City of Morro Bay and
Cayucos Sanitary District

OFFSHORE MONITORING AND REPORTING PROGRAM

SEMIANNUAL EFFLUENT SAMPLING

CHEMICAL AND BIOASSAY ANALYSIS RESULTS

JANUARY 2012

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 2012

Prepared by

Bonnie Luke
Douglas A. Coats

Marine Research Specialists

3140 Telegraph Rd., Suite A
Ventura, California 93003

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February 2012

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

6 February 2012

Reference: Semiannual Effluent Self-Monitoring Report for January through June 2012

Dear Mr. Keogh:

This self-monitoring report documents the chemical and bioassay analysis results for effluent samples collected in January 2012 as required by NPDES discharge permit CA0047881.[1] Analyses of effluent samples collected on 11 and 17 January 2012 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 2012 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 2012 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 2012 effluent. Of those, only four 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.

Cyanide was the only additional chemical detected at quantifiable levels within the January 2012 effluent sample. Although cyanide occurs naturally within the mineralogy of the central California coast, it can also form in the treatment process as a byproduct of the disinfection process. Cyanide has been detected at low, but quantifiable levels within approximately 20% of the effluent samples collected over the past decade and

[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

a half. However, as with the other detected elements, cyanide's measured concentration in the January 2012 sample was 8-fold lower than its permit limitation and therefore, not of ecological concern.

A chronic bioassay further affirmed the effluent's overall low toxicity. Chronic toxicity tests on the January 2012 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 13 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 2012 effluent grab sample are incorporated within the attachments to this document to satisfy reporting requirements. All the nutrient measurements reported in 2012 will be discussed and compared with other oceanic sources as part of the 2012 annual report.

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

Sincerely,

Bonnie Luke
Program Manager

Submitted Digitally

ATTACHMENT A

MINIMUM LEVEL REPORTING

ATTACHMENT A
Analytical Results for Effluent Samples Collected during January 2012

Chemical Compound or Parameter	Units	Method	Detection Limit[a]	Practical[b] Quantification Limit	Minimum Level[c]	Permit[d] Limit	Reported Value
Nutrients							
Nitrate (as N)	mg/L	300.0	0.002	0.05	—	—[e]	0.3 as measured
Urea (as N)	mg/L	Mulvenna & Savid	0.0007	0.01	—	—	0.051 as measured
Ortho-Phosphate (as P)	mg/L	300.0	0.003	0.05	—	—	1.94 as measured
Dissolved Silica (Si02)	mg/L	4500-SI-E	0.04	0.5	—	—	12. as measured
Objectives for the Protection of Marine Aquatic Life							
Arsenic	mg/L	200.8	0.00061	0.002	0.002	0.67	ND
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	0.02 as measured
Lead	mg/L	200.8	0.00012	0.001	0.0005	0.27	0.00065 as measured[g]
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 0.0035 Est. Conc.
Selenium	mg/L	200.8	0.00036	0.002	0.002	2.01	DNQ 0.0019 Est. Conc.
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	0.059 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.

[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 2012

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	0.0016	0.005	0.005	0.13	0.016 as measured
Toxicity-Chronic: H. Rufescens	TUc	600/R-95/136	—	—	—	134.	10. 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	01/01/2012	**TO**	06/30/2012

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	******	******	******	******	******	*0.3*	*mg/L*	0	*Semi-annual*	*Grab*
00620 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	Req. Mon. DAILY MX	mg/L		Semiannual	GRAB
Cyanide, total (as CN)	SAMPLE MEASUREMENT	******	******	******	*0.016*	*0.016*	*0.016*	*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		Semiannual	COMP24
Silica, dissolved (as SiO2)	SAMPLE MEASUREMENT	******	******	******	******	******	*12.*	*mg/L*	0	*Semi-annual*	*Grab*
00955 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	Req. Mon. DAILY MX	mg/L		Semiannual	GRAB
Arsenic, total recoverable	SAMPLE MEASUREMENT	******	******	******	*NODI (B)*	*NODI (B)*	*NODI (B)*	*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		Semiannual	COMP24
Selenium, total recoverable	SAMPLE MEASUREMENT	******	******	******	*NODI (Q)*	*NODI (Q)*	*NODI (Q)*	*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		Semiannual	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		Semiannual	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		Semiannual	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		02/06/2012
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	01/01/2012	**TO**	06/30/2012

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		Semiannual	COMP24
Zinc, total recoverable	SAMPLE MEASUREMENT	******	******	******	*0.059*	*0.059*	*0.059*	*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		Semiannual	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		Semiannual	COMP24
Lead, total recoverable	SAMPLE MEASUREMENT	******	******	******	*0.00065*	*0.00065*	*0.00065*	*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		Semiannual	COMP24
Copper, total recoverable	SAMPLE MEASUREMENT	******	******	******	*0.02*	*0.02*	*0.02*	*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		Semiannual	COMP24
Phosphate, ortho (as P)	SAMPLE MEASUREMENT	******	******	******	******	******	*1.94*	*mg/L*	0	*Semi-annual*	*Grab*
04175 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	Req. Mon. DAILY MX	mg/L		Semiannual	GRAB
Urea	SAMPLE MEASUREMENT	******	******	******	******	******	*0.051*	*mg/L*	0	*Semi-annual*	*Grab*
71800 1 0 Effluent Gross	PERMIT REQUIREMENT	******	******	******	******	******	Req. Mon. DAILY MX	mg/L		Semiannual	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		02/06/2012
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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DISCHARGE MONITORING REPORT (DMR)

