 forms that were submitted under separate cover to the California Division of Water Quality (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 2013 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 2013 samples were typical of wastewater derived from domestic sources, and all concentrations were considerably below the limits specified in the NPDES discharge permit.

Seven chemicals that are monitored on a semiannual basis were detected in the January 2013 effluent. Of those, only five had concentrations high enough to be quantified above their respective MLs. Three of the quantifiable concentrations were associated with commonly occurring metals: 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.

Selenium and cyanide were the only additional chemicals detected at quantifiable levels within the January 2013 effluent sample. Both are similar to the metals detected in that they are naturally occurring components of the mineralogy of the central California coast. Cyanide has been detected at low, but quantifiable levels within approximately 20% of the effluent samples collected in the past. In contrast, selenium is only

[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

infrequently detected in quantifiable amounts within effluent; the last quantifiable detects of selenium in effluent occurred in January 2005 and in July 1998, and July 2010 respectively.

Anthropogenic sources of selenium include glass manufacturing, the combustion of fossil fuels (coal burning), and metal refining, while cyanide can form in the treatment process as a byproduct of the disinfection process. Nevertheless, cyanide's measured concentration in the January 2013 sample was less than half its permit limitation and therefore, not of ecological concern. Similarly, the small, but quantifiable concentration of selenium that was detected within the January 2013 effluent sample was more than a 1000 times lower that the limit specified in the NPDES discharge permit.

A chronic bioassay further affirmed the effluent's overall low toxicity. Chronic toxicity tests on the January 2013 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 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 2013 effluent grab sample are incorporated within the attachments to this document to satisfy reporting requirements. All the nutrient measurements reported in 2013 will be discussed and compared with other oceanic sources as part of the 2013 annual report.

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

Sincerely,

Bonnie Luke

Bonnie Luke
Program Manager

Submitted Digitally

ATTACHMENT A

MINIMUM LEVEL REPORTING

ATTACHMENT A
Analytical Results for Effluent Samples Collected during January 2013

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	0.004	0.1	—	—[e]	0.1 as measured
Urea (as N)	mg/L	Mulvenna & Savid	0.0007	0.01	—	—	0.089 as measured
Ortho-Phosphate (as P)	mg/L	300.0	0.006	0.1	—	—	2.1 as measured
Dissolved Silica (Si02)	mg/L	4500-SI-E	0.04	0.5	—	—	14. as measured
Objectives for the Protection of Marine Aquatic Life							
Arsenic	mg/L	200.8	0.0007	0.002	0.002	0.67	DNQ 0.0013 Est. Conc.
Cadmium	mg/L	200.7	0.001	0.01	0.01	0.13	ND
Chromium VI[f]	mg/L	200.7	0.001	0.01	0.01	0.27	ND
Copper	mg/L	200.7	0.0023	0.01	0.01	0.14	0.016 as measured
Lead	mg/L	200.8	0.0001	0.001	0.0005	0.27	0.001 as measured
Mercury	µg/L	245.1	0.030	0.2	0.2	5.29	ND
Nickel	mg/L	200.7	0.0012	0.01	0.02	0.67	DNQ 0.0037 Est. Conc.
Selenium	mg/L	200.8	0.00019	0.002	0.002	2.01	0.002 as measured
Silver	mg/L	200.7	0.001	0.01	0.01	0.07	ND
Zinc	mg/L	200.7	0.0029	0.05	0.02	1.62	0.046 as measured[g]

[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.

[g] The reported concentration was below the PQL and was flagged “as estimated” by the chemistry laboratory (See Attachment C). However, in accordance with the guidance from the COP, the reported value is listed “as measured” herein, because the measured value exceeded the ML.

Analytical Results for Effluent Samples Collected during January 2013

Chemical Compound or Parameter	Units	Method	Detection Limit[a]	Practical[b] Quantification Limit	Minimum Level[c]	Permit[d] Limit	Reported Value
Cyanide	mg/L	335.4	0.0024	0.005	0.005	0.13	0.050 as measured
Toxicity-Chronic: H. Rufescens	TUc	600/R-95/136	—	—	—	134.	17.9 as measured

ATTACHMENT B

DISCHARGE MONITORING REPORTS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME: MORRO BAY, CITY OF AND CAYUCOS SANITARY I
ADDRESS: 160 ATASCADERO ROAD
MORRO BAY, CA 93442

FACILITY: MORRO BAY/CAYUCOS WWTP
LOCATION: 160 ATASCADERO ROAD
MORRO BAY, CA 93442

ATTN: BRUCE KEOGH

CA0047881	001-S
PERMIT NUMBER	**DISCHARGE NUMBER**

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	01/01/2013	**TO**	06/30/2013

