City of Morro Bay and
Cayucos Sanitary District

MONITORING AND REPORTING PROGRAM

EFFLUENT SAMPLING

CHEMICAL AND BIOASSAY ANALYSIS RESULTS

JULY 2018

Marine Research Specialists

4744 Telephone Rd Ste 3 PMB 315
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

ANNUAL EFFLUENT REPORT

CHEMICAL AND BIOASSAY ANALYSIS RESULTS

JULY 2018

Prepared by

Douglas A. Coats

Marine Research Specialists

4744 Telephone Rd Ste 3 PMB 315
Ventura California 93003

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

August 2018

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.

Mr. John Gunderlock
Wastewater/Collections System Supervisor
City of Morro Bay/Cayucos CSD Wastewater Treatment Plant

Date: 8/15/18

marine research specialists
4744 Telephone Rd., Suite 3 PMB 315 • Ventura, CA 93003 • (805) 644-1180

John Gunderlock
Wastewater & Collection Systems Supervisor
City of Morro Bay
955 Shasta Avenue
Morro Bay, CA 93442

15 August 2018

Reference: Annual Effluent Self-Monitoring Report for 2018

Dear Mr. Gunderlock:

This self-monitoring report documents the chemical and bioassay analysis results for effluent samples collected in July 2018 as required by NPDES discharge permit CA0047881.[1] Analyses of effluent samples collected on 18, 23, 24, and 26 July were conducted in accordance with the monitoring requirements specified in the permit, including:

- Tributyltin and radionuclide analyses conducted on a composite sample collected on 18 July 2018;
- Nutrient compounds measured in a grab sample collected on 18 July 2018;
- Chlorinated dioxins and furans measured in a composite sample collected on 18 July 2018;
- Chronic bioassays conducted on composite samples collected on 23, 24, and 26 July 2018;
- Chemical analyses conducted on a composite sample collected on 18 July 2018; and
- Phenolic compounds measured in a grab sample collected on 18 July 2018.

Three attachments to this report demonstrate that all chemical concentrations, radioactivity, and toxicological endpoints were 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 are normally submitted under separate cover to the California State Water Resources Control Board (Attachment B[2]). 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 July 2018 augment data collected over the past two decades from the MBSCD[3] 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.

---

[1] Regional Water Quality Control Board (RWQCB) - Central Coast Region and the Environmental Protection Agency (EPA) – Region IX. 2017. Waste Discharge Requirements (Order No. R3-2017-0050) 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 2018.

[2] At the time this report was prepared, there were no Discharge Monitoring Report (DMR) templates available on the California Integrated Water Quality System Project (CIWQS) website for electronically submitting results for the constituents that were previously reported on an annual basis (Feature – LS: 001-Y). Consequently, the DMR forms included in Attachment B for all constituents associated with the "annual" electronic Self Monitoring Report [eSMR/eDMR ID: 2009486 2018 (Annual Sampling)], were prepared manually, rather than downloaded from a CIWQS database submission. The data associated with "semi-annual" constituents, including nutrients, metals, and chronic toxicity, were successfully uploaded to the website, and the downloaded eDMR forms are included as the first two pages of Appendix B (Feature – LS: 001-S).

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

The concentrations of 78 chemical compounds are limited under the current permit.[4] In July 2018, only 13 of these compounds were detected, and of those, only three had concentrations high enough to be reliably quantified above their respective MLs: copper, lead, and zinc. The concentrations of these three metals within the July 2018 samples were typical of wastewater derived from domestic sources, and were significantly below the limits specified in the NPDES discharge permit. Copper, lead, and zinc are commonly occurring metals that enter the wastewater collection system through erosion of natural mineral deposits along the central California coast. They also enter the system through corrosion of household plumbing systems. Regardless of their provenance, the concentrations of these compounds in the July 2018 effluent were well below the levels deemed deleterious to marine organisms.

Chronic toxicity tests conducted on July-2018 composite effluent samples measured the effluent's potential to impact a variety of marine organisms by exposing those organisms to a range of effluent dilutions in the laboratory. The three bioassays assessed: 1) the development of larval red abalone (*Haliotis rufescens*); 2) the germination of kelp (*Macrocystis pyrifera*) spores and the growth of kelp germ tubes; and 3) the survival and growth of larval topsmelt (*Atherinops affinis*). Although these organisms are highly sensitive to contaminants, adverse effects were not observed within effluent-seawater mixtures that were seven times more concentrated than that allowed by the discharge permit.

The series of three bioassays conducted on the July-2018 effluent samples were substantially more involved than the toxicity assessments performed on MBCSD effluent samples over the prior 25 years. First, the new NPDES discharge permit requires annual testing of three marine species on three separate occasions to determine the most sensitive organism. However, repeating these screening bioassays over the next two years is highly unlikely to yield any additional insight into organism sensitivity, and the screening requirement should be discontinued. This is evident from the results of the tests conducted on the July-2018 effluent samples (Table 1). Namely, larval abalone specimens were found to be significantly more sensitive than the other test organisms and because of this, should be tested alone in future bioassays. Similar results were found in screening bioassays conducted in 2009 and 2010, and the effluent's toxicity to abalone larvae in 2018 (17.9 TUc), is identical to that measured in the nine prior bioassays conducted over the past 5 years.

Table 1. Comparison of Measured Toxicity Levels during July 2018

Sample Date	Bioassay Test	End Point (%)	Concentration (TU)	Limit (TU)
23 July	Topsmelt (*A. affinis*)			
	Survival	32.0	3.12	134
	Growth	32.0	3.12	134
24 July	Giant Kelp (*M. pyrifera*)			
	Germination	10.0	10.0	134
	Growth	10.0	10.0	134
24 July	Red Abalone (*H. rufescens*)			
	Development	5.6	17.9	134

The second unnecessarily onerous aspect of the new permit's toxicity testing requirement is for dilution and control test water to be collected "*from an area of the receiving waters, typically upstream*" of the discharge. Collection of ambient seawater from an offshore location near the outfall involves the mobilization of an offshore survey vessel and immediate vehicle transport of the heavy, iced seawater samples from Morro Bay to the bioassay laboratory in Ventura California. Depending on the timing of the three screening toxicity tests, offshore seawater collection may be required on up-to three separate occasions. Such an effort is unwarranted because, in contrast to discharges to onshore surface waterbodies or within enclosed bays, the receiving waters of the open Pacific Ocean are relatively uniform and there is no advantage to collecting seawater near the outfall, as opposed to seawater collected in the open ocean near the toxicity testing facility

[4] In addition to these 78 chemical compounds, levels of nutrients, radionuclides, and chronic toxicity are also documented as part of the current permit requirements.

(e.g. culture water from the abalone farm's seawater intake). This fact was demonstrated during the July-2018 bioassay when control tests were conducted using pure seawater from three different sources (Table 2). There were no statistical differences among the control toxicity endpoints from the three sources. Future bioassays should be permitted to use dilution and control seawater collected from anywhere along the open coast of the Pacific Ocean.

Table 2. Comparison of Toxicity End Points within three Seawater Control Samples

Bioassay Test	Ambient (Outfall)	Abalone Culture Water	Artificial (Brine)
Topsmelt (*A. affinis*)			
Survival (%)	100.	100.	100.
Biomass (mg)	1.788	1.731	1.695
Giant Kelp (*M. pyrifera*)			
Germination (%)	81.3	80.6	81.7
Tube Length (µm)	15.75	16.45	16.00
Red Abalone (*H. rufescens*)			
Development (%)	96.1	96.2	95.8

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

Sincerely,

Douglas A. Coats
Vice President
MARINE RESEARCH SPECIALISTS
2018.08.15 13:41:22 -07'00'

Douglas A. Coats
Program Manager

ATTACHMENT A

MINIMUM LEVEL REPORTING

ATTACHMENT A
Analytical Results for Effluent Samples Collected during July 2018

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	0.01	0.1	—[e]	—[e]	DNQ 0.04 Est. Conc.
Urea (as N)	mg/L	Mulvenna & Savid	0.008	0.01	—	—	0.094 as measured
Ortho-Phosphate (as P)	mg/L	300.0	0.02	0.1	—	—	2.62 as measured
Dissolved Silica (Si02)	mg/L	200.7	0.3	0.5	—	—	12. as measured
Objectives for the Protection of Marine Aquatic Life							
Arsenic	mg/L	200.8	0.0007	0.002	0.002	0.67	DNQ 0.0016 Est. Conc.
Cadmium	mg/L	200.7	0.0011	0.01	0.01	0.13	ND
Chromium VI	mg/L	200.7	0.0012	0.01	0.01	0.27	DNQ 0.0016 Est. Conc.
Copper	mg/L	200.7	0.0012	0.01	0.01	0.14	0.02 as measured
Lead	mg/L	200.8	0.0001	0.001	0.0005	0.27	0.0023 as measured
Mercury	µg/L	245.1	0.029	0.2	0.2	5.29	ND
Nickel	mg/L	200.7	0.0023	0.01	0.02	0.67	DNQ 0.0039 Est. Conc.
Selenium	mg/L	200.8	0.00019	0.002	0.002	2.01	DNQ 0.0018 Est. Conc.
Silver	mg/L	200.7	0.0013	0.01	0.01	0.07	ND
Zinc	mg/L	200.7	0.0095	0.05	0.02	1.62	0.06 as measured
Cyanide	mg/L	335.4	0.0017	0.005	0.005	0.13	DNQ 0.0025 Est. Conc.
Toxicity-Chronic: *M. pyrifera*	TUc	600/R-95/136	—	—	—	134.	10. as measured
Toxicity-Chronic: *H. Rufescens*	TUc	600/R-95/136	—	—	—	134.	17.9 as measured
Toxicity-Chronic: *A. affinis*	TUc	600/R-95/136	—	—	—	134.	3.125 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 2012 Ocean Plan (COP).

[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 minimum levels or permit limits have been established for nutrients.

Analytical Results for Effluent Samples Collected during July 2018

Chemical Compound or Parameter	Units	Method	Detection Limit[a]	Practical[b] Quantification Limit	Minimum Level[c]	Permit[d] Limit	Reported Value
Nonchlorinated Phenolics	mg/L	625	0.003	0.02	0.0495	4.02	ND
Chlorinated Phenolics	mg/L	625	0.0026	0.02	0.0495	0.13	ND
Endosulfan (Sum)	µg/L	608	0.0024	0.005	0.01	1.21	ND
Endrin	µg/L	608	0.0036	0.005	0.01	0.27	ND
HCH	µg/L	608	0.0023	0.005	0.02	0.54	ND
Radioactivity Gross α	pCi/L	SM-7110C	0.033[f]	±0.084[f]	—	15.	0.006 as ND[f]
Radioactivity Gross β	pCi/L	900	1.942[f]	±1.562[f]	—	50.	13. as measured
Objectives for the Protection of Human Health: Noncarcinogens							
Acrolein	mg/L	624	0.0015	0.02	0.005	29.5	ND
Antimony	mg/L	200.7	0.005	0.1	0.05	160.8	ND
Bis(2-chloroethoxy) methane	mg/L	625	0.0027	0.02	0.0495	0.59	ND
Bis(2-chloroisopropyl)ether	mg/L	625	0.017	0.02	0.0198	160.8	ND
Chlorobenzene	mg/L	624	0.000051	0.0005	0.002	76.4	ND
Chromium III[g]	g/L	200.7	0.0000012	0.00001	0.00001	25.5	DNQ 0.0000016 Est. Conc.
Di-n-butyl phthalate	mg/L	625	0.002	0.02	0.099	469.	ND
Dichlorobenzene	mg/L	624	0.00011	0.0005	0.002	683.	ND
Diethyl phthalate	mg/L	625	0.002	0.02	0.0198	4,420.	ND
Dimethyl phthalate	g/L	625	0.0000025	0.00002	0.0000198	109.9	ND
2-Methyl-4,6-dinitrophenol	mg/L	625	0.0043	0.1	0.0495	29.5	ND
2,4-Dinitrophenol	mg/L	625	0.0037	0.1	0.0495	0.54	ND
Ethylbenzene	mg/L	624	0.00005	0.0005	0.002	549.	ND
Fluoranthene	mg/L	625	0.0041	0.02	0.0099	2.	ND
Hexachlorocyclopentadiene	mg/L	625	0.0035	0.02	0.0495	7.8	ND
Nitrobenzene	mg/L	625	0.0039	0.02	0.0099	0.66	ND

[f] Reporting of radioactivity differs from chemical reporting. Minimum Detectable Activity (MDA) is listed under *Detection Limit* and counting uncertainty is listed under the PQL. No *Minimum Level* is specified for radioactivity in the Ocean Plan, although the USEPA has specified minimum acceptable detection limits on Gross α and β as 3 pCi/L and 4 pCi/L, respectively. Lastly, by convention, raw radioactivity measurements are always reported rather than just the censored values. Consequently, the 0.006-pCi/L Gross α activity, which was below 0.033 pCi/L MDA, is reported here, along with an *ND* qualifier.

[g] Total chromium concentration was reported rather than the concentration of the trivalent oxidation state alone.

Analytical Results for Effluent Samples Collected during July 2018

Chemical Compound or Parameter	Units	Method	Detection Limit[a]	Practical[b] Quantification Limit	Minimum Level[c]	Permit[d] Limit	Reported Value
Thallium	mg/L	200.8	0.0001	0.001	0.001	0.27	ND
Toluene	g/L	624	0.000000054	0.0000005	0.000002	11.4	DNQ 0.00000057 Est. Conc.[h]
Tributyltin	µg/L	GC/MS	0.005	—	0.1	0.188	ND
1,1,1-Trichloroethane	g/L	624	0.00000009	0.0000005	0.000002	72.4	ND
Objectives for the Protection of Human Health: Carcinogens							
Acrylonitrile	µg/L	624	0.66	5.	2.	13.4	ND
Aldrin	ng/L	608	1.9	5.	5.	2.95	ND
Benzene	µg/L	624	0.05	0.5	2.	791.	ND
Benzidine	ng/L	625	30,000.	200,000.	49,500.	9.25	ND
Beryllium	µg/L	200.7	0.77	10.	2.	4.42	DNQ 0.99 Est. Conc.
Bis (2-chloroethyl) ether	µg/L	625	19.	20.	9.9	6.03	ND
Bis(2-ethylhexyl) phthalate	µg/L	625	2.	50.	49.5	469.	ND
Carbon Tetrachloride	µg/L	624	0.08	0.5	2.	121.	ND
Chlordane	ng/L	608	150.	500.	100.	3.08	ND
Dibromochloromethane	µg/L	624	0.074	0.5	2.	1,152.	ND
Chloroform	mg/L	624	0.00005	0.0005	0.002	17.4	DNQ 0.00083 Est. Conc.[h]
DDT (Sum)	ng/L	608	1.7	5.	10.	22.8	ND
1,4-Dichlorobenzene	mg/L	624	0.000068	0.0005	0.002	2.41	DNQ 0.00018 Est. Conc.
3,3-Dichlorobenzidine	µg/L	625	4.1	100.	49.5	1.09	ND
1,2-Dichloroethane	mg/L	624	0.000093	0.0005	0.002	3.75	ND
1,1-Dichloroethene	mg/L	624	0.00005	0.0005	0.002	0.12	ND
Dichlorobromomethane	mg/L	624	0.00005	0.0005	0.002	0.83	ND
Methylene chloride	mg/L	624	0.00008	0.001	0.002	60.3	ND
1,3-Dichloropropene	mg/L	624	0.000087	0.0005	5.	1.19	ND
Dieldrin	ng/L	608	2.3	5.	10.	5.36	ND
2,4-Dinitrotoluene	µg/L	625	8.7	20.	49.5	348.	ND
1,2-Diphenylhydrazine	µg/L	625	4.4	20.	9.9	21.4	ND

[h] The reported concentration was above the PQL and accordingly, was not flagged "as estimated" by the chemistry laboratory (See Attachment C). However, in accordance with the guidance from the COP, the reported value is listed here as an estimated concentration ("Est. Conc.") because the measured value was below the minimum level (ML).

Analytical Results for Effluent Samples Collected during July 2018

Chemical Compound or Parameter	Units	Method	Detection Limit[a]	Practical Quantification Limit[b]	Minimum Level[c]	Permit Limit[d]	Reported Value
Halomethanes	mg/L	624	0.000086	0.0005	0.002	17.4	ND
Heptachlor	µg/L	608	0.002	0.005	0.01	0.0067	ND
Heptachlor Epoxide	µg/L	608	0.0042	0.005	0.01	0.00268	ND
Hexachlorobenzene	ng/L	625	2,300.	20,000.	9,900.	28.1	ND
Hexachlorobutadiene	mg/L	625	0.0046	0.02	0.0099	1.88	ND
Hexachloroethane	µg/L	625	13.	20.	9.9	335.	ND
Isophorone	mg/L	625	0.0041	0.02	0.0099	98.	ND
N-Nitrosodimethylamine	µg/L	625	5.6	20.	49.5	978.	ND
N-Nitrosodi-n-propylamine	µg/L	625	5.6	20.	49.5	50.9	ND
N-Nitrosodiphenylamine	µg/L	625	2.7	20.	9.9	335.	ND
PAHs	µg/L	625	2.	20.	99.	1.18	ND
Total PCB's	ng/L	608	34.	200.	500.	2.55	ND
Dioxin (TCDD equivalents)	pg/L	1613B	0.00689	0.0496	—	0.52	DNQ 0.0313 Est. Conc.[i]
1,1,2,2-Tetrachloroethane	mg/L	624	0.000079	0.0005	0.002	0.31	ND
Tetrachloroethene	µg/L	624	0.053	0.5	2.	268.	ND
Toxaphene	ng/L	608	200.	2,000.	500.	28.1	ND
Trichloroethene	mg/L	624	0.000096	0.0005	0.002	3.62	ND
1,1,2-Trichloroethane	mg/L	624	0.000077	0.0005	0.002	1.26	ND
2,4,6-Trichlorophenol	mg/L	625	0.0034	0.05	0.099	0.039	ND
Vinyl chloride	mg/L	624	0.000068	0.0005	0.002	4.82	ND

[i] The Toxic Equivalent Quotient (TEQ) reported here was flagged as estimated because it was based on the detection of only one of the 17 isomers (*OCDD*) at a concentration "*below the Reporting Limit*" (See Data Qualifier J in the laboratory report contained in Attachment C).

ATTACHMENT B

DISCHARGE MONITORING REPORTS

eSMR PDF
Summary: DMR

NPDES Permit #: CA0047881 **Facility:** THE CITY OF MORRO BAY/CAYUCOS SANITARY DISTRICT WWTP

DMR Parameters

Feature - LS: 001-S **Monitoring Period:** 07/01/2014 - 12/31/2014

Loc	Sea	Param	Param Text	Q1	Q2	C1	C2	C3	Excur Count	Analy Freq	Sample Type
1	0	00620	Nitrogen, nitrate total (as N)					NODI: Q Daily Maximum			
1	0	00720	Cyanide, total (as CN)			NODI: Q 6 Month Median	NODI: Q Daily Maximum	NODI: Q Instantaneous Maximum			
1	0	00955	Silica, dissolved (as SiO2)					12.0 mg/L Daily Maximum	0	Semiannual	GRAB
1	0	00978	Arsenic, total recoverable			NODI: Q 6 Month Median	NODI: Q Daily Maximum	NODI: Q Instantaneous Maximum			
1	0	00981	Selenium, total recoverable			NODI: Q 6 Month Median	NODI: Q Daily Maximum	NODI: Q Instantaneous Maximum			
1	0	01032	Chromium, hexavalent (as Cr)			NODI: Q 6 Month Median	NODI: Q Daily Maximum	NODI: Q Instantaneous Maximum			
1	0	01074	Nickel, total recoverable			NODI: Q 6 Month Median	NODI: Q Daily Maximum	NODI: Q Instantaneous Maximum			
1	0	01079	Silver total recoverable			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum			
1	0	01094	Zinc, total recoverable			0.06 mg/L 6 Month Median	0.06 mg/L Daily Maximum	0.06 mg/L Instantaneous Maximum	0	Semiannual	COMP24
1	0	01113	Cadmium, total recoverable			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum			

Feature - LS: 001-S **Monitoring Period:** 07/01/2014 - 12/31/2014

Loc	Sea	Param	Param Text	Q1	Q2	C1	C2	C3	Excur Count	Analy Freq	Sample Type
1	0	01114	Lead, total recoverable			0.0023 mg/L 6 Month Median	0.0023 mg/L Daily Maximum	0.0023 mg/L Instantaneous Maximum	0	Semiannual	COMP24
1	0	01119	Copper, total recoverable			0.02 mg/L 6 Month Median	0.02 mg/L Daily Maximum	0.02 mg/L Instantaneous Maximum	0	Semiannual	COMP24
1	0	04175	Phosphate, ortho (as P)					2.62 mg/L Daily Maximum	0	Semiannual	GRAB
1	0	71800	Urea					0.094 mg/L Daily Maximum	0	Semiannual	GRAB
1	0	71901	Mercury, total recoverable			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum			
1	0	TTK1D	Static 48Hr Chronic Macrocystis Pyrifera					10.0 tox chronic Daily Maximum	0	Semiannual	COMP24
1	0	TTK3R	Static 48Hr Chronic Haliotis Rufescens					17.9 tox chronic Daily Maximum	0	Semiannual	COMP24

~~eSMR PDF~~

Summary: DMR

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

DMR Parameters

Feature - LS: 001-Y **Monitoring Period:** 01/01/2018 - 12/31/2018

Loc	Sea	Param	Param Text	Q1	Q2	C1	C2	C3	Excur Count	Analy Freq	Sample Type
1	0	00189	Radioactivity					13.0 pCi/L Daily Maximum	0	Annual	COMP24
1	0	00982	Thallium, total recoverable				NODI: B Monthly Average		0		
1	0	00998	Beryllium, total recoverable (as Be)				NODI: Q Monthly Average		0		
1	0	01033	Chromium, trivalent (as Cr)				NODI: Q Monthly Average		0		
1	0	01268	Antimony, total recoverable				NODI: B Monthly Average		0		
1	0	03615	2-Methyl-4,6-dinitrophenol				NODI: B Monthly Average		0		
1	0	03824	Tributyltin				NODI: B Monthly Average		0		
1	0	22456	Polynuclear Aromatic Hydrocarbons (PAHs)				NODI: B Monthly Average		0		
1	0	32101	Dichlorobromo methane				NODI: B Monthly Average		0		
1	0	32102	Carbon tetrachloride				NODI: B Monthly Average		0		

Feature - LS: 001-Y **Monitoring Period:** 01/01/2018 - 12/31/2018

Loc	Sea	Param	Param Text	Q1	Q2	C1	C2	C3	Excur Count	Analy Freq	Sample Type
1	0	32103	1,2-Dichloroethane				NODI: B Monthly Average		0		
1	0	32105	Dibromochloro methane				NODI: B Monthly Average		0		
1	0	32106	Chloroform				NODI: Q Monthly Average		0		
1	0	34010	Toluene				NODI: Q Monthly Average		0		
1	0	34030	Benzene				NODI: B Monthly Average		0		
1	0	34210	Acrolein				NODI: B Monthly Average		0		
1	0	34215	Acrylonitrile				NODI: B Monthly Average		0		
1	0	34273	Bis(2-chloroethyl) ether				NODI: B Monthly Average		0		
1	0	34278	Bis(2-chloroethoxy) methane				NODI: B Monthly Average		0		
1	0	34283	Bis(2-chloroisopropyl) ether				NODI: B Monthly Average		0		
1	0	34301	Chlorobenzene				NODI: B Monthly Average		0		
1	0	34336	Diethyl phthalate				NODI: B Monthly Average		0		
1	0	34341	Dimethyl phthalate				NODI: B Monthly Average		0		

Feature - LS: 001-Y **Monitoring Period:** 01/01/2018 - 12/31/2018

Loc	Sea	Param	Param Text	Q1	Q2	C1	C2	C3	Excur Count	Analy Freq	Sample Type
1	0	34346	1,2-Diphenylhydrazine				NODI: B Monthly Average		0		
1	0	34371	Ethylbenzene				NODI: B Monthly Average		0		
1	0	34376	Fluoranthene				NODI: B Monthly Average		0		
1	0	34386	Hexachlorocyclopentadiene				NODI: B Monthly Average		0		
1	0	34391	Hexachlorobutadiene				NODI: B Monthly Average		0		
1	0	34396	Hexachloroethane				NODI: B Monthly Average		0		
1	0	34408	Isophorone				NODI: B Monthly Average		0		
1	0	34423	Methylene chloride				NODI: B Monthly Average		0		
1	0	34428	N-Nitrosodi-N-propylamine				NODI: B Monthly Average		0		
1	0	34433	N-Nitrosodiphenylamine				NODI: B Monthly Average		0		
1	0	34438	N-Nitrosodimethylamine (NDMA)				NODI: B Monthly Average		0		
1	0	34447	Nitrobenzene				NODI: B Monthly Average		0		
1	0	34475	Tetrachloroethylene				NODI: B Monthly Average		0		

Feature - LS: 001-Y **Monitoring Period:** 01/01/2018 - 12/31/2018

Loc	Sea	Param	Param Text	Q1	Q2	C1	C2	C3	Excur Count	Analy Freq	Sample Type
1	0	34501	1,1-Dichloroethylene				NODI: B Monthly Average		0		
1	0	34506	1,1,1-Trichloroethane				NODI: B Monthly Average		0		
1	0	34511	1,1,2-Trichloroethane				NODI: B Monthly Average		0		
1	0	34516	1,1,2,2-Tetrachloroethane				NODI: B Monthly Average		0		
1	0	34571	1,4-Dichlorobenzene				NODI: Q Monthly Average		0		
1	0	34611	2,4-Dinitrotoluene				NODI: B Monthly Average		0		
1	0	34616	2,4-Dinitrophenol				NODI: B Monthly Average		0		
1	0	34621	2,4,6-Trichlorophenol				NODI: B Monthly Average		0		
1	0	34631	3,3'-Dichlorobenzidine				NODI: B Monthly Average		0		
1	0	39100	Bis(2-ethylhexyl) phthalate				NODI: B Monthly Average		0		
1	0	39110	Di-n-butyl phthalate				NODI: B Monthly Average		0		
1	0	39120	Benzidine				NODI: B Monthly Average		0		
1	0	39175	Vinyl chloride				NODI: B Monthly Average		0		

Feature - LS: 001-Y **Monitoring Period:** 01/01/2018 - 12/31/2018

Loc	Sea	Param	Param Text	Q1	Q2	C1	C2	C3	Excur Count	Analy Freq	Sample Type
1	0	39180	Trichloroethylene				NODI: B Monthly Average		0		
1	0	39330	Aldrin				NODI: B Monthly Average		0		
1	0	39350	Chlordane (tech mix. and metabolites)				NODI: B Monthly Average		0		
1	0	39379	DDT/DDD/DDE, sum of p,p' & o, p' isomers				NODI: B Monthly Average		0		
1	0	39380	Dieldrin				NODI: B Monthly Average		0		
1	0	39388	Endosulfan, total			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum	0		
1	0	39390	Endrin			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum	0		
1	0	39400	Toxaphene				NODI: B Monthly Average		0		
1	0	39410	Heptachlor				NODI: B Monthly Average		0		
1	0	39420	Heptachlor epoxide				NODI: B Monthly Average		0		
1	0	39516	Polychlorinated biphenyls (PCBs)				NODI: B Monthly Average		0		
1	0	39700	Hexachlorobenzene				NODI: B Monthly Average		0		
1	0	74015	Phenols, chlorinated			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum	0		

Feature - LS: 001-Y **Monitoring Period:** 01/01/2018 - 12/31/2018

Loc	Sea	Param	Param Text	Q1	Q2	C1	C2	C3	Excur Count	Analy Freq	Sample Type
1	0	77163	1,3-Dichloropropene				NODI: B Monthly Average		0		
1	0	77835	Hexachlorocyclohexane, total			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum	0		
1	0	78218	Phenolic compounds, unchlorinated			NODI: B 6 Month Median	NODI: B Daily Maximum	NODI: B Instantaneous Maximum	0		
1	0	78456	Halomethanes				NODI: B Monthly Average		0		
1	0	81524	Dichlorobenzene				NODI: B Monthly Average		0		
1	0	82698	TCDD equivalents				NODI: Q Monthly Average		0		

ATTACHMENT C
LABORATORY REPORTS

Date of Report: 08/03/2018

Doug Coats

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Client Project:	MBCSD H2 2018
BCL Project:	Semi-Annual Eff
BCL Work Order:	1822618
Invoice ID:	B311739

Enclosed are the results of analyses for samples received by the laboratory on 7/18/2018. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Contact Person: Christina Herndon
Client Service Rep

Stuart Buttram
Technical Director

Table of Contents

BC Laboratories, Inc.
Environmental Testing Laboratory Since 1949.

Chain of Custody Form

Report To:
Client: Marine Research Specialists
Attn: Douglas A Coats
Street Address: 4744 TELEPHONE RD STE 3 PMB 315
City, State, Zip: Ventura CA 93003-5258
Phone: 805.218.3662
Email Address: Marine@Rain.org
Work Order# 18-22618

Project #:
Project Name: MBCSD H2 2018
Global ID #:
Sampler(s): SRA

Analysis Requested

Sample #	Description	Date Sampled	Time Sampled	EPA 625 (see comments)	EPA 625 (see comments)	EPA 624 (see attachment)	EPA 608	Cyanide: EPA 335.3	Metals: Ag, Be, Cd, Cr, Cu, Ni, Sb, Zn, As, Pb, Se, Tl, & Hg	Sample Matrix: Soil	Sludge	Drinking Water	Ground water	Waste Water	Other
1	BC1 Grab ARS	7/18/18	0810	X										X	
2	BC2 Comp ARS	7/18/18	0810		X	X	X	X	X					X	

Comments:
Grab 625: Total chlorinated & non-chlorinated phenolic compounds. Report only the phenolic compounds! Composite 625: full list of base neutral and acid-extractable congeners. See next page!