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ATTN: BRUCE KEOGH

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

MONITORING PERIOD			
	MM/DD/YYYY		**MM/DD/YYYY**
FROM	01/01/2012	**TO**	06/30/2012

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		Semiannual	COMP24
Static 48Hr Chronic Macrocystis Pyrifera	**SAMPLE MEASUREMENT**	******	******	******	******	******	*NODI(9)*		0		
TTK1D 1 0 Effluent Gross	**PERMIT REQUIREMENT**	******	******	******	******	******	134 DAILY MX	tox chronic		Semiannual	COMP24
Static 48Hr Chronic Haliotis Rufescens	**SAMPLE MEASUREMENT**	******	******	******	******	******	*10.0*	*TUc*	0	*Semi-annual*	*Comp24*
TTK3R 1 0 Effluent Gross	**PERMIT REQUIREMENT**	******	******	******	******	******	134 DAILY MX	tox chronic		Semiannual	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		02/06/2012
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: 01/25/2012

Doug Coats

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

Project: Semi-Annual Eff
BC Work Order: 1200671
Invoice ID: B115288

Enclosed are the results of analyses for samples received by the laboratory on 1/11/2012. 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): SRA
Phone: 805-644-1180	
Email Address: doug.coats@mrsenv.com	
Work Order# 1200671	

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? Yes / No	Notes
1 -1	Comp Eff	1/11/12	10:00	✓	✓					✓			see comments

CHK BY DISTRIBUTION
MAINT
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	2. Relinquished By	Date	Time
Steven R Aschenbrew	1/11/12	1530		1-11-12	1530
2. Relinquished By	Date	Time	3. Relinquished By	Date	Time
	1-11-12	1945	Recv:	1-11-12	2000
3. Relinquished By	Date	Time			

Chain of Custody and Cooler Receipt Form for 1200671 Page 2 of 2

BC LABORATORIES INC. SAMPLE RECEIPT FORM Rev. No. 12 06/24/08 Page __ Of __

Submission #: 1200671

SHIPPING INFORMATION
Federal Express ☐ UPS ☐ Hand Delivery ☐
BC Lab Field Service ☑ Other ☐ (Specify)_____

SHIPPING CONTAINER
Ice Chest ☑ None ☐
Box ☐ 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: ptpe Thermometer ID: 177

Temperature: A 0.3 °C / C 0.6 °C

Date/Time 1-11-12 1953

Analyst Init JNW

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
QT GENERAL MINERAL/ GENERAL PHYSICAL										
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										
100ml EPA 547										
100ml EPA 531.1										
QT 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										

Comments:

Sample Numbering Completed By: KIQ Date/Time: 1-11-12 2115

A = Actual / C = Corrected

[H:\DOCS\WP80\LAB_DOCS\FORMS\SAMREC2.WPD]

Work Order

1200671

BC Laboratories, Inc.

Client:	Marine Research Specialists	COC Number:	
Project:	Semi-Annual Eff	Project Number:	[none]

Report To:

Marine Research Specialists
3140 Telegraph Road, Suite A
Suite A
Ventura, CA 93003-3238
Attn: Doug Coats
Phone: 805-644-1180
FAX: (805) 289-3935

Invoice To:

Marine Research Specialists
3140 Telegraph Road, Suite A
Suite A
Ventura, CA 93003-3238
Attn: Doug Coats
Phone: 805-644-1180
FAX: (805) 289-3935
PO Number:

Date Received:	01/11/2012 20:00	Date Due:	01/25/2012 17:00 (10 day TAT)
Received By:	Komal Qazi	CSR Name:	Tina Green
Samples Received at:	0.6 C	CSR Email:	tina@bclabs.com
Date Logged In:	01/12/2012 09:18	CSR Phone:	661-852-4204
Logged In By:	Tina Green	(CSR = Client Service Representative)	

Lab Number	Client Sample Description	Matrix	# of Bottles
1200671-01	Comp Eff, 1/11/2012 10:00:00AM	Water	2

Client Sample Description Format: *<Project Name>, *<Location>, <Sample Name>, <Date/Time Sampled>, *<Sampled By>, *<Sample Depth>
(* = shown if available)

Analysis	Matrix	Due Date	Samples
Metals			
m200.7wb Tot Cadmium	Water	01/25/2012 17:00	01
m200.7wb Tot Chromium	Water	01/25/2012 17:00	01
m200.7wb Tot Copper	Water	01/25/2012 17:00	01
m200.7wb Tot Nickel	Water	01/25/2012 17:00	01
m200.7wb Tot Silver	Water	01/25/2012 17:00	01
m200.7wb Tot Zinc	Water	01/25/2012 17:00	01
m200.8wb TRM Arsenic	Water	01/25/2012 17:00	01
m200.8wb TRM Lead	Water	01/25/2012 17:00	01
m200.8wb TRM Selenium	Water	01/25/2012 17:00	01
m245.1wb Tot Mercury	Water	01/25/2012 17:00	01
mp200.2w TRM 200.(7,8,9), 2xx.x	Water	01/25/2012 17:00	01
mp3010w Tot 200.(7,8), 6010	Water	01/25/2012 17:00	01
Wet Chem			
i335.4w Tot CN	Water	01/25/2012 17:00	01

Work Order

1200671

BC Laboratories, Inc.