DMR Mailing ZIP CODE: 93442
MAJOR
(SUBR 03)
DISCHARGE 001/ SEMIANNUALLY
External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Nitrogen, nitrate total (as N)	SAMPLE MEASUREMENT	******	******	******	******	******	*0.1*	*mg/L*	0	*Semi-annual*	*Grab*
00620 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	Req. Mon. DAILY MX	mg/L		Twice Per Year	GRAB
Cyanide, total (as CN)	SAMPLE MEASUREMENT	******	******	******	*0.05*	*0.05*	*0.05*	*mg/L*	0	*Semi-annual*	*Comp24*
00720 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	.13 6 MO MED	.54 DAILY MX	1.34 INST MAX	mg/L		Twice Per Year	COMP24
Silica, dissolved (as SiO2)	SAMPLE MEASUREMENT	******	******	******	******	******	*14.*	*mg/L*	0	*Semi-annual*	*Grab*
00955 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	Req. Mon. DAILY MX	mg/L		Twice Per Year	GRAB
Arsenic, total recoverable	SAMPLE MEASUREMENT	******	******	******	*NODI(Q)*	*NODI(Q)*	*NODI(Q)*	*mg/L*	0	*Semi-annual*	*Comp24*
00978 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	.67 6 MO MED	3.89 DAILY MX	10.3 INST MAX	mg/L		Twice Per Year	COMP24
Selenium, total recoverable	SAMPLE MEASUREMENT	******	******	******	*0.002*	*0.002*	*0.002*	*mg/L*	0	*Semi-annual*	*Comp24*
00981 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	2.01 6 MO MED	8.04 DAILY MX	20.1 INST MAX	mg/L		Twice Per Year	COMP24
Chromium, hexavalent (as Cr)	SAMPLE MEASUREMENT	******	******	******	*NODI(B)*	*NODI(B)*	*NODI(B)*	*mg/L*	0	*Semi-annual*	*Comp24*
01032 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	.27 6 MO MED	1.07 DAILY MX	2.68 INST MAX	mg/L		Twice Per Year	COMP24
Nickel, total recoverable	SAMPLE MEASUREMENT	******	******	******	*NODI(Q)*	*NODI(Q)*	*NODI(Q)*	*mg/L*	0	*Semi-annual*	*Comp24*
01074 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	.67 6 MO MED	2.68 DAILY MX	6.7 INST MAX	mg/L		Twice Per Year	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE
Bruce Keogh Wastewater Division Manager	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.		(805)772-6272		01/25/2013
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

~~AFTER SCREENING PERIOD FOR CHRONIC TOXICITY TESTING, REPORT "NODI(9)" FOR SPECIES NOT TESTED.~~

Total chromium is reported for hexavalent chromium.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

DISCHARGE MONITORING REPORT (DMR)

Form Approved
OMB No. 2040-0004

PERMITTEE NAME/ADDRESS *(Include Facility Name/Location if Different)*

NAME: MORRO BAY, CITY OF AND CAYUCOS SANITARY I
ADDRESS: 160 ATASCADERO ROAD
MORRO BAY, CA 93442

FACILITY: MORRO BAY/CAYUCOS WWTP
LOCATION: 160 ATASCADERO ROAD
MORRO BAY, CA 93442

ATTN: BRUCE KEOGH

CA0047881	001-S
PERMIT NUMBER	**DISCHARGE NUMBER**

MONITORING PERIOD			
	MM/DD/YYYY		MM/DD/YYYY
FROM	01/01/2013	**TO**	06/30/2013

DMR Mailing ZIP CODE: 93442
MAJOR
(SUBR 03)
DISCHARGE 001/ SEMIANNUALLY
External Outfall

No Discharge ☐

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		VALUE	VALUE	UNITS	VALUE	VALUE	VALUE	UNITS			
Silver total recoverable	SAMPLE MEASUREMENT	******	******	******	NODI(B)	NODI(B)	NODI(B)	mg/L	0	Semi-annual	Comp24
01079 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	.07 6 MO MED	.35 DAILY MX	.92 INST MAX	mg/L		Twice Per Year	COMP24
Zinc, total recoverable	SAMPLE MEASUREMENT	******	******	******	0.046	0.046	0.046	mg/L	0	Semi-annual	Comp24
01094 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	1.62 6 MO MED	9.66 DAILY MX	25.7 INST MAX	mg/L		Twice Per Year	COMP24
Cadmium, total recoverable	SAMPLE MEASUREMENT	******	******	******	NODI(B)	NODI(B)	NODI(B)	mg/L	0	Semi-annual	Comp24
01113 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	.13 6 MO MED	.54 DAILY MX	1.34 INST MAX	mg/L		Twice Per Year	COMP24
Lead, total recoverable	SAMPLE MEASUREMENT	******	******	******	0.001	0.001	0.001	mg/L	0	Semi-annual	Comp24
01114 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	.27 6 MO MED	1.07 DAILY MX	2.68 INST MAX	mg/L		Twice Per Year	COMP24
Copper, total recoverable	SAMPLE MEASUREMENT	******	******	******	0.016	0.016	0.016	mg/L	0	Semi-annual	Comp24
01119 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	.14 6 MO MED	1.34 DAILY MX	3.75 INST MAX	mg/L		Twice Per Year	COMP24
Phosphate, ortho (as P)	SAMPLE MEASUREMENT	******	******	******	******	******	2.1	mg/L	0	Semi-annual	Grab
04175 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	Req. Mon. DAILY MX	mg/L		Twice Per Year	GRAB
Urea	SAMPLE MEASUREMENT	******	******	******	******	******	0.089	mg/L	0	Semi-annual	Grab
71800 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	Req. Mon. DAILY MX	mg/L		Twice Per Year	GRAB

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			TELEPHONE		DATE
Bruce Keogh Wastewater Division Manager	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.		(805) 772-6272		01/25/2013
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA Code	NUMBER	MM/DD/YYYY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

~~AFTER SCREENING PERIOD FOR CHRONIC TOXICITY TESTING, REPORT "NODI(9)" FOR SPECIES NOT TESTED.~~

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CA0047881	001-S
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	MM/DD/YYYY		**MM/DD/YYYY**
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DMR Mailing ZIP CODE: 93442
MAJOR
(SUBR 03)
DISCHARGE 001/ SEMIANNUALLY
External Outfall