Are there any tests with holding times less than or equal to 48 hours? ☐ Yes ☒ No

Notes: Please see/read page 2 for additional instructions

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

	Relinquished By	Date	Time
1		18 July 18	1320
2		7/18/18	2005
3			

	Relinquished By	Date	Time
1		7/18/18	1320
2		7/18/18	2005
3			

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

Page 1 of 2

Chain of Custody and Cooler Receipt Form for 1822618 Page 2 of 3

BC LABORATORIES INC. COOLER RECEIPT FORM Page 1 Of 1

Submission #: 1822618

SHIPPING INFORMATION
Fed Ex ☐ UPS ☐ Ontrac ☐ Hand Delivery ☐
BC Lab Field Service ☒ Other ☐ (Specify)_____

SHIPPING CONTAINER
Ice Chest ☒ None ☐ Box ☐
Other ☐ (Specify)_____

FREE LIQUID
YES ☐ NO ☐
(W) / S

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: 0.97 Container: PG Thermometer ID: 208 Date/Time 7/18 2005

Temperature: (A) 2.3 °C / (C) 2.4 °C Analyst Init GSI

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
QT PE UNPRES										
4oz / 8oz / 16oz PE UNPRES										
2oz Cr^{+6}										
QT INORGANIC CHEMICAL METALS										
INORGANIC CHEMICAL METALS 4oz / 8oz / (16oz)		D								
PT CYANIDE		E								
PT NITROGEN FORMS										
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
PT TOTAL ORGANIC CARBON										
PT CHEMICAL OXYGEN DEMAND										
PtA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK			A							
40ml VOA VIAL		BHC								
QT EPA 1664										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 505/508/8080		F								
QT EPA 515.D8150										
QT EPA 525	BD	GH								
QT EPA 525 TRAVEL BLANK										
40ml EPA 547										
40ml EPA 531.1										
8oz EPA 548										
QT EPA 549										
QT EPA 8015M										
QT EPA 8270										
8oz / 16oz / 32oz AMBER										
8oz / 16oz / 32oz JAR										
SOIL SLEEVE										
PCB VIAL										
PLASTIC BAG										
TEDLAR BAG										
FERROUS IRON										
ENCORE										
SMART KIT										
SUMMA CANISTER										

Comments:_____
Sample Numbering Completed By: GSI Date/Time: 7/19 1731
A = Actual / C = Corrected

Rev 21 05/23/2016
S:\WPDocs\WordPerfect\LAB_DOCS\FORMS\SAMREC rev 20

BC Laboratories
Chain of Custody Form
Addendum

Analysis of Effluent Samples collected from the Morro Bay Wastewater Treatment Plant in July 2018

Analysis	Sample	Method
Level IIA QC Report concentrations that are detected above the MDL, but are below the PQL		
Total Chlorinated and Total Non-Chlorinated Phenolic Compounds (Report only the phenolic compounds)	Grab	EPA-625
13 Metals:		
Ag Silver	Composite	EPA 200.7
As Arsenic	Composite	EPA 200.8
Be Beryllium	Composite	EPA 200.7
Cd Cadmium	Composite	EPA 200.7
Cr Chromium	Composite	EPA 200.7
Cu Copper	Composite	EPA 200.7
Hg Mercury	Composite	EPA 245.1
Ni Nickel	Composite	EPA 200.7
Pb Lead	Composite	EPA 200.8
Sb Antimony	Composite	EPA 200.7
Se Selenium	Composite	EPA 200.8
Tl Thallium	Composite	EPA 200.8
Zn Zinc	Composite	EPA 200.7
Volatile Organics - Low Level, Including Acrolein, and Acrylonitrile	Composite	EPA 624/8240
Organochlorine Pesticides and PCBs	Composite	EPA 608/8080
Phenolic Compounds: Full list of base-neutral and acid-extractable congeners	Composite	EPA 625/8270
Cyanide	Composite	EPA 335.3

Invoice and Report to be sent to:
Doug Coats(Marine@Rain.org)
Marine Research Specialists
4744 TELEPHONE RD STE 3 PMB 315
Ventura CA 93003-5258
Telephone: (805) 218-3662

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

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
1822618-01	**COC Number:**	---	**Receive Date:**	07/18/2018 20:05
	Project Number:	---	**Sampling Date:**	07/18/2018 08:10
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	BC1 Grab ARS	**Lab Matrix:**	Water
	Sampled By:	Steve A.	**Sample Type:**	Wastewater
1822618-02	**COC Number:**	---	**Receive Date:**	07/18/2018 20:05
	Project Number:	---	**Sampling Date:**	07/18/2018 08:10
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	BC2 Comp ARS	**Lab Matrix:**	Water
	Sampled By:	Steve A.	**Sample Type:**	Wastewater
1822618-03	**COC Number:**	---	**Receive Date:**	07/18/2018 20:05
	Project Number:	---	**Sampling Date:**	07/18/2018 00:00
	Sampling Location:	---	**Sample Depth:**	---
	Sampling Point:	Travel Blank	**Lab Matrix:**	Water
	Sampled By:	Steve A.	**Sample Type:**	Blank Water

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Base Neutral and Acid Extractables Organic Analysis (EPA Method 625)

BCL Sample ID: 1822618-01 | **Client Sample Name:** BC1 Grab ARS, 7/18/2018 8:10:00AM, Steve A.

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
4-Chloro-3-methylphenol	ND	ug/L	50	4.2	EPA-625	ND	A01	1
2-Chlorophenol	ND	ug/L	20	8.5	EPA-625	ND	A01	1
2,4-Dichlorophenol	ND	ug/L	20	2.6	EPA-625	ND	A01	1
2,4-Dimethylphenol	ND	ug/L	20	3.0	EPA-625	ND	A01	1
4,6-Dinitro-2-methylphenol	ND	ug/L	100	4.3	EPA-625	ND	A01	1
2,4-Dinitrophenol	ND	ug/L	100	3.7	EPA-625	ND	A01	1
2-Methylphenol	ND	ug/L	20	4.3	EPA-625	ND	A01	1
3- & 4-Methylphenol	ND	ug/L	20	13	EPA-625	ND	A01	1
2-Nitrophenol	ND	ug/L	20	3.9	EPA-625	ND	A01	1
4-Nitrophenol	ND	ug/L	20	6.6	EPA-625	ND	A01	1
Pentachlorophenol	ND	ug/L	100	4.3	EPA-625	ND	A01	1
Phenol	ND	ug/L	20	8.4	EPA-625	ND	A01	1
2,4,5-Trichlorophenol	ND	ug/L	50	3.6	EPA-625	ND	A01	1
2,4,6-Trichlorophenol	ND	ug/L	50	3.4	EPA-625	ND	A01	1
2-Fluorophenol (Surrogate)	56.9	%	30 - 120 (LCL - UCL)		EPA-625		A01	1
Phenol-d5 (Surrogate)	40.6	%	12 - 110 (LCL - UCL)		EPA-625		A01	1
Nitrobenzene-d5 (Surrogate)	58.7	%	50 - 130 (LCL - UCL)		EPA-625		A01	1
2-Fluorobiphenyl (Surrogate)	58.4	%	55 - 125 (LCL - UCL)		EPA-625		A01	1
2,4,6-Tribromophenol (Surrogate)	58.7	%	40 - 150 (LCL - UCL)		EPA-625		A01	1
p-Terphenyl-d14 (Surrogate)	25.7	%	40 - 150 (LCL - UCL)		EPA-625		A01,S09	1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-625	07/23/18 21:20	07/25/18 18:39	MK1	MS-B2	9.900	B019973

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Organochlorine Pesticides and PCB's (EPA Method 608)

BCL Sample ID: 1822618-02 | **Client Sample Name:** BC2 Comp ARS, 7/18/2018 8:10:00AM, Steve A.

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Aldrin	ND	ug/L	0.0050	0.0019	EPA-608	ND		1
alpha-BHC	ND	ug/L	0.0050	0.0023	EPA-608	ND		1
beta-BHC	ND	ug/L	0.0050	0.0025	EPA-608	ND		1
delta-BHC	ND	ug/L	0.0050	0.0024	EPA-608	ND		1
gamma-BHC (Lindane)	ND	ug/L	0.0050	0.0024	EPA-608	ND		1
Chlordane (Technical)	ND	ug/L	0.50	0.15	EPA-608	ND		1
4,4'-DDD	ND	ug/L	0.0050	0.0025	EPA-608	ND		1
4,4'-DDE	ND	ug/L	0.0050	0.0024	EPA-608	ND		1
4,4'-DDT	ND	ug/L	0.0050	0.0017	EPA-608	ND		1
Dieldrin	ND	ug/L	0.0050	0.0023	EPA-608	ND		1
Endosulfan I	ND	ug/L	0.0050	0.0024	EPA-608	ND		1
Endosulfan II	ND	ug/L	0.0050	0.0030	EPA-608	ND		1
Endosulfan sulfate	ND	ug/L	0.0050	0.0043	EPA-608	ND		1
Endrin	ND	ug/L	0.0050	0.0036	EPA-608	ND		1
Endrin aldehyde	ND	ug/L	0.010	0.0039	EPA-608	ND		1
Heptachlor	ND	ug/L	0.0050	0.0020	EPA-608	ND		1
Heptachlor epoxide	ND	ug/L	0.0050	0.0042	EPA-608	ND		1
Methoxychlor	ND	ug/L	0.0050	0.0038	EPA-608	ND		1
Toxaphene	ND	ug/L	2.0	0.20	EPA-608	ND		1
PCB-1016	ND	ug/L	0.20	0.062	EPA-608	ND		1
PCB-1221	ND	ug/L	0.20	0.095	EPA-608	ND		1
PCB-1232	ND	ug/L	0.20	0.063	EPA-608	ND		1
PCB-1242	ND	ug/L	0.20	0.069	EPA-608	ND		1
PCB-1248	ND	ug/L	0.20	0.12	EPA-608	ND		1
PCB-1254	ND	ug/L	0.20	0.057	EPA-608	ND		1
PCB-1260	ND	ug/L	0.20	0.034	EPA-608	ND		1
Total PCB's (Summation)	ND	ug/L	0.20	0.10	EPA-608	ND		1
TCMX (Surrogate)	52.9	%	40 - 140 (LCL - UCL)		EPA-608			1
Decachlorobiphenyl (Surrogate)	21.3	%	40 - 130 (LCL - UCL)		EPA-608		S09	1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-608	07/24/18 21:45	07/31/18 00:45	HKS	GC-17	1	B020093

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 1822618-02 | **Client Sample Name:** BC2 Comp ARS, 7/18/2018 8:10:00AM, Steve A.

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	ND	ug/L	0.50	0.050	EPA-624	ND		1
Bromodichloromethane	ND	ug/L	0.50	0.050	EPA-624	ND		1
Bromoform	ND	ug/L	0.50	0.12	EPA-624	ND		1
Bromomethane	ND	ug/L	1.0	0.066	EPA-624	ND		1
Carbon tetrachloride	ND	ug/L	0.50	0.080	EPA-624	ND		1
Chlorobenzene	ND	ug/L	0.50	0.051	EPA-624	ND		1
Chloroethane	ND	ug/L	0.50	0.053	EPA-624	ND		1
Chloroform	**0.83**	**ug/L**	**0.50**	**0.050**	**EPA-624**	ND		1
Chloromethane	ND	ug/L	0.50	0.12	EPA-624	ND		1
Dibromochloromethane	ND	ug/L	0.50	0.074	EPA-624	ND		1
1,2-Dichlorobenzene	ND	ug/L	0.50	0.060	EPA-624	ND		1
1,3-Dichlorobenzene	ND	ug/L	0.50	0.050	EPA-624	ND		1
1,4-Dichlorobenzene	**0.18**	**ug/L**	**0.50**	**0.068**	**EPA-624**	ND	**J**	1
1,1-Dichloroethane	ND	ug/L	0.50	0.077	EPA-624	ND		1
1,2-Dichloroethane	ND	ug/L	0.50	0.093	EPA-624	ND		1
1,1-Dichloroethene	ND	ug/L	0.50	0.050	EPA-624	ND		1
trans-1,2-Dichloroethene	ND	ug/L	0.50	0.050	EPA-624	ND		1
1,2-Dichloropropane	ND	ug/L	0.50	0.050	EPA-624	ND		1
cis-1,3-Dichloropropene	ND	ug/L	0.50	0.050	EPA-624	ND		1
trans-1,3-Dichloropropene	ND	ug/L	0.50	0.087	EPA-624	ND		1
Ethylbenzene	ND	ug/L	0.50	0.050	EPA-624	ND		1
Methylene chloride	ND	ug/L	1.0	0.080	EPA-624	ND		1
Methyl t-butyl ether	ND	ug/L	0.50	0.054	EPA-624	ND		1
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	0.079	EPA-624	ND		1
Tetrachloroethene	ND	ug/L	0.50	0.053	EPA-624	ND		1
Toluene	**0.57**	**ug/L**	**0.50**	**0.054**	**EPA-624**	ND		1
1,1,1-Trichloroethane	ND	ug/L	0.50	0.090	EPA-624	ND		1
1,1,2-Trichloroethane	ND	ug/L	0.50	0.077	EPA-624	ND		1
Trichloroethene	ND	ug/L	0.50	0.096	EPA-624	ND		1
Trichlorofluoromethane	ND	ug/L	0.50	0.11	EPA-624	ND		1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ug/L	0.50	0.090	EPA-624	ND		1
Vinyl chloride	ND	ug/L	0.50	0.068	EPA-624	ND		1
Total Xylenes	ND	ug/L	0.50	0.15	EPA-624	ND		1

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 1822618-02 | **Client Sample Name:** BC2 Comp ARS, 7/18/2018 8:10:00AM, Steve A.

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acrolein	ND	ug/L	20	1.5	EPA-624	ND		1
Acrylonitrile	ND	ug/L	5.0	0.66	EPA-624	ND		1
p- & m-Xylenes	ND	ug/L	0.50	0.10	EPA-624	ND		1
o-Xylene	ND	ug/L	0.50	0.050	EPA-624	ND		1
1,2-Dichloroethane-d4 (Surrogate)	100	%	75 - 125 (LCL - UCL)		EPA-624			1
Toluene-d8 (Surrogate)	100	%	80 - 120 (LCL - UCL)		EPA-624			1
4-Bromofluorobenzene (Surrogate)	102	%	80 - 120 (LCL - UCL)		EPA-624			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-624	07/24/18 06:00	07/24/18 09:29	MGC	MS-V7	1	B019675

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Base Neutral and Acid Extractables Organic Analysis (EPA Method 625)

BCL Sample ID: 1822618-02 | **Client Sample Name:** BC2 Comp ARS, 7/18/2018 8:10:00AM, Steve A.

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acenaphthene	ND	ug/L	20	2.2	EPA-625	ND	A01	1
Acenaphthylene	ND	ug/L	20	2.0	EPA-625	ND	A01	1
Aldrin	ND	ug/L	20	2.8	EPA-625	ND	A01	1
Aniline	ND	ug/L	50	18	EPA-625	ND	A01	1
Anthracene	ND	ug/L	20	2.0	EPA-625	ND	A01	1
Benzidine	ND	ug/L	200	30	EPA-625	ND	A01	1
Benzo[a]anthracene	ND	ug/L	20	3.0	EPA-625	ND	A01	1
Benzo[b]fluoranthene	ND	ug/L	20	4.2	EPA-625	ND	A01	1
Benzo[k]fluoranthene	ND	ug/L	20	2.9	EPA-625	ND	A01	1
Benzo[a]pyrene	ND	ug/L	20	2.1	EPA-625	ND	A01	1
Benzo[g,h,i]perylene	ND	ug/L	20	4.8	EPA-625	ND	A01	1
Benzoic acid	ND	ug/L	100	7.2	EPA-625	ND	A01	1
Benzyl alcohol	ND	ug/L	20	3.5	EPA-625	ND	A01	1
Benzyl butyl phthalate	ND	ug/L	20	2.6	EPA-625	ND	A01	1
alpha-BHC	ND	ug/L	20	3.6	EPA-625	ND	A01	1
beta-BHC	ND	ug/L	20	2.5	EPA-625	ND	A01	1
delta-BHC	ND	ug/L	20	2.8	EPA-625	ND	A01	1
gamma-BHC (Lindane)	ND	ug/L	20	3.2	EPA-625	ND	A01	1
bis(2-Chloroethoxy)methane	ND	ug/L	20	2.7	EPA-625	ND	A01	1
bis(2-Chloroethyl) ether	ND	ug/L	20	19	EPA-625	ND	A01	1
bis(2-Chloroisopropyl)ether	ND	ug/L	20	17	EPA-625	ND	A01	1
bis(2-Ethylhexyl)phthalate	ND	ug/L	50	2.0	EPA-625	ND	A01	1
4-Bromophenyl phenyl ether	ND	ug/L	20	2.0	EPA-625	ND	A01	1
4-Chloroaniline	ND	ug/L	20	3.9	EPA-625	ND	A01	1
2-Chloronaphthalene	ND	ug/L	20	2.3	EPA-625	ND	A01	1
4-Chlorophenyl phenyl ether	ND	ug/L	20	2.0	EPA-625	ND	A01	1
Chrysene	ND	ug/L	20	2.6	EPA-625	ND	A01	1
4,4'-DDD	ND	ug/L	20	4.0	EPA-625	ND	A01	1
4,4'-DDE	ND	ug/L	30	3.2	EPA-625	ND	A01	1
4,4'-DDT	ND	ug/L	20	2.6	EPA-625	ND	A01	1
Dibenzo[a,h]anthracene	ND	ug/L	30	5.9	EPA-625	ND	A01	1
Dibenzofuran	ND	ug/L	20	2.0	EPA-625	ND	A01	1
1,2-Dichlorobenzene	ND	ug/L	20	18	EPA-625	ND	A01	1

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Base Neutral and Acid Extractables Organic Analysis (EPA Method 625)

BCL Sample ID: 1822618-02 | **Client Sample Name:** BC2 Comp ARS, 7/18/2018 8:10:00AM, Steve A.

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
1,3-Dichlorobenzene	ND	ug/L	20	18	EPA-625	ND	A01	1
1,4-Dichlorobenzene	ND	ug/L	20	18	EPA-625	ND	A01	1
3,3-Dichlorobenzidine	ND	ug/L	100	4.1	EPA-625	ND	A01	1
Dieldrin	ND	ug/L	30	4.5	EPA-625	ND	A01	1
Diethyl phthalate	ND	ug/L	20	2.0	EPA-625	ND	A01	1
Dimethyl phthalate	ND	ug/L	20	2.5	EPA-625	ND	A01	1
Di-n-butyl phthalate	ND	ug/L	20	2.0	EPA-625	ND	A01	1
2,4-Dinitrotoluene	ND	ug/L	20	8.7	EPA-625	ND	A01	1
2,6-Dinitrotoluene	ND	ug/L	20	4.6	EPA-625	ND	A01	1
Di-n-octyl phthalate	ND	ug/L	20	3.1	EPA-625	ND	A01	1
1,2-Diphenylhydrazine	ND	ug/L	20	4.4	EPA-625	ND	A01	1
Endosulfan I	ND	ug/L	100	3.7	EPA-625	ND	A01	1
Endosulfan II	ND	ug/L	100	3.7	EPA-625	ND	A01	1
Endosulfan sulfate	ND	ug/L	30	3.7	EPA-625	ND	A01	1
Endrin	ND	ug/L	20	6.7	EPA-625	ND	A01	1
Endrin aldehyde	ND	ug/L	100	3.7	EPA-625	ND	A01	1
Fluoranthene	ND	ug/L	20	4.1	EPA-625	ND	A01	1
Fluorene	ND	ug/L	20	2.0	EPA-625	ND	A01	1
Heptachlor	ND	ug/L	20	2.2	EPA-625	ND	A01	1
Heptachlor epoxide	ND	ug/L	20	3.5	EPA-625	ND	A01	1
Hexachlorobenzene	ND	ug/L	20	2.3	EPA-625	ND	A01	1
Hexachlorobutadiene	ND	ug/L	20	4.6	EPA-625	ND	A01	1
Hexachlorocyclopentadiene	ND	ug/L	20	3.5	EPA-625	ND	A01	1
Hexachloroethane	ND	ug/L	20	13	EPA-625	ND	A01	1
Indeno[1,2,3-cd]pyrene	ND	ug/L	20	7.1	EPA-625	ND	A01	1
Isophorone	ND	ug/L	20	4.1	EPA-625	ND	A01	1
2-Methylnaphthalene	ND	ug/L	20	3.0	EPA-625	ND	A01	1
Naphthalene	ND	ug/L	20	2.0	EPA-625	ND	A01	1
2-Naphthylamine	ND	ug/L	200	17	EPA-625	ND	A01	1
2-Nitroaniline	ND	ug/L	20	3.6	EPA-625	ND	A01	1
3-Nitroaniline	ND	ug/L	20	5.2	EPA-625	ND	A01	1
4-Nitroaniline	ND	ug/L	50	8.5	EPA-625	ND	A01	1
Nitrobenzene	ND	ug/L	20	3.9	EPA-625	ND	A01	1

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Base Neutral and Acid Extractables Organic Analysis (EPA Method 625)

BCL Sample ID: 1822618-02 | **Client Sample Name:** BC2 Comp ARS, 7/18/2018 8:10:00AM, Steve A.

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
N-Nitrosodimethylamine	ND	ug/L	20	5.6	EPA-625	ND	A01	1
N-Nitrosodi-N-propylamine	ND	ug/L	20	5.6	EPA-625	ND	A01	1
N-Nitrosodiphenylamine	ND	ug/L	20	2.7	EPA-625	ND	A01	1
Phenanthrene	ND	ug/L	20	2.0	EPA-625	ND	A01	1
Pyrene	ND	ug/L	20	3.1	EPA-625	ND	A01	1
1,2,4-Trichlorobenzene	ND	ug/L	20	2.4	EPA-625	ND	A01	1
4-Chloro-3-methylphenol	ND	ug/L	50	4.2	EPA-625	ND	A01	1
2-Chlorophenol	ND	ug/L	20	8.5	EPA-625	ND	A01	1
2,4-Dichlorophenol	ND	ug/L	20	2.6	EPA-625	ND	A01	1
2,4-Dimethylphenol	ND	ug/L	20	3.0	EPA-625	ND	A01	1
4,6-Dinitro-2-methylphenol	ND	ug/L	100	4.3	EPA-625	ND	A01	1
2,4-Dinitrophenol	ND	ug/L	100	3.7	EPA-625	ND	A01	1
2-Methylphenol	ND	ug/L	20	4.3	EPA-625	ND	A01	1
3- & 4-Methylphenol	ND	ug/L	20	13	EPA-625	ND	A01	1
2-Nitrophenol	ND	ug/L	20	3.9	EPA-625	ND	A01	1
4-Nitrophenol	ND	ug/L	20	6.6	EPA-625	ND	A01	1
Pentachlorophenol	ND	ug/L	100	4.3	EPA-625	ND	A01	1
Phenol	ND	ug/L	20	8.4	EPA-625	ND	A01	1
2,4,5-Trichlorophenol	ND	ug/L	50	3.6	EPA-625	ND	A01	1
2,4,6-Trichlorophenol	ND	ug/L	50	3.4	EPA-625	ND	A01	1
2-Fluorophenol (Surrogate)	97.3	%	30 - 120 (LCL - UCL)		EPA-625		A01	1
Phenol-d5 (Surrogate)	52.7	%	12 - 110 (LCL - UCL)		EPA-625		A01	1
Nitrobenzene-d5 (Surrogate)	72.8	%	50 - 130 (LCL - UCL)		EPA-625		A01	1
2-Fluorobiphenyl (Surrogate)	82.2	%	55 - 125 (LCL - UCL)		EPA-625		A01	1
2,4,6-Tribromophenol (Surrogate)	75.0	%	40 - 150 (LCL - UCL)		EPA-625		A01	1
p-Terphenyl-d14 (Surrogate)	35.6	%	40 - 150 (LCL - UCL)		EPA-625		A01,S09	1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-625	07/23/18 21:20	07/26/18 12:47	MK1	MS-B2	9.900	B019973

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Water Analysis (General Chemistry)

BCL Sample ID: 1822618-02 | **Client Sample Name:** BC2 Comp ARS, 7/18/2018 8:10:00AM, Steve A.

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Total Cyanide	**0.0025**	**mg/L**	**0.0050**	**0.0017**	**EPA-335.4**	ND	**J**	1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-335.4	07/24/18 09:09	07/26/18 13:33	MC1	KONE-1	1	B019707

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Metals Analysis

BCL Sample ID: 1822618-02 | **Client Sample Name:** BC2 Comp ARS, 7/18/2018 8:10:00AM, Steve A.

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Total Mercury	ND	ug/L	0.20	0.029	EPA-245.1	ND		1
Total Recoverable Antimony	ND	ug/L	100	5.0	EPA-200.7	ND		2
Total Recoverable Arsenic	**1.6**	**ug/L**	**2.0**	**0.70**	**EPA-200.8**	ND	**J**	3
Total Recoverable Beryllium	**0.99**	**ug/L**	**10**	**0.77**	**EPA-200.7**	ND	**J**	2
Total Recoverable Cadmium	ND	ug/L	10	1.1	EPA-200.7	ND		2
Total Recoverable Chromium	**1.6**	**ug/L**	**10**	**1.2**	**EPA-200.7**	ND	**J**	2
Total Recoverable Copper	**20**	**ug/L**	**10**	**1.2**	**EPA-200.7**	ND		2
Total Recoverable Lead	**2.3**	**ug/L**	**1.0**	**0.10**	**EPA-200.8**	ND		4
Total Recoverable Nickel	**3.9**	**ug/L**	**10**	**2.3**	**EPA-200.7**	ND	**J**	2
Total Recoverable Selenium	**1.8**	**ug/L**	**2.0**	**0.19**	**EPA-200.8**	ND	**J**	4
Total Recoverable Silver	ND	ug/L	10	1.3	EPA-200.7	ND		2
Total Recoverable Thallium	ND	ug/L	1.0	0.10	EPA-200.8	ND		4
Total Recoverable Zinc	**60**	**ug/L**	**50**	**9.5**	**EPA-200.7**	ND		2

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-245.1	07/25/18 13:10	07/26/18 10:39	JP1	CETAC2	1	B019849
2	EPA-200.7	07/25/18 08:30	07/27/18 18:11	JRG	PE-OP2	1	B019816
3	EPA-200.8	07/24/18 09:00	07/26/18 13:26	MH1	PE-EL2	1	B019712
4	EPA-200.8	07/24/18 09:00	07/24/18 23:58	ARD	PE-EL2	1	B019712

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 1822618-03 | **Client Sample Name:** Travel Blank, 7/18/2018 12:00:00AM, Steve A.

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Benzene	ND	ug/L	0.50	0.050	EPA-624	ND		1
Bromodichloromethane	ND	ug/L	0.50	0.050	EPA-624	ND		1
Bromoform	ND	ug/L	0.50	0.12	EPA-624	ND		1
Bromomethane	ND	ug/L	1.0	0.066	EPA-624	ND		1
Carbon tetrachloride	ND	ug/L	0.50	0.080	EPA-624	ND		1
Chlorobenzene	ND	ug/L	0.50	0.051	EPA-624	ND		1
Chloroethane	ND	ug/L	0.50	0.053	EPA-624	ND		1
Chloroform	ND	ug/L	0.50	0.050	EPA-624	ND		1
Chloromethane	ND	ug/L	0.50	0.12	EPA-624	ND		1
Dibromochloromethane	ND	ug/L	0.50	0.074	EPA-624	ND		1
1,2-Dichlorobenzene	ND	ug/L	0.50	0.060	EPA-624	ND		1
1,3-Dichlorobenzene	ND	ug/L	0.50	0.050	EPA-624	ND		1
1,4-Dichlorobenzene	ND	ug/L	0.50	0.068	EPA-624	ND		1
1,1-Dichloroethane	ND	ug/L	0.50	0.077	EPA-624	ND		1
1,2-Dichloroethane	ND	ug/L	0.50	0.093	EPA-624	ND		1
1,1-Dichloroethene	ND	ug/L	0.50	0.050	EPA-624	ND		1
trans-1,2-Dichloroethene	ND	ug/L	0.50	0.050	EPA-624	ND		1
1,2-Dichloropropane	ND	ug/L	0.50	0.050	EPA-624	ND		1
cis-1,3-Dichloropropene	ND	ug/L	0.50	0.050	EPA-624	ND		1
trans-1,3-Dichloropropene	ND	ug/L	0.50	0.087	EPA-624	ND		1
Ethylbenzene	ND	ug/L	0.50	0.050	EPA-624	ND		1
Methylene chloride	ND	ug/L	1.0	0.080	EPA-624	ND		1
Methyl t-butyl ether	ND	ug/L	0.50	0.054	EPA-624	ND		1
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	0.079	EPA-624	ND		1
Tetrachloroethene	ND	ug/L	0.50	0.053	EPA-624	ND		1
Toluene	ND	ug/L	0.50	0.054	EPA-624	ND		1
1,1,1-Trichloroethane	ND	ug/L	0.50	0.090	EPA-624	ND		1
1,1,2-Trichloroethane	ND	ug/L	0.50	0.077	EPA-624	ND		1
Trichloroethene	ND	ug/L	0.50	0.096	EPA-624	ND		1
Trichlorofluoromethane	ND	ug/L	0.50	0.11	EPA-624	ND		1
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ug/L	0.50	0.090	EPA-624	ND		1
Vinyl chloride	ND	ug/L	0.50	0.068	EPA-624	ND		1
Total Xylenes	ND	ug/L	0.50	0.15	EPA-624	ND		1

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 1822618-03 | **Client Sample Name:** Travel Blank, 7/18/2018 12:00:00AM, Steve A.