Client:	Marine Research Specialists	COC Number:	
Project:	Semi-Annual Eff	Project Number:	[none]

Metals

m200.7wb Tot Cadmium	**Analyte** Total Cadmium
m200.7wb Tot Chromium	**Analyte** Total Chromium
m200.7wb Tot Copper	**Analyte** Total Copper
m200.7wb Tot Nickel	**Analyte** Total Nickel
m200.7wb Tot Silver	**Analyte** Total Silver
m200.7wb Tot Zinc	**Analyte** Total Zinc
m200.8wb TRM Arsenic	**Analyte** Total Recoverable Arsenic
m200.8wb TRM Lead	**Analyte** Total Recoverable Lead
m200.8wb TRM Selenium	**Analyte** Total Recoverable Selenium
m245.1wb Tot Mercury	**Analyte** Total Mercury

Work Order

1200671

BC Laboratories, Inc.

Client:	Marine Research Specialists	COC Number:	
Project:	Semi-Annual Eff	Project Number:	[none]

Wet Chem

i335.4w Tot CN	**Analyte**
	Total Cyanide

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

Reported: 01/25/2012 12:00
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
1200671-01	**COC Number:**	---	**Receive Date:**	01/11/2012 20:00
	Project Number:	---	**Sampling Date:**	01/11/2012 10:00
	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: 01/25/2012 12:00
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Water Analysis (General Chemistry)

BCL Sample ID: 1200671-01 | **Client Sample Name:** Comp Eff, 1/11/2012 10:00:00AM

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Total Cyanide	**0.016**	**mg/L**	**0.0050**	**0.0016**	**EPA-335.4**	0.0020		1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-335.4	01/16/12	01/17/12 09:01	TDC	KONE-1	1	BVA0916

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

Reported: 01/25/2012 12:00
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Water Analysis (Metals)

BCL Sample ID: 1200671-01 | **Client Sample Name:** Comp Eff, 1/11/2012 10:00:00AM

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	**20**	**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	**3.5**	**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	**59**	**ug/L**	**50**	**2.9**	**EPA-200.7**	ND		1
Total Recoverable Arsenic	ND	ug/L	2.0	0.61	EPA-200.8	ND		3
Total Recoverable Lead	**0.65**	**ug/L**	**1.0**	**0.12**	**EPA-200.8**	ND	**J**	3
Total Recoverable Selenium	**1.9**	**ug/L**	**2.0**	**0.36**	**EPA-200.8**	ND	**J**	3

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-200.7	01/18/12	01/19/12 19:39	JRG	PE-OP2	1	BVA1063
2	EPA-245.1	01/19/12	01/24/12 11:44	MEV	CETAC1	1	BVA1212
3	EPA-200.8	01/17/12	01/18/12 17:10	PPS	PE-EL1	1	BVA0974

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

Reported: 01/25/2012 12:00
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: BVA0916						
Total Cyanide	BVA0916-BLK1	0.0019500	mg/L	0.0050	0.0016	J

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

Reported: 01/25/2012 12:00
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: BVA0916										
Total Cyanide	BVA0916-BS1	LCS	0.14700	0.15000	mg/L	98.0		90 - 110		

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

Reported: 01/25/2012 12:00
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: BVA0916	Used client sample: N										
Total Cyanide	DUP	1200653-01	ND	ND		mg/L			10		
	MS	1200653-01	ND	0.093647	0.10000	mg/L		93.6		90 - 110	
	MSD	1200653-01	ND	0.088326	0.10000	mg/L	5.8	88.3	10	90 - 110	Q03

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

Reported: 01/25/2012 12:00
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Water Analysis (Metals)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: BVA0974						
Total Recoverable Arsenic	BVA0974-BLK1	ND	ug/L	2.0	0.61	
Total Recoverable Lead	BVA0974-BLK1	ND	ug/L	1.0	0.12	
Total Recoverable Selenium	BVA0974-BLK1	ND	ug/L	2.0	0.36	
QC Batch ID: BVA1063						
Total Cadmium	BVA1063-BLK1	ND	ug/L	10	1.0	
Total Chromium	BVA1063-BLK1	ND	ug/L	10	1.0	
Total Copper	BVA1063-BLK1	ND	ug/L	10	2.3	
Total Nickel	BVA1063-BLK1	ND	ug/L	10	1.2	
Total Silver	BVA1063-BLK1	ND	ug/L	10	1.0	
Total Zinc	BVA1063-BLK1	ND	ug/L	50	2.9	
QC Batch ID: BVA1212						
Total Mercury	BVA1212-BLK1	ND	ug/L	0.20	0.030	

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

Reported: 01/25/2012 12:00
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Water Analysis (Metals)

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: BVA0974										
Total Recoverable Arsenic	BVA0974-BS1	LCS	94.880	100.00	ug/L	94.9		85 - 115		
Total Recoverable Lead	BVA0974-BS1	LCS	107.11	100.00	ug/L	107		85 - 115		
Total Recoverable Selenium	BVA0974-BS1	LCS	99.637	100.00	ug/L	99.6		85 - 115		
QC Batch ID: BVA1063										
Total Cadmium	BVA1063-BS1	LCS	182.52	200.00	ug/L	91.3		85 - 115		
Total Chromium	BVA1063-BS1	LCS	196.53	200.00	ug/L	98.3		85 - 115		
Total Copper	BVA1063-BS1	LCS	377.34	400.00	ug/L	94.3		85 - 115		
Total Nickel	BVA1063-BS1	LCS	391.13	400.00	ug/L	97.8		85 - 115		
Total Silver	BVA1063-BS1	LCS	92.933	100.00	ug/L	92.9		85 - 115		
Total Zinc	BVA1063-BS1	LCS	472.01	500.00	ug/L	94.4		85 - 115		
QC Batch ID: BVA1212										
Total Mercury	BVA1212-BS1	LCS	1.0175	1.0000	ug/L	102		85 - 115		