No Discharge ☐

PARAMETER		**QUANTITY OR LOADING**			**QUALITY OR CONCENTRATION**				**NO. EX**	**FREQUENCY OF ANALYSIS**	**SAMPLE TYPE**
		VALUE	**VALUE**	**UNITS**	**VALUE**	**VALUE**	**VALUE**	**UNITS**			
Mercury, total recoverable	**SAMPLE MEASUREMENT**	******	******	******	*NODI(B)*	*NODI(B)*	*NODI(B)*	µg/L	0	*Semi-annual*	*Comp24*
71901 1 0 Effluent Gross	**PERMIT REQUIREMENT**	******	******	******	5.29 6 MO MED	21.4 DAILY MX	53.5 INST MAX	ug/L		Twice Per Year	COMP24
Static 48Hr Chronic Macrocystis Pyrifera	**SAMPLE MEASUREMENT**	******	******	******	******	******	*NODI(9)*		0		
TTK1D 1 0 Effluent Gross	**PERMIT REQUIREMENT**	******	******	******	******	******	134 DAILY MX	tox chronic		Twice Per Year	COMP24
Static 48Hr Chronic Haliotis Rufescens	**SAMPLE MEASUREMENT**	******	******	******	******	******	*17.9*	*TUc*	0	*Semi-annual*	*Comp24*
TTK3R 1 0 Effluent Gross	**PERMIT REQUIREMENT**	******	******	******	******	******	134 DAILY MX	tox chronic		Twice Per Year	COMP24

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER			**TELEPHONE**		**DATE**
Bruce Keogh Wastewater Division Manager	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.		(805)772-6272		01/25/2013
TYPED OR PRINTED		**SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT**	**AREA Code**	**NUMBER**	**MM/DD/YYYY**

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

AFTER SCREENING PERIOD FOR CHRONIC TOXICITY TESTING, REPORT "NODI(9)" FOR SPECIES NOT TESTED.

ATTACHMENT C
LABORATORY REPORTS

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949

Date of Report: 01/22/2013

Doug Coats

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

Project: Semi-Annual Eff
BC Work Order: 1300660
Invoice ID: B138431

Enclosed are the results of analyses for samples received by the laboratory on 1/9/2013. 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# 13-006060	

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	1/09/13	0930	✓	✓					✓		see comments

CHK BY: DJW
DISTRIBUTION: ORIGINAL ☐ 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
Steve Aschenbrener	1/9/13	1415		1-9-13	1415
2. Relinquished By	Date	Time	2. Relinquished By	Date	Time
	1-9-13	2000		1-9-13	2000
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

Chain of Custody and Cooler Receipt Form for 1300660 Page 2 of 2

: LABORATORIES INC. COOLER RECEIPT FORM Rev. No. 13 08/17/12 Page 1 Of 1

ubmission #: 13-000660

SHIPPING INFORMATION

ederal Express ☐ UPS ☐ Hand Delivery ☐
: Lab Field Service ☑ Other ☐ (Specify)_____

SHIPPING CONTAINER

Ice Chest ☑ None ☐
Box ☐ Other ☐ (Specify)_____

efrigerant: Ice ☑ Blue Ice ☐ None ☐ Other ☐ Comments:

ustody Seals Ice Chest ☐ Intact? Yes ☐ No ☐ Containers ☐ Intact? Yes ☐ No ☐ None ☑ Comments:

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

COC Received
☑ YES ☐ NO

Emissivity: 0.95 Container: pe Thermometer ID: 207
Temperature: (A) 2.0 °C / (C) 2.3 °C

Date/Time 1-9-13 2020
Analyst Init KIQ

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
GENERAL MINERAL/ GENERAL PHYSICAL										
PE UNPRESERVED										
INORGANIC CHEMICAL METALS										
INORGANIC CHEMICAL METALS	A									
CYANIDE	B									
NITROGEN FORMS										
TOTAL SULFIDE										
NITRATE / NITRITE										
TOTAL ORGANIC CARBON										
TOX										
CHEMICAL OXYGEN DEMAND										
PHENOLICS										
ml VOA VIAL TRAVEL BLANK										
ml VOA VIAL	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
EPA 413.1, 413.2, 418.1										
ODOR										
BIOLOGICAL										
CTERIOLOGICAL										
ml VOA VIAL- 504										
EPA 508/608/8080										
EPA 515.1/8150										
EPA 525										
EPA 525 TRAVEL BLANK										
ml EPA 547										
ml EPA 531.1										
EPA 548										
EPA 549										
EPA 632										
EPA 8015M										
AMBER										
Z. JAR										
OZ. JAR										
L SLEEVE										
B VIAL										
ASTIC BAG										
RROUS IRON										
CORE										
ART KIT										

ments:_____

ple Numbering Completed By: KIQ Date/Time: 1-9-13 @ 2125
Actual / C = Corrected

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

Reported: 01/22/2013 11:52
Project: Semi-Annual Eff
Project Number: MBCSD Semi Ann
Project Manager: Doug Coats

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
1300660-01	**COC Number:**	---	**Receive Date:**	01/09/2013 20:00
	Project Number:	---	**Sampling Date:**	01/09/2013 09:30
	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: 01/22/2013 11:52
Project: Semi-Annual Eff
Project Number: MBCSD Semi Ann
Project Manager: Doug Coats

Water Analysis (General Chemistry)

BCL Sample ID: 1300660-01 | **Client Sample Name:** Comp Eff, 1/9/2013 9:30:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Total Cyanide	**0.050**	**mg/L**	**0.0050**	**0.0024**	**EPA-335.4**	ND		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-335.4	01/15/13	01/15/13 11:22	TDC	KONE-1	1	BWA0890

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

Reported: 01/22/2013 11:52
Project: Semi-Annual Eff
Project Number: MBCSD Semi Ann
Project Manager: Doug Coats