Constituent	Result	Units	PQL	MDL	Method	MB Bias	Lab Quals	Run #
Acrolein	ND	ug/L	20	1.5	EPA-624	ND		1
Acrylonitrile	ND	ug/L	5.0	0.66	EPA-624	ND		1
p- & m-Xylenes	ND	ug/L	0.50	0.10	EPA-624	ND		1
o-Xylene	ND	ug/L	0.50	0.050	EPA-624	ND		1
1,2-Dichloroethane-d4 (Surrogate)	99.3	%	75 - 125 (LCL - UCL)		EPA-624			1
Toluene-d8 (Surrogate)	102	%	80 - 120 (LCL - UCL)		EPA-624			1
4-Bromofluorobenzene (Surrogate)	99.2	%	80 - 120 (LCL - UCL)		EPA-624			1

Run #	Method	Prep Date	Run Date/Time	Analyst	Instrument	Dilution	QC Batch ID
1	EPA-624	07/24/18 06:00	07/24/18 09:52	MGC	MS-V7	1	B019675

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Organochlorine Pesticides and PCB's (EPA Method 608)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B020093						
Aldrin	B020093-BLK1	ND	ug/L	0.0050	0.0019	
alpha-BHC	B020093-BLK1	ND	ug/L	0.0050	0.0023	
beta-BHC	B020093-BLK1	ND	ug/L	0.0050	0.0025	
delta-BHC	B020093-BLK1	ND	ug/L	0.0050	0.0024	
gamma-BHC (Lindane)	B020093-BLK1	ND	ug/L	0.0050	0.0024	
Chlordane (Technical)	B020093-BLK1	ND	ug/L	0.50	0.15	
4,4'-DDD	B020093-BLK1	ND	ug/L	0.0050	0.0025	
4,4'-DDE	B020093-BLK1	ND	ug/L	0.0050	0.0024	
4,4'-DDT	B020093-BLK1	ND	ug/L	0.0050	0.0017	
Dieldrin	B020093-BLK1	ND	ug/L	0.0050	0.0023	
Endosulfan I	B020093-BLK1	ND	ug/L	0.0050	0.0024	
Endosulfan II	B020093-BLK1	ND	ug/L	0.0050	0.0030	
Endosulfan sulfate	B020093-BLK1	ND	ug/L	0.0050	0.0043	
Endrin	B020093-BLK1	ND	ug/L	0.0050	0.0036	
Endrin aldehyde	B020093-BLK1	ND	ug/L	0.010	0.0039	
Heptachlor	B020093-BLK1	ND	ug/L	0.0050	0.0020	
Heptachlor epoxide	B020093-BLK1	ND	ug/L	0.0050	0.0042	
Methoxychlor	B020093-BLK1	ND	ug/L	0.0050	0.0038	
Toxaphene	B020093-BLK1	ND	ug/L	2.0	0.20	
PCB-1016	B020093-BLK1	ND	ug/L	0.20	0.062	
PCB-1221	B020093-BLK1	ND	ug/L	0.20	0.095	
PCB-1232	B020093-BLK1	ND	ug/L	0.20	0.063	
PCB-1242	B020093-BLK1	ND	ug/L	0.20	0.069	
PCB-1248	B020093-BLK1	ND	ug/L	0.20	0.12	
PCB-1254	B020093-BLK1	ND	ug/L	0.20	0.057	
PCB-1260	B020093-BLK1	ND	ug/L	0.20	0.034	
Total PCB's (Summation)	B020093-BLK1	ND	ug/L	0.20	0.10	
TCMX (Surrogate)	**B020093-BLK1**	**90.6**	%	**40 - 140 (LCL - UCL)**		
Decachlorobiphenyl (Surrogate)	**B020093-BLK1**	**74.6**	%	**40 - 130 (LCL - UCL)**		

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Organochlorine Pesticides and PCB's (EPA Method 608)

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: B020093										
Aldrin	B020093-BS1	LCS	0.090250	0.15000	ug/L	60.2		50 - 130		
gamma-BHC (Lindane)	B020093-BS1	LCS	0.12037	0.15000	ug/L	80.2		60 - 130		
4,4'-DDT	B020093-BS1	LCS	0.15381	0.15000	ug/L	103		60 - 130		
Dieldrin	B020093-BS1	LCS	0.12037	0.15000	ug/L	80.2		60 - 130		
Endrin	B020093-BS1	LCS	0.13382	0.15000	ug/L	89.2		60 - 130		
Heptachlor	B020093-BS1	LCS	0.10949	0.15000	ug/L	73.0		60 - 130		
TCMX (Surrogate)	B020093-BS1	LCS	0.27135	0.30000	ug/L	90.4		40 - 140		
Decachlorobiphenyl (Surrogate)	B020093-BS1	LCS	0.51635	0.60000	ug/L	86.1		40 - 130		

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Organochlorine Pesticides and PCB's (EPA Method 608)

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: B020093	Used client sample: N										
Aldrin	MS	**1821541-42**	**ND**	**0.057950**	**0.15000**	**ug/L**		**38.6**		**50 - 130**	**Q03**
	MSD	**1821541-42**	**ND**	**0.10294**	**0.15000**	**ug/L**	**55.9**	**68.6**	**30**	**50 - 130**	**Q02**
gamma-BHC (Lindane)	MS	**1821541-42**	**ND**	**0.074870**	**0.15000**	**ug/L**		**49.9**		**60 - 130**	**Q03**
	MSD	**1821541-42**	**ND**	**0.12522**	**0.15000**	**ug/L**	**50.3**	**83.5**	**30**	**60 - 130**	**Q02**
4,4'-DDT	MS	**1821541-42**	**ND**	**0.083260**	**0.15000**	**ug/L**		**55.5**		**60 - 130**	**Q03**
	MSD	**1821541-42**	**ND**	**0.14738**	**0.15000**	**ug/L**	**55.6**	**98.3**	**30**	**60 - 130**	**Q02**
Dieldrin	MS	**1821541-42**	**ND**	**0.073740**	**0.15000**	**ug/L**		**49.2**		**60 - 130**	**Q03**
	MSD	**1821541-42**	**ND**	**0.12342**	**0.15000**	**ug/L**	**50.4**	**82.3**	**30**	**60 - 130**	**Q02**
Endrin	MS	**1821541-42**	**ND**	**0.078160**	**0.15000**	**ug/L**		**52.1**		**60 - 130**	**Q03**
	MSD	**1821541-42**	**ND**	**0.13057**	**0.15000**	**ug/L**	**50.2**	**87.0**	**30**	**60 - 130**	**Q02**
Heptachlor	MS	**1821541-42**	**ND**	**0.070860**	**0.15000**	**ug/L**		**47.2**		**50 - 130**	**Q03**
	MSD	**1821541-42**	**ND**	**0.11803**	**0.15000**	**ug/L**	**49.9**	**78.7**	**30**	**50 - 130**	**Q02**
TCMX (Surrogate)	MS	1821541-42	ND	0.17127	0.30000	ug/L		57.1		40 - 140	
	MSD	1821541-42	ND	0.28625	0.30000	ug/L	50.3	95.4		40 - 140	
Decachlorobiphenyl (Surrogate)	MS	1821541-42	ND	0.29107	0.60000	ug/L		48.5		40 - 130	
	MSD	1821541-42	ND	0.44775	0.60000	ug/L	42.4	74.6		40 - 130	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Volatile Organic Analysis (EPA Method 624)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B019675						
Benzene	B019675-BLK1	ND	ug/L	0.50	0.050	
Bromodichloromethane	B019675-BLK1	ND	ug/L	0.50	0.050	
Bromoform	B019675-BLK1	ND	ug/L	0.50	0.12	
Bromomethane	B019675-BLK1	ND	ug/L	1.0	0.066	
Carbon tetrachloride	B019675-BLK1	ND	ug/L	0.50	0.080	
Chlorobenzene	B019675-BLK1	ND	ug/L	0.50	0.051	
Chloroethane	B019675-BLK1	ND	ug/L	0.50	0.053	
Chloroform	B019675-BLK1	ND	ug/L	0.50	0.050	
Chloromethane	B019675-BLK1	ND	ug/L	0.50	0.12	
Dibromochloromethane	B019675-BLK1	ND	ug/L	0.50	0.074	
1,2-Dichlorobenzene	B019675-BLK1	ND	ug/L	0.50	0.060	
1,3-Dichlorobenzene	B019675-BLK1	ND	ug/L	0.50	0.050	
1,4-Dichlorobenzene	B019675-BLK1	ND	ug/L	0.50	0.068	
1,1-Dichloroethane	B019675-BLK1	ND	ug/L	0.50	0.077	
1,2-Dichloroethane	B019675-BLK1	ND	ug/L	0.50	0.093	
1,1-Dichloroethene	B019675-BLK1	ND	ug/L	0.50	0.050	
trans-1,2-Dichloroethene	B019675-BLK1	ND	ug/L	0.50	0.050	
1,2-Dichloropropane	B019675-BLK1	ND	ug/L	0.50	0.050	
cis-1,3-Dichloropropene	B019675-BLK1	ND	ug/L	0.50	0.050	
trans-1,3-Dichloropropene	B019675-BLK1	ND	ug/L	0.50	0.087	
Ethylbenzene	B019675-BLK1	ND	ug/L	0.50	0.050	
Methylene chloride	B019675-BLK1	ND	ug/L	1.0	0.080	
Methyl t-butyl ether	B019675-BLK1	ND	ug/L	0.50	0.054	
1,1,2,2-Tetrachloroethane	B019675-BLK1	ND	ug/L	0.50	0.079	
Tetrachloroethene	B019675-BLK1	ND	ug/L	0.50	0.053	
Toluene	B019675-BLK1	ND	ug/L	0.50	0.054	
1,1,1-Trichloroethane	B019675-BLK1	ND	ug/L	0.50	0.090	
1,1,2-Trichloroethane	B019675-BLK1	ND	ug/L	0.50	0.077	
Trichloroethene	B019675-BLK1	ND	ug/L	0.50	0.096	
Trichlorofluoromethane	B019675-BLK1	ND	ug/L	0.50	0.11	
1,1,2-Trichloro-1,2,2-trifluoroethane	B019675-BLK1	ND	ug/L	0.50	0.090	
Vinyl chloride	B019675-BLK1	ND	ug/L	0.50	0.068	
Total Xylenes	B019675-BLK1	ND	ug/L	0.50	0.15	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Volatile Organic Analysis (EPA Method 624)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B019675						
Acrolein	B019675-BLK1	ND	ug/L	20	1.5	
Acrylonitrile	B019675-BLK1	ND	ug/L	5.0	0.66	
p- & m-Xylenes	B019675-BLK1	ND	ug/L	0.50	0.10	
o-Xylene	B019675-BLK1	ND	ug/L	0.50	0.050	
1,2-Dichloroethane-d4 (Surrogate)	**B019675-BLK1**	**94.2**	%	**75 - 125 (LCL - UCL)**		
Toluene-d8 (Surrogate)	**B019675-BLK1**	**101**	%	**80 - 120 (LCL - UCL)**		
4-Bromofluorobenzene (Surrogate)	**B019675-BLK1**	**98.8**	%	**80 - 120 (LCL - UCL)**		

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Volatile Organic Analysis (EPA Method 624)

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: B019675										
Benzene	B019675-BS1	LCS	26.440	25.000	ug/L	106		79 - 120		
Bromodichloromethane	B019675-BS1	LCS	26.000	25.000	ug/L	104		79 - 125		
Bromoform	B019675-BS1	LCS	25.900	25.000	ug/L	104		66 - 130		
Bromomethane	B019675-BS1	LCS	21.720	25.000	ug/L	86.9		53 - 141		
Carbon tetrachloride	B019675-BS1	LCS	24.020	25.000	ug/L	96.1		72 - 136		
Chlorobenzene	B019675-BS1	LCS	25.380	25.000	ug/L	102		82 - 118		
Chloroethane	B019675-BS1	LCS	25.740	25.000	ug/L	103		60 - 138		
Chloroform	B019675-BS1	LCS	25.680	25.000	ug/L	103		79 - 124		
Chloromethane	B019675-BS1	LCS	22.670	25.000	ug/L	90.7		50 - 139		
Dibromochloromethane	B019675-BS1	LCS	24.940	25.000	ug/L	99.8		74 - 126		
1,2-Dichlorobenzene	B019675-BS1	LCS	25.120	25.000	ug/L	100		80 - 119		
1,3-Dichlorobenzene	B019675-BS1	LCS	25.000	25.000	ug/L	100		80 - 119		
1,4-Dichlorobenzene	B019675-BS1	LCS	24.580	25.000	ug/L	98.3		79 - 118		
1,1-Dichloroethane	B019675-BS1	LCS	26.100	25.000	ug/L	104		77 - 125		
1,2-Dichloroethane	B019675-BS1	LCS	24.410	25.000	ug/L	97.6		73 - 128		
1,1-Dichloroethene	B019675-BS1	LCS	26.100	25.000	ug/L	104		71 - 131		
trans-1,2-Dichloroethene	B019675-BS1	LCS	26.260	25.000	ug/L	105		75 - 124		
1,2-Dichloropropane	B019675-BS1	LCS	26.070	25.000	ug/L	104		78 - 122		
cis-1,3-Dichloropropene	B019675-BS1	LCS	25.390	25.000	ug/L	102		75 - 124		
trans-1,3-Dichloropropene	B019675-BS1	LCS	24.870	25.000	ug/L	99.5		73 - 127		
Ethylbenzene	B019675-BS1	LCS	26.390	25.000	ug/L	106		79 - 121		
Methylene chloride	B019675-BS1	LCS	24.280	25.000	ug/L	97.1		74 - 124		
Methyl t-butyl ether	B019675-BS1	LCS	24.710	25.000	ug/L	98.8		71 - 124		
1,1,2,2-Tetrachloroethane	B019675-BS1	LCS	26.500	25.000	ug/L	106		71 - 121		
Tetrachloroethene	B019675-BS1	LCS	25.720	25.000	ug/L	103		74 - 129		
Toluene	B019675-BS1	LCS	26.110	25.000	ug/L	104		80 - 121		
1,1,1-Trichloroethane	B019675-BS1	LCS	24.460	25.000	ug/L	97.8		74 - 131		
1,1,2-Trichloroethane	B019675-BS1	LCS	25.660	25.000	ug/L	103		80 - 119		
Trichloroethene	B019675-BS1	LCS	25.980	25.000	ug/L	104		79 - 123		
Trichlorofluoromethane	B019675-BS1	LCS	24.790	25.000	ug/L	99.2		65 - 141		
1,1,2-Trichloro-1,2,2-trifluoroethane	B019675-BS1	LCS	26.590	25.000	ug/L	106		70 - 136		
Vinyl chloride	B019675-BS1	LCS	25.740	25.000	ug/L	103		58 - 137		
Total Xylenes	B019675-BS1	LCS	76.650	75.000	ug/L	102		79 - 121		

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Volatile Organic Analysis (EPA Method 624)

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: B019675										
p- & m-Xylenes	B019675-BS1	LCS	50.580	50.000	ug/L	101		80 - 121		
o-Xylene	B019675-BS1	LCS	26.070	25.000	ug/L	104		78 - 122		
1,2-Dichloroethane-d4 (Surrogate)	B019675-BS1	LCS	9.8600	10.000	ug/L	98.6		75 - 125		
Toluene-d8 (Surrogate)	B019675-BS1	LCS	10.000	10.000	ug/L	100		80 - 120		
4-Bromofluorobenzene (Surrogate)	B019675-BS1	LCS	10.070	10.000	ug/L	101		80 - 120		

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Volatile Organic Analysis (EPA Method 624)

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: B019675	Used client sample: N										
Benzene	MS	1822894-01	ND	28.230	25.000	ug/L		113		79 - 120	
	MSD	1822894-01	ND	29.080	25.000	ug/L	3.0	116	30	79 - 120	
Bromodichloromethane	MS	1822894-01	ND	26.480	25.000	ug/L		106		79 - 125	
	MSD	1822894-01	ND	27.130	25.000	ug/L	2.4	109	30	79 - 125	
Bromoform	MS	1822894-01	ND	26.370	25.000	ug/L		105		66 - 130	
	MSD	1822894-01	ND	26.130	25.000	ug/L	0.9	105	30	66 - 130	
Bromomethane	MS	1822894-01	ND	24.620	25.000	ug/L		98.5		53 - 141	
	MSD	1822894-01	ND	26.340	25.000	ug/L	6.8	105	30	53 - 141	
Carbon tetrachloride	MS	1822894-01	ND	24.990	25.000	ug/L		100		72 - 136	
	MSD	1822894-01	ND	24.980	25.000	ug/L	0.0	99.9	30	72 - 136	
Chlorobenzene	MS	1822894-01	ND	25.540	25.000	ug/L		102		82 - 118	
	MSD	1822894-01	ND	26.000	25.000	ug/L	1.8	104	30	82 - 118	
Chloroethane	MS	1822894-01	ND	27.230	25.000	ug/L		109		60 - 138	
	MSD	1822894-01	ND	27.990	25.000	ug/L	2.8	112	30	60 - 138	
Chloroform	MS	1822894-01	ND	27.330	25.000	ug/L		109		79 - 124	
	MSD	1822894-01	ND	27.230	25.000	ug/L	0.4	109	30	79 - 124	
Chloromethane	MS	1822894-01	ND	23.870	25.000	ug/L		95.5		50 - 139	
	MSD	1822894-01	ND	24.480	25.000	ug/L	2.5	97.9	30	50 - 139	
Dibromochloromethane	MS	1822894-01	ND	25.070	25.000	ug/L		100		74 - 126	
	MSD	1822894-01	ND	25.650	25.000	ug/L	2.3	103	30	74 - 126	
1,2-Dichlorobenzene	MS	1822894-01	ND	24.560	25.000	ug/L		98.2		80 - 119	
	MSD	1822894-01	ND	24.910	25.000	ug/L	1.4	99.6	30	80 - 119	
1,3-Dichlorobenzene	MS	1822894-01	ND	24.260	25.000	ug/L		97.0		80 - 119	
	MSD	1822894-01	ND	24.580	25.000	ug/L	1.3	98.3	30	80 - 119	
1,4-Dichlorobenzene	MS	1822894-01	ND	24.580	25.000	ug/L		98.3		79 - 118	
	MSD	1822894-01	ND	24.560	25.000	ug/L	0.1	98.2	30	79 - 118	
1,1-Dichloroethane	MS	1822894-01	ND	27.900	25.000	ug/L		112		77 - 125	
	MSD	1822894-01	ND	28.630	25.000	ug/L	2.6	115	30	77 - 125	
1,2-Dichloroethane	MS	1822894-01	ND	25.180	25.000	ug/L		101		73 - 128	
	MSD	1822894-01	ND	25.600	25.000	ug/L	1.7	102	30	73 - 128	
1,1-Dichloroethene	MS	1822894-01	ND	27.940	25.000	ug/L		112		71 - 131	
	MSD	1822894-01	ND	27.860	25.000	ug/L	0.3	111	30	71 - 131	
trans-1,2-Dichloroethene	MS	1822894-01	ND	27.310	25.000	ug/L		109		75 - 124	
	MSD	1822894-01	ND	27.820	25.000	ug/L	1.9	111	30	75 - 124	
1,2-Dichloropropane	MS	1822894-01	ND	27.210	25.000	ug/L		109		78 - 122	
	MSD	1822894-01	ND	28.120	25.000	ug/L	3.3	112	30	78 - 122	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Volatile Organic Analysis (EPA Method 624)

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: B019675	Used client sample: N										
cis-1,3-Dichloropropene	MS	1822894-01	ND	26.650	25.000	ug/L		107		75 - 124	
	MSD	1822894-01	ND	27.580	25.000	ug/L	3.4	110	30	75 - 124	
trans-1,3-Dichloropropene	MS	1822894-01	ND	25.700	25.000	ug/L		103		73 - 127	
	MSD	1822894-01	ND	26.890	25.000	ug/L	4.5	108	30	73 - 127	
Ethylbenzene	MS	1822894-01	ND	26.580	25.000	ug/L		106		79 - 121	
	MSD	1822894-01	ND	27.490	25.000	ug/L	3.4	110	30	79 - 121	
Methylene chloride	MS	1822894-01	ND	25.790	25.000	ug/L		103		74 - 124	
	MSD	1822894-01	ND	26.520	25.000	ug/L	2.8	106	30	74 - 124	
Methyl t-butyl ether	MS	1822894-01	ND	26.900	25.000	ug/L		108		71 - 124	
	MSD	1822894-01	ND	27.510	25.000	ug/L	2.2	110	30	71 - 124	
1,1,2,2-Tetrachloroethane	MS	1822894-01	ND	27.520	25.000	ug/L		110		71 - 121	
	MSD	1822894-01	ND	28.180	25.000	ug/L	2.4	113	30	71 - 121	
Tetrachloroethene	MS	1822894-01	ND	25.120	25.000	ug/L		100		74 - 129	
	MSD	1822894-01	ND	25.070	25.000	ug/L	0.2	100	30	74 - 129	
Toluene	MS	1822894-01	ND	26.430	25.000	ug/L		106		80 - 121	
	MSD	1822894-01	ND	27.370	25.000	ug/L	3.5	109	30	80 - 121	
1,1,1-Trichloroethane	MS	1822894-01	ND	25.940	25.000	ug/L		104		74 - 131	
	MSD	1822894-01	ND	25.820	25.000	ug/L	0.5	103	30	74 - 131	
1,1,2-Trichloroethane	MS	1822894-01	ND	26.440	25.000	ug/L		106		80 - 119	
	MSD	1822894-01	ND	27.290	25.000	ug/L	3.2	109	30	80 - 119	
Trichloroethene	MS	1822894-01	ND	26.250	25.000	ug/L		105		79 - 123	
	MSD	1822894-01	ND	26.860	25.000	ug/L	2.3	107	30	79 - 123	
Trichlorofluoromethane	MS	1822894-01	ND	25.230	25.000	ug/L		101		65 - 141	
	MSD	1822894-01	ND	25.290	25.000	ug/L	0.2	101	30	65 - 141	
1,1,2-Trichloro-1,2,2-trifluoroethane	MS	1822894-01	ND	26.890	25.000	ug/L		108		70 - 136	
	MSD	1822894-01	ND	27.130	25.000	ug/L	0.9	109	30	70 - 136	
Vinyl chloride	MS	1822894-01	ND	27.160	25.000	ug/L		109		58 - 137	
	MSD	1822894-01	ND	27.940	25.000	ug/L	2.8	112	30	58 - 137	
Total Xylenes	MS	1822894-01	ND	76.920	75.000	ug/L		103		79 - 121	
	MSD	1822894-01	ND	79.030	75.000	ug/L	2.7	105	30	79 - 121	
p- & m-Xylenes	MS	1822894-01	ND	50.740	50.000	ug/L		101		80 - 121	
	MSD	1822894-01	ND	52.050	50.000	ug/L	2.5	104	30	80 - 121	
o-Xylene	MS	1822894-01	ND	26.180	25.000	ug/L		105		78 - 122	
	MSD	1822894-01	ND	26.980	25.000	ug/L	3.0	108	30	78 - 122	
1,2-Dichloroethane-d4 (Surrogate)	MS	1822894-01	ND	10.450	10.000	ug/L		104		75 - 125	
	MSD	1822894-01	ND	10.700	10.000	ug/L	2.4	107		75 - 125	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Volatile Organic Analysis (EPA Method 624)

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: B019675	Used client sample: N										
Toluene-d8 (Surrogate)	MS	1822894-01	ND	9.9600	10.000	ug/L		99.6		80 - 120	
	MSD	1822894-01	ND	10.370	10.000	ug/L	4.0	104		80 - 120	
4-Bromofluorobenzene (Surrogate)	MS	1822894-01	ND	10.030	10.000	ug/L		100		80 - 120	
	MSD	1822894-01	ND	10.080	10.000	ug/L	0.5	101		80 - 120	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Base Neutral and Acid Extractables Organic Analysis (EPA Method 625)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B019973						
Acenaphthene	B019973-BLK1	ND	ug/L	2.0	0.22	
Acenaphthylene	B019973-BLK1	ND	ug/L	2.0	0.20	
Aldrin	B019973-BLK1	ND	ug/L	2.0	0.28	
Aniline	B019973-BLK1	ND	ug/L	5.0	1.8	
Anthracene	B019973-BLK1	ND	ug/L	2.0	0.20	
Benzidine	B019973-BLK1	ND	ug/L	20	3.0	
Benzo[a]anthracene	B019973-BLK1	ND	ug/L	2.0	0.30	
Benzo[b]fluoranthene	B019973-BLK1	ND	ug/L	2.0	0.42	
Benzo[k]fluoranthene	B019973-BLK1	ND	ug/L	2.0	0.29	
Benzo[a]pyrene	B019973-BLK1	ND	ug/L	2.0	0.21	
Benzo[g,h,i]perylene	B019973-BLK1	ND	ug/L	2.0	0.48	
Benzoic acid	B019973-BLK1	ND	ug/L	10	0.72	
Benzyl alcohol	B019973-BLK1	ND	ug/L	2.0	0.35	
Benzyl butyl phthalate	B019973-BLK1	ND	ug/L	2.0	0.26	
alpha-BHC	B019973-BLK1	ND	ug/L	2.0	0.36	
beta-BHC	B019973-BLK1	ND	ug/L	2.0	0.25	
delta-BHC	B019973-BLK1	ND	ug/L	2.0	0.28	
gamma-BHC (Lindane)	B019973-BLK1	ND	ug/L	2.0	0.32	
bis(2-Chloroethoxy)methane	B019973-BLK1	ND	ug/L	2.0	0.27	
bis(2-Chloroethyl) ether	B019973-BLK1	ND	ug/L	2.0	1.9	
bis(2-Chloroisopropyl)ether	B019973-BLK1	ND	ug/L	2.0	1.7	
bis(2-Ethylhexyl)phthalate	B019973-BLK1	ND	ug/L	5.0	0.20	
4-Bromophenyl phenyl ether	B019973-BLK1	ND	ug/L	2.0	0.20	
4-Chloroaniline	B019973-BLK1	ND	ug/L	2.0	0.39	
2-Chloronaphthalene	B019973-BLK1	ND	ug/L	2.0	0.23	
4-Chlorophenyl phenyl ether	B019973-BLK1	ND	ug/L	2.0	0.20	
Chrysene	B019973-BLK1	ND	ug/L	2.0	0.26	
4,4'-DDD	B019973-BLK1	ND	ug/L	2.0	0.40	
4,4'-DDE	B019973-BLK1	ND	ug/L	3.0	0.32	
4,4'-DDT	B019973-BLK1	ND	ug/L	2.0	0.26	
Dibenzo[a,h]anthracene	B019973-BLK1	ND	ug/L	3.0	0.59	
Dibenzofuran	B019973-BLK1	ND	ug/L	2.0	0.20	
1,2-Dichlorobenzene	B019973-BLK1	ND	ug/L	2.0	1.8	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Base Neutral and Acid Extractables Organic Analysis (EPA Method 625)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B019973						
1,3-Dichlorobenzene	B019973-BLK1	ND	ug/L	2.0	1.8	
1,4-Dichlorobenzene	B019973-BLK1	ND	ug/L	2.0	1.8	
3,3-Dichlorobenzidine	B019973-BLK1	ND	ug/L	10	0.41	
Dieldrin	B019973-BLK1	ND	ug/L	3.0	0.45	
Diethyl phthalate	B019973-BLK1	ND	ug/L	2.0	0.20	
Dimethyl phthalate	B019973-BLK1	ND	ug/L	2.0	0.25	
Di-n-butyl phthalate	B019973-BLK1	ND	ug/L	2.0	0.20	
2,4-Dinitrotoluene	B019973-BLK1	ND	ug/L	2.0	0.87	
2,6-Dinitrotoluene	B019973-BLK1	ND	ug/L	2.0	0.46	
Di-n-octyl phthalate	B019973-BLK1	ND	ug/L	2.0	0.31	
1,2-Diphenylhydrazine	B019973-BLK1	ND	ug/L	2.0	0.44	
Endosulfan I	B019973-BLK1	ND	ug/L	10	0.37	
Endosulfan II	B019973-BLK1	ND	ug/L	10	0.37	
Endosulfan sulfate	B019973-BLK1	ND	ug/L	3.0	0.37	
Endrin	B019973-BLK1	ND	ug/L	2.0	0.67	
Endrin aldehyde	B019973-BLK1	ND	ug/L	10	0.37	
Fluoranthene	B019973-BLK1	ND	ug/L	2.0	0.41	
Fluorene	B019973-BLK1	ND	ug/L	2.0	0.20	
Heptachlor	B019973-BLK1	ND	ug/L	2.0	0.22	
Heptachlor epoxide	B019973-BLK1	ND	ug/L	2.0	0.35	
Hexachlorobenzene	B019973-BLK1	ND	ug/L	2.0	0.23	
Hexachlorobutadiene	B019973-BLK1	ND	ug/L	2.0	0.46	
Hexachlorocyclopentadiene	B019973-BLK1	ND	ug/L	2.0	0.35	
Hexachloroethane	B019973-BLK1	ND	ug/L	2.0	1.3	
Indeno[1,2,3-cd]pyrene	B019973-BLK1	ND	ug/L	2.0	0.71	
Isophorone	B019973-BLK1	ND	ug/L	2.0	0.41	
2-Methylnaphthalene	B019973-BLK1	ND	ug/L	2.0	0.30	
Naphthalene	B019973-BLK1	ND	ug/L	2.0	0.20	
2-Naphthylamine	B019973-BLK1	ND	ug/L	20	1.7	
2-Nitroaniline	B019973-BLK1	ND	ug/L	2.0	0.36	
3-Nitroaniline	B019973-BLK1	ND	ug/L	2.0	0.52	
4-Nitroaniline	B019973-BLK1	ND	ug/L	5.0	0.85	
Nitrobenzene	B019973-BLK1	ND	ug/L	2.0	0.39	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Base Neutral and Acid Extractables Organic Analysis (EPA Method 625)

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B019973						
N-Nitrosodimethylamine	B019973-BLK1	ND	ug/L	2.0	0.56	
N-Nitrosodi-N-propylamine	B019973-BLK1	ND	ug/L	2.0	0.56	
N-Nitrosodiphenylamine	B019973-BLK1	ND	ug/L	2.0	0.27	
Phenanthrene	B019973-BLK1	ND	ug/L	2.0	0.20	
Pyrene	B019973-BLK1	ND	ug/L	2.0	0.31	
1,2,4-Trichlorobenzene	B019973-BLK1	ND	ug/L	2.0	0.24	
4-Chloro-3-methylphenol	B019973-BLK1	ND	ug/L	5.0	0.42	
2-Chlorophenol	B019973-BLK1	ND	ug/L	2.0	0.85	
2,4-Dichlorophenol	B019973-BLK1	ND	ug/L	2.0	0.26	
2,4-Dimethylphenol	B019973-BLK1	ND	ug/L	2.0	0.30	
4,6-Dinitro-2-methylphenol	B019973-BLK1	ND	ug/L	10	0.43	
2,4-Dinitrophenol	B019973-BLK1	ND	ug/L	10	0.37	
2-Methylphenol	B019973-BLK1	ND	ug/L	2.0	0.43	
3- & 4-Methylphenol	B019973-BLK1	ND	ug/L	2.0	1.3	
2-Nitrophenol	B019973-BLK1	ND	ug/L	2.0	0.39	
4-Nitrophenol	B019973-BLK1	ND	ug/L	2.0	0.66	
Pentachlorophenol	B019973-BLK1	ND	ug/L	10	0.43	
Phenol	B019973-BLK1	ND	ug/L	2.0	0.84	
2,4,5-Trichlorophenol	B019973-BLK1	ND	ug/L	5.0	0.36	
2,4,6-Trichlorophenol	B019973-BLK1	ND	ug/L	5.0	0.34	
2-Fluorophenol (Surrogate)	**B019973-BLK1**	**61.7**	%	**30 - 120 (LCL - UCL)**		
Phenol-d5 (Surrogate)	**B019973-BLK1**	**33.8**	%	**12 - 110 (LCL - UCL)**		
Nitrobenzene-d5 (Surrogate)	**B019973-BLK1**	**60.9**	%	**50 - 130 (LCL - UCL)**		
2-Fluorobiphenyl (Surrogate)	**B019973-BLK1**	**64.0**	%	**55 - 125 (LCL - UCL)**		
2,4,6-Tribromophenol (Surrogate)	**B019973-BLK1**	**54.5**	%	**40 - 150 (LCL - UCL)**		
p-Terphenyl-d14 (Surrogate)	**B019973-BLK1**	**59.2**	%	**40 - 150 (LCL - UCL)**		

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Base Neutral and Acid Extractables Organic Analysis (EPA Method 625)

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: B019973										
Acenaphthene	B019973-BS1	LCS	34.600	50.000	ug/L	69.2		50 - 120		
1,4-Dichlorobenzene	B019973-BS1	LCS	32.359	50.000	ug/L	64.7		50 - 120		
2,4-Dinitrotoluene	B019973-BS1	LCS	35.725	50.000	ug/L	71.5		50 - 120		
Hexachlorobenzene	B019973-BS1	LCS	23.474	40.000	ug/L	58.7		60 - 120		L01
Hexachlorobutadiene	B019973-BS1	LCS	24.231	50.000	ug/L	48.5		40 - 110		
Hexachloroethane	B019973-BS1	LCS	24.376	50.000	ug/L	48.8		40 - 120		
Nitrobenzene	B019973-BS1	LCS	38.548	50.000	ug/L	77.1		50 - 120		
N-Nitrosodi-N-propylamine	B019973-BS1	LCS	28.858	50.000	ug/L	57.7		50 - 120		
Pyrene	B019973-BS1	LCS	28.858	50.000	ug/L	57.7		40 - 140		
1,2,4-Trichlorobenzene	B019973-BS1	LCS	28.091	50.000	ug/L	56.2		45 - 120		
4-Chloro-3-methylphenol	B019973-BS1	LCS	28.780	50.000	ug/L	57.6		50 - 120		
2-Chlorophenol	B019973-BS1	LCS	33.620	50.000	ug/L	67.2		50 - 120		
2-Methylphenol	B019973-BS1	LCS	24.492	50.000	ug/L	49.0		40 - 110		
3- & 4-Methylphenol	B019973-BS1	LCS	45.299	100.00	ug/L	45.3		40 - 110		
4-Nitrophenol	B019973-BS1	LCS	17.877	50.000	ug/L	35.8		10 - 110		
Pentachlorophenol	B019973-BS1	LCS	21.844	40.000	ug/L	54.6		30 - 130		
Phenol	B019973-BS1	LCS	18.226	50.000	ug/L	36.5		20 - 110		
2,4,6-Trichlorophenol	B019973-BS1	LCS	27.082	50.000	ug/L	54.2		54 - 120		
2-Fluorophenol (Surrogate)	B019973-BS1	LCS	28.887	40.000	ug/L	72.2		30 - 120		
Phenol-d5 (Surrogate)	B019973-BS1	LCS	15.840	40.000	ug/L	39.6		12 - 110		
Nitrobenzene-d5 (Surrogate)	B019973-BS1	LCS	23.222	40.000	ug/L	58.1		50 - 130		
2-Fluorobiphenyl (Surrogate)	B019973-BS1	LCS	26.830	40.000	ug/L	67.1		55 - 125		
2,4,6-Tribromophenol (Surrogate)	B019973-BS1	LCS	28.334	40.000	ug/L	70.8		40 - 150		
p-Terphenyl-d14 (Surrogate)	B019973-BS1	LCS	11.747	20.000	ug/L	58.7		40 - 150		

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Base Neutral and Acid Extractables Organic Analysis (EPA Method 625)