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

Reported: 01/25/2012 12:00
Project: Semi-Annual Eff
Project Number: [none]
Project Manager: Doug Coats

Water Analysis (Metals)

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: BVA0974	Used client sample: N										
Total Recoverable Arsenic	DUP	1200762-02	ND	ND		ug/L			20		
	MS	1200762-02	ND	90.920	100.00	ug/L		90.9		70 - 130	
	MSD	1200762-02	ND	91.772	100.00	ug/L	0.9	91.8	20	70 - 130	
Total Recoverable Lead	DUP	1200762-02	5.3930	5.2270		ug/L	3.1		20		
	MS	1200762-02	5.3930	107.16	100.00	ug/L		102		70 - 130	
	MSD	1200762-02	5.3930	110.16	100.00	ug/L	2.8	105	20	70 - 130	
Total Recoverable Selenium	DUP	1200762-02	ND	ND		ug/L			20		
	MS	1200762-02	ND	94.342	100.00	ug/L		94.3		70 - 130	
	MSD	1200762-02	ND	96.570	100.00	ug/L	2.3	96.6	20	70 - 130	
QC Batch ID: BVA1063	Used client sample: N										
Total Cadmium	DUP	1200766-03	ND	ND		ug/L			20		
	MS	1200766-03	ND	186.72	200.00	ug/L		93.4		75 - 125	
	MSD	1200766-03	ND	182.71	200.00	ug/L	2.2	91.4	20	75 - 125	
Total Chromium	DUP	1200766-03	ND	ND		ug/L			20		
	MS	1200766-03	ND	200.76	200.00	ug/L		100		75 - 125	
	MSD	1200766-03	ND	196.25	200.00	ug/L	2.3	98.1	20	75 - 125	
Total Copper	DUP	1200766-03	ND	6.7479		ug/L			20		J
	MS	1200766-03	ND	386.29	400.00	ug/L		96.6		75 - 125	
	MSD	1200766-03	ND	380.28	400.00	ug/L	1.6	95.1	20	75 - 125	
Total Nickel	DUP	1200766-03	ND	ND		ug/L			20		
	MS	1200766-03	ND	403.51	400.00	ug/L		101		75 - 125	
	MSD	1200766-03	ND	395.33	400.00	ug/L	2.0	98.8	20	75 - 125	
Total Silver	DUP	1200766-03	ND	ND		ug/L			20		
	MS	1200766-03	ND	94.467	100.00	ug/L		94.5		75 - 125	
	MSD	1200766-03	ND	92.376	100.00	ug/L	2.2	92.4	20	75 - 125	
Total Zinc	DUP	1200766-03	ND	ND		ug/L			20		
	MS	1200766-03	ND	486.27	500.00	ug/L		97.3		75 - 125	
	MSD	1200766-03	ND	484.02	500.00	ug/L	0.5	96.8	20	75 - 125	
QC Batch ID: BVA1212	Used client sample: N										
Total Mercury	DUP	1200471-02	1.0925	1.1050		ug/L	1.1		20		
	MS	1200471-02	1.0925	1.8275	1.0000	ug/L		73.5		70 - 130	
	MSD	1200471-02	1.0925	1.6375	1.0000	ug/L	11.0	54.5	20	70 - 130	Q03

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

 Wednesday, February 01, 2012

Lab Number: **AA84081**

Collection Date/Time:	1/11/2012	9:00	Sample Collector:	ASCHENBRENER,
Submittal Date/Time:	1/12/2012	10:00	Sample ID	

Sample Description: Grab Effluent A.R.S.

Analyte	Method	Unit	**Result**	Qual	PQL	Date Analyzed
Nitrate as NO3	EPA300.0	mg/L	**1**		1	1/12/2012
Nitrate as NO3-N	EPA300.0	mg/L	**0.30**		0.05	1/12/2012
o-Phosphate-P	EPA300.0	mg/L	**1.94**		0.05	1/12/2012
Silica as SiO2, Dissolved	EPA200.7	mg/L	**12**		0.5	1/16/2012
Urea-N	Mulvenna&Savid	ug/L	**51**		10	1/27/2012

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

20120112

QC SUMMARY EPA 300

		NO3-N	PO4
		2	2
1		2.05	2.11
% Recovery	85%-115%	102.25	105.73
2	lcs high	2.12	2.17
% Recovery	85%-115%	106.10	108.25
RPD	10%	3.70	2.36

		NO3-N	PO4
		2	2
3	lcs high	2.09	2.21
% Recovery	85%-115%	104.44	110.53
4	lcs high	2.16	2.21
% Recovery	85%-115%	108.05	110.51
RPD	10%	3.40	0.02

MS check:		NO3-N	PO4
	84070	4.93	0.70
	84070 MSD	8.76	2.60
average:		8.76	2.60
% Recovery:	80%-120%	191.53	95.25