Metals Analysis

BCL Sample ID: 1300660-01 | **Client Sample Name:** Comp Eff, 1/9/2013 9:30:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Total Cadmium	ND	ug/L	10	1.0	EPA-200.7	ND		1
Total Chromium	ND	ug/L	10	1.0	EPA-200.7	ND		1
Total Copper	**16**	**ug/L**	**10**	**2.3**	**EPA-200.7**	ND		1
Total Mercury	ND	ug/L	0.20	0.030	EPA-245.1	ND		2
Total Nickel	**3.7**	**ug/L**	**10**	**1.2**	**EPA-200.7**	ND	**J**	1
Total Silver	ND	ug/L	10	1.0	EPA-200.7	ND		1
Total Zinc	**46**	**ug/L**	**50**	**2.9**	**EPA-200.7**	7.7	**J**	1
Total Recoverable Arsenic	**1.3**	**ug/L**	**2.0**	**0.70**	**EPA-200.8**	ND	**J**	3
Total Recoverable Lead	**1.0**	**ug/L**	**1.0**	**0.10**	**EPA-200.8**	ND		3
Total Recoverable Selenium	**2.0**	**ug/L**	**2.0**	**0.19**	**EPA-200.8**	ND		3

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-200.7	01/10/13	01/11/13 12:28	JRG	PE-OP2	1	BWA0621
2	EPA-245.1	01/14/13	01/15/13 13:07	MEV	CETAC1	1	BWA0804
3	EPA-200.8	01/11/13	01/11/13 16:42	JSS	PE-EL1	1	BWA0718

Marine Research Specialists
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Reported: 01/22/2013 11:52
Project: Semi-Annual Eff
Project Number: MBCSD Semi Ann
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: BWA0890						
Total Cyanide	BWA0890-BLK1	ND	mg/L	0.0050	0.0024	

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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: BWA0890										
Total Cyanide	BWA0890-BS1	LCS	0.15885	0.15000	mg/L	106		90 - 110		

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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: BWA0890	Used client sample: N										
Total Cyanide	DUP	1300649-02	ND	ND		mg/L			10		
	MS	1300649-02	ND	0.11147	0.10000	mg/L		111		90 - 110	Q03
	MSD	1300649-02	ND	0.11053	0.10000	mg/L	0.9	111	10	90 - 110	Q03

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Metals Analysis

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BWA0621						
Total Cadmium	BWA0621-BLK1	ND	ug/L	10	1.0	
Total Chromium	BWA0621-BLK1	ND	ug/L	10	1.0	
Total Copper	BWA0621-BLK1	ND	ug/L	10	2.3	
Total Nickel	BWA0621-BLK1	ND	ug/L	10	1.2	
Total Silver	BWA0621-BLK1	ND	ug/L	10	1.0	
Total Zinc	BWA0621-BLK1	7.7107	ug/L	50	2.9	J
QC Batch ID: BWA0718						
Total Recoverable Arsenic	BWA0718-BLK1	ND	ug/L	2.0	0.70	
Total Recoverable Lead	BWA0718-BLK1	ND	ug/L	1.0	0.10	
Total Recoverable Selenium	BWA0718-BLK1	ND	ug/L	2.0	0.19	
QC Batch ID: BWA0804						
Total Mercury	BWA0804-BLK1	ND	ug/L	0.20	0.030	

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Reported: 01/22/2013 11:52
Project: Semi-Annual Eff
Project Number: MBCSD Semi Ann
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: BWA0621										
Total Cadmium	BWA0621-BS1	LCS	209.74	200.00	ug/L	105		85 - 115		
Total Chromium	BWA0621-BS1	LCS	218.03	200.00	ug/L	109		85 - 115		
Total Copper	BWA0621-BS1	LCS	422.89	400.00	ug/L	106		85 - 115		
Total Nickel	BWA0621-BS1	LCS	438.42	400.00	ug/L	110		85 - 115		
Total Silver	BWA0621-BS1	LCS	103.80	100.00	ug/L	104		85 - 115		
Total Zinc	BWA0621-BS1	LCS	542.02	500.00	ug/L	108		85 - 115		
QC Batch ID: BWA0718										
Total Recoverable Arsenic	BWA0718-BS1	LCS	97.987	100.00	ug/L	98.0		85 - 115		
Total Recoverable Lead	BWA0718-BS1	LCS	102.28	100.00	ug/L	102		85 - 115		
Total Recoverable Selenium	BWA0718-BS1	LCS	98.056	100.00	ug/L	98.1		85 - 115		
QC Batch ID: BWA0804										
Total Mercury	BWA0804-BS1	LCS	0.99250	1.0000	ug/L	99.2		85 - 115		