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: B019973	Used client sample: N										
Acenaphthene	MS	1821541-50	ND	31.987	50.000	ug/L		64.0		50 - 120	
	MSD	1821541-50	ND	34.181	50.000	ug/L	6.6	68.4	30	50 - 120	
1,4-Dichlorobenzene	MS	1821541-50	ND	33.293	50.000	ug/L		66.6		47 - 120	
	MSD	1821541-50	ND	33.620	50.000	ug/L	1.0	67.2	30	47 - 120	
2,4-Dinitrotoluene	MS	1821541-50	ND	30.989	50.000	ug/L		62.0		50 - 130	
	MSD	1821541-50	ND	34.770	50.000	ug/L	11.5	69.5	30	50 - 130	
Hexachlorobenzene	MS	1821541-50	ND	23.194	40.000	ug/L		58.0		50 - 120	
	MSD	1821541-50	ND	24.073	40.000	ug/L	3.7	60.2	30	50 - 120	
Hexachlorobutadiene	MS	1821541-50	ND	25.603	50.000	ug/L		51.2		40 - 110	
	MSD	1821541-50	ND	24.728	50.000	ug/L	3.5	49.5	30	40 - 110	
Hexachloroethane	MS	1821541-50	ND	26.074	50.000	ug/L		52.1		40 - 120	
	MSD	1821541-50	ND	24.862	50.000	ug/L	4.8	49.7	30	40 - 120	
Nitrobenzene	MS	1821541-50	ND	35.837	50.000	ug/L		71.7		50 - 120	
	MSD	1821541-50	ND	38.380	50.000	ug/L	6.9	76.8	30	50 - 120	
N-Nitrosodi-N-propylamine	MS	1821541-50	ND	27.542	50.000	ug/L		55.1		50 - 120	
	MSD	1821541-50	ND	29.849	50.000	ug/L	8.0	59.7	30	50 - 120	
Pyrene	MS	1821541-50	ND	30.614	50.000	ug/L		61.2		40 - 140	
	MSD	1821541-50	ND	33.336	50.000	ug/L	8.5	66.7	30	40 - 140	
1,2,4-Trichlorobenzene	MS	1821541-50	ND	27.830	50.000	ug/L		55.7		43 - 120	
	MSD	1821541-50	ND	28.452	50.000	ug/L	2.2	56.9	30	43 - 120	
4-Chloro-3-methylphenol	MS	1821541-50	ND	26.573	50.000	ug/L		53.1		50 - 120	
	MSD	1821541-50	ND	29.498	50.000	ug/L	10.4	59.0	30	50 - 120	
2-Chlorophenol	MS	1821541-50	ND	31.882	50.000	ug/L		63.8		50 - 120	
	MSD	1821541-50	ND	33.830	50.000	ug/L	5.9	67.7	30	50 - 120	
2-Methylphenol	MS	1821541-50	ND	22.282	50.000	ug/L		44.6		40 - 110	
	MSD	1821541-50	ND	23.646	50.000	ug/L	5.9	47.3	30	40 - 110	
3- & 4-Methylphenol	MS	1821541-50	ND	41.395	100.00	ug/L		41.4		40 - 110	
	MSD	1821541-50	ND	44.564	100.00	ug/L	7.4	44.6	30	40 - 110	
4-Nitrophenol	MS	1821541-50	ND	16.675	50.000	ug/L		33.4		10 - 110	
	MSD	1821541-50	ND	18.098	50.000	ug/L	8.2	36.2	30	10 - 110	
Pentachlorophenol	MS	1821541-50	ND	16.848	40.000	ug/L		42.1		30 - 120	
	MSD	1821541-50	ND	18.753	40.000	ug/L	10.7	46.9	30	30 - 120	
Phenol	MS	1821541-50	ND	16.435	50.000	ug/L		32.9		20 - 110	
	MSD	1821541-50	ND	17.794	50.000	ug/L	7.9	35.6	30	20 - 110	
2,4,6-Trichlorophenol	MS	**1821541-50**	**ND**	**23.242**	**50.000**	**ug/L**		**46.5**		**50 - 150**	**Q03**
	MSD	**1821541-50**	**ND**	**25.517**	**50.000**	**ug/L**	**9.3**	**51.0**	**30**	**50 - 150**	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Base Neutral and Acid Extractables Organic Analysis (EPA Method 625)

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: B019973	Used client sample: N										
2-Fluorophenol (Surrogate)	MS	1821541-50	ND	28.061	40.000	ug/L		70.2		30 - 120	
	MSD	1821541-50	ND	28.785	40.000	ug/L	2.5	72.0		30 - 120	
Phenol-d5 (Surrogate)	MS	1821541-50	ND	15.014	40.000	ug/L		37.5		12 - 110	
	MSD	1821541-50	ND	16.140	40.000	ug/L	7.2	40.4		12 - 110	
Nitrobenzene-d5 (Surrogate)	MS	1821541-50	ND	23.222	40.000	ug/L		58.1		50 - 130	
	MSD	1821541-50	ND	24.102	40.000	ug/L	3.7	60.3		50 - 130	
2-Fluorobiphenyl (Surrogate)	MS	1821541-50	ND	25.363	40.000	ug/L		63.4		55 - 125	
	MSD	1821541-50	ND	26.248	40.000	ug/L	3.4	65.6		55 - 125	
2,4,6-Tribromophenol (Surrogate)	MS	1821541-50	ND	27.082	40.000	ug/L		67.7		40 - 150	
	MSD	1821541-50	ND	28.738	40.000	ug/L	5.9	71.8		40 - 150	
p-Terphenyl-d14 (Surrogate)	MS	1821541-50	ND	11.136	20.000	ug/L		55.7		40 - 150	
	MSD	1821541-50	ND	11.846	20.000	ug/L	6.2	59.2		40 - 150	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
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: B019707						
Total Cyanide	B019707-BLK1	ND	mg/L	0.0050	0.0017	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
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: B019707										
Total Cyanide	B019707-BS1	LCS	0.14404	0.15000	mg/L	96.0		90 - 110		

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
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: B019707	Used client sample: N										
Total Cyanide	DUP	1822495-13	ND	ND		mg/L			10		
	MS	1822495-13	ND	0.092024	0.10000	mg/L		92.0		90 - 110	
	MSD	1822495-13	ND	0.093387	0.10000	mg/L	1.5	93.4	10	90 - 110	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Metals Analysis

Quality Control Report - Method Blank Analysis

Constituent	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
QC Batch ID: B019712						
Total Recoverable Arsenic	B019712-BLK1	ND	ug/L	2.0	0.70	
Total Recoverable Lead	B019712-BLK1	ND	ug/L	1.0	0.10	
Total Recoverable Selenium	B019712-BLK1	ND	ug/L	2.0	0.19	
Total Recoverable Thallium	B019712-BLK1	ND	ug/L	1.0	0.10	
QC Batch ID: B019816						
Total Recoverable Antimony	B019816-BLK1	ND	ug/L	100	5.0	
Total Recoverable Beryllium	B019816-BLK1	ND	ug/L	10	0.77	
Total Recoverable Cadmium	B019816-BLK1	ND	ug/L	10	1.1	
Total Recoverable Chromium	B019816-BLK1	ND	ug/L	10	1.2	
Total Recoverable Copper	B019816-BLK1	ND	ug/L	10	1.2	
Total Recoverable Nickel	B019816-BLK1	ND	ug/L	10	2.3	
Total Recoverable Silver	B019816-BLK1	ND	ug/L	10	1.3	
Total Recoverable Zinc	B019816-BLK1	ND	ug/L	50	9.5	
QC Batch ID: B019849						
Total Mercury	B019849-BLK1	ND	ug/L	0.20	0.029	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
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: B019712										
Total Recoverable Arsenic	B019712-BS1	LCS	103.00	100.00	ug/L	103		85 - 115		
Total Recoverable Lead	B019712-BS1	LCS	110.58	100.00	ug/L	111		85 - 115		
Total Recoverable Selenium	B019712-BS1	LCS	101.76	100.00	ug/L	102		85 - 115		
Total Recoverable Thallium	B019712-BS1	LCS	43.418	40.000	ug/L	109		85 - 115		
QC Batch ID: B019816										
Total Recoverable Antimony	B019816-BS1	LCS	425.16	400.00	ug/L	106		85 - 115		
Total Recoverable Beryllium	B019816-BS1	LCS	216.99	200.00	ug/L	108		85 - 115		
Total Recoverable Cadmium	B019816-BS1	LCS	207.61	200.00	ug/L	104		85 - 115		
Total Recoverable Chromium	B019816-BS1	LCS	210.78	200.00	ug/L	105		85 - 115		
Total Recoverable Copper	B019816-BS1	LCS	410.08	400.00	ug/L	103		85 - 115		
Total Recoverable Nickel	B019816-BS1	LCS	435.79	400.00	ug/L	109		85 - 115		
Total Recoverable Silver	B019816-BS1	LCS	103.98	100.00	ug/L	104		85 - 115		
Total Recoverable Zinc	B019816-BS1	LCS	541.12	500.00	ug/L	108		85 - 115		
QC Batch ID: B019849										
Total Mercury	B019849-BS1	LCS	1.0400	1.0000	ug/L	104		85 - 115		

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
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: B019712	Used client sample: N										
Total Recoverable Arsenic	DUP	**1822330-01**	**1.3420**	**0.79900**		**ug/L**	**50.7**		**20**		**J,A02**
	MS	**1822330-01**	**1.3420**	**106.84**	**100.00**	**ug/L**		**105**		**70 - 130**	
	MSD	**1822330-01**	**1.3420**	**104.69**	**100.00**	**ug/L**	**2.0**	**103**	**20**	**70 - 130**	
Total Recoverable Lead	DUP	1822330-01	0.96400	1.0020		ug/L	3.9		20		
	MS	1822330-01	0.96400	108.52	100.00	ug/L		108		70 - 130	
	MSD	1822330-01	0.96400	107.40	100.00	ug/L	1.0	106	20	70 - 130	
Total Recoverable Selenium	DUP	1822330-01	ND	ND		ug/L			20		
	MS	1822330-01	ND	99.725	100.00	ug/L		99.7		70 - 130	
	MSD	1822330-01	ND	96.767	100.00	ug/L	3.0	96.8	20	70 - 130	
Total Recoverable Thallium	DUP	1822330-01	ND	ND		ug/L			20		
	MS	1822330-01	ND	42.901	40.000	ug/L		107		70 - 130	
	MSD	1822330-01	ND	42.371	40.000	ug/L	1.2	106	20	70 - 130	
QC Batch ID: B019816	Used client sample: N										
Total Recoverable Antimony	DUP	1822568-01	ND	ND		ug/L			20		
	MS	1822568-01	ND	428.56	400.00	ug/L		107		75 - 125	
	MSD	1822568-01	ND	451.86	400.00	ug/L	5.3	113	20	75 - 125	
Total Recoverable Beryllium	DUP	1822568-01	ND	ND		ug/L			20		
	MS	1822568-01	ND	219.53	200.00	ug/L		110		75 - 125	
	MSD	1822568-01	ND	230.39	200.00	ug/L	4.8	115	20	75 - 125	
Total Recoverable Cadmium	DUP	1822568-01	ND	ND		ug/L			20		
	MS	1822568-01	ND	205.43	200.00	ug/L		103		75 - 125	
	MSD	1822568-01	ND	218.18	200.00	ug/L	6.0	109	20	75 - 125	
Total Recoverable Chromium	DUP	1822568-01	ND	ND		ug/L			20		
	MS	1822568-01	ND	209.13	200.00	ug/L		105		75 - 125	
	MSD	1822568-01	ND	224.35	200.00	ug/L	7.0	112	20	75 - 125	
Total Recoverable Copper	DUP	1822568-01	1.5505	ND		ug/L			20		
	MS	1822568-01	1.5505	418.48	400.00	ug/L		104		75 - 125	
	MSD	1822568-01	1.5505	434.99	400.00	ug/L	3.9	108	20	75 - 125	
Total Recoverable Nickel	DUP	1822568-01	ND	ND		ug/L			20		
	MS	1822568-01	ND	421.99	400.00	ug/L		105		75 - 125	
	MSD	1822568-01	ND	447.17	400.00	ug/L	5.8	112	20	75 - 125	
Total Recoverable Silver	DUP	1822568-01	ND	ND		ug/L			20		
	MS	1822568-01	ND	105.32	100.00	ug/L		105		75 - 125	
	MSD	1822568-01	ND	109.69	100.00	ug/L	4.1	110	20	75 - 125	
Total Recoverable Zinc	DUP	1822568-01	19.766	17.481		ug/L	12.3		20		J
	MS	1822568-01	19.766	545.75	500.00	ug/L		105		75 - 125	
	MSD	1822568-01	19.766	575.69	500.00	ug/L	5.3	111	20	75 - 125	
QC Batch ID: B019849	Used client sample: N										

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
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: B019849	Used client sample: N										
Total Mercury	DUP	1822774-01	ND	1.0375		ug/L			20		
	MS	1822774-01	ND	0.21307	0.20101	ug/L		106		70 - 130	
	MSD	1822774-01	ND	0.20151	0.20101	ug/L	5.6	100	20	70 - 130	

Marine Research Specialists
4744 Telephone Rd
Ste 3-315
Suite A
Ventura, CA 93003-3238

Reported: 08/03/2018 14:26
Project: Semi-Annual Eff
Project Number: MBCSD H2 2018
Project Manager: Doug Coats

Notes And Definitions

J	Estimated Value (CLP Flag)
MDL	Method Detection Limit
ND	Analyte Not Detected
PQL	Practical Quantitation Limit
A01	Detection and quantitation limits are raised due to sample dilution.
A02	The difference between duplicate readings is less than the quantitation limit.
L01	The Laboratory Control Sample Water (LCSW) recovery is not within laboratory established control limits.
Q02	Matrix spike precision is not within the control limits.
Q03	Matrix spike recovery(s) was(were) not within the control limits.
S09	The surrogate recovery for this compound was not within the control limits.

Marine Research Specialists
Douglas A Coats
4744 Telephone Rd Ste 3 PMB 315
Ventura, CA 93003-5258

Monterey Bay Analytical Services
4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS (6227)
www.MBASinc.com
ELAP Certification Number: 2385

Tuesday, August 14, 2018

Lab Number: 180719_04-01 Sample Description: M1 ARS Grab

Collection Date/Time: 7/18/2018 9:10 Sample Collector: Aschenbrener S Client Sample #: H2 2018
Submittal Date/Time: 7/19/2018 10:21 Sample ID: Morro Bay WWTP Semi Annual Effluent

Analyte	Method	Unit	Result	Dil.	Qual	PQL	MDL	Analysis Date / Time		Analyst
Nitrate as N	EPA300.0	mg/L	0.04	1	J	0.1	0.01	7/19/2018	17:24	BS
Orthophosphate as P	EPA300.0	mg/L	2.62	1	IL	0.1	0.02	7/19/2018	17:24	BS

Comments: IL: RPD exceeds laboratory control limit.

Lab Number: 180719_04-02 Sample Description: M2 ARS Grab

Collection Date/Time: 7/18/2018 9:10 Sample Collector: Aschenbrener S Client Sample #: H2 2018
Submittal Date/Time: 7/19/2018 10:21 Sample ID: Morro Bay WWTP Semi Annual Effluent

Analyte	Method	Unit	Result	Dil.	Qual	PQL	MDL	Analysis Date / Time		Analyst
Urea-N	Mulvenna&Savidge	µg/L	94	1	IL	10	8	8/10/2018	17:04	LM

Comments: IL: RPD exceeds laboratory control limit.

Lab Number: 180719_04-03 Sample Description: M3 ARS Grab

Collection Date/Time: 7/18/2018 9:10 Sample Collector: Aschenbrener S Client Sample #: H2 2018
Submittal Date/Time: 7/19/2018 10:21 Sample ID: Morro Bay WWTP Semi Annual Effluent

Analyte	Method	Unit	Result	Dil.	Qual	PQL	MDL	Analysis Date / Time		Analyst
Silica SiO2, Dissolved	EPA200.7	mg/L	12	1		0.5	0.3	7/27/2018	17:11	MW

Comments:

Report Approved by:
David Holland, Laboratory Director

mg/L : Millgrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit MCL : Maximum Contamination Level
H = Analyzed outside of hold time E = Analysis performed by External Laboratory; See Report attachments T = Temperature Exceedance
MDL = Method Detection Limit J = Result is less than PQL

Marine Research Specialists
Douglas A Coats
4744 Telephone Rd Ste 3 PMB 315
Ventura, CA 93003-5258

Monterey Bay Analytical Services
4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS (6227)
www.MBASinc.com
ELAP Certification Number: 2385

Tuesday, August 14, 2018

QC Results

QCBatch ID	QC ID	Parameter	Results	Units	% Rec	% RPD	Control Limits
QC18072001	180719_07-01: MS 1	Nitrate as N	9.5	mg/L	96		80 - 120
	180719_07-01: MSD 1	Nitrate as N	9.59	mg/L	100	4.6	0 - 10
	CCVB 1	Nitrate as N	ND	mg/L		< 0.1	
	CCVB 2	Nitrate as N	ND	mg/L		< 0.1	
	LCS 1	Nitrate as N	1.85	mg/L	93		90 - 110
	LCSD 1	Nitrate as N	2.01	mg/L	100	7.9	0 - 10
	LCSD 2	Nitrate as N	2.0	mg/L	100	6.9	0 - 10
	LCSL 1	Nitrate as N	0.19	mg/L	93		50 - 150
	Method Blank 1	Nitrate as N	ND	mg/L		< 0.1	
	180719_07-01: MS 1	Orthophosphate as P	1.91	mg/L	95		80 - 120
	180719_07-01: MSD 1	Orthophosphate as P	1.94	mg/L	97	1.8	0 - 10
	CCVB 1	Orthophosphate as P	ND	mg/L		< 0.1	
	CCVB 2	Orthophosphate as P	ND	mg/L		< 0.1	
	LCS 1	Orthophosphate as P	1.96	mg/L	98		90 - 110
	LCSD 1	Orthophosphate as P	2.17	mg/L	108	10.0	0 - 10
	LCSD 2	Orthophosphate as P	2.19	mg/L	110	15.9	0 - 10
	LCSL 1	Orthophosphate as P	0.18	mg/L	90		50 - 150
	Method Blank 1	Orthophosphate as P	ND	mg/L		< 0.1	
QC18081402	180727_08-07: MS 1	Urea-N	103.0	ug/L	89		85 - 115
	180727_08-07: MSD 1	Urea-N	126.0	ug/L	112	22.9	0 - 20
	180727_08-21: MS 2	Urea-N	127.0	ug/L	105		85 - 115
	180727_08-21: MSD 2	Urea-N	128.0	ug/L	106	0.9	0 - 20
	180808_06-10: MS 3	Urea-N	128.0	ug/L	98		85 - 115
	180808_06-10: MSD 3	Urea-N	125.0	ug/L	95	3.1	0 - 20
	180808_06-19: MS 4	Urea-N	100.0	ug/L	97		85 - 115
	180808_06-19: MSD 4	Urea-N	103.0	ug/L	100	3.0	0 - 20
	LFB 1	Urea-N	107.0	ug/L	107		85 - 115
	LFBD 1	Urea-N	103.0	ug/L	103	3.8	0 - 25
	LFBD 2	Urea-N	101.0	ug/L	101	5.8	0 - 25
	LFBD 3	Urea-N	99.0	ug/L	99	7.8	0 - 25

mg/L : Millgrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit MCL : Maximum Contamination Level
H = Analyzed outside of hold time E = Analysis performed by External Laboratory; See Report attachments T = Temperature Exceedance
MDL = Method Detection Limit J = Result is less than PQL

Marine Research Specialists
Douglas A Coats
4744 Telephone Rd Ste 3 PMB 315
Ventura, CA 93003-5258

Monterey Bay Analytical Services
4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS (6227)
www.MBASinc.com
ELAP Certification Number: 2385

Tuesday, August 14, 2018

	LFBL 1	Urea-N	10.0	ug/L	100		80 - 120
	LFBLD 1	Urea-N	10.0	ug/L	100	< 0.1	0 - 25
	Method Blank 1	Urea-N	ND	µg/L		< 0.1	
	QCS 1	Urea-N	51.7	ug/L	110		90 - 110
	QCSD 1	Urea-N	50.0	ug/L	106	2.0	0 - 25
QC18073010	180720_04-02: MS 1	Silica (SiO2), Total	83.1	mg/L	95		70 - 130
	180720_04-02: MSD 1	Silica (SiO2), Total	83.1	mg/L	95	< 0.1	0 - 20
	CCVB 1	Silica (SiO2), Total	ND	mg/L		< 0.1	
	LCB 1	Silica (SiO2), Total	ND	mg/L		< 0.1	
	LCS 1	Silica (SiO2), Total	51.09	mg/L	102		95 - 105
	LCSD 1	Silica (SiO2), Total	49.79	mg/L	100	2.6	0 - 10
	LFB 1	Silica (SiO2), Total	52.84	mg/L	106		85 - 115
	LFBD 1	Silica (SiO2), Total	51.88	mg/L	104	1.8	0 - 20
	Method Blank 1	Silica (SiO2), Total	ND	mg/L		< 0.1	
	QCS 1	Silica (SiO2), Total	51.03	mg/L	102		95 - 105

mg/L : Millgrams per liter (=ppm) ug/L : Micrograms per liter (=ppb) PQL : Practical Quantitation Limit MCL : Maximum Contamination Level
H = Analyzed outside of hold time E = Analysis performed by External Laboratory; See Report attachments T = Temperature Exceedance
MDL = Method Detection Limit J = Result is less than PQL

180719-04

Monterey Bay Analytical Services Chain Of Custody / Analysis Request

4 Justin Ct. Suite D • Monterey, Ca 93940 • (831) 375-MBAS (6227) • (831) 641-0734 (Fax)

MBAS
Monterey Bay Analytical Services

Client/Company Name: **Marine Research Specialists**

Attention: Douglas A Coats

Billing Address: 4744 TELEPHONE RD STE 3 PMB 315; Ventura CA 93003

Project/System Information: Morro Bay WWTP Semi Annual Effluent

E-Mail Address(es): Marine@Rain.org

Contract/P.O. #:

For Regulatory Complaince? YES ☑ NO ☐
For State or Local Health Department reporting:
Electronic Data Transfer (EDT)? YES ☐ NO ☑
System ID Number: _____

Turn Around Time: STD (7-14 Days) ☑ 48-Hour ☐ 5-Day ☐ 24-Hour ☐

Phone # 805.218.3662

Fax #

Drinking water ☐ Wastewater ☑ Monitoring Well ☐ Soil ☐ Sludge ☐ Other ☐

MBAS Lab #	Project ID or Source Code #	Sample Site / Description (Well Name, APN#, Address, Stormdrain #)	Sampling Date	Sampling Time	Receiving Temp.	CL2 Residual	Coliform Analysis Routine	Coliform Analysis Other	Coliform Analysis Repeat	Coliform Analysis Special	# Cont.	Container Type	Container Size	Nitrate as NO3 [EPA 300.0]	O-Phosphate-P [EPA 300.0]	Dissolved Silica as SiO2 [EPA 4500-SI-E]	Urea [Mulvenna & Savid]		
01	H2 2018	M1 ARS Grab	7/18/18	0910	2.3						1			✓	✓				
02	H2 2018	M2 ARS Grab*	7/18/18	0910	1						1						✓		
03	H2 2018	M3 ARS Grab	7/18/18	0910	1						1					✓			

	Printed Name	Signature	Date	Time
Sampled by:	Aschenbrener Steven R		18JUL18	0910
Relinquished by:	Aschenbrener Steven R		18JUL18	1430
Received by:				
Relinquished by:				
Received by:	Monterey Bay Analytical Services		07/19/18	1021

Comments or Special Instructions: *Pour off 50 ml & freeze to hold for Urea test

☐ Payment received Check # Amount: Receipt # Date:

180719-04

MBAS

Sample Condition Upon Receipt

COC Info

Was temp acceptable? Chemistry ≤6°C Micro ≤10°C — YES NO NA <2 Hr — Is there evidence of chilling? YES NO NA

Did bottles arrive intact? YES NO NA

Did bottle labels agree with COC? YES NO NA

Discrepency Documentation:

Person Contacted: _____ Method: In Person/Phone/Email _____

Problem _____

_____

Resolution _____

_____

Person Contacted: _____ Method: In Person/Phone/Email _____

Problem _____

_____

Resolution _____

_____

Sample Split/Filtration

Lab ID	Cont. Size	Pres	Date/Initials

Lab ID	Cont. Size	Pres	Date/Initials

Comments

① SI DISS SAMPLE RECEIVED FILTERED AND PRESERVED WITH HNO_3. pH <2
KC 07/19/18

LABORATORY REPORT

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

Date: August 2, 2018

Client: Marine Research Specialists
4744 Telephone Rd
Suite 3-315
Ventura, CA 93003-5258
Attn: Doug Coats

Laboratory No.: A-18072404-001
Sample I.D.: Morro Bay Effluent

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

Date Sampled:	07/23/18	07/24/18	07/26/18
Date Received:	07/24/18	07/24/18	07/27/18
Temp. Received:	1.7°C	1.1°C	0.3°C
Chlorine (TRC):	0.0 mg/l	0.0 mg/l	0.0 mg/l
Date Tested:	07/24/18 to	07/31/18	

Sample Analysis: The following analyses were performed on your sample:

Abalone Larval Development Short-Term Toxicity Test;
Giant Kelp Germination and Growth Short-Term Toxicity Test;
Topsmelt Larval Survival and Growth Test.

Result Summary:

Test	NOEC	TUc
Abalone Development:	5.6%	17.9
Kelp Spore Germination:	10%	10.0
Kelp Germ Tube Growth:	10%	10.0
Topsmelt Larval Survival:	32%	3.12
Topsmelt Larval Growth:	32%	3.12

Quality Control: Reviewed and approved by:

Joseph A. LeMay
Laboratory Director

Aquatic
Testing
Laboratories

Abalone Larval Development Short-Term Toxicity Test

1. Test and Results Summary

2. Raw Data

3. Statistical Analyses

ABALONE LARVAL DEVELOPMENT SHORT-TERM TOXICITY TEST

Lab No.: A-18072404-002
Client/ID: Morro Bay WWTP

Date tested: 07/25/18 - 07/27/18

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-180725 (ran concurrently)

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

RESULTS SUMMARY

Sample Concentration	Percent Normal Development	
Control (Dilution)	96.1%	
Control (Brine)	95.8%	
Control (Culture)	96.2%	
3.2%	95.8%	
5.6%	95.6%	
10.0%	8.0%	*
18.0%	0%	*
32.0%	0%	*

* Statistically significantly less than control at P = 0.05 level
Dilution water is client supplied receiving water.
Culture water control obtained from The Cultured Abalone Farm.

CHRONIC TOXICITY

NOEC	5.6%
TUc	17.9

QA/QC TEST ACCEPTABILITY

Parameter	Result
Average control normality ≥80%	PASS (96.1%)
%MSD <20% relative to control	PASS (%MSD = 5.1%)
Concentration response relationship acceptable	PASS (Response curve normal)
Please see RT-180725 report for additional test acceptability criteria.	

Abalone Larval Development Test-Proportion Normal

Start Date:	7/25/2018 15:30	Test ID:	18072404ab	Sample ID:	MORRO BAY
End Date:	7/27/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/24/2018 08:44	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	HR-Haliotis rufescens

Comments:

Conc-%	1	2	3	4	5
D-Control	0.9292	0.9633	0.9813	0.9714	0.9615
B-Control	0.9381	0.9464	0.9636	0.9630	0.9817
3.2	0.9808	0.9640	0.9375	0.9459	0.9640
5.6	0.9386	0.9459	0.9528	0.9806	0.9636
10	0.0545	0.1346	0.1636	0.0189	0.0268
18	0.0000	0.0000	0.0000	0.0000	0.0000
32	0.0000	0.0000	0.0000	0.0000	0.0000

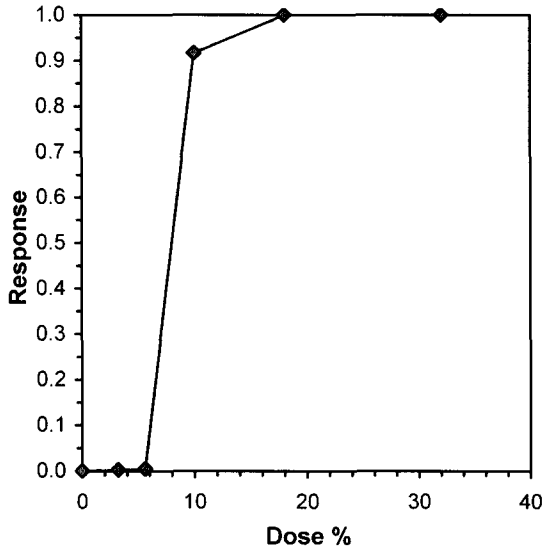
			Transform: Arcsin Square Root					1-Tailed			Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	0.9614	1.0029	1.3775	1.3015	1.4336	3.538	5	*			0.9610	1.0000
B-Control	0.9585	1.0000	1.3695	1.3193	1.4349	3.264	5					
3.2	0.9584	0.9999	1.3691	1.3181	1.4317	3.231	5	0.180	2.230	0.1041	0.9581	0.9970
5.6	0.9563	0.9977	1.3637	1.3204	1.4310	3.183	5	0.296	2.230	0.1041	0.9559	0.9947
*10	0.0797	0.0831	0.2660	0.1378	0.4165	46.930	5	23.805	2.230	0.1041	0.0793	0.0826
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)	0.98336	0.905	0.296	0.32293
Bartlett's Test indicates equal variances (p = 0.08)	6.76171	11.3449		
The control means are not significantly different (p = 0.79)	0.2708	2.306		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test Treatments vs D-Control	5.6	10	7.48331	17.8571	0.04898	0.05086	1.52391	0.00545	5.0E-14	3, 16

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05	5.8157	0.0344	5.6970	5.8573	-0.5168
IC10	6.0569	0.0352	5.9326	6.1117	-0.3982
IC15	6.2980	0.0375	6.1721	6.3642	-0.2316
IC20	6.5392	0.0410	6.4089	6.6208	-0.0628
IC25	6.7804	0.0454	6.6470	6.8842	0.0794
IC40	7.5040	0.0620	7.3455	7.6682	0.3232
IC50	7.9864	0.0745	7.8170	8.1998	0.3930



Abalone Larval Development Test-Proportion Normal

Start Date:	7/25/2018 15:30	Test ID:	18072404ac	Sample ID:	Controls
End Date:	7/27/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	AMB1-Ambient water
Sample Date:	7/24/2018	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	HR-Haliotis rufescens
Comments:					

Conc-%	1	2	3	4	5
D-Control	0.9292	0.9633	0.9813	0.9714	0.9615
B-Control	0.9381	0.9464	0.9636	0.9630	0.9817
C-Control	0.9810	0.9375	0.9439	0.9810	0.9640

			Transform: Arcsin Square Root					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	0.9614	1.0029	1.3775	1.3015	1.4336	3.538	5	*		
B-Control	0.9585	1.0000	1.3695	1.3193	1.4349	3.264	5			
C-Control	0.9615	1.0030	1.3789	1.3181	1.4323	3.911	5	-0.042	1.860	0.0604

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.90609		0.842		-0.3329	-1.2292
F-Test indicates equal variances (p = 0.85)	1.2246		23.1545			
The control means are not significantly different (p = 0.79)	0.2708		2.306			
Hypothesis Test (1-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Homoscedastic t Test indicates no significant differences Treatments vs D-Control	0.02611	0.02711	4.6E-06	0.00264	0.96759	1, 8

ABALONE CHRONIC BIOASSAY

Aquatic Testing Laboratories

Lab No.: A-18072404-002
Client ID: MRS - Morro Bay Effluent

Start Date: 07/25/2018

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)	15.1	8.2	8.0	33	15.0	7.9	15.1	7.8	7.9	33
Control (dilution)	14.9	8.4	8.0	33	15.1	7.9	15.1	7.8	7.9	33
3.2%	14.9	8.4	8.0	33	15.0	8.0	15.0	7.9	7.9	33
5.6%	14.8	8.4	8.0	33	15.0	7.9	15.0	7.8	7.9	33
10%	14.9	8.5	8.0	33	15.1	8.0	15.1	7.8	8.0	33
18%	14.9	8.4	8.0	33	15.0	8.0	15.1	7.7	8.0	33
32%	14.8	8.4	8.0	33	15.1	8.0	15.0	7.7	8.0	33

Sample as received: Chlorine: 0 mg/l; pH: 7.8; Salinity: <1 ppt; Temp: 14.1 °C; DO: 6.8 mg/l.
Dilution water is client supplied receiving water. NH_3-N: 42 mg/l

Initial readings: [signature] Date/Time: 7-25-18 1530 Final readings: [signature] Date/Time: 7-27-18 1530

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	105	8	13	3.2	107	4	25	18	0	100
2	10	6	104	14	10	14	90	26	BC	104	4
3	BC	106	7	15	C	105	2	27	5.6	101	2
4	18	0	100	16	5.6	101	5	28	32	0	100
5	3.2	102	2	17	18	0	100	29	C	100	4
6	32	0	100	18	BC	106	4	30	10	3	109
7	5.6	107	7	19	3.2	105	7	31	3.2	107	4
8	C	105	4	20	10	18	92	32	18	0	100
9	5.6	105	6	21	32	0	100	33	BC	107	2
10	18	0	100	22	C	102	3	34	5.6	106	4
11	BC	106	6	23	10	2	104	35	32	0	100
12	32	0	100	24	3.2	105	6				

Microscopic examination: Analyst: [signature] Date: 7-31-18 Time: 0800

Aquatic Testing Laboratories

ABALONE CHRONIC BIOASSAY

Lab No.: A-17072404-002
Client ID: MRS - Morro Bay Effluent

Start Date: 07/25/2018

RANDOMIZATION WORKSHEET

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

Analyst: _____ Date: 7-25-18 Time: 1000

GIANT KELP GERMINATION AND AND GROWTH SHORT-TERM TOXICITY TEST

- *Test and Result Summary*
- *Data Summary and Statistical Analysis*
- *Raw Test Data: Water Quality & Test Organism Measurements*

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

Lab No.: A-18072404-002
Client/ID: MRS - Morro Bay Comp. Effluent

Date Tested: 07/25/18 - 07/27/18

TEST SUMMARY

Species: *Macrocystis pyrifera.*
Protocol: EPA Method 1009.0.
Test type: Static.
Test chamber: glass beaker.
Temperature: 15 +/- 1°C.
Number of spores per ml: 7,500 (approx.).
QA/QC Batch No.: RT-180725 (ran concurrently).