Sample 84070 pH is < 2 and is converting NO2-N to NO3-N

MS check:		NO3-N	PO4
	84080	8.32	0.00
	84080 MS	10.54	1.79
	84080 MSD	10.65	1.77
average:		10.59	1.78
% Recovery:	80%-120%	113.59	88.86
% Difference	< 10%	0.98	0.97

MS check:		NO3-N	PO4
	84091	14.07	0.10
	84091 + ms	16.44	1.72
	84091 + msd	16.34	1.84
average:		16.39	1.78
% Recovery:	80%-120%	116.05	83.89
% Difference	< 10%	0.62	6.77

Monterey Bay Analytical Services

QC Summary for Urea Analyses Batch ID 20120126

Spiked Sample ID	Sample	Spiked	MS	MSD	MS-MSD	MS-MSD	LCS	LCSD	LCS-LCSD	LCS-LCSD	Acceptance Criteria %			
	ug/L	ug/L	ug/L	ug/L	% RPD	% Rec	ug/L	ug/L	% RPD	% Rec	MS/MSD	RPD	LCS/LCSD	RPD
84277	2	100	102	107	4.78	102.45	100	na	na	na	80-120	20	85-115	20

Second Source	Value	Result	% Rec	Acceptance Criteria %
	ug/L	ug/L		Second Source
Absolute #051509	47	49	104.26	85-115

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

ICP-OES EPA 200.7

Batch # 20120116

Element/		Calibration			WP-11		
Wavelength	Range	Value	Result	%Rec	Value	Result	%Rec
Si 251.611	0.5-200ppm	50	50.2	100.4%	169	162.8	96.3%

Matrix Spikes

Sample ID 83998

Element/	Sample	MS	%Rec	MSD	%Rec	%Diff	LCS		
Wavelength	Value	Value	85-115%	Value	85-115%		Value	Result	%Rec
Si 251.611	31.0	79.2	96.3%	79.8	97.5%	0.7%	50	49.9	99.9%

Sample ID 84070

Element/	Sample	MS	%Rec	MSD	%Rec	%Diff	LCS		
Wavelength	Value	Value	85-115%	Value	85-115%		Value	Result	%Rec
Si 251.611	43.3	91.4	96.1%	91.8	97.0%	0.5%	50	49.9	99.8%

Note: Italics indicates that the result is outside the calibration range.

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

Reported: 01/25/2012 12:00
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
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 DOHS ELAP Cert. No.: 1775

Date: January 21, 2012

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

Laboratory No.: A-12011801-001
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:	01/17/12 (composite)
Date Received:	01/18/12
Temp. Received:	1.3°C
Chlorine (TRC):	0.0 mg/l
Dates Tested:	01/18/12 to 01/20/12

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:	10%	10.0

Quality Control: Reviewed and approved by:

Joseph A. LeMay
Laboratory Director

ABALONE LARVAL DEVELOPMENT SHORT-TERM TOXICITY TEST

Lab No.: A-12011801-001
Client/ID: Morro Bay WWTP

Date tested: 01/18/12 - 01/20/12

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-120118 (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)	96.3%	
3.2%	97.0%	
5.6%	96.6%	
10.0%	96.0%	
18.0%	4.8%	*
32.0%	0%	*
* Statistically significantly less than control at P = 0.05 level		

CHRONIC TOXICITY

NOEC	10%
TUc	10

QA/QC TEST ACCEPTABILITY

Parameter	Result
Average control normality ≥80%	PASSED (96.3%)
%MSD <20% relative to control	PASSED (%MSD = 5.0%)
Please see RT-120118 report for additional test acceptability criteria.	

Abalone Larval Development Test-Proportion Normal

Start Date:	1/18/2012 14:00	Test ID:	12011801ab	Sample ID:	CA0047881-Morro Bay SD
End Date:	1/20/2012 14:00	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	1/17/2012 10:30	Protocol:	WCCH-EPA-600-R-95-136	Test Species:	HR-Haliotis rufescens

Comments:

Conc-%	1	2	3	4	5
B-Control	0.9720	0.9906	0.9813	0.9537	0.9813
D-Control	0.9640	0.9541	0.9633	0.9720	0.9623
3.2	0.9808	0.9810	0.9528	0.9725	0.9636
5.6	0.9626	0.9537	0.9808	0.9813	0.9528
10	0.9545	0.9722	0.9375	0.9725	0.9623
18	0.1481	0.0000	0.0000	0.0377	0.0531
32	0.0000	0.0000	0.0000	0.0000	0.0000