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Reported: 01/22/2013 11:52
Project: Semi-Annual Eff
Project Number: MBCSD Semi Ann
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: BWA0621	Used client sample: Y - Description: Comp Eff, 01/09/2013 09:30										
Total Cadmium	DUP	1300660-01	ND	ND		ug/L			20		
	MS	1300660-01	ND	209.62	200.00	ug/L		105		75 - 125	
	MSD	1300660-01	ND	214.22	200.00	ug/L	2.2	107	20	75 - 125	
Total Chromium	DUP	1300660-01	ND	ND		ug/L			20		
	MS	1300660-01	ND	210.17	200.00	ug/L		105		75 - 125	
	MSD	1300660-01	ND	216.16	200.00	ug/L	2.8	108	20	75 - 125	
Total Copper	DUP	1300660-01	16.091	16.290		ug/L	1.2		20		
	MS	1300660-01	16.091	441.78	400.00	ug/L		106		75 - 125	
	MSD	1300660-01	16.091	455.12	400.00	ug/L	3.0	110	20	75 - 125	
Total Nickel	DUP	1300660-01	3.7480	4.4011		ug/L	16.0		20		J
	MS	1300660-01	3.7480	424.74	400.00	ug/L		105		75 - 125	
	MSD	1300660-01	3.7480	433.50	400.00	ug/L	2.0	107	20	75 - 125	
Total Silver	DUP	1300660-01	ND	ND		ug/L			20		
	MS	1300660-01	ND	103.13	100.00	ug/L		103		75 - 125	
	MSD	1300660-01	ND	106.46	100.00	ug/L	3.2	106	20	75 - 125	
Total Zinc	DUP	1300660-01	46.291	48.807		ug/L	5.3		20		J
	MS	1300660-01	46.291	576.46	500.00	ug/L		106		75 - 125	
	MSD	1300660-01	46.291	587.75	500.00	ug/L	1.9	108	20	75 - 125	
QC Batch ID: BWA0718	Used client sample: N										
Total Recoverable Arsenic	DUP	1300678-01	2.9870	2.7480		ug/L	8.3		20		
	MS	1300678-01	2.9870	105.58	100.00	ug/L		103		70 - 130	
	MSD	1300678-01	2.9870	107.35	100.00	ug/L	1.7	104	20	70 - 130	
Total Recoverable Lead	DUP	1300678-01	0.11800	0.11800		ug/L	0		20		J
	MS	1300678-01	0.11800	102.16	100.00	ug/L		102		70 - 130	
	MSD	1300678-01	0.11800	106.83	100.00	ug/L	4.5	107	20	70 - 130	
Total Recoverable Selenium	DUP	1300678-01	ND	ND		ug/L			20		
	MS	1300678-01	ND	100.51	100.00	ug/L		101		70 - 130	
	MSD	1300678-01	ND	103.70	100.00	ug/L	3.1	104	20	70 - 130	
QC Batch ID: BWA0804	Used client sample: Y - Description: Comp Eff, 01/09/2013 09:30										
Total Mercury	DUP	1300660-01	ND	ND		ug/L			20		
	MS	1300660-01	ND	1.0150	1.0000	ug/L		102		70 - 130	
	MSD	1300660-01	ND	1.0350	1.0000	ug/L	2.0	104	20	70 - 130	

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

Reported: 01/22/2013 11:52
Project: Semi-Annual Eff
Project Number: MBCSD Semi Ann
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
Q03	Matrix spike recovery(s) is(are) not within the control limits.

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

MBAS
MONTEREY BAY ANALYTICAL SERVICES
PRECISION • ACCURACY • DEPENDABILITY
4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS
montereybayanalytical@usa.net
ELAP Certification Number: 2385

 Thursday, January 17, 2013

Lab Number: AA96720

Collection Date/Time:	1/9/2013	9:30	Sample Collector:	ASCHENBRENER
Submittal Date/Time:	1/10/2013	8:50	Sample ID	MBCSD

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	1/10/2013	RL
o-Phosphate-P	EPA300.0	mg/L	**2.1**		0.1	1/10/2013	RL
Silica as SiO2, Dissolved	EPA200.7	mg/L	**14**		0.5	1/16/2013	SM
Silica as SiO2, Total	EPA200.7	mg/L	**15**		0.5	1/16/2013	SM
Urea-N	Mulvenna&Savid	ug/L	**89**		10	1/11/2013	HC

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
H = Analyzed ouside of hold time E = Analysis performed by External Laboratory; See External Laboratory Report attachments.
D = Method deviates from standard method due to insufficient sample for MS/MSD J = Result is less than PQL

Chain of Custody / Analysis Request

MBAS
MONTEREY BAY ANALYTICAL SERVICES
PRECISION • ACCURACY • DEPENDABILITY

4 Justin Court, Suite D
Monterey, CA 93940
831-375-MBAS (6227)
831-641-0734 Fax
montereybayanalytical@usa.net

Client / Company Name:	Marine Research Specialists (MBCSD Semi ann eff)	email address to sent report & invoice:	bonnie.luke@mrsenv.com
Attn:	Bonnie Luke	Drinking water [ ] Wastewater [X] Monitoring Well [ ] Soil [ ] Sludge [ ]	
Mailing Address	3140 Telegraph Rd. Suite A, Ventura, CA 93003	For State or Local Health Department reporting, the System # is	
Billing Address	same as above	Phone # 805-289-3926	Fax # 805-289-3935

MBAS Lab #	Project ID or #	Sample Site / Description (Well Name, APN#, Address, Stormdrain #)	Sampling Date	Sampling Time	Receiving Temp	Coliform Analysis CL2 Residual	Coliform Analysis Routine	Coliform Analysis Other	Coliform Analysis Repeat	# Cont.	Container Type	Container Size	Analysis Requested: Nitrate as NO3/EPA 300.0	O-Phosphate-P/EPA 300.0	Silica as SiO2/EPA 4500-SI-E	Urea/Mulvenna & Savid		
96720	MBCSD Semi ann	Grab Eff A.R.S. E1	1/09 2013	0930						1			X	X				
	MBCSD Semi ann	Grab Eff A.R.S. E2	1/09 2013	0930						1						X		
↓	MBCSD Semi ann	Grab Eff A.R.S. E3	1/09 2013	0930						1					X			

	Printed Name	Signature	Date	Time	Comment
Sampled by:	Steven Aschenbrener	Steven R. Aschenbrener	9 Jan 13	0930	Is sample for regulatory purposes? Yes / No
Relinquished by:	Steven Aschenbrener	Steven R. Aschenbrener	9 Jan 13	1430	
Received by:	Sarah McGinnis	Sarah McGinnis	1/10/13	0850	*pour off 50 ml & freeze to hold for Urea test
Relinquished by:					
Received by:					

[ ] Payment received Check # Amount: Receipt # Date:

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 DOHS ELAP Cert. No.: 1775

Date: January 18, 2013

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

Laboratory No.: A-13011502-001
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:	01/14/13 (composite)
Date Received:	01/15/13
Temp. Received:	4.8°C
Chlorine (TRC):	0.0 mg/l
Dates Tested:	01/15/13 to 01/17/13

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-13011502-001
Client/ID: Morro Bay WWTP

Date tested: 01/15/13 - 01/17/13

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-130115 (ran concurrently)

Source: The Cultured Abalone.
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)	97.6%	
Control (Dilution)	96.7%	
3.2%	96.9%	
5.6%	95.8%	
10.0%	0%	*
18.0%	0%	*
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 (96.7%)
%MSD <20% relative to control	PASSED (%MSD = 2.5%)
Please see RT-130115 report for additional test acceptability criteria.	