Source: Field collected.
Dilution water: Client supplied seawater.
Endpoints: NOEC, IC25 at 48 hrs.
Test volume: 200 ml.
Aeration: None.
Number of replicates: 5.

RESULTS SUMMARY

Sample Concentration	Percent Germination		Mean Germ Tube Length (μm)	
Control (Dilution)	81.3%		15.75	
Control (Brine)	81.7%		16.00	
Control (Culture)	80.6%		16.45	
3.2%	81.5%		16.50	
5.6%	81.8%		16.35	
10%	77.8%		15.75	
18%	69.0%	*	14.15	*
32%	51.8%	*	10.90	*

* Statistically significantly less than control at P = 0.05 level
Dilution water is client supplied receiving water.
Culture water control obtained from The Cultured Abalone Farm.

CHRONIC TOXICITY

END POINT	GERMINATION	GERM TUBE LENGTH
NOEC	10%	10%
TUc (100/NOEC)	10.0	10.0

QA/QC TEST ACCEPTABILITY

Parameter	Result
Mean control germination ≥ 70%	PASS (81.3%)
Mean control germination tube length >10 μm	PASS (15.75 μm)
Concentration response relationship acceptable	PASS (Response curve normal)
Please see RT-180725 report for additional test acceptability criteria.	

Macrocystis Germination and Growth Test-Proportion Germinated

Start Date:	7/25/2018 15:30	Test ID:	18072404k	Sample ID:	Morro Bay
End Date:	7/27/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/24/2018 08:44	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	MP-Macrocystis pyrifera

Comments:

Conc-%	1	2	3	4	5
D-Control	0.8641	0.7642	0.7921	0.8519	0.7909
B-Control	0.7909	0.8131	0.8835	0.7961	0.8000
3.2	0.8491	0.7788	0.9020	0.7818	0.7636
5.6	0.8515	0.7909	0.8020	0.8431	0.8037
10	0.8491	0.7547	0.8000	0.7706	0.7156
18	0.7156	0.6990	0.5849	0.8476	0.6038
32	0.5575	0.4078	0.6102	0.4602	0.5556

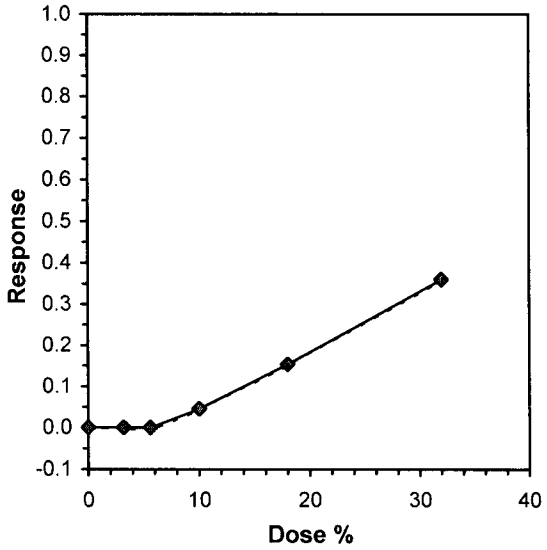
			Transform: Arcsin Square Root					1-Tailed			Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	0.8126	0.9950	1.1252	1.0637	1.1932	4.987	5	*			0.8147	1.0000
B-Control	0.8167	1.0000	1.1303	1.0959	1.2225	4.648	5					
3.2	0.8151	0.9980	1.1306	1.0631	1.2523	7.077	5	-0.112	2.360	0.1150	0.8147	1.0000
5.6	0.8183	1.0019	1.1312	1.0959	1.1752	3.147	5	-0.124	2.360	0.1150	0.8147	1.0000
10	0.7780	0.9526	1.0823	1.0083	1.1718	5.676	5	0.881	2.360	0.1150	0.7776	0.9544
*18	0.6902	0.8451	0.9858	0.8707	1.1698	12.089	5	2.861	2.360	0.1150	0.6900	0.8469
*32	0.5182	0.6345	0.8038	0.6926	0.8965	10.273	5	6.596	2.360	0.1150	0.5207	0.6392

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.97022	0.927	0.54194	0.26224
Bartlett's Test indicates equal variances (p = 0.34)	5.62781	15.0863		
The control means are not significantly different (p = 0.88)	0.1496	2.306		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test Treatments vs D-Control	10	18	13.4164	10	0.09694	0.11905	0.08427	0.00594	1.6E-06	5, 24

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05	10.330	2.474	4.274	16.071	0.5828
IC10	14.051	2.801	7.636	21.331	0.5402
IC15	17.771	2.686	11.419	23.813	0.0588
IC20	21.162	2.720	13.574	26.266	-0.1744
IC25	24.531	2.636	15.602	30.047	-0.3603
IC40	>32				
IC50	>32				



Macrocystis Germination and Growth Test-Proportion Germinated

Start Date:	7/25/2018 15:30	Test ID:	18072404kc	Sample ID:	CONTROLS
End Date:	7/27/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/24/2018 08:44	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	MP-Macrocystis pyrifera

Comments:

Conc-%	1	2	3	4	5
D-Control	0.8641	0.7642	0.7921	0.8519	0.7909
B-Control	0.7909	0.8131	0.8835	0.7961	0.8000
C-Control	0.8378	0.8505	0.8113	0.7339	0.7961

			Transform: Arcsin Square Root					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	0.8126	0.9950	1.1252	1.0637	1.1932	4.987	5	*		
B-Control	0.8167	1.0000	1.1303	1.0959	1.2225	4.648	5			
C-Control	0.8059	0.9868	1.1165	1.0288	1.1738	5.061	5	0.242	1.860	0.0662

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.94177		0.842		-0.2427	-1.1535
F-Test indicates equal variances (p = 0.99)	1.01416		23.1545			
The control means are not significantly different (p = 0.88)	0.1496		2.306			
Hypothesis Test (1-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Homoscedastic t Test indicates no significant differences Treatments vs D-Control	0.05412	0.06647	0.00019	0.00317	0.81485	1, 8

Macrocystis Germination and Growth Test-Growth-Length

Start Date:	7/25/2018 15:30	Test ID:	18072404k	Sample ID:	Morro Bay
End Date:	7/27/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/24/2018 08:44	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	MP-Macrocystis pyrifera

Comments:

Conc-%	1	2	3	4	5
D-Control	15.250	15.750	15.250	15.750	16.750
B-Control	15.750	16.500	16.250	15.500	16.000
3.2	16.750	16.250	16.500	16.000	17.000
5.6	17.000	16.250	16.500	16.750	15.250
10	16.250	16.250	16.500	15.500	14.250
18	13.250	16.250	14.500	12.000	14.750
32	10.500	11.250	9.250	12.500	11.000

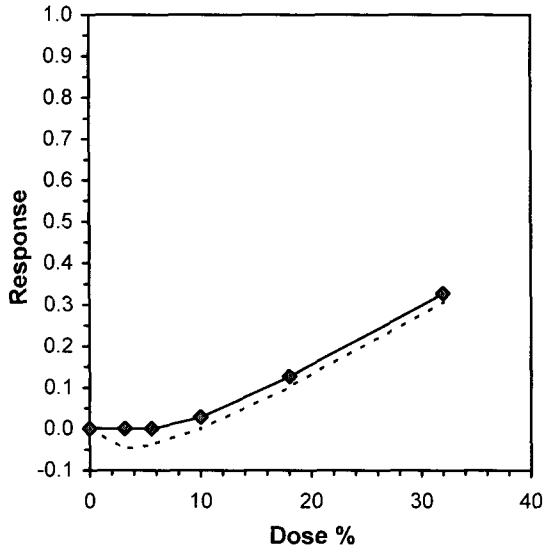
			Transform: Untransformed					1-Tailed			Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	15.750	0.9844	15.750	15.250	16.750	3.888	5	*			16.200	1.0000
B-Control	16.000	1.0000	16.000	15.500	16.500	2.471	5					
3.2	16.500	1.0313	16.500	16.000	17.000	2.396	5	-1.205	2.360	1.468	16.200	1.0000
5.6	16.350	1.0219	16.350	15.250	17.000	4.131	5	-0.964	2.360	1.468	16.200	1.0000
10	15.750	0.9844	15.750	14.250	16.500	5.832	5	0.000	2.360	1.468	15.750	0.9722
*18	14.150	0.8844	14.150	12.000	16.250	11.354	5	2.572	2.360	1.468	14.150	0.8735
*32	10.900	0.6813	10.900	9.250	12.500	10.831	5	7.795	2.360	1.468	10.900	0.6728

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.96958	0.927	-0.2331	0.89927
Bartlett's Test indicates equal variances (p = 0.13)	8.43775	15.0863		
The control means are not significantly different (p = 0.47)	0.76696	2.306		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test Treatments vs D-Control	10	18	13.4164	10	1.4683	0.09323	22.67	0.96771	1.6E-08	5, 24

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05	11.800	2.076	7.488	20.137	1.0397
IC10	15.850	2.144	12.145	22.266	0.3771
IC15	19.637	2.110	14.540	24.473	-0.0977
IC20	23.126	2.046	16.117	26.807	-0.7108
IC25	26.615	1.831	21.256	30.763	-0.4853
IC40	>32				
IC50	>32				



Macrocystis Germination and Growth Test-Growth-Length

Start Date:	7/25/2018 15:30	Test ID:	18072404kc	Sample ID:	CONTROLS
End Date:	7/27/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/24/2018 08:44	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	MP-Macrocystis pyrifera

Comments:

Conc-%	1	2	3	4	5
D-Control	15.250	15.750	15.250	15.750	16.750
B-Control	15.750	16.500	16.250	15.500	16.000
C-Control	17.250	16.500	16.500	16.000	16.000

			Transform: Untransformed					2-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	15.750	0.9844	15.750	15.250	16.750	3.888	5	*		
B-Control	16.000	1.0000	16.000	15.500	16.500	2.471	5			
C-Control	16.450	1.0281	16.450	16.000	17.250	3.115	5	1.960	2.306	0.823

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.83241		0.842		0.99459	0.05589
F-Test indicates equal variances (p = 0.74)	1.42857		23.1545			
The control means are not significantly different (p = 0.47)	0.76696		2.306			
Hypothesis Test (2-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Homoscedastic t Test indicates no significant differences Treatments vs D-Control	0.82341	0.05228	1.225	0.31875	0.08561	1, 8

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

Lab No.: A-18072404-002
Client ID: Morro Bay

Start Date: 07/25/2018

Dish No.	Sample Conc.	Total Number Counted	Number Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					A	B	C	D	E	F	G	H	I	J
1	32	113	63	50	5	4	6	4	5	3	3	4	3	5
2	BC	110	87	23	7	6	7	5	7	6	6	8	6	5
3	3.2	106	90	16	5	6	7	8	6	7	7	8	6	7
4	3.2	104	81	23	6	7	6	7	7	5	7	6	7	7
5	BC	107	87	20	7	6	7	8	7	5	7	6	6	7
6	3.2	102	92	10	8	7	6	7	6	7	5	7	7	6
7	5.6	101	86	15	6	7	7	8	7	6	7	6	7	7
8	18	109	78	31	6	5	7	7	5	4	4	6	4	5
9	10	106	90	16	7	8	6	7	7	6	5	7	6	6
10	10	106	80	26	6	6	7	5	7	6	6	7	8	7
11	BC	103	91	12	6	7	7	6	5	7	6	7	8	6
12	C	103	89	14	6	6	6	7	5	6	7	6	7	5
13	BC	103	82	21	7	5	7	6	7	6	5	8	7	4
14	3.2	110	86	24	6	7	7	6	7	5	6	7	7	6
15	C	106	81	25	8	7	6	4	7	6	C	5	7	7
16	3.2	110	84	26	7	6	7	5	7	8	7	6	8	7
17	C	101	80	21	5	7	8	8	4	5	6	7	5	6
18	C	108	92	16	7	6	7	6	7	5	6	7	6	6
19	10	105	84	21	6	7	7	6	7	8	5	7	6	7
20	32	103	42	61	4	5	5	4	6	4	5	5	3	4

Comments:

Micrometer conversion factor: 1 unit = 2.5 um at 400X power

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

Lab No.: A-18072404-002
Client ID: Morro Bay

Start Date: 07/25/2018

Dish No.	Sample Conc.	Total Number Counted	Number Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					A	B	C	D	E	F	G	H	I	J
21	5.6	110	87	23	6	7	6	8	8	4	7	6	7	6
22	10	109	84	25	6	5	5	6	7	8	7	5	6	7
23	32	118	72	46	3	4	3	4	5	4	3	4	3	4
24	DC	105	84	21	7	6	7	5	7	6	6	6	7	7
25	18	103	72	31	6	5	7	5	7	8	7	7	6	7
26	18	106	62	44	6	5	7	6	5	5	6	7	6	5
27	5.6	107	81	20	6	7	5	7	7	6	8	7	7	6
28	5.6	102	86	16	6	7	8	7	6	7	5	6	7	8
29	C	110	87	23	7	6	7	8	5	7	8	7	6	6
30	18	105	89	16	5	4	7	4	5	4	5	4	6	4
31	10	109	78	31	7	5	6	5	4	5	6	6	7	6
32	5.6	107	86	21	7	5	7	4	7	6	7	7	6	5
33	32	113	52	61	5	6	4	4	5	7	4	6	4	5
34	18	106	64	42	7	5	6	6	5	7	6	5	6	6
35	32	108	60	48	4	5	3	4	5	6	6	4	4	3
36														
37														
38														
39														
40														

Comments:

Micrometer conversion factor: 1 unit = 2.5 um at 400X power

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

Lab No.: A-18072404-002
Client ID: Morro Bay

Start Date: 07/25/2018

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)
Brine Control	15.5	8.2	8.0	33	15.6	7.9	15.6	7.9	8.0	33
Control	15.4	8.3	8.0	33	15.7	7.9	15.7	7.9	8.0	33
3.2%	15.3	8.3	8.0	33	15.6	8.0	15.7	7.9	8.1	33
5.6%	15.2	8.3	8.0	33	15.6	8.0	15.7	7.9	8.1	33
10%	15.2	8.3	8.0	33	15.4	8.0	15.7	7.9	8.1	33
18%	15.2	8.4	8.0	33	15.8	8.0	15.6	7.8	8.1	33
32%	15.0	8.3	8.0	33	15.7	8.0	15.6	7.7	8.1	33

Sample as received: Chlorine: 0 mg/l; pH: 7.8; Salinity: <1 ppt; Temp: 16.1 °C;
DO: 6.8 mg/l NH_3-N: 42 ug/L

Control/dilution water is client supplied receiving water.

Illumination (16 hr light / 8 hr dark at 50 ± 10 uE/m^2/s) at 5 locations in incubator:
(four corners and center): 41, 43, 44, 47, 44 uE/m^2/s.

Initial readings: Analyst: JM Date: 7-25-18 Time: 1530

Final readings: Analyst: JM Date: 7-27-18 Time: 1530

Aquatic Testing Laboratories

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Lab No.: A-18072404-002
Client ID: Morro Bay

Start Date: 07/25/2018

RANDOMIZATION WORKSHEET

Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Notes
1	3.2	13	BC	25	18	Need 7500/ml x 200 ml = 1,500,000 spores. Add 1.0 ml spore stock of 6 spores per 5x5 hemacytometer grid
2	BC	14	3.2	26	18	
3	3.2	15	C	27	5.6	
4	3.2	16	3.2	28	5.6	
5	BC	17	C	29	C	
6	3.2	18	C	30	18	
7	5.6	19	10	31	10	
8	18	20	32	32	5.6	
9	10	21	5.6	33	32	
10	10	22	10	34	18	
11	BC	23	32	35	32	
12	C	24	BC			

Analyst: _____ Date: 7-25-18 Time: 1000

Aquatic
Testing
Laboratories

Topsmelt Larvae Survival and Growth Short-Term Toxicity Test

- *Test and Result Summary*
- *Data Summary and Statistical Analysis*
- *Raw Test Data: Water Quality & Test Organism Measurements*

TOPSMELT LARVAE CHRONIC BIOASSAY
SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

Lab No.: A18072404-001/003
Client/ID: Morro Bay WWTP

Date Tested: 07/24/18 - 07/31/18

TEST SUMMARY

Species: *Atherinops affinis*.
Protocol: EPA/600/R-95/136.
Test type: Static renewal (90% daily).
Food: 40 b.s. nauplii per larvae 2X daily.
Test solution volume: 200 ml.
Number of larvae per chamber: 5.
Photoperiod: 16hr light / 8hr dark.
Dil. water: Client supplied receiving water.

Source: Aquatic BioSystems.
Endpoints: NOEC, TUc.
Age: 9 days (9-15 days).
Test chamber size: 600 ml.
Number of replicates: 5.
Temperature: 20 +/- 1°C.
Salinity: 33 +/- 2 o/oo.
QA/QC Batch No.: RT-180724

RESULTS SUMMARY

Sample Concentration	Percent Survival		Mean Weight of Larvae (Biomass)	
Control (Dilution)	100%		1.788 mg	
Control (Brine)	100%		1.695 mg	
Control (Culture)	100%		1.731 mg	
3.2%	96%		1.566 mg	
5.6%	96%		1.741 mg	
10.0%	96%		1.807 mg	
18.0%	96%		1.639 mg	
32.0%	80%		1.398 mg	

* Statistically significantly less than control at P = 0.05 level.
** Concentrations with significantly less than control survival rates are not used in ANOVA comparisons.
Culture water control obtained from organism supplier Aquatic BioSystems.

CHRONIC TOXICITY

END POINT	SURVIVAL	GROWTH
NOEC	32%	32%
TUc (100/NOEC)	3.125	3.125

QA/QC TEST ACCEPTABILITY

Parameter	Result
Average control survival ≥80%	PASS (100%)
Average dry weight of control ≥0.85 mg (when starting with 9 day old larvae)	PASS (average control dry weight = 1.788 mg (9 day old))
Concentration response relationship acceptable	PASS (Response curve normal)
Please see RT-180724 report for additional QA Information	

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	7/24/2018 15:30	Test ID:	18072404ts	Sample ID:	Morro Bay
End Date:	7/31/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/23/2018 08:48	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	AA-Atherinops affinis

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
B-Control	1.0000	1.0000	1.0000	1.0000	1.0000
3.2	1.0000	1.0000	1.0000	1.0000	0.8000
5.6	0.8000	1.0000	1.0000	1.0000	1.0000
10	1.0000	1.0000	1.0000	1.0000	0.8000
18	1.0000	1.0000	0.8000	1.0000	1.0000
32	0.8000	0.6000	1.0000	0.8000	0.8000

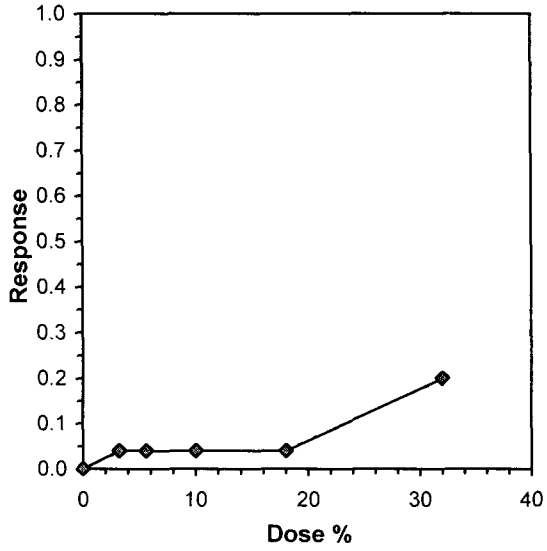
			Transform: Arcsin Square Root					Rank	1-Tailed	Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5	*		1.0000	1.0000
B-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5				
3.2	0.9600	0.9600	1.2977	1.1071	1.3453	8.207	5	25.00	16.00	0.9600	0.9600
5.6	0.9600	0.9600	1.2977	1.1071	1.3453	8.207	5	25.00	16.00	0.9600	0.9600
10	0.9600	0.9600	1.2977	1.1071	1.3453	8.207	5	25.00	16.00	0.9600	0.9600
18	0.9600	0.9600	1.2977	1.1071	1.3453	8.207	5	25.00	16.00	0.9600	0.9600
32	0.8000	0.8000	1.1106	0.8861	1.3453	14.625	5	17.50	16.00	0.8000	0.8000

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.73364	0.927	-0.9123	1.3952
Equality of variance cannot be confirmed				
The control means are not significantly different (p = 1.00)	0	2.306		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	32	>32		3.125
Treatments vs D-Control				

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)	Skew
IC05	18.875			
IC10	23.250			
IC15	27.625			
IC20	>32			
IC25	>32			
IC40	>32			
IC50	>32			



Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	7/24/2018 15:30	Test ID:	18072404ts	Sample ID:	MORRO BAY
End Date:	7/31/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/23/2018 08:48	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	AA-Atherinops affinis

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
B-Control	1.0000	1.0000	1.0000	1.0000	1.0000
3.2	1.0000	1.0000	1.0000	1.0000	0.8000
5.6	0.8000	1.0000	1.0000	1.0000	1.0000
10	1.0000	1.0000	1.0000	1.0000	0.8000
18	1.0000	1.0000	0.8000	1.0000	1.0000
32	0.8000	0.6000	1.0000	0.8000	0.8000

			Transform: Arcsin Square Root					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5	*		
B-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5			
3.2	0.9600	0.9600	1.2977	1.1071	1.3453	8.207	5	0.689	2.360	0.1632
5.6	0.9600	0.9600	1.2977	1.1071	1.3453	8.207	5	0.689	2.360	0.1632
10	0.9600	0.9600	1.2977	1.1071	1.3453	8.207	5	0.689	2.360	0.1632
18	0.9600	0.9600	1.2977	1.1071	1.3453	8.207	5	0.689	2.360	0.1632
*32	0.8000	0.8000	1.1106	0.8861	1.3453	14.625	5	3.394	2.360	0.1632

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.73364	0.927	-0.9123	1.3952
Equality of variance cannot be confirmed				
The control means are not significantly different (p = 1.00)	0	2.306		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	18	32	24	5.55556	0.09365	0.09858	0.03403	0.01196	0.03721	5, 24
Treatments vs D-Control										

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	7/24/2018 15:30	Test ID:	18072404tc	Sample ID:	MORRO BAY
End Date:	7/31/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/23/2018 08:48	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	AA-Atherinops affinis

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
B-Control	1.0000	1.0000	1.0000	1.0000	1.0000
C-Control	1.0000	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5	*	
B-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5		
C-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5	27.50	19.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	1	0.842		
Equality of variance cannot be confirmed				
The control means are not significantly different (p = 1.00)	0	2.306		
Hypothesis Test (1-tail, 0.05)				
Wilcoxon Two-Sample Test indicates no significant differences				
Treatments vs D-Control				

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	7/24/2018 15:30	Test ID:	18072404c	Sample ID:	MORRO BAY
End Date:	7/31/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/23/2018 08:48	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	AA-Atherinops affinis

Comments:

Conc-%	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
B-Control	1.0000	1.0000	1.0000	1.0000	1.0000
C-Control	1.0000	1.0000	1.0000	1.0000	1.0000
L-Control	1.0000	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5	*	
B-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5		
C-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5	27.50	18.00
L-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5	27.50	18.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	1	0.881		
Equality of variance cannot be confirmed				
The control means are not significantly different (p = 1.00)	0	2.306		
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates no significant differences				
Treatments vs D-Control				

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	7/24/2018 15:30	Test ID:	18072404ts	Sample ID:	Morro Bay
End Date:	7/31/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/23/2018 08:48	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	AA-Atherinops affinis

Comments:

Conc-%	1	2	3	4	5
D-Control	1.8660	1.7680	1.7980	1.8260	1.6820
B-Control	1.7620	1.4800	2.0200	1.7720	1.4400
3.2	1.7880	1.4520	1.7680	1.8680	0.9560
5.6	1.3340	1.4920	1.7560	2.0240	2.0980
10	2.0760	1.9940	1.9640	1.5640	1.4360
18	1.6860	1.8140	1.3240	1.3180	2.0540
32	1.6040	1.0080	1.4840	1.2900	1.6020

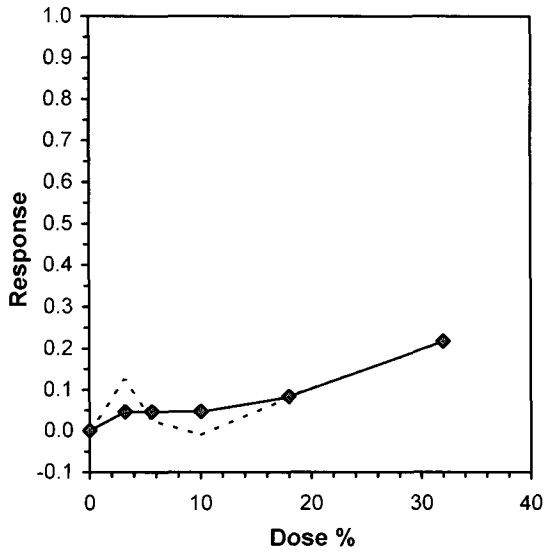
			Transform: Untransformed					1-Tailed			Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	1.7880	1.0550	1.7880	1.6820	1.8660	3.881	5	*			1.7880	1.0000
B-Control	1.6948	1.0000	1.6948	1.4400	2.0200	14.065	5					
3.2	1.5664	0.9242	1.5664	0.9560	1.8680	24.023	5	1.210	2.360	0.4322	1.7047	0.9534
5.6	1.7408	1.0271	1.7408	1.3340	2.0980	18.953	5	0.258	2.360	0.4322	1.7047	0.9534
10	1.8068	1.0661	1.8068	1.4360	2.0760	15.865	5	-0.103	2.360	0.4322	1.7047	0.9534
18	1.6392	0.9672	1.6392	1.3180	2.0540	19.467	5	0.813	2.360	0.4322	1.6392	0.9168
32	1.3976	0.8246	1.3976	1.0080	1.6040	18.073	5	2.132	2.360	0.4322	1.3976	0.7817

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.94899	0.927	-0.5314	-0.582
Bartlett's Test indicates equal variances (p = 0.16)	7.91449	15.0863		
The control means are not significantly different (p = 0.43)	0.83941	2.306		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test Treatments vs D-Control	32	>32		3.125	0.43219	0.24172	0.12244	0.08384	0.2395	5, 24

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05	10.741	7.038	0.000	26.179	0.3207
IC10	19.738	6.905	0.000	29.552	-0.7822
IC15	24.919				
IC20	30.099				
IC25	>32				
IC40	>32				
IC50	>32				



Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	7/24/2018 15:30	Test ID:	18072404tc	Sample ID:	MORRO BAY
End Date:	7/31/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/23/2018 08:48	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	AA-Atherinops affinis

Comments:

Conc-%	1	2	3	4	5
D-Control	1.8660	1.7680	1.7980	1.8260	1.6820
B-Control	1.7620	1.4800	2.0200	1.7720	1.4400
C-Control	1.6400	1.5760	1.4060	2.0520	1.9820

			Transform: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	1.7880	1.0550	1.7880	1.6820	1.8660	3.881	5	*		
B-Control	1.6948	1.0000	1.6948	1.4400	2.0200	14.065	5			
C-Control	1.7312	1.0215	1.7312	1.4060	2.0520	15.924	5	0.447	1.860	0.2364

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.97282		0.842		0.1884	0.15244
F-Test indicates equal variances (p = 0.02)	15.7793		23.1545			
The control means are not significantly different (p = 0.43)	0.83941		2.306			
Hypothesis Test (1-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Homoscedastic t Test indicates no significant differences Treatments vs D-Control	0.2364	0.13222	0.00807	0.0404	0.66687	1, 8

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	7/24/2018 15:30	Test ID:	18072404c	Sample ID:	MORRO BAY
End Date:	7/31/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	7/23/2018 08:48	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	AA-Atherinops affinis
Comments:					

Conc-%	1	2	3	4	5
D-Control	1.8660	1.7680	1.7980	1.8260	1.6820
B-Control	1.7620	1.4800	2.0200	1.7720	1.4400
C-Control	1.6400	1.5760	1.4060	2.0520	1.9820
L-Control	1.5380	1.2780	1.3080	1.8160	1.7940

			Transform: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	1.7880	1.0550	1.7880	1.6820	1.8660	3.881	5	*		
B-Control	1.6948	1.0000	1.6948	1.4400	2.0200	14.065	5			
C-Control	1.7312	1.0215	1.7312	1.4060	2.0520	15.924	5	0.406	2.110	0.2949
L-Control	1.5468	0.9127	1.5468	1.2780	1.8160	16.575	5	1.726	2.110	0.2949

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.94901		0.881		0.10397	-1.0108
Bartlett's Test indicates equal variances (p = 0.06)	5.6805		9.21034			
The control means are not significantly different (p = 0.43)	0.83941		2.306			
Hypothesis Test (1-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test indicates no significant differences Treatments vs D-Control	0.29494	0.16496	0.07951	0.04885	0.2369	2, 12