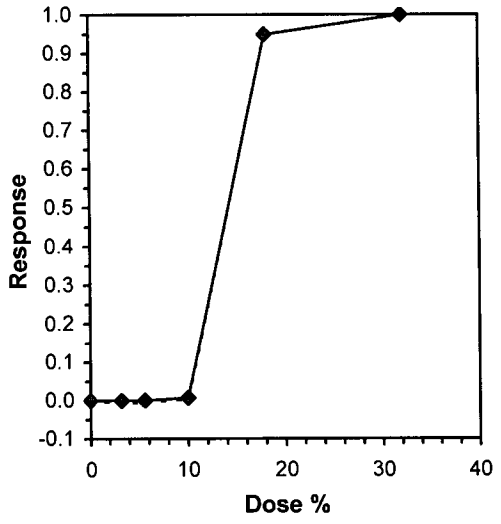
			Transform: Arcsin Square Root					Rank	1-Tailed	Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
B-Control	0.9758	1.0131	1.4195	1.3539	1.4735	3.132	5				
D-Control	0.9631	1.0000	1.3781	1.3549	1.4026	1.228	5	*		0.9666	1.0000
3.2	0.9701	1.0073	1.3998	1.3519	1.4323	2.482	5	33.00	17.00	0.9666	1.0000
5.6	0.9662	1.0032	1.3895	1.3519	1.4336	2.920	5	27.00	17.00	0.9662	0.9996
10	0.9598	0.9966	1.3714	1.3181	1.4041	2.625	5	27.50	17.00	0.9596	0.9928
*18	0.0478	0.0496	0.1846	0.0500	0.3951	77.995	5	15.00	17.00	0.0493	0.0510
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 non-normal distribution (p <= 0.05)	0.86263	0.918	0.74666	4.6534
Bartlett's Test indicates unequal variances (p = 6.35E-04)	19.4712	13.2767		
The control means are not significantly different (p = 0.09)	1.94314	2.30601		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	10	18	13.4164	10
Treatments vs D-Control				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05	10.364	0.047	10.223	10.458	-0.4980
IC10	10.789	0.048	10.639	10.898	-0.3149
IC15	11.213	0.052	11.053	11.338	-0.0929
IC20	11.638	0.059	11.469	11.778	0.1043
IC25	12.063	0.066	11.879	12.219	0.2523
IC40	13.337	0.094	13.111	13.581	0.4734
IC50	14.186	0.115	13.915	14.476	0.5301



Abalone Larval Development Test-Proportion Normal

Start Date:	1/18/2012 14:00	Test ID: 12011801ab	Sample ID: CA0047881-Morro Bay SD
End Date:	1/20/2012 14:00	Lab ID: CAATL-Aquatic Testing Labs	Sample Type: EFF1-POTW
Sample Date:	1/17/2012 10:30	Protocol: WCCH-EPA-600-R-95-136	Test Species: HR-Haliotis rufescens

Comments:

Conc-%	1	2	3	4	5
B-Control	0.9720	0.9906	0.9813	0.9537	0.9813
D-Control	0.9640	0.9541	0.9633	0.9720	0.9623
3.2	0.9808	0.9810	0.9528	0.9725	0.9636
5.6	0.9626	0.9537	0.9808	0.9813	0.9528
10	0.9545	0.9722	0.9375	0.9725	0.9623
18	0.1481	0.0000	0.0000	0.0377	0.0531
32	0.0000	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
B-Control	0.9758	1.0131	1.4195	1.3539	1.4735	3.132	5			
D-Control	0.9631	1.0000	1.3781	1.3549	1.4026	1.228	5	*		
3.2	0.9701	1.0073	1.3998	1.3519	1.4323	2.482	5	-0.483	2.300	0.1032
5.6	0.9662	1.0032	1.3895	1.3519	1.4336	2.920	5	-0.253	2.300	0.1032
10	0.9598	0.9966	1.3714	1.3181	1.4041	2.625	5	0.151	2.300	0.1032
*18	0.0478	0.0496	0.1846	0.0500	0.3951	77.995	5	26.596	2.300	0.1032
32	0.0000	0.0000	0.0500	0.0500	0.0500	0.000	5			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.86263	0.918	0.74666	4.6534
Bartlett's Test indicates unequal variances (p = 6.35E-04)	19.4712	13.2767		
The control means are not significantly different (p = 0.09)	1.94314	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	10	18	13.4164	10	0.04836	0.0502	1.44072	0.00503	2.4E-17	4, 20

ABALONE CHRONIC BIOASSAY

Aquatic Testing Laboratories

Lab No.: A-12011801-001
Client ID: MRS - Morro Bay Effluent

Start Date: 01/18/2012

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)	14.7	7.8	8.1	34	15.4	8.1	15.3	7.1	8.0	34
Control (lab)	14.5	8.2	8.1	34	15.3	8.0	15.1	7.3	8.0	34
3.2%	14.4	8.2	8.1	34	15.3	8.0	15.2	7.4	8.0	34
5.6%	14.3	8.2	8.1	34	15.2	8.0	15.0	7.4	8.0	34
10%	14.4	8.3	8.1	34	15.2	8.0	15.1	7.3	8.0	34
18%	14.4	8.1	8.1	34	15.2	8.0	15.1	7.4	8.0	34
32%	14.5	~~8.8~~ 7.9	8.1	34	15.2	8.0	15.1	7.1	8.0	34

Sample as received: Chlorine: 0 mg/l; pH: 7.7; Salinity: 1 ppt; Temp: 13 °C; DO: 5.4 mg/l.