Abalone Larval Development Test-Proportion Normal

Start Date:	1/15/2013 14:00	Test ID:	13011502ab
End Date:	1/17/2013 14:00	Lab ID:	CAATL-Aquatic Testing Labs
Sample Date:	1/14/2013 10:30	Protocol:	WCCH-EPA-600-R-95-136
Comments:			

Sample ID:	MORRO BAY				
Sample Type:	EFF1-POTW				
Test Species:	HR-Haliotis rufescens				

Conc-%	1	2	3	4	5
B-Control	0.9813	0.9450	0.9811	0.9905	0.9813
D-Control	0.9722	0.9720	0.9633	0.9450	0.9810
3.2	0.9811	0.9640	0.9815	0.9727	0.9444
5.6	0.9630	0.9464	0.9304	0.9810	0.9720
10	0.0000	0.0000	0.0000	0.0000	0.0000
18	0.0000	0.0000	0.0000	0.0000	0.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000

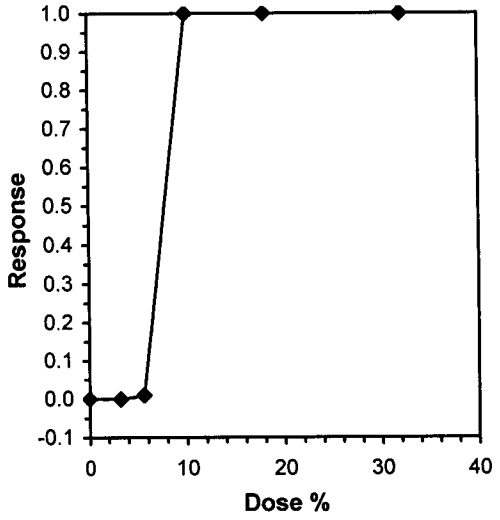
			Transform: Arcsin Square Root					1-Tailed			Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
B-Control	0.9758	1.0095	1.4215	1.3340	1.4731	3.646	5					
D-Control	0.9667	1.0000	1.3901	1.3340	1.4323	2.646	5	*			0.9676	1.0000
3.2	0.9687	1.0021	1.3970	1.3329	1.4343	3.028	5	-0.250	2.110	0.0584	0.9676	1.0000
5.6	0.9585	0.9916	1.3706	1.3039	1.4323	3.728	5	0.701	2.110	0.0584	0.9580	0.9900
10	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	5				0.0000	0.0000
18	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	5				0.0000	0.0000
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)	0.93658	0.881	-0.4134	-0.905
Bartlett's Test indicates equal variances (p = 0.82)	0.3943	9.21035		
The control means are not significantly different (p = 0.30)	1.10516	2.30601		

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	0.02381	0.02461	0.00093	0.00192	0.62657	2, 12

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05	5.7778	0.0365	5.6763	5.8327	-0.8305
IC10	6.0000	0.0345	5.9038	6.0520	-0.8305
IC15	6.2223	0.0326	6.1314	6.2713	-0.8305
IC20	6.4445	0.0307	6.3590	6.4907	-0.8305
IC25	6.6667	0.0288	6.5865	6.7100	-0.8305
IC40	7.3334	0.0230	7.2692	7.3680	-0.8305
IC50	7.7778	0.0192	7.7243	7.8067	-0.8305



Reviewed by: _____

ABALONE CHRONIC BIOASSAY

Aquatic Testing Laboratories

Lab No.: A-13011502-001
Client ID: MRS - Morro Bay Effluent

Start Date: 01/15/2013

WATER QUALITY READINGS

Sample	Initial Readings				24 Hrs		Final Readings			
	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	14.6	8.0	14.7	8.0	8.0	34
Control (lab)	14.3	8.0	8.1	34	14.4	8.0	14.4	8.2	8.1	34
3.2%	14.5	8.0	8.1	34	14.7	8.1	14.9	8.0	8.1	34
5.6%	14.3	7.9	8.1	34	14.6	8.1	14.6	8.1	8.1	34
10%	14.4	8.0	8.1	34	14.8	8.1	15.0	7.9	8.1	34
18%	14.4	7.8	8.1	34	14.8	8.1	15.3	7.8	8.1	34
32%	14.3	7.9	8.1	34	14.5	8.1	15.1	7.7	8.1	34

Sample as received: Chlorine: 0 mg/l; pH: 7.9 ; Salinity: 1 ppt; Temp: 4.8 °C; DO: 7.1 mg/l.