TOPSMELT CHRONIC BIOASSAY
Survival and Growth Raw Data Sheet

Aquatic Testing Laboratories

Lab No.: A-18072404-001/003 Start Date:07/24/2018
Client ID: Morro Bay

Sample	Rep	Number of Live Larvae / Day							Final Results		Dry Weight (mg)		
		1	2	3	4	5	6	7	# Tested	# Dead	Total Wt.	Tare Wt.	
Control	A	5	5	5	5	5	5	5	5	0	386.29	376.96	33
	B	5	5	5	5	5	5	5	5	0	386.64	377.80	
	C	5	5	5	5	5	5	5	5	0	384.55	375.56	
	D	5	5	5	5	5	5	5	5	0	388.63	379.50	
	E	5	5	5	5	5	5	5	5	0	380.30	371.89	
3.2%	A	5	5	5	5	5	5	5	5	0	376.37	367.43	
	B	5	5	5	5	5	5	5	5	0	386.51	379.25	
	C	5	5	5	5	5	5	5	5	0	381.09	372.25	
	D	5	5	5	5	5	5	5	5	0	376.46	367.12	41
	E	5	5	5	5	5	5	4	5	1	389.65	384.87	
5.6%	A	5	5	5	5	5	5	4	5	1	380.16	373.49	
	B	5	5	5	5	5	5	5	5	0	376.60	369.14	
	C	5	5	5	5	5	5	5	5	0	395.87	387.09	
	D	5	5	5	5	5	5	5	5	0	396.56	386.44	
	E	5	5	5	5	5	5	5	5	0	380.84	370.35	
10%	A	5	5	5	5	5	5	5	5	0	381.55	371.17	48
	B	5	5	5	5	5	5	5	5	0	389.81	379.84	
	C	5	5	5	5	5	5	5	5	0	389.15	379.33	
	D	5	5	5	5	5	5	5	5	0	386.85	379.03	
	E	5	5	5	5	5	5	4	5	1	382.06	374.88	
18%	A	5	5	5	5	5	5	5	5	0	376.32	367.89	
	B	5	5	5	5	5	5	5	5	0	380.45	371.38	
	C	5	5	5	5	5	5	4	5	1	379.41	373.29	
	D	5	5	5	5	5	5	5	5	0	373.72	367.13	
	E	5	5	5	5	5	5	5	5	0	382.54	372.27	
32%	A	5	5	5	5	4	4	4	5	1	381.15	373.13	58
	B	5	5	5	5	5	4	3	5	2	382.92	377.88	
	C	5	5	5	5	5	5	4 5	5	0	380.37	372.95	
	D	5	5	5	5	4	4	4	5	1	377.25	370.80	
	E	5	5	5	5	5	4	4	5	1	373.40	365.29	

TOPSMELT CHRONIC BIOASSAY
Water Chemistries Raw Data Sheet

Aquatic Testing Laboratories

Lab No.: A-18072404-001/003
Client ID: Morro Bay

Start Date:07/24/2018

		DAY 1		DAY 2		DAY 3		DAY 4		DAY 5		DAY 6		DAY 7	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Analyst Initials:		J	J	J	J	J	J	J	J	J	J	J	J	J	J
Time of Readings:		1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530	1530
Control	DO	8.4	7.9	7.2	6.5	7.1	7.0	7.1	6.5	6.9	6.4	7.0	6.4	7.1	6.1
	pH	8.0	7.4	7.9	7.9	8.0	7.9	8.0	8.0	7.9	7.6	7.9	8.0	8.1	7.9
	°C	20.0	20.8	20.5	20.7	20.7	20.7	20.6	20.6	20.7	20.7	20.7	20.8	20.8	20.7
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33
3.2%	DO	8.3	6.8	7.2	6.7	7.2	6.6	7.0	6.6	6.7	6.1	6.9	6.4	7.1	6.0
	pH	8.0	8.0	8.0	7.9	8.0	7.9	8.0	7.9	7.9	7.9	7.9	8.0	8.1	7.9
	°C	19.8	20.5	20.6	20.7	20.7	20.6	20.5	20.6	20.7	20.8	20.8	20.8	20.7	20.6
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33
5.6%	DO	8.2	6.9	7.1	6.6	7.1	6.6	7.0	6.5	6.9	6.2	6.9	6.4	7.1	6.1
	pH	8.0	8.0	8.0	8.0	8.0	7.9	8.0	7.9	7.9	7.9	7.9	8.0	8.1	7.9
	°C	19.8	20.7	20.7	20.7	20.8	20.7	20.5	20.5	20.6	20.7	20.6	20.7	20.8	20.7
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33
10%	DO	8.2	6.9	7.1	6.3	7.1	6.6	6.9	6.3	6.8	6.1	6.8	6.4	7.1	6.1
	pH	8.0	8.0	8.0	8.0	8.0	7.9	8.0	7.9	8.0	7.9	7.9	8.0	8.1	7.9
	°C	19.8	20.8	20.7	20.7	20.7	20.7	20.5	20.6	20.7	20.7	20.7	20.8	20.9	20.7
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33
18%	DO	8.0	6.9	7.1	6.5	7.1	6.6	6.9	6.1	6.8	6.2	6.8	6.1	7.2	6.0
	pH	8.0	8.0	8.0	8.0	8.0	7.9	8.0	7.9	8.0	8.0	8.0	8.1	8.1	7.9
	°C	19.8	20.5	20.6	20.7	20.8	20.7	20.6	20.7	20.6	20.7	20.6	20.7	20.8	20.7
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33
32%	DO	7.8	6.9	7.1	6.7	7.0	6.7	7.1	6.2	6.9	6.1	6.8	6.0	7.2	6.0
	pH	8.1	8.0	8.0	8.0	8.0	8.0	8.0	7.9	8.0	7.9	8.0	8.1	8.1	8.0
	°C	19.7	20.5	20.6	20.7	20.8	20.7	20.6	20.7	20.6	20.7	20.6	20.8	20.7	20.7
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33

Comments:

Dissolved Oxygen (DO) readings in mg/l O_2; Salinity (Sal.) readings in ppt. **Sample 001** used for initial on Day 1; **Sample 002** used for initial (renewals) on Day 2 and Day 3; **Sample 003** used for initial (renewals) on Day 4, Day 5, Day 6, and Day 7.

TOPSMELT CHRONIC BIOASSAY

Aquatic Testing Laboratories

Lab No.: A-18072404-additional controls
Client ID: Morro Bay

Start Date: 07/24/2018

		DAY 1		DAY 2		DAY 3		DAY 4		DAY 5		DAY 6		DAY 7	
		0 hr	24hr	0 hr	24hr	0 hr	24hr	0 hr	24hr	0 hr	24hr	0 hr	24hr	0 hr	24hr
Analyst Initials:															
Time of Readings:		1520	1520	1500	1430	1430	1445	1445	1430	1430	1500	1500	1430	1430	1530
Brine Control	DO	7.5	6.8	7.0	6.5	7.2	6.6	7.3	7.4	6.9	6.4	6.8	6.5	7.0	5.9
	pH	8.0	7.9	7.9	7.9	7.9	7.7	7.8	7.7	7.8	7.8	7.8	7.9	8.0	7.9
	°C	20.4	20.9	20.6	20.7	20.4	20.7	20.6	20.7	20.8	20.7	20.7	20.8	20.8	20.9
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Culture Water Control	DO	7.4	6.8	7.1	6.4	7.0	6.9	7.0	7.4	6.9	6.4	6.5	6.3	7.1	6.0
	pH	8.0	8.0	8.0	7.9	8.0	7.9	7.9	7.7	8.0	7.9	8.0	7.9	8.0	7.9
	°C	20.5	20.8	20.6	20.7	20.8	20.7	20.4	20.5	20.7	20.6	20.7	20.8	20.8	20.9
	Sal.	30	30	30	30	30	30	30	30	30	30	30	31	31	31

Comments: Brine Control made with similar amount of sea salts used to adjust salinity of highest concentration of effluent in test (32%). Culture Water Control supplied by test organism provider.
Dissolved Oxygen (DO) readings in mg/l O_2. Salinity (Sal.) in ppt.
Original sample used for all renewals. No ammonia (< 0.1 mg/L NH_3-N) detected in either sample.

Sample	Rep	Number of Live Larvae / Day							Final Results		Dry Weight (mg)		
		1	2	3	4	5	6	7	# Tested	# Dead	Total Wt.	Tare Wt.	
Brine Control	A	5	5	5	5	5	5	5	5	0	378.30	369.49	23
	B	5	5	5	5	5	5	5	5	0	379.24	371.84	
	C	5	5	5	5	5	5	5	5	0	380.51	370.41	
	D	5	5	5	5	5	5	5	5	0	377.18	368.32	
	E	5	5	5	5	5	5	5	5	0	375.07	367.87	
Culture Water Control	A	5	5	5	5	5	5	5	5	0	375.65	367.45	
	B	5	5	5	5	5	5	5	5	0	404.47	396.59	
	C	5	5	5	5	5	5	5	5	0	383.22	376.19	
	D	5	5	5	5	5	5	5	5	0	379.76	369.50	
	E	5	5	5	5	5	5	5	5	0	382.29	372.38	32

Additional Water Quality Parameters for 100% Effluent Samples as Received	Sample 001	Sample 002	Sample 003
DO (mg/L O_2)	3.8	6.8	6.3
pH	7.7	7.8	7.9
Salinity (ppt) - sample adjusted with sea salts	<1	<1	<1
Ammonia (mg/l NH_3-N)	43.5	42	40.5

Aquatic
Testing
Laboratories

CHAIN OF CUSTODY

#1

CHAIN OF CUSTODY

Client: City of Morro Bay

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

Project Manager: Doug Coats - MRS

Phone: (805) 644-1180

Fax: (805) 289-3935

Purchase Order No:

Aquatic Testing Laboratories

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

Sample ID	Sample Date	Sample Time	Sample Type *	Chlorine (TRC)**	Number of Containers	Testing Requested
Comp. Eff.	7-23-18	0848 AT RF	E	0	1 (2.5 gallon)	3 Species Marine Chronic

Special Instructions:

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

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

CUSTODY TRANSFERS

Relinquished by (signature)	Received by (signature)	Date (mm/dd/yy)	Time (hh:mm)	Sample Intact? (Yes, No)	Temperature Received (°C)
		7/24/2018	09:06	—	—
		7-24-18	12:20	Yes	1.7

CHAIN OF CUSTODY

Client: City of Morro Bay

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

Project Manager: Doug Coats - MRS

Phone: (805) 644-1180

Fax: (805) 289-3935

Purchase Order No:

Aquatic Testing Laboratories

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

Sample ID	Sample Date	Sample Time	Sample Type *	Chlorine (TRC)**	Number of Containers	Testing Requested
Comp. Eff.	24-Jul-18	0844 AT/RF	E	—	1 (2.5 gallon)	3 Species Marine Chronic

Special Instructions:

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

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

CUSTODY TRANSFERS

Relinquished by (signature)	Received by (signature)	Date (mm/dd/yy)	Time (hh:mm)	Sample Intact? (Yes, No)	Temperature Received (°C)
		7/24/2018	0905	—	—
		7-24-18	1220	Yes	1.1

CHAIN OF CUSTODY

Client: City of Morro Bay

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

Project Manager: Doug Coats - Marine Research

Phone: (805) 644-1180

Fax:

Email: Marine@Rain.org

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
ATL Comp ARS	7/23/18	0848	E	Ø	1	3 Species Marine Chronic Screen
ATL 1 Comp ARS	7/24/18	0844	E	Ø	1	1.1°C
ATL2 Sea Water	7/24/18	0750	RW	Ø	34 RF	5.6°C

1.7°C

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)	Custody Seals Intact? (Yes, No, NA)	Temperature Received (°C)
		7-24-18	09:04	N/A	—
		7-24-18	12:20	N/A	5.6
				N/A	
				N/A	

CHAIN OF CUSTODY

Client: City of Morro Bay

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

Project Manager: Doug Coats - Marine Research

Phone: (805) 644-1180

Fax:

Email: Marine@Rain.org

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
ATL3 Comp ARS	7/26/18	0832	E	—	1	3 Species Marine Chronic Screen

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)	Custody Seals Intact? (Yes, No, NA)	Temperature Received (°C)
	—	7-26-18	1241	N/A	—
	FedEx	7-26-18	1241	N/A	—
FedEx		7-27-18	1010	N/A	0.3°C
				N/A	

Aquatic
Testing
Laboratories

REFERENCE TOXICANT DATA

Aquatic
Testing
Laboratories

Abalone Larval Development Short-Term Toxicity Test

1. Test and Results Summary

2. Raw Data

3. Statistical Analyses

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

Aquatic Testing Laboratories

QA/QC Batch No.: RT-180725

Date tested: 07/25/18 – 07/27/18

TEST SUMMARY

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

Source: Cultured Abalone Farm.
Dilution water: Lab seawater.
Endpoints: NOEC, IC25 at 48 hrs.
Test volume: 200 ml.
Aeration: None.
Number of replicates: 5.
Ref. Tox. source: VWR.
Lot No.: 3357C295.

RESULTS SUMMARY

SAMPLE CONCENTRATION	PERCENT NORMAL DEVELOPMENT
Control	96.2%
10 μg/l	96.6%
18 μg/l	95.7%
32 μg/l	21.7% *
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	22.4 μg/l

QA/QC TEST ACCEPTABILITY

Parameter	Result
Average control normality ≥80%	Yes (96.2%)
56 μg/l treatment response significantly less than control response	Yes (NOEC = 18 μg/l)
%MSD <20% relative to control	Yes (%MSD = 3.9%)

Abalone Larval Development Test-Proportion Normal

Start Date:	7/25/2018 15:30	Test ID:	RT180725ab	Sample ID:	REF-Ref Toxicant
End Date:	7/27/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	ZNSO-Zinc sulfate
Sample Date:	7/25/2018	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	HR-Haliotis rufescens
Comments:					

Conc-ug/L	1	2	3	4	5
D-Control	0.9810	0.9375	0.9439	0.9810	0.9640
10	0.9906	0.9304	0.9808	0.9722	0.9541
18	0.9815	0.9808	0.9528	0.9450	0.9266
32	0.1651	0.2830	0.2358	0.1810	0.2182
56	0.0000	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000	0.0000

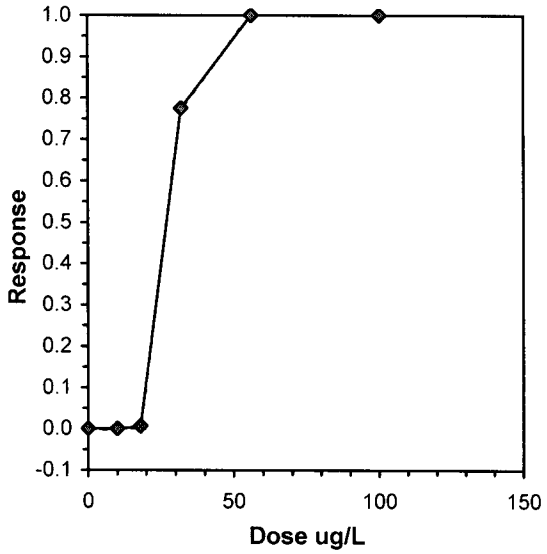
			Transform: Arcsin Square Root					1-Tailed			Isotonic	
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	0.9615	1.0000	1.3789	1.3181	1.4323	3.911	5				0.9630	1.0000
10	0.9656	1.0043	1.3935	1.3039	1.4735	4.743	5	-0.388	2.230	0.0840	0.9630	1.0000
18	0.9573	0.9957	1.3697	1.2965	1.4343	4.467	5	0.245	2.230	0.0840	0.9571	0.9938
*32	0.2166	0.2253	0.4824	0.4185	0.5610	11.695	5	23.788	2.230	0.0840	0.2164	0.2247
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)	0.93695	0.905	-0.0017	-1.3899
Bartlett's Test indicates equal variances (p = 0.98)	0.17712	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		0.03786	0.03929	1.00911	0.00355	4.4E-14	3, 16

Linear Interpolation (200 Resamples)

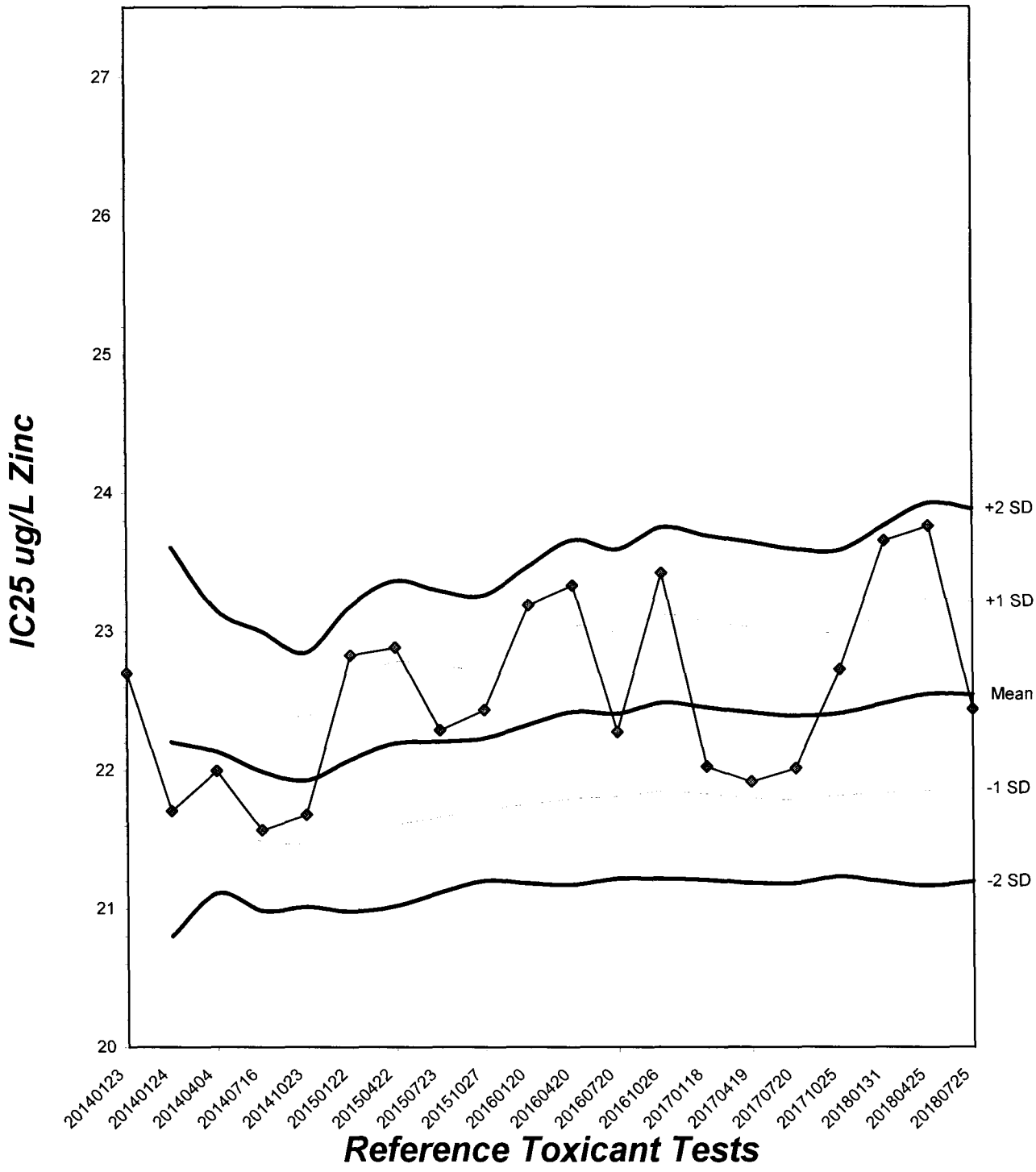
Point	ug/L	SD	95% CL(Exp)		Skew
IC05	18.798	0.151	18.245	19.000	-0.8143
IC10	19.708	0.149	19.161	19.944	-0.7138
IC15	20.618	0.150	20.040	20.889	-0.5433
IC20	21.528	0.157	20.995	21.851	-0.3366
IC25	22.438	0.167	21.896	22.841	-0.1349
IC40	25.169	0.213	24.555	25.825	0.2608
IC50	26.989	0.253	26.291	27.813	0.3743



Reviewed by:

Abalone Larval Development Laboratory Control Chart

CV% = 2.98



ABALONE CHRONIC BIOASSAY
Reference Toxicant - Zinc Sulfate

Aquatic Testing Laboratories

QA/QC No.: RT-180725

Start Date: 07/25/2018

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	15.4	8.3	8.0	33	15.4	8.0	15.6	7.6	7.9	33
10 µg/l Zn	15.2	8.2	8.0	33	15.3	8.0	15.5	7.7	7.9	33
18 µg/l Zn	15.1	8.2	8.0	33	15.4	8.0	15.4	7.7	7.9	33
32 µg/l Zn	15.0	8.2	8.0	33	15.4	8.0	15.3	7.8	8.0	33
56 µg/l Zn	15.0	8.2	8.0	33	15.1	8.0	15.3	7.8	8.0	33
100 µg/l Zn	14.9	8.2	8.0	33	15.1	8.0	15.2	7.8	8.0	33

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

Initial readings: [signature] Date/Time: 7-25-18 1530 Final readings: [signature] Date/Time: 7-27-18 1530

MICROSCOPIC EXAMINATION

Beaker No.	Sample Conc.	Number Normal	Number Abnormal	Beaker No.	Sample Conc.	Number Normal	Number Abnormal	Beaker No.	Sample Conc.	Number Normal	Number Abnormal
1	56	0	100	11	18	102	2	21	10	105	3
2	10	105	1	12	100	0	100	22	56	0	100
3	18	106	2	13	18	101	5	23	18	103	6
4	100	0	100	14	56	0	100	24	C	103	2
5	32	18	91	15	C	101	6	25	10	104	5
6	C	103	2	16	100	0	100	26	56	0	100
7	32	30	76	17	32	25	81	27	18	101	8
8	10	107	8	18	10	102	2	28	100	0	100
9	56	0	100	19	100	0	100	29	32	24	86
10	C	105	7	20	32	19	86	30	C	107	4

Microscopic examination: Analyst: [signature] Date: 7-31-18 Time: 0800

ABALONE CHRONIC BIOASSAY
Reference Toxicant - Zinc Sulfate

Aquatic Testing Laboratories

QA/QC No.: RT-180725

Start Date: 07/25/2018

RANDOMIZATION WORKSHEET

Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Notes
1	56	11	18	21	10	Number Males used: 4
2	10	12	100	22	56	Number females used: 6
3	18	13	18	23	18	Time H_2O_2 added: 12:00
4	100	14	56	24	C	Time water changed: 14:30
5	32	15	C	25	10	Time spawned: 1443 1515
6	C	16	100	26	56	
7	32	17	32	27	18	Time placed in test: 1545
8	10	18	10	28	100	Add 1600 fertilized eggs per 200 ml..
9	56	19	100	29	32	
10	C	20	32	30	C	Time glutaraldehyde added: 1530

Analyst: JM Date: 7-25-18 Time: 1100

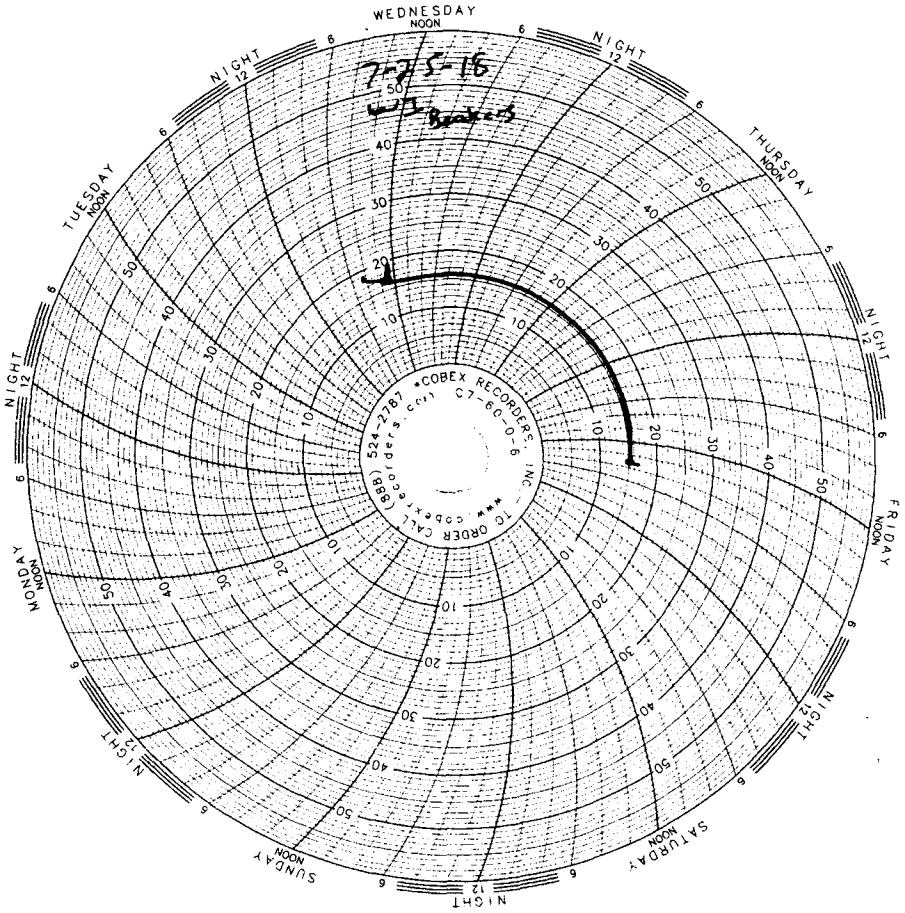
Aquatic
Testing
Laboratories

Test Temperature Chart

Test No: RT-180725

Date Tested: 07/25/18 to 07/27/18

Acceptable Range: 15 +/- 1°C



GIANT KELP GERMINATION AND AND GROWTH SHORT-TERM TOXICITY TEST

- *Test and Result Summary*
- *Data Summary and Statistical Analysis*
- *Raw Test Data: Water Quality & Test Organism Measurements*

GIANT KELP GERMINATION AND GROWTH TEST
REFERENCE TOXICANT - COPPER

Aquatic Testing Laboratories

QA/QC Batch No.: RT-180725

Date Tested: 07/25/18 - 07/27/18

TEST SUMMARY

Species: *Macrocystis pyrifera.*
Protocol: EPA/600/R-95/136.
Test type: Static.
Test chamber: Plastic beakers.
Temperature: 15 +/- 1°C.
Number of spores per ml: 7,500 (approx.).
Standard toxicant: Copper chloride.
Lab seawater: 0.2 um filtered seawater.

Source: Field collected.
Dilution water: Lab seawater.
Endpoints: NOEC, IC25 at 48 hrs.
Test volume: 200 ml.
Aeration: None.
Number of replicates: 5.
Ref. tox. source: Mallinckrodt.

RESULTS SUMMARY

Sample Concentration	Percent Germination		Mean Germ Tube Length (μm)	
Control	80.6%		16.45	
10 μg/l	81.5%		16.30	
18 μg/l	82.0%		15.85	
32 μg/l	69.9%	*	13.80	*
56 μg/l	47.4%	*	9.35	*
100 μg/l	14.2%	*	7.20	*
180 μg/l	3.1%	*	5.95	*
* Statistically significantly less than control at P = 0.05 level				

CHRONIC TOXICITY

Germination NOEC	18 μg/l
Germination IC25	41.4 μg/l
Germ Tube Growth NOEC	18 μg/l
Germ Tube Growth IC25	39.9 μg/l

QA/QC TEST ACCEPTABILITY

Parameter	Result
Mean control germination ≥ 70%	Yes (80.6%)
Mean control germination tube length >10 μm	Yes (16.45 μm)
Germination tube growth NOEC <35 μg/l Copper	Yes (18 μg/l)
%MSD <20% relative to control (germination & growth)	Yes (germ = 9.9%, growth = 5.9%)

Macrocystis Germination and Growth Test-Proportion Germinated

Start Date:	7/25/2018 15:30	Test ID:	RT180725k	Sample ID:	REF-Ref Toxicant
End Date:	7/27/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	CUCL-Copper chloride
Sample Date:	7/25/2018	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	MP-Macrocystis pyrifera

Comments:

Conc-ug/L	1	2	3	4	5
D-Control	0.8378	0.8505	0.8113	0.7339	0.7961
10	0.8440	0.8000	0.8431	0.8056	0.7822
18	0.8416	0.8241	0.7308	0.8365	0.8667
32	0.6796	0.5905	0.7339	0.7692	0.7196
56	0.4175	0.5283	0.4623	0.5825	0.3774
100	0.1607	0.1038	0.1089	0.1132	0.2222
180	0.0187	0.0194	0.0288	0.0513	0.0385

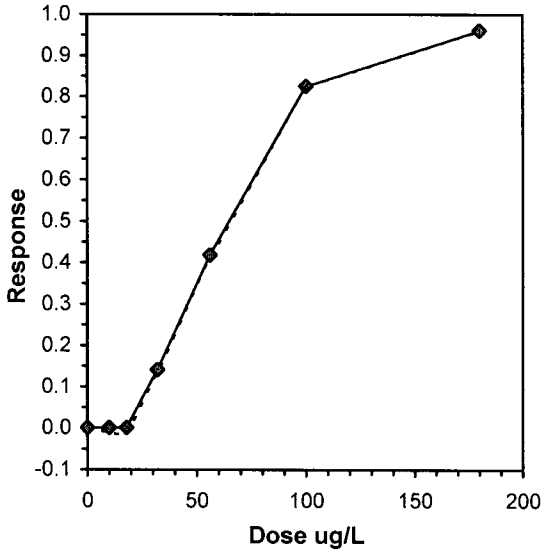
			Transform: Arcsin Square Root					1-Tailed			Isotonic	
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	0.8059	1.0000	1.1165	1.0288	1.1738	5.061	5				0.8137	1.0000
10	0.8150	1.0112	1.1270	1.0852	1.1648	3.160	5	-0.264	2.409	0.0953	0.8137	1.0000
18	0.8199	1.0174	1.1353	1.0253	1.1970	5.739	5	-0.473	2.409	0.0953	0.8137	1.0000
*32	0.6986	0.8668	0.9914	0.8764	1.0697	7.433	5	3.163	2.409	0.0953	0.6989	0.8589
*56	0.4736	0.5876	0.7587	0.6615	0.8683	10.982	5	9.040	2.409	0.0953	0.4733	0.5816
*100	0.1418	0.1759	0.3822	0.3280	0.4909	18.175	5	18.554	2.409	0.0953	0.1426	0.1752
*180	0.0313	0.0389	0.1747	0.1371	0.2284	22.258	5	23.797	2.409	0.0953	0.0318	0.0391

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.97418	0.934	-0.1723	-0.3268
Bartlett's Test indicates equal variances (p = 0.68)	4.00035	16.8119		

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		0.08029	0.09944	0.76865	0.00392	1.5E-21	6, 28