Initial readings: [signature] Date/Time: 1-18-12/1400 Final readings: [signature] Date/Time: 1-20-12 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	104	3	13	18	0	100	25	C	104	3
2	3.2	0	100	14	10	105	3	26	5.6	105	2
3	5.6	103	4	15	3.2	101	5	27	18	4	102
4	3.2	102	2	16	CB	105	2	28	10	106	3
5	10	105	5	17	3.2	0	100	29	3.2	0	100
6	18	16	92	18	C	105	4	30	C	102	4
7	C	107	4	19	5.6	102	2	31	3.2	106	4
8	3.2	0	100	20	10	105	7	32	CB	105	2
9	CB	105	1	21	18	0	100	33	10	102	4
10	5.6	103	5	22	3.2	106	3	34	5.6	101	5
11	3.2	103	2	23	CB	103	5	35	18	6	107
12	C	104	5	24	3.2	0	100				

Microscopic examination: Analyst: [signature] Date: 1-21-12 Time: 0800

Aquatic Testing Laboratories

ABALONE CHRONIC BIOASSAY

Lab No.: A-12011801-001
Client ID: MRS - Morro Bay Effluent

Start Date: 01/18/2012

RANDOMIZATION WORKSHEET

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

Analyst: [signature] Date: 1/18/12 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.	1/17/12	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)
		1/17/12	1450	NA	—
		1-18-12	1020	NA	1.3

Aquatic
Testing
Laboratories

REFERENCE TOXICANT DATA

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

Aquatic Testing Laboratories

QA/QC Batch No.: RT-120118

Date tested: 01/18/12 - 01/20/12

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: American Abalone Farms.
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	97.0%
10 µg/l	97.5%
18 µg/l	96.6%
32 µg/l	15.8% *
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	22.1 µg/l

QA/QC TEST ACCEPTABILITY

Parameter	Result
Average control normality ≥80%	Yes (97.0%)
56 µg/l treatment response significantly less than control response	Yes (NOEC = 18 µg/l)
%MSD <20% relative to control	Yes (%MSD = 3.1%)

Abalone Larval Development Test-Proportion Normal

Start Date:	1/18/2012 14:00	Test ID:	RT120118ab	Sample ID:	REF-Ref Toxicant
End Date:	1/20/2012 14:00	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	ZNSO-Zinc sulfate
Sample Date:	1/18/2012	Protocol:	WCCH-EPA-600-R-95-136	Test Species:	HR-Haliotis rufescens

Comments:

Conc-ug/L	1	2	3	4	5
D-Control	0.9810	0.9714	0.9450	0.9720	0.9811
10	0.9720	0.9904	0.9810	0.9806	0.9528
18	0.9712	0.9524	0.9720	0.9623	0.9720
32	0.1636	0.0762	0.1359	0.2432	0.1714
56	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000

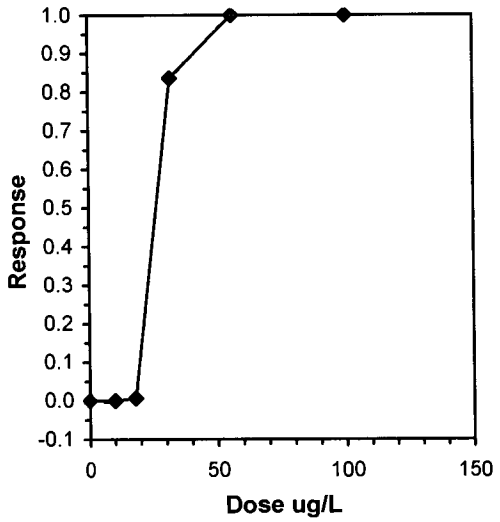
			Transform: Arcsin Square Root					1-Tailed			Isotonic	
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	0.9701	1.0000	1.4006	1.3340	1.4330	2.878	5				0.9726	1.0000
10	0.9753	1.0054	1.4181	1.3519	1.4726	3.147	5	-0.517	2.230	0.0755	0.9726	1.0000
18	0.9659	0.9957	1.3863	1.3508	1.4026	1.653	5	0.422	2.230	0.0755	0.9660	0.9932
*32	0.1581	0.1630	0.4033	0.2797	0.5158	21.232	5	29.443	2.230	0.0755	0.1592	0.1637
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)	0.93175	0.905	-0.4223	1.98465
Bartlett's Test indicates equal variances (p = 0.11)	6.13042	11.3449		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	18	32	24		0.03049	0.0314	1.24676	0.00287	1.5E-15	3, 16
Treatments vs D-Control										