Initial readings: JH Date/Time: 1-15-13 1400 Final readings: JH Date/Time: 1-17-13 1400

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	CB	105	2	13	32	0	100	25	18	0	100
2	18	0	100	14	3.2	107	4	26	32	0	100
3	10	0	100	15	CB	104	2	27	C	103	6
4	5.6	104	4	16	10	0	100	28	3.2	107	3
5	32	0	100	17	5.6	107	8	29	10	0	100
6	C	105	3	18	32	0	100	30	CB	105	2
7	3.2	104	2	19	C	105	4	31	5.6	104	3
8	10	0	100	20	18	0	100	32	18	0	100
9	C	104	3	21	3.2	106	2	33	32	0	100
10	CB	103	6	22	CB	104	1	34	3.2	102	6
11	18	0	100	23	10	0	100	35	C	103	2
12	5.6	106	6	24	5.6	103	2				

Microscopic examination: Analyst: JH Date: 1-18-13 Time: 1000

Aquatic Testing Laboratories

ABALONE CHRONIC BIOASSAY

Lab No.: A-13011502-001
Client ID: MRS - Morro Bay Effluent

Start Date: 01/15/2013

RANDOMIZATION WORKSHEET

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

Analyst: _____ Date: 1-14-13 Time: 1200

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 St., 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.	1/14/13	1030	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)	Seals Intact? (Yes, No, NA)	Temperature Received (°C)
		1/14/13	1430	YES	—
Fed Ex		1-15-13	10:15	N/A	4.8

Aquatic
Testing
Laboratories

REFERENCE TOXICANT DATA

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

Aquatic Testing Laboratories

QA/QC Batch No.: RT-130115

Date tested: 01/15/13 - 01/17/13

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.
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	96.7%
10 µg/l	96.8%
18 µg/l	96.0%
32 µg/l	29.5% *
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	22.9 µg/l

QA/QC TEST ACCEPTABILITY

Parameter	Result
Average control normality ≥80%	Yes (96.7%)
56 µg/l treatment response significantly less than control response	Yes (NOEC = 18 µg/l)
%MSD <20% relative to control	Yes (%MSD = 4.2%)

Abalone Larval Development Test-Proportion Normal

Start Date:	1/15/2013 14:00	Test ID:	RT130115ab	Sample ID:	REF-Ref Toxicant
End Date:	1/17/2013 14:00	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	ZNSO-Zinc sulfate
Sample Date:	1/15/2013	Protocol:	WCCH-EPA-600-R-95-136	Test Species:	HR-Haliotis rufescens
Comments:					

Conc-ug/L	1	2	3	4	5
D-Control	0.9712	0.9626	0.9813	0.9806	0.9381
10	0.9450	0.9906	0.9712	0.9633	0.9717
18	0.9815	0.9623	0.9636	0.9286	0.9633
32	0.4035	0.1652	0.3364	0.3186	0.2523
56	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000

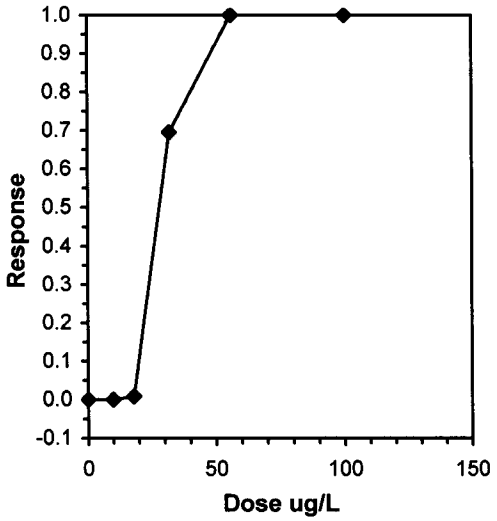
			Transform: Arcsin Square Root					1-Tailed			Isotonic	
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	0.9667	1.0000	1.3921	1.3193	1.4336	3.381	5				0.9672	1.0000
10	0.9683	1.0016	1.3975	1.3340	1.4735	3.617	5	-0.130	2.230	0.0935	0.9672	1.0000
18	0.9599	0.9929	1.3734	1.3002	1.4343	3.476	5	0.446	2.230	0.0935	0.9596	0.9921
*32	0.2952	0.3054	0.5703	0.4186	0.6883	17.989	5	19.602	2.230	0.0935	0.2946	0.3046
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)	0.96614	0.905	-0.5312	0.99651
Bartlett's Test indicates equal variances (p = 0.30)	3.65848	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		0.04069	0.04201	0.83553	0.00439	1.0E-12	3, 16