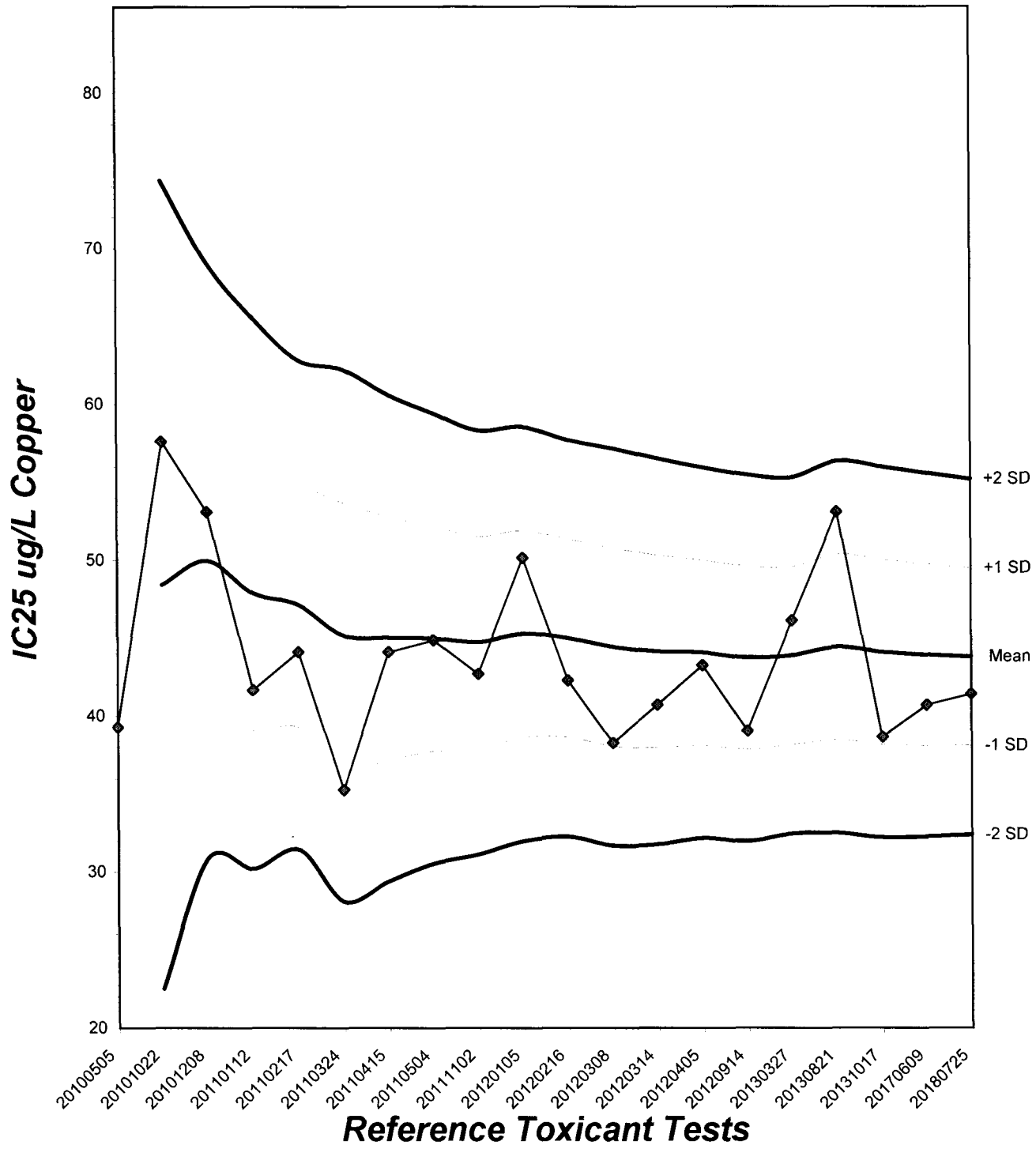
Linear Interpolation (200 Resamples)

Point	ug/L	SD	95% CL(Exp)		Skew
IC05	22.960	1.967	15.745	28.202	-0.3437
IC10	27.919	2.571	21.506	36.165	0.4796
IC15	32.767	2.626	24.879	39.448	0.0303
IC20	37.096	2.659	28.539	44.709	-0.1923
IC25	41.424	2.641	33.452	49.338	-0.0418
IC40	54.410	3.504	46.200	64.372	0.2325
IC50	64.838	3.855	51.909	73.311	-0.3645



Giant Kelp Germination Laboratory Control Chart

CV% = 13



Macrocystis Germination and Growth Test-Growth-Length

Start Date:	7/25/2018 15:30	Test ID:	RT180725k	Sample ID:	REF-Ref Toxicant
End Date:	7/27/2018 15:30	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	CUCL-Copper chloride
Sample Date:	7/25/2018	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	MP-Macrocystis pyrifera
Comments:					

Conc-ug/L	1	2	3	4	5
D-Control	17.250	16.500	16.500	16.000	16.000
10	16.500	16.000	16.000	17.000	16.000
18	15.250	16.750	16.750	15.250	15.250
32	14.250	14.500	14.000	13.500	12.750
56	10.500	9.750	9.000	8.500	9.000
100	7.250	7.000	6.500	7.000	8.250
180	5.750	5.500	6.000	6.750	5.750

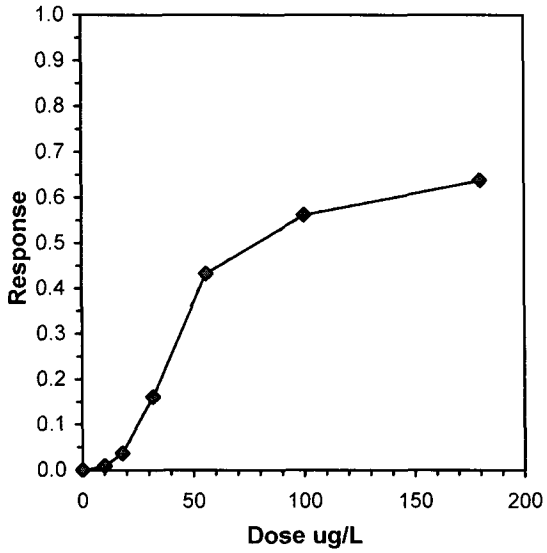
			Transform: Untransformed					1-Tailed			Isotonic	
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	16.450	1.0000	16.450	16.000	17.250	3.115	5				16.450	1.0000
10	16.300	0.9909	16.300	16.000	17.000	2.744	5	0.370	2.409	0.977	16.300	0.9909
18	15.850	0.9635	15.850	15.250	16.750	5.183	5	1.479	2.409	0.977	15.850	0.9635
*32	13.800	0.8389	13.800	12.750	14.500	5.027	5	6.531	2.409	0.977	13.800	0.8389
*56	9.350	0.5684	9.350	8.500	10.500	8.370	5	17.498	2.409	0.977	9.350	0.5684
*100	7.200	0.4377	7.200	6.500	8.250	8.988	5	22.797	2.409	0.977	7.200	0.4377
*180	5.950	0.3617	5.950	5.500	6.750	8.082	5	25.877	2.409	0.977	5.950	0.3617

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.93889	0.934	0.43566	-0.7783
Bartlett's Test indicates equal variances (p = 0.87)	2.49259	16.8119		

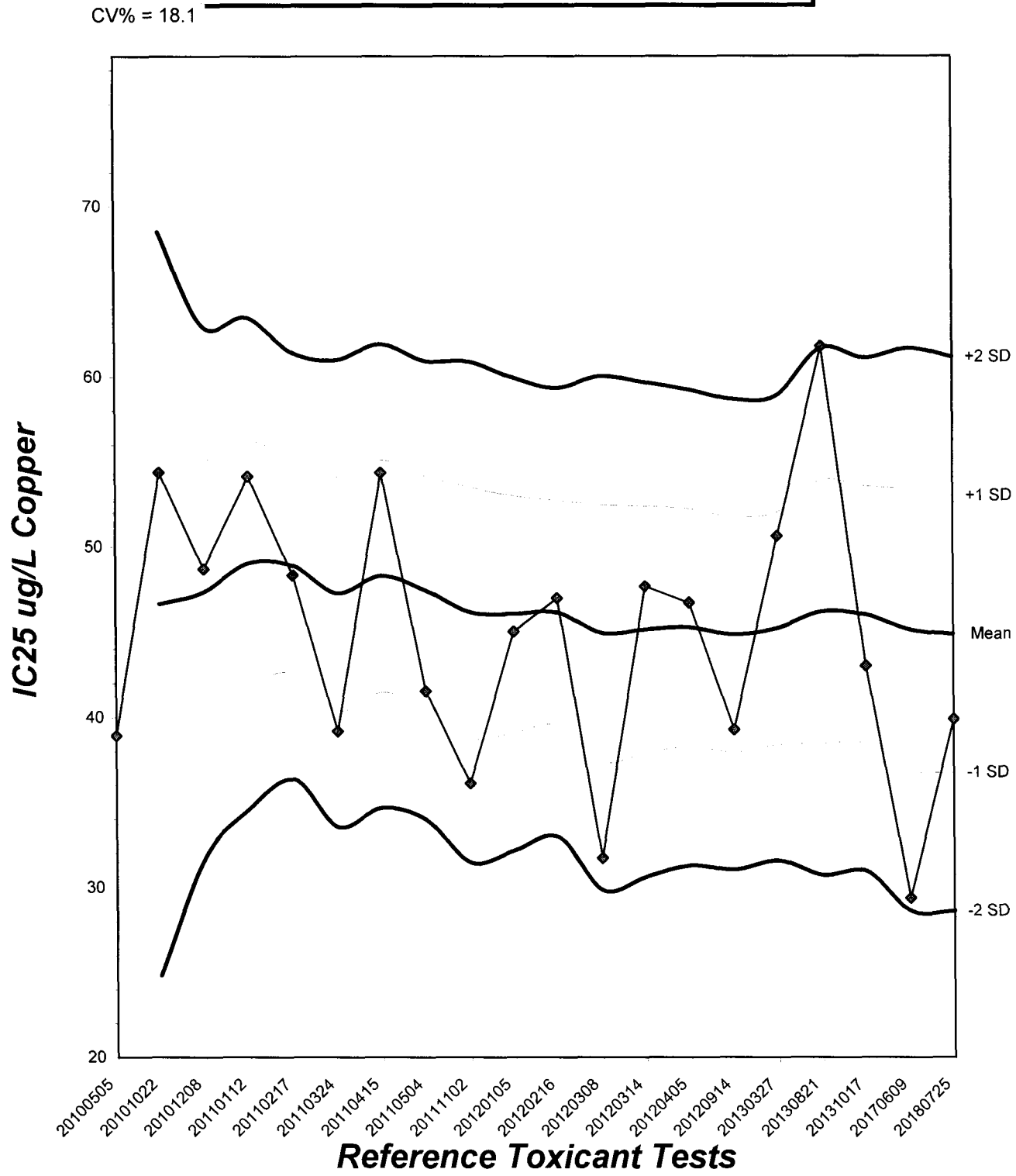
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test Treatments vs D-Control	18	32	24		0.97731	0.05941	102.42	0.41161	6.0E-23	6, 28

Linear Interpolation (200 Resamples)

Point	ug/L	SD	95% CL(Exp)		Skew
IC05	19.520	2.704	8.789	24.121	-0.6543
IC10	25.137	1.873	19.527	29.829	-0.0296
IC15	30.754	1.742	25.368	35.169	0.1020
IC20	35.452	1.438	30.914	38.859	-0.1102
IC25	39.888	1.312	36.096	43.131	0.0127
IC40	53.196	2.068	48.442	61.341	1.2068
IC50	79.023	5.142	61.805	92.201	-0.2707



Giant Kelp Germ Tube Length
Laboratory Control Chart



GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

QA/QC No.: RT-180725

Start Date:07/25/2018

Dish No.	Sample Conc.	Total Number Counted	Number Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					A	B	C	D	E	F	G	H	I	J
1	56	103	43	60	4	3	5	5	4	3	4	5	4	5
2	32	103	70	33	6	5	7	6	5	5	7	4	6	6
3	10	109	42	107	7	8	6	7	7	5	7	6	7	6
4	C	111	93	108	6	7	6	7	8	7	8	7	6	7
5	32	105	62	43	5	6	5	7	6	7	4	5	6	7
6	10	105	84	21	6	7	6	7	5	7	7	6	6	7
7	56	106	56	50	4	3	3	5	4	6	3	3	4	4
8	10	102	86	16	5	7	8	7	6	6	7	5	7	6
9	56	106	49	57	5	3	2	3	4	5	3	4	4	3
10	18	101	85	16	7	6	7	6	6	5	7	6	5	6
11	18	108	89	19	6	7	7	6	6	7	8	7	6	7
12	56	103	60	43	3	4	4	3	2	4	3	5	3	3
13	100	107	2	105	2	2	2	4	3	2	2	2	2	2
14	10	112	18	94	3	4	3	2	3	3	2	4	3	2
15	32	109	80	29	5	7	6	7	5	5	4	6	5	6
16	C	107	91	16	8	5	7	6	6	7	6	7	7	7
17	10	108	87	21	7	6	7	7	6	8	7	7	6	7
18	18	104	76	28	6	7	7	8	7	5	7	6	7	7
19	10	106	11	95	3	2	4	3	2	2	2	3	4	3
20	100	103	2	101	2	2	3	2	2	3	2	2	2	2

Comments:

Micrometer conversion factor: 1 unit = 2.5 um at 400X power

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

QA/QC No.: RT-180725

Start Date:07/25/2018

Dish No.	Sample Conc.	Total Number Counted	Number Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					A	B	C	D	E	F	G	H	I	J
21	15	104	87	17	6	5	7	7	6	5	7	6	5	7
22	100	101	11	90	3	2	3	2	2	3	2	4	2	3
23	15	105	91	14	5	5	7	6	6	7	5	7	6	7
24	32	104	80	24	6	5	7	5	5	4	6	7	4	5
25	56	106	40	66	4	5	4	3	3	4	5	3	2	3
26	C	106	86	20	6	7	5	7	7	8	7	6	6	7
27	C	109	80	29	6	6	7	5	6	7	7	6	7	7
28	10	101	79	22	6	7	6	5	7	6	6	7	8	6
29	180	104	3	101	2	3	2	2	2	4	2	3	2	2
30	180	117	6	111	2	3	3	3	4	3	2	2	3	2
31	100	106	12	94	3	2	2	3	3	2	3	4	3	3
32	100	108	24	84	3	4	2	3	4	3	3	4	3	4
33	32	107	77	30	6	5	7	5	5	4	5	3	6	5
34	C	103	82	21	6	7	7	6	5	7	6	7	7	6
35	180	104	4	100	2	2	2	4	2	2	2	3	2	2
36														
37														
38														
39														
40														

Comments:

Micrometer conversion factor: 1 unit = 2.5 um at 400X power

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

QA/QC No.: RT-180725

Start Date:07/25/2018

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	15.0	8.2	8.0	33	15.5	7.9	15.4	8.0	8.0	33
10 µg/l	15.0	8.2	8.0	33	15.6	7.9	15.4	8.0	8.0	33
18 µg/l	14.9	8.2	8.0	33	15.7	8.0	15.3	8.0	8.0	33
32µg/l	14.9	8.2	8.0	33	15.6	8.0	15.4	7.9	8.0	33
56 µg/l	14.8	8.2	8.0	33	15.7	8.0	15.4	7.9	8.0	33
100 µg/l	14.8	8.2	8.0	33	15.6	8.0	15.3	7.9	8.0	33
180 µg/l	14.7	8.2	8.0	33	15.8	8.0	15.4	8.0	8.0	33

Comments:

Reference toxicant: Copper chloride.

All dilutions made with reference lab seawater.

Illumination (16 hr light / 8 hr dark at 50 ± 10 uE/m^2/s) at 5 locations in incubator:
(four corners and center): 41, 43, 44, 47, 44 uE/m^2/s.

Initial readings: Analyst: JL Date: 7-25-18 Time: 1510

Final readings: Analyst: JL Date: 7-27-18 Time: 1510

Aquatic Testing Laboratories

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

QA/QC No.: RT-180725

Start Date:07/25/2018

RANDOMIZATION WORKSHEET

Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Notes
1	56	11	18	21	18	31	100	Need 7500/ml x 200 ml = 1,500,000 spores. Add 1.0 ml spore stock of 6 spores per 5x5 hemacytometer grid
2	32	12	56	22	100	32	100	
3	10	13	180	23	18	33	32	
4	C	14	100	24	32	34	C	
5	32	15	32	25	56	35	18	
6	10	16	C	26	C			
7	56	17	10	27	C			
8	10	18	18	28	10			
9	56	19	100	29	180			
10	18	20	180	30	180			

Analyst: _____ Date: 7-25-18 Time: 1000

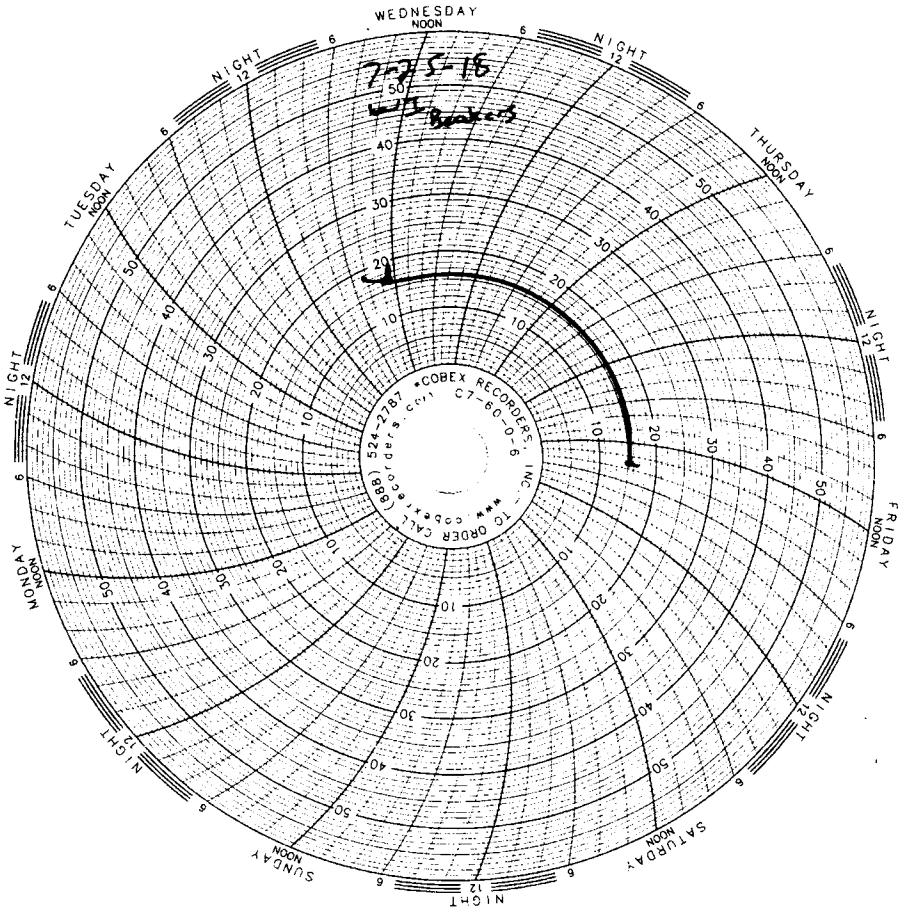
Aquatic Testing Laboratories

Test Temperature Chart

Test No: RT-180725

Date Tested: 07/25/18 to 07/27/18

Acceptable Range: 15 +/- 1°C



Aquatic
Testing
Laboratories

Topsmelt Larvae Survival and Growth Short-Term Toxicity Test

- *Test and Result Summary*
- *Data Summary and Statistical Analysis*
- *Raw Test Data: Water Quality & Test Organism Measurements*

TOPSMELT LARVAE CHRONIC BIOASSAY
REFERENCE TOXICANT - Copper

Aquatic Testing Laboratories

QA/QC Batch No.: RT-180724

Date Tested: 07/24/18 - 07/31/18

TEST SUMMARY

Species: *Atherinops affinis*.
Protocol: EPA/600/R-95/136.
Test type: Static renewal (90% daily).
Food: 40 b.s. nauplii per larvae 2X daily.
Test solution volume: 200 ml.
Number of larvae per chamber: 5.
Photoperiod: 16hr light / 8hr dark.
Dil. water: Laboratory sea water.

Source: Aquatic BioSystems.
Endpoints: LC50, IC25.
Age: 9 days (9-15 days).
Test chamber size: 600 ml.
Number of replicates: 5.
Temperature: 20 +/- 1°C.
Salinity: 33 +/- 2 o/oo.

RESULTS SUMMARY

Sample Concentration	Percent Survival		Mean Weight of Larvae (Biomass)	
Control	100%		1.547 mg	
56 µg/l	100%		1.712 mg	
100 µg/l	100%		1.560 mg	
180 µg/l	56%	*	0.954 mg	**
320 µg/l	8%	*	0.063 mg	**

* Statistically significantly less than control at P = 0.05 level.
** Concentrations with significantly less than control survival rates are not used in ANOVA comparisons.

CHRONIC TOXICITY

Survival LC50	196.6 µg/l
Biomass IC25	144.5 µg/l

QA/QC TEST ACCEPTABILITY

Parameter	Result
Average control survival ≥80%	PASS (100%)
Average dry weight of control ≥0.85 mg (when starting with 9 day old larvae)	PASS (average control dry weight = 1.547 mg (9 day old))
Survival LC50 ≤2 SD of control chart mean	PASS (see chart)
Survival LC50 <205 µg/l Copper	PASS (LC50 = 196.6 µg/l Copper)
%MSD of <25% relative to control survival	PASS (%MSD = 5.7%)
%MSD of <50% relative to control growth	PASS (%MSD = 21.7%)
Concentration response relationship acceptable	PASS (Response curve normal)

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	7/24/2018 14:45	Test ID:	RT180724ts	Sample ID:	REF-Ref Toxicant
End Date:	7/31/2018 14:45	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	CUCL-Copper chloride
Sample Date:	7/24/2018	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	AA-Atherinops affinis
Comments:					

Conc-ug/L	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000
180	0.6000	0.6000	0.6000	0.6000	0.4000
320	0.2000	0.2000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					Rank	1-Tailed	Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Resp	Number
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5			0	25
56	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5	27.50	17.00	0	25
100	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5	27.50	17.00	0	25
*180	0.5600	0.5600	0.8458	0.6847	0.8861	10.647	5	15.00	17.00	11	25
*320	0.0800	0.0800	0.3208	0.2255	0.4636	40.662	5	15.00	17.00	23	25

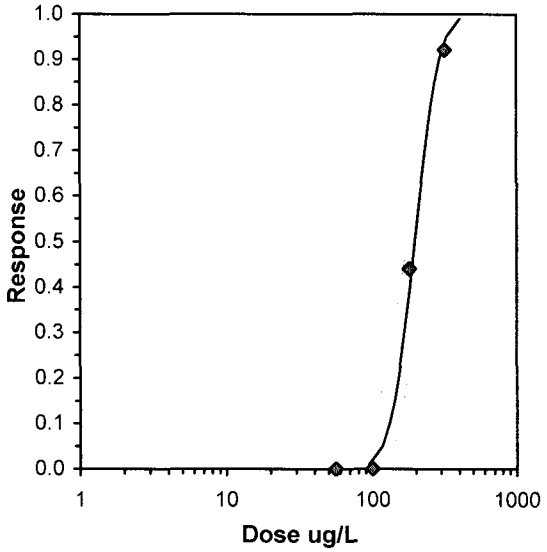
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.81093	0.918	-0.1133	1.97209
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	180	134.164	
Treatments vs D-Control				

Maximum Likelihood-Probit

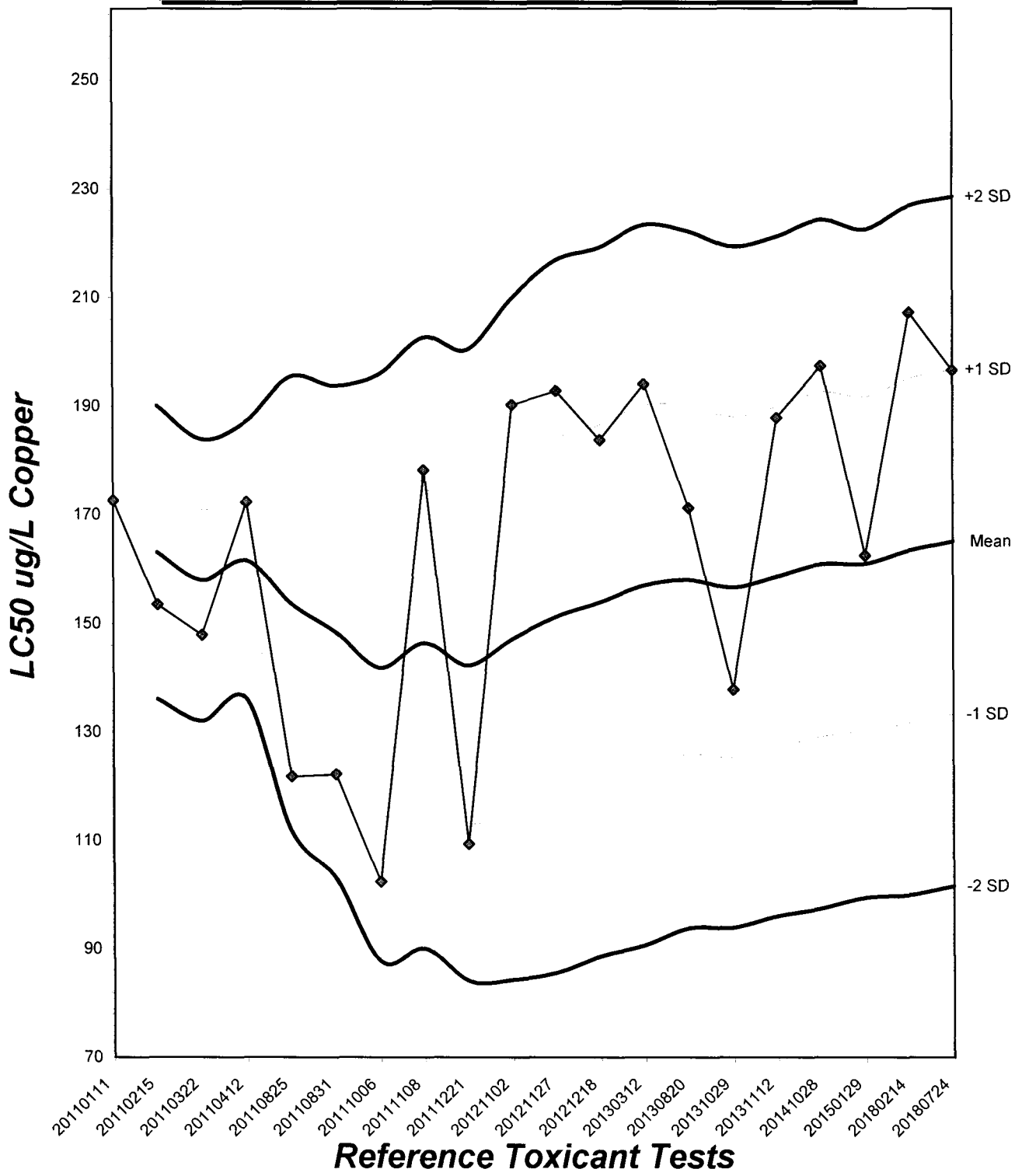
Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	7.32892	1.37781	4.62842	10.0294	0	0.83479	5.99146	0.66	2.29355	0.13645	4
Intercept	-11.809	3.16655	-18.016	-5.6028							
TSCR											

Point	Probits	ug/L	95% Fiducial Limits	
EC01	2.674	94.6513	60.1027	118.476
EC05	3.355	117.25	83.5203	139.933
EC10	3.718	131.427	99.21	153.418
EC15	3.964	141.948	111.179	163.609
EC20	4.158	150.908	121.483	172.515
EC25	4.326	159.043	130.845	180.867
EC40	4.747	181.543	156.093	205.929
EC50	5.000	196.583	171.876	224.845
EC60	5.253	212.87	187.663	247.581
EC75	5.674	242.984	213.664	295.355
EC80	5.842	256.084	224.008	318.118
EC85	6.036	272.248	236.202	347.601
EC90	6.282	294.042	251.892	389.539
EC95	6.645	329.595	276.165	462.716
EC99	7.326	408.289	326.182	643.004



Topsmelt Larvae Chronic Survival Laboratory Control Chart

CV% = 19.2



Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	7/24/2018 14:45	Test ID:	RT180724ts	Sample ID:	REF-Ref Toxicant
End Date:	7/31/2018 14:45	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	CUCL-Copper chloride
Sample Date:	7/24/2018	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	AA-Atherinops affinis
Comments:					

Conc-ug/L	1	2	3	4	5
D-Control	1.0000	1.0000	1.0000	1.0000	1.0000
56	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000
180	0.6000	0.6000	0.6000	0.6000	0.4000
320	0.2000	0.2000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					1-Tailed		
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
D-Control	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5			
56	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5	0.000	2.300	0.1031
100	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	5	0.000	2.300	0.1031
*180	0.5600	0.5600	0.8458	0.6847	0.8861	10.647	5	11.142	2.300	0.1031
*320	0.0800	0.0800	0.3208	0.2255	0.4636	40.662	5	22.853	2.300	0.1031

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.05)	0.81093	0.918	-0.1133	1.97209
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	180	134.164		0.05416	0.05701	1.04325	0.00502	5.6E-16	4, 20
Treatments vs D-Control										

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	7/24/2018 14:45	Test ID:	RT180724ts	Sample ID:	REF-Ref Toxicant
End Date:	7/31/2018 14:45	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	CUCL-Copper chloride
Sample Date:	7/24/2018	Protocol:	EPAW 95-EPA/600/R-95/136	Test Species:	AA-Atherinops affinis
Comments:					

Conc-ug/L	1	2	3	4	5
D-Control	1.5380	1.2780	1.3080	1.8160	1.7940
56	1.7720	1.8040	1.4080	1.6220	1.9560
100	1.3380	1.6960	1.5780	1.2360	1.9500
180	0.9560	0.9960	0.8620	1.2540	0.7000
320	0.1700	0.1440	0.0000	0.0000	0.0000

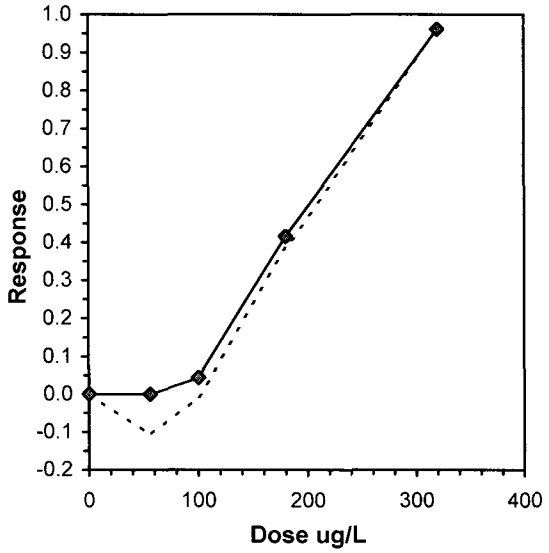
			Transform: Untransformed					1-Tailed			Isotonic	
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	1.5468	1.0000	1.5468	1.2780	1.8160	16.575	5				1.6296	1.0000
56	1.7124	1.1071	1.7124	1.4080	1.9560	12.114	5	-1.040	2.110	0.3359	1.6296	1.0000
100	1.5596	1.0083	1.5596	1.2360	1.9500	18.282	5	-0.080	2.110	0.3359	1.5596	0.9570
180	0.9536	0.6165	0.9536	0.7000	1.2540	21.282	5				0.9536	0.5852
320	0.0628	0.0406	0.0628	0.0000	0.1700	137.711	5				0.0628	0.0385

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)	0.93721	0.881	0.0348	-1.2847
Bartlett's Test indicates equal variances (p = 0.83)	0.36207	9.21034		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test Treatments vs D-Control	100	>100			0.33589	0.21715	0.04245	0.06335	0.52985	2, 12