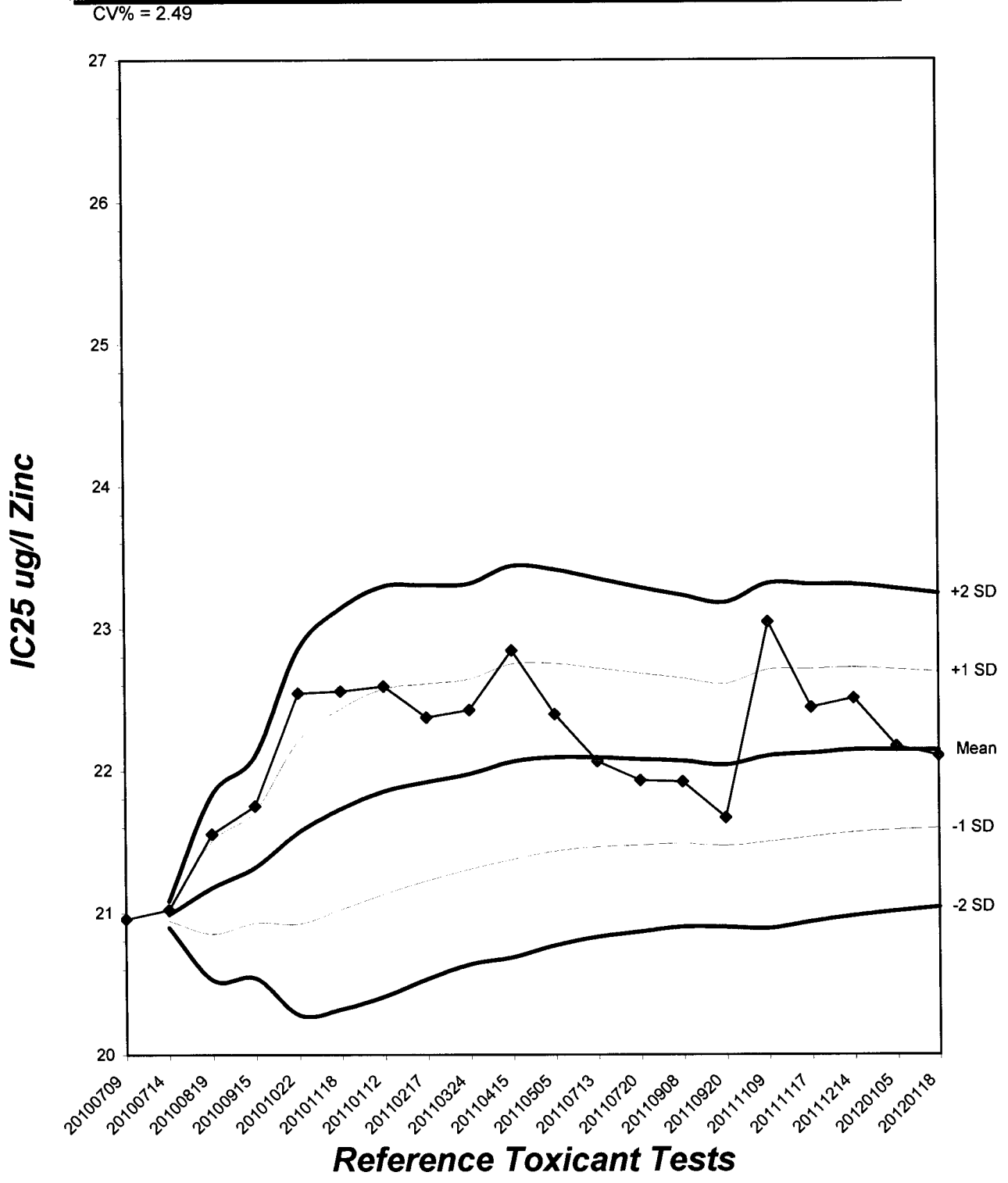
Linear Interpolation (200 Resamples)

Point	ug/L	SD	95% CL(Exp)		Skew
IC05	18.729	0.093	18.414	18.924	-0.0484
IC10	19.573	0.100	19.257	19.799	0.0462
IC15	20.417	0.113	20.078	20.687	0.1054
IC20	21.261	0.132	20.868	21.590	0.1388
IC25	22.105	0.153	21.669	22.546	0.1588
IC40	24.636	0.225	24.022	25.256	0.1888
IC50	26.324	0.277	25.580	27.103	0.1993



Reviewed by:_____

Abalone Larval Development Laboratory Control Chart



ABALONE CHRONIC BIOASSAY
Reference Toxicant - Zinc Sulfate

Aquatic Testing Laboratories

QA/QC No.: RT-120118

Start Date: 01/18/2012

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	15.7	7.8	8.1	34	15.9	7.9	15.9	7.3	7.8	34
10 µg/l Zn	15.6	7.8	8.1	34	15.9	8.0	15.4	7.3	7.9	34
18 µg/l Zn	15.4	7.8	8.1	34	15.7	8.0	15.3	7.3	7.9	34
32 µg/l Zn	15.0	7.9	8.1	34	15.7	8.0	15.4	7.2	7.9	34
56 µg/l Zn	14.9	7.9	8.1	34	15.7	7.9	15.2	7.1	7.9	34
100 µg/l Zn	15.3	7.8	8.1	34	15.6	8.0	15.1	7.0	8.0	34

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

Initial readings: [signature] Date/Time: 1-18-12 1400 Final readings: [signature] Date/Time: 1-20-12 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	C	103	2	11	100	0	100	21	100	0	100
2	56	0	100	12	10	103	1	22	C	104	3
3	100	0	100	13	56	0	100	23	56	0	100
4	32	18	92	14	C	103	6	24	18	102	4
5	18	101	3	15	32	14	89	25	100	0	100
6	10	104	3	16	100	0	100	26	32	18	87
7	56	0	100	17	10	103	2	27	10	101	5
8	C	102	3	18	18	104	3	28	C	104	2
9	18	100	5	19	10	101	2	29	18	104	3
10	32	8	97	20	32	27	84	30	56	0	100

Microscopic examination: Analyst: [signature] Date: 1-20-12 Time: 1430

ABALONE CHRONIC BIOASSAY
Reference Toxicant - Zinc Sulfate

Aquatic Testing Laboratories

QA/QC No.: RT-120118

Start Date: 01/18/2012

RANDOMIZATION WORKSHEET

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

Notes

Number Males used: 4

Number females used: 6

Time H_2O_2 added: 10:30

Time water changed: 13:00

Time spawned: 13:15 ♂, 13:45 ♀

Time placed in test: 14:45

Add 1600 fertilized eggs per 200 ml..

Time glutaraldehyde added: 1400

Analyst: [signature] Date: 1-18-12 Time: 13a

Aquatic Testing Laboratories

Test Temperature Chart

Test No: RT-120118

Date Tested: 01/18/12 to 01/20/12

Acceptable Range: 15+/- 1°C