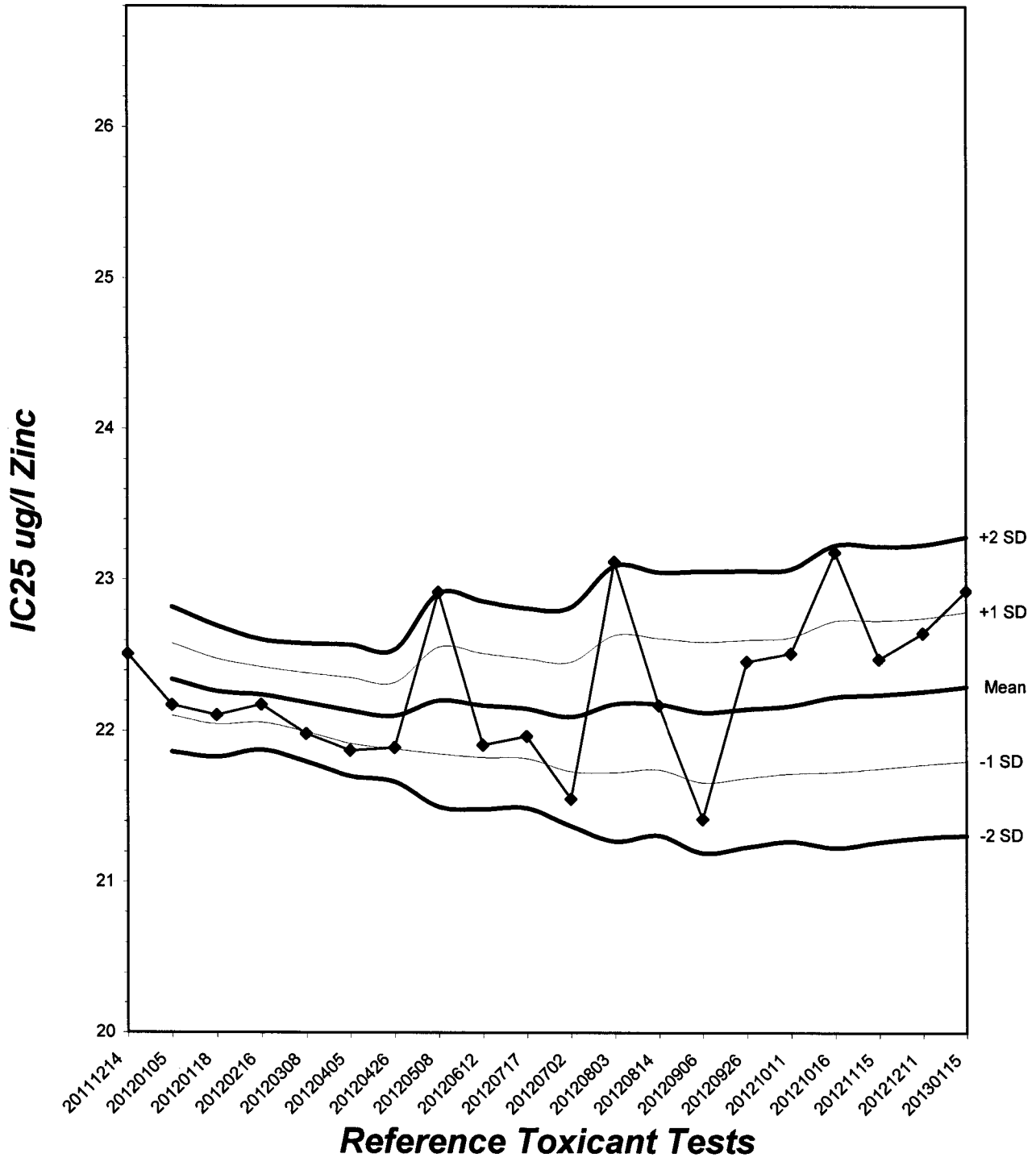
Linear Interpolation (200 Resamples)

Point	ug/L	SD	95% CL(Exp)		Skew
IC05	18.858	0.175	18.205	19.155	-0.6385
IC10	19.876	0.180	19.244	20.282	-0.3351
IC15	20.895	0.199	20.246	21.411	-0.1401
IC20	21.913	0.229	21.192	22.559	-0.0522
IC25	22.931	0.265	22.169	23.696	-0.0139
IC40	25.985	0.397	24.979	27.281	0.0422
IC50	28.022	0.494	26.799	29.630	0.0716



Abalone Larval Development Laboratory Control Chart

CV% = 2.22



ABALONE CHRONIC BIOASSAY
Reference Toxicant - Zinc Sulfate

Aquatic Testing Laboratories

QA/QC No.: RT-130115

Start Date: 01/15/2013

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	14.3	7.9	8.1	34	14.2	8.1	14.9	8.0	8.1	34
10 µg/l Zn	14.2	7.9	8.1	34	14.8	8.1	15.1	7.9	8.1	34
18 µg/l Zn	14.3	7.9	8.1	34	15.0	8.0	14.7	8.1	8.0	34
32 µg/l Zn	14.5	7.9	8.1	34	14.7	8.0	14.9	8.0	8.0	34
56 µg/l Zn	14.3	7.8	8.1	34	14.4	8.0	14.9	7.9	8.1	34
100 µg/l Zn	14.2	7.8	8.1	34	14.6	8.0	15.3	8.0	8.1	34

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

Initial readings: _____ Date/Time: 1-15-13 1400 Final readings: _____ Date/Time: 1-17-13 1400

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	18	106	2	11	100	0	100	21	18	104	8
2	C	101	3	12	18	102	4	22	100	0	100
3	32	46	68	13	32	36	71	23	10	105	4
4	10	103	6	14	C	105	2	24	56	0	100
5	100	0	100	15	18	106	4	25	C	106	7
6	56	0	100	16	100	0	100	26	10	103	3
7	32	19	96	17	56	0	100	27	32	28	83
8	56	0	100	18	10	101	3	28	10	105	4
9	10	105	1	19	32	36	77	29	56	0	100
10	C	103	4	20	C	101	2	30	100	0	100

Microscopic examination: Analyst: _____ Date: 1-18-13 Time: 1000

ABALONE CHRONIC BIOASSAY
Reference Toxicant - Zinc Sulfate

Aquatic Testing Laboratories

QA/QC No.: RT-130115

Start Date: 01/15/2013

RANDOMIZATION WORKSHEET

Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Notes
1	18	11	100	21	18	Number Males used: 4
2	C	12	18	22	100	Number females used: 6
3	32	13	32	23	10	Time H_2O_2 added: 10:15
4	10	14	C	24	56	Time water changed: 12:45
5	100	15	18	25	C	Time spawned: ♂ 13:15 ♀ 13:30
6	56	16	100	26	10	
7	32	17	56	27	32	Time placed in test: 1400
8	56	18	10	28	18	Add 1600 fertilized eggs per 200 ml..
9	10	19	32	29	56	
10	C	20	C	30	100	Time glutaraldehyde added: 1400

Analyst: _____ Date: 1-14-13 Time: 1130

Aquatic Testing Laboratories

Test Temperature Chart

Test No: RT-130115

Date Tested: 01/15/13 to 01/17/13

Acceptable Range: 15 +/- 1°C