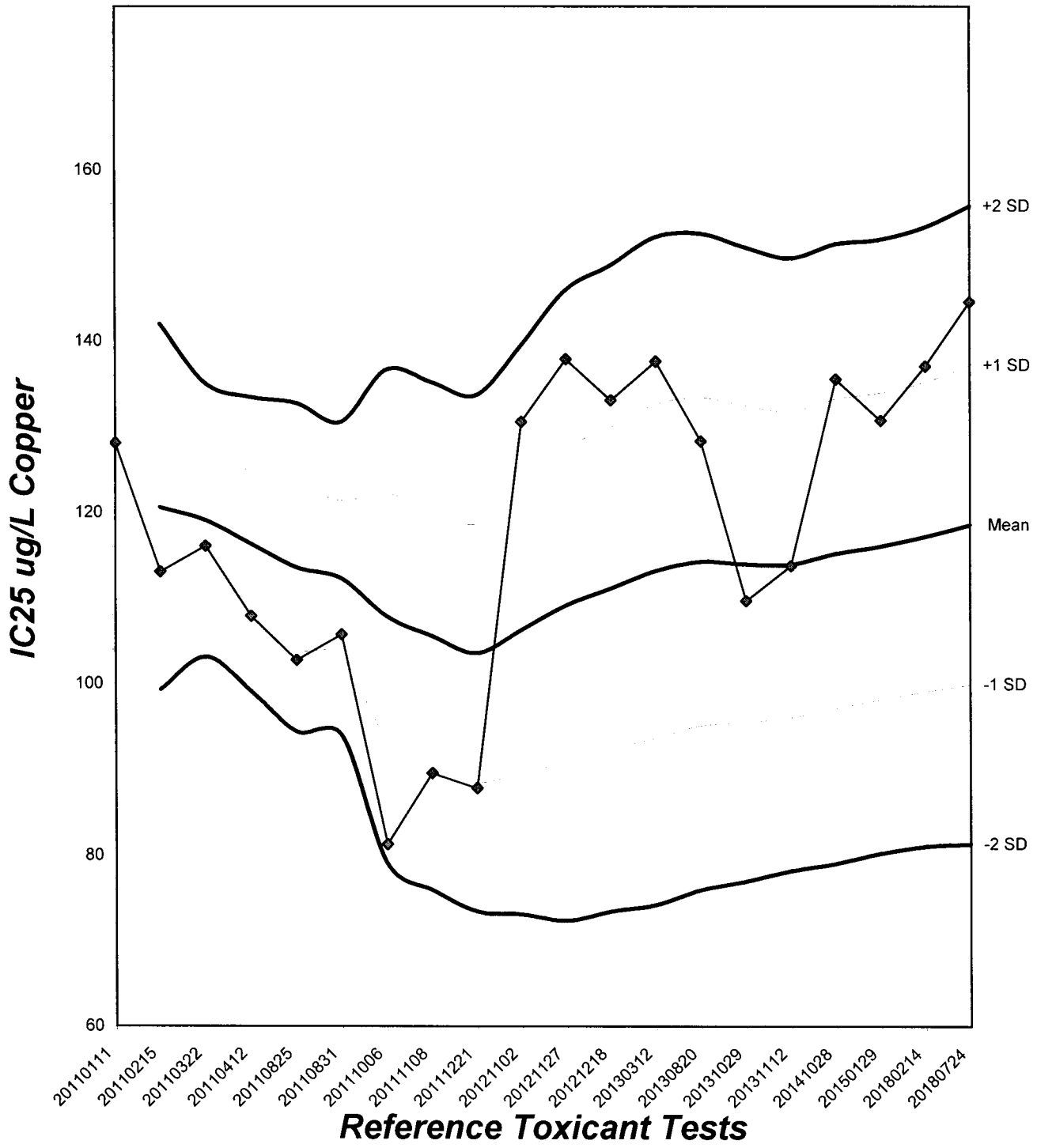
Linear Interpolation (200 Resamples)

Point	ug/L	SD	95% CL(Exp)		Skew
IC05	101.52	19.57	10.04	117.13	-0.7486
IC10	112.27	14.25	58.50	129.64	-0.8176
IC15	123.03	12.27	76.09	142.15	-0.7551
IC20	133.78	11.19	90.90	155.75	-0.6745
IC25	144.54	10.61	107.34	169.37	-0.4779
IC40	176.81	10.84	149.42	206.75	0.2044
IC50	201.81	11.07	168.19	228.50	-0.1229



Topsmelt Larvae Chronic Growth Laboratory Control Chart

CV% = 15.7



TOPSMELT CHRONIC BIOASSAY
Reference Toxicant - Copper
Survival and Growth Raw Data Sheet

Aquatic Testing Laboratories

QA/QC No.: RT-180724

Start Date:07/24/2018

Sample	Rep	Number of Live Larvae / Day							Final Results		Dry Weight (mg)	
		1	2	3	4	5	6	7	# Tested	# Dead	Total Wt.	Tare Wt.
Control	A	5	5	5	5	5	5	5	5	0	380.76	373.07
	B	5	5	5	5	5	5	5	5	0	372.09	365.70
	C	5	5	5	5	5	5	5	5	0	379.46	372.92
	D	5	5	5	5	5	5	5	5	0	383.03	373.95
	E	5	5	5	5	5	5	5	5	0	382.12	373.15
56 µg/l	A	5	5	5	5	5	5	5	5	0	378.71	369.85
	B	5	5	5	5	5	5	5	5	0	380.76	371.74
	C	5	5	5	5	5	5	5	5	0	374.32	367.28
	D	5	5	5	5	5	5	5	5	0	373.85	365.74
	E	5	5	5	5	5	5	5	5	0	385.05	375.27
100 µg/l	A	5	5	5	5	5	5	5	5	0	379.70	373.01
	B	5	5	5	5	5	5	5	5	0	382.62	374.14
	C	5	5	5	5	5	5	5	5	0	385.42	377.53
	D	5	5	5	5	5	5	5	5	0	373.57	367.39
	E	5	5	5	5	5	5	5	5	0	377.46	367.21
180 µg/l	A	4	4	3	3	3	3	3	5	2	375.04	370.26
	B	4	4	3	3	3	3	3	5	2	378.87	373.89
	C	5	4	4	4	4	3	3	5	2	378.44	374.63
	D	4	4	4	4	4	3	3	5	2	377.08	370.81
	E	5	3	2	2	2	2	2	5	3	370.65	367.15
320 µg/l	A	2	2	1	1	1	1	1	5	4	374.79	373.94
	B	3	2	1	1	1	1	1	5	4	373.08	372.36
	C	2	1	0	-	-	-	-	5	5	-	-
	D	1	1	1	1	0	-	-	5	5	-	-
	E	1	1	0	-	-	-	-	5	5	-	-

Time placed in drying oven: 1SW Temperature of drying oven: 60 °C (dry for 24 hr at 60°C)

Time placed in desiccator: 1SW Analyst: [signature] Date/Time: 8-1-18

Blank: 381.77 381.76

TOPSMELT CHRONIC BIOASSAY
Reference Toxicant - Copper
Water Chemistries Raw Data Sheet

Aquatic Testing Laboratories

QA/QC No.: RT-180724

Start Date:07/24/2018

		DAY 1		DAY 2		DAY 3		DAY 4		DAY 5		DAY 6		DAY 7	
		Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Analyst Initials:															
Time of Readings:		1445	1430	1430	1400	1400	1400	1400	1430	1430	1445	1445	1400	1400	1445
Control	DO	7.3	6.8	7.3	6.7	7.0	6.9	7.0	6.8	6.9	6.7	6.9	6.3	7.1	6.0
	pH	8.1	7.9	7.9	7.7	7.9	7.9	7.9	7.9	7.9	7.8	7.9	8.0	8.1	7.8
	Temp	20.9	20.8	20.7	20.6	20.7	20.6	20.3	20.4	20.6	20.7	20.7	20.8	20.8	20.7
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33
56 µg/l	DO	7.3	6.7	7.1	6.8	7.0	6.7	6.8	7.0	7.0	6.6	6.9	6.3	7.2	6.0
	pH	8.1	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9	8.0	8.0	7.8
	Temp	20.9	20.8	20.7	20.7	20.8	20.7	20.4	20.6	20.7	20.6	20.6	20.8	20.8	20.9
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33
100 µg/l	DO	7.3	6.7	7.0	6.8	7.0	6.9	6.9	7.8	7.0	6.5	6.9	6.4	7.1	6.1
	pH	8.1	8.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9	8.0	8.1	7.9
	Temp	20.9	20.8	20.8	20.8	20.8	20.7	20.5	20.6	20.6	20.7	20.7	20.8	20.7	20.9
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33
180 µg/l	DO	7.3	6.8	7.1	6.8	7.1	6.9	7.0	8.0	7.1	6.7	7.0	6.5	7.1	6.2
	pH	8.1	8.0	8.0	7.9	8.0	7.9	7.9	7.9	7.9	7.8	7.9	8.0	8.1	7.9
	Temp	20.9	20.8	20.7	20.7	20.8	20.7	20.5	20.5	20.6	20.7	20.8	20.8	20.7	20.9
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33
320 µg/l	DO	7.3	7.0	7.2	6.8	7.2	7.1	7.1	8.1	7.4	6.9	7.0	6.6	7.4	6.6
	pH	8.1	8.0	8.0	8.0	8.0	7.9	7.9	7.9	8.0	7.9	7.9	8.0	8.1	8.0
	Temp	20.9	20.8	20.8	20.7	20.7	20.6	20.5	20.6	20.7	20.6	20.7	20.8	20.7	20.9
	Sal.	33	33	33	33	33	33	33	33	33	33	33	33	33	33

Comments:

Dissolved Oxygen (DO) readings in mg/l O_2.
Temperature (Temp) readings in °C.
Salinity (Sal.) readings in ppt.

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

ORGANISM HISTORY

DATE: 7/23/2018

SPECIES: *Atherinops affinis*

AGE: 8 day

LIFE STAGE: Larvae

HATCH DATE: 7/15/2018

BEGAN FEEDING: Immediately

FOOD: *Artemia* sp.

Water Chemistry Record:	Current	Range
TEMPERATURE:	23°C	18-23°C
SALINITY/CONDUCTIVITY:	30 ppt **	28-32 ppt
TOTAL HARDNESS (as $CaCO_3$):	--	--
TOTAL ALKALINITY (as $CaCO_3$):	150 mg/l	140-170 mg/l
pH:	7.91	7.71-8.20

Comments: ** Acclimated to 32 ppt 7/23/18.

Facility Supervisor

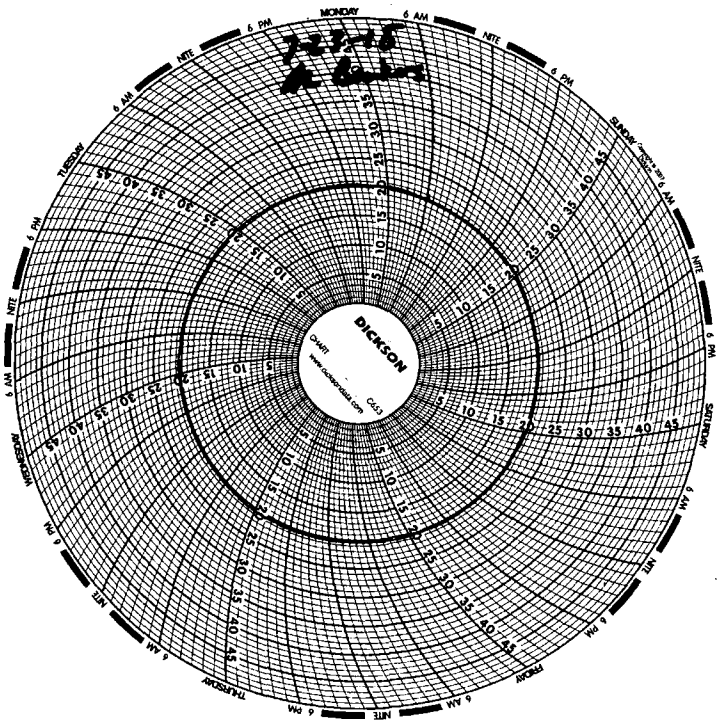
Aquatic Testing Laboratories

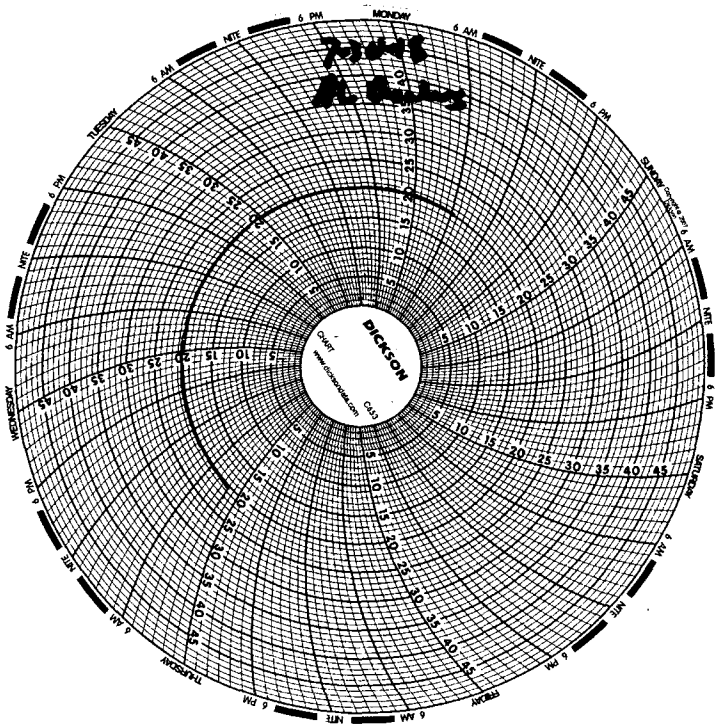
Test Temperature Chart

Test No: RT-180724

Date Tested: 07/24/18 to 07/31/18

Acceptable Range: 20 +/- 1°C





WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 8G19093

Project: MBCSD H2 2018

Attn: Doug Coats

Client: Marine Research Specialties
4744 TELEPHONE RD STE 3 PMB 315
Ventura, CA 93003-5258

Report Date: 8/08/2018
Received Date: 7/19/2018
Turnaround Time: Normal
Phones: (805) 218-3662
Fax:
P.O. #:
Billing Code:

DoD-ELAP #L2457 ● ELAP-CA #1132 ● EPA-UCMR #CA00211 ● Guam-EPA #17-008R ● HW-DOH # ● ISO 17025 #L2457.01 ● LACSD #10143 ● NELAP-CA #04229CA ● NELAP-OR #4047 ● NJ-DEP #CA015

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

Dear Doug Coats,

Enclosed are the results of analyses for samples received 7/19/18 with the Chain-of-Custody document. The samples were received in good condition, at 3.8 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Kim G. Tu
Project Manager

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634
www.wecklabs.com

Marine Research Specialties
4744 TELEPHONE RD STE 3 PMB 315
Ventura, CA 93003-5258

Project Number: MBCSD H2 2018

Project Manager: Doug Coats

Reported:
08/08/2018 14:33

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
W1 ARS Comp	SRA	8G19093-01	Water	07/18/18 08:35	
W2 ARS Comp	SRA	8G19093-02	Water	07/18/18 08:35	

Not Certified Analyses Summary

Analyte	CAS #	Not Accredited By
Krone, et al, 1989 in Water		
Tri-n-butyltin	688-73-3	NELAP
Tripentyltin	41784-41-2	NELAP

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Marine Research Specialties
4744 TELEPHONE RD STE 3 PMB 315
Ventura, CA 93003-5258

Project Number: MBCSD H2 2018

Project Manager: Doug Coats

Reported:
08/08/2018 14:33

Sample Results

Sample: W1 ARS Comp
8G19093-01 (Water)

Sampled: 07/18/18 8:35 by SRA

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Organo Tin by GC/MS						
Method: Krone, et al, 1989 **Batch ID:** W8G1422 **Instr:** GCMS15 **Prepared:** 07/25/18 12:06 **Analyst:** EFC						
Tri-n-butyltin	ND	0.0050	ug/l	1	07/31/18 22:25	
Surrogate(s)						
Tripentyltin	*116% Conc: 0.231*	*43-179*			*07/31/18 22:25*	

Sample: W2 ARS Comp
8G19093-02 (Water)

Sampled: 07/18/18 8:35 by SRA

Analyte	Result	MRL	Units	Dil	Analyzed	Qualifier
Radiological Parameters by APHA/EPA Methods						
Method: EPA 900.0 **Batch ID:** W8G1559 **Instr:** Inst **Prepared:** 07/27/18 10:45 **Analyst:** jea						
Gross Beta	**13**		pCi/L	1	08/02/18 17:40	
Uncertainty: 1.562 **MDA:** 1.942						
Method: SM 7110C **Batch ID:** W8G1562 **Instr:** MPC 9604- **Prepared:** 07/30/18 10:08 **Analyst:** jea						
Gross Alpha	**0.00600**		pCi/L	1	08/03/18 12:32	
Uncertainty: 0.084 **MDA:** 0.033						

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634
www.wecklabs.com

Marine Research Specialties
4744 TELEPHONE RD STE 3 PMB 315
Ventura, CA 93003-5258

Project Number: MBCSD H2 2018

Project Manager: Doug Coats

Reported:
08/08/2018 14:33

Quality Control Results

Organo Tin by GC/MS

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8G1422 - Krone, et al, 1989										
Blank (W8G1422-BLK1)				**Prepared: 07/25/18**	**Analyzed: 07/31/18**					
Tri-n-butyltin	ND	0.0050	ug/l							
Surrogate(s)										
Tripentyltin		*0.345*	*ug/l*	*0.200*		*172*	*43-179*			
LCS (W8G1422-BS1)				**Prepared: 07/25/18**	**Analyzed: 07/31/18**					
Tri-n-butyltin	0.0637	0.0050	ug/l	0.0500		127	40-181			
Surrogate(s)										
Tripentyltin		*0.354*	*ug/l*	*0.200*		*177*	*43-179*			
Matrix Spike (W8G1422-MS1)	**Source: 8G18091-01**			**Prepared: 07/25/18**	**Analyzed: 07/31/18**					
Tri-n-butyltin	0.0672	0.0050	ug/l	0.0500	ND	134	71-149			
Surrogate(s)										
Tripentyltin		*0.362*	*ug/l*	*0.200*		*181*	*43-179*			*S-MS*
Matrix Spike (W8G1422-MS2)	**Source: 8G19109-01**			**Prepared: 07/25/18**	**Analyzed: 07/31/18**					
Tri-n-butyltin	0.0565	0.0050	ug/l	0.0500	ND	113	71-149			
Surrogate(s)										
Tripentyltin		*0.310*	*ug/l*	*0.200*		*155*	*43-179*			
Matrix Spike Dup (W8G1422-MSD1)	**Source: 8G18091-01**			**Prepared: 07/25/18**	**Analyzed: 07/31/18**					
Tri-n-butyltin	0.0554	0.0050	ug/l	0.0500	ND	111	71-149	19	30	
Surrogate(s)										
Tripentyltin		*0.297*	*ug/l*	*0.200*		*149*	*43-179*			
Matrix Spike Dup (W8G1422-MSD2)	**Source: 8G19109-01**			**Prepared: 07/25/18**	**Analyzed: 07/31/18**					
Tri-n-butyltin	0.0715	0.0050	ug/l	0.0500	ND	143	71-149	23	30	
Surrogate(s)										
Tripentyltin		*0.376*	*ug/l*	*0.200*		*188*	*43-179*			*S-MS*

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Marine Research Specialties
4744 TELEPHONE RD STE 3 PMB 315
Ventura, CA 93003-5258

Project Number: MBCSD H2 2018

Project Manager: Doug Coats

Reported: 08/08/2018 14:33

Quality Control Results

(Continued)

Radiological Parameters by APHA/EPA Methods

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8G1559 - EPA 900.0										
Blank (W8G1559-BLK1)				**Prepared: 07/27/18**	**Analyzed: 08/02/18**					
Gross Beta	-0.32		pCi/L							
Uncertainty: 0.445	**MDA:** 0.741									
LCS (W8G1559-BS1)				**Prepared: 07/27/18**	**Analyzed: 08/02/18**					
Gross Beta	14		pCi/L	16.0		88	77-138			
Uncertainty: 0.837	**MDA:** 0.856									
LCS Dup (W8G1559-BSD1)				**Prepared: 07/27/18**	**Analyzed: 08/03/18**					
Gross Beta	13		pCi/L	16.0		81	77-138	8	30	
Uncertainty: 0.774	**MDA:** 0.741									
Matrix Spike (W8G1559-MS1)	**Source: 8G19109-01**			**Prepared: 07/27/18**	**Analyzed: 08/02/18**					
Gross Beta	1300		pCi/L	1070	330	94	70-130			
Uncertainty: 72.219	**MDA:** 72.139									
Matrix Spike Dup (W8G1559-MSD1)	**Source: 8G19109-01**			**Prepared: 07/27/18**	**Analyzed: 08/02/18**					
Gross Beta	1300		pCi/L	1070	330	94	70-130	0.5	30	
Uncertainty: 76.321	**MDA:** 79.526									
Batch: W8G1562 - SM 7110C										
Blank (W8G1562-BLK1)				**Prepared: 07/30/18**	**Analyzed: 08/03/18**					
Gross Alpha	-0.382		pCi/L							
Uncertainty: 0.07	**MDA:** 0.033									
LCS (W8G1562-BS1)				**Prepared: 07/30/18**	**Analyzed: 08/03/18**					
Gross Alpha	4.15		pCi/L	4.80		87	55-149			
Uncertainty: 0.233	**MDA:** 0.033									
Matrix Spike (W8G1562-MS1)	**Source: 8G19109-01**			**Prepared: 07/30/18**	**Analyzed: 08/03/18**					
Gross Alpha	6.87		pCi/L	4.80	1.13	120	70-130			
Uncertainty: 0.331	**MDA:** 0.033									
Matrix Spike Dup (W8G1562-MSD1)	**Source: 8G19109-01**			**Prepared: 07/30/18**	**Analyzed: 08/03/18**					
Gross Alpha	6.02		pCi/L	4.80	1.13	102	70-130	13	30	
Uncertainty: 0.3	**MDA:** 0.033									

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634

www.wecklabs.com

Marine Research Specialties
4744 TELEPHONE RD STE 3 PMB 315
Ventura, CA 93003-5258

Project Number: MBCSD H2 2018

Project Manager: Doug Coats

Reported:
08/08/2018 14:33

Notes and Definitions

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

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

14859 Clark Avenue,City of Industry CA, 91745 | Phone: (626) 336-2139 | Fax: (626) 336-2634
www.wecklabs.com

g9l9093

Weck Laboratories, Inc.
Analytical Laboratory Services - Since 1964

14859 East Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 1

CLIENT NAME:	PROJECT:
Marine Research Specialists	MBCSD H2 2018
ADDRESS: 4744 TELEPHONE RD STE 3 PMB 315 Ventura CA 93003-5258	PHONE: 805.218.3662 FAX: EMAIL: Marine@Rain.org
PROJECT MANAGER: Douglas A Coats	SAMPLER: SLA

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Tributyltin by GC/MS	SM 7110C & EPA 900.0
	7/18/18	0835	WW	W1 ARS Comp	1	X	
	7/18/18	0835	WW	W2 ARS Comp	1		X

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☒ 10 - 15 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment: Fed Ex

COMMENTS

Tributyltin by GC/MS

Radioactivity: Gross alpha and beta

RELINQUISHED BY	DATE / TIME	RECEIVED BY
SLA	13 July 18 - 1420	7/19/18 10:19
RELINQUISHED BY	DATE / TIME	RECEIVED BY
RELINQUISHED BY	DATE / TIME	RECEIVED BY

SAMPLE CONDITION:

Actual Temperature: 3.6°C

Received On Ice	Y	(N)
Preserved	Y	(N)
Evidence Seals Present	Y	(N)
Container Attacked	Y	(N)
Preserved at Lab	(Y)	N

SAMPLE TYPE CODE:

AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

PRESCHEDULED RUSH ANALYSES WILL TAKE PRIORITY OVER UNSCHEDULED RUSH REQUESTS
Client agrees to Terms & Conditions at: www.wecklabs.com

SPECIAL REQUIREMENTS / BILLING INFORMATION

COC version 042707

August 07, 2018

Vista Work Order No. 1801854

Dr. Douglas Coats
Marine Research Specialists
3140 Telegraph Rd., Ste A
Ventura, CA 93003-3238

Dear Dr. Coats,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on July 19, 2018. This sample set was analyzed on a standard turn-around time, under your Project Name 'MBCSD H2 2018'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1801854
Case Narrative

Sample Condition on Receipt:

One wastewater sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

EPA Method 1613B

This sample was extracted and analyzed for tetra-through-octa chlorinated dioxins and furans by EPA Method 1613B using a ZB-5MS GC column.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above the quantitation limit. The OPR recoveries were within the method acceptance criteria.

Labeled standard recoveries for all QC and field samples were within method acceptance criteria.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1801854-01	A.R.S. COMP EFF	18-Jul-18 08:40	19-Jul-18 09:41	Amber Glass NM Bottle, 1L

Vista Project: 1801854

Client Project: MBCSD H2 2018

ANALYTICAL RESULTS

Sample ID: Method Blank

EPA Method 1613B

Matrix: Aqueous
Sample Size: 1.00 L

QC Batch: B8H0006
Date Extracted: 01-Aug-2018 8:11

Lab Sample: B8H0006-BLK1
Date Analyzed : 04-Aug-18 01:23 Column: ZB-5MS

Analyte	Conc. (pg/L)	DL	EMPC	MDL	Qualifiers
2,3,7,8-TCDD	ND	0.884		1.08	
1,2,3,7,8-PeCDD	ND	0.902		3.94	
1,2,3,4,7,8-HxCDD	ND	1.44		3.00	
1,2,3,6,7,8-HxCDD	ND	1.59		4.20	
1,2,3,7,8,9-HxCDD	ND	1.52		5.70	
1,2,3,4,6,7,8-HpCDD	ND	2.57		3.51	
OCDD	ND		4.13	6.94	
2,3,7,8-TCDF	ND	0.784		0.902	
1,2,3,7,8-PeCDF	ND	0.896		3.43	
2,3,4,7,8-PeCDF	ND	0.901		2.21	
1,2,3,4,7,8-HxCDF	ND	0.735		2.96	
1,2,3,6,7,8-HxCDF	ND	0.758		4.01	
2,3,4,6,7,8-HxCDF	ND	0.861		2.61	
1,2,3,7,8,9-HxCDF	ND	1.21		2.38	
1,2,3,4,6,7,8-HpCDF	ND	1.38		2.64	
1,2,3,4,7,8,9-HpCDF	ND	1.63		4.82	
OCDF	7.03			7.05	J

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	83.5	25 - 164	
	13C-1,2,3,7,8-PeCDD	86.1	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	81.1	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	80.6	28 - 130	
	13C-1,2,3,7,8,9-HxCDD	79.2	32 - 141	
	13C-1,2,3,4,6,7,8-HpCDD	67.2	23 - 140	
	13C-OCDD	66.7	17 - 157	
	13C-2,3,7,8-TCDF	79.0	24 - 169	
	13C-1,2,3,7,8-PeCDF	94.8	24 - 185	
	13C-2,3,4,7,8-PeCDF	89.7	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	85.5	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	82.5	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	83.6	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	82.1	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	83.5	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	81.0	26 - 138	
	13C-OCDF	71.5	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	88.2	35 - 197	

Toxic Equivalent Quotient (TEQ) Data (pg/L)

TEQMinWHO2005Dioxin	0.00211

TOTALS

Total TCDD	ND	0.884
Total PeCDD	ND	0.902
Total HxCDD	ND	1.52
Total HpCDD	ND	2.57
Total TCDF	ND	0.784
Total PeCDF	ND	0.898
Total HxCDF	ND	0.876
Total HpCDF	ND	1.50

DL - Sample specifc estimated detection limit
MDL - Method detection limit
LCL-UCL- Lower control limit - upper control limit
EMPC - Estimated maximum possible concentration
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

Sample ID: OPR **EPA Method 1613B**

Matrix:	Aqueous	QC Batch:	B8H0006	Lab Sample:	B8H0006-BS1
Sample Size:	1.00 L	Date Extracted:	01-Aug-2018 8:11	Date Analyzed:	03-Aug-18 23:42 Column: ZB-5MS

Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits		Labeled Standard	%R	LCL-UCL
2,3,7,8-TCDD	194	200	97.2	67 - 158	IS	13C-2,3,7,8-TCDD	91.0	20 - 175
1,2,3,7,8-PeCDD	1000	1000	100	70 - 142		13C-1,2,3,7,8-PeCDD	90.9	21 - 227
1,2,3,4,7,8-HxCDD	999	1000	99.9	70 - 164		13C-1,2,3,4,7,8-HxCDD	84.9	21 - 193
1,2,3,6,7,8-HxCDD	1020	1000	102	76 - 134		13C-1,2,3,6,7,8-HxCDD	85.9	25 - 163
1,2,3,7,8,9-HxCDD	1030	1000	103	64 - 162		13C-1,2,3,7,8,9-HxCDD	84.6	21 - 193
1,2,3,4,6,7,8-HpCDD	1050	1000	105	70 - 140		13C-1,2,3,4,6,7,8-HpCDD	76.2	26 - 166
OCDD	2020	2000	101	78 - 144		13C-OCDD	68.8	13 - 199
2,3,7,8-TCDF	204	200	102	75 - 158		13C-2,3,7,8-TCDF	86.3	22 - 152
1,2,3,7,8-PeCDF	982	1000	98.2	80 - 134		13C-1,2,3,7,8-PeCDF	95.7	21 - 192
2,3,4,7,8-PeCDF	1010	1000	101	68 - 160		13C-2,3,4,7,8-PeCDF	93.7	13 - 328
1,2,3,4,7,8-HxCDF	998	1000	99.8	72 - 134		13C-1,2,3,4,7,8-HxCDF	88.6	19 - 202
1,2,3,6,7,8-HxCDF	997	1000	99.7	84 - 130		13C-1,2,3,6,7,8-HxCDF	86.6	21 - 159
2,3,4,6,7,8-HxCDF	979	1000	97.9	70 - 156		13C-2,3,4,6,7,8-HxCDF	87.6	22 - 176
1,2,3,7,8,9-HxCDF	1000	1000	100	78 - 130		13C-1,2,3,7,8,9-HxCDF	88.1	17 - 205
1,2,3,4,6,7,8-HpCDF	989	1000	98.9	82 - 122		13C-1,2,3,4,6,7,8-HpCDF	82.1	21 - 158
1,2,3,4,7,8,9-HpCDF	989	1000	98.9	78 - 138		13C-1,2,3,4,7,8,9-HpCDF	79.6	20 - 186
OCDF	2080	2000	104	63 - 170		13C-OCDF	72.7	13 - 199
					CRS	37Cl-2,3,7,8-TCDD	91.7	31 - 191

LCL-UCL - Lower control limit - upper control limit

Sample ID: A.R.S. COMP EFF

EPA Method 1613B

Client Data
Name: Marine Research Specialists
Project: MBCSD H2 2018
Date Collected: 18-Jul-2018 8:40

Sample Data
Matrix: Wastewater
Sample Size: 1.01 L

Laboratory Data
Lab Sample: 1801854-01 Date Received: 19-Jul-2018 9:41
QC Batch: B8H0006 Date Extracted: 01-Aug-2018 8:11
Date Analyzed : 04-Aug-18 03:03 Column: ZB-5MS

Analyte	Conc. (pg/L)	DL	EMPC	MDL	Qualifiers
2,3,7,8-TCDD	ND	1.03		1.07	
1,2,3,7,8-PeCDD	ND	1.01		3.91	
1,2,3,4,7,8-HxCDD	ND	1.70		2.98	
1,2,3,6,7,8-HxCDD	ND	1.83		4.17	
1,2,3,7,8,9-HxCDD	ND	1.87		5.66	
1,2,3,4,6,7,8-HpCDD	ND		5.78	3.48	
OCDD	31.2			6.89	J
2,3,7,8-TCDF	ND	1.13		0.895	
1,2,3,7,8-PeCDF	ND	1.16		3.40	
2,3,4,7,8-PeCDF	ND	1.12		2.19	
1,2,3,4,7,8-HxCDF	ND	0.973		2.94	
1,2,3,6,7,8-HxCDF	ND	0.987		3.98	
2,3,4,6,7,8-HxCDF	ND	1.08		2.59	
1,2,3,7,8,9-HxCDF	ND	1.49		2.36	
1,2,3,4,6,7,8-HpCDF	ND	1.42		2.62	
1,2,3,4,7,8,9-HpCDF	ND	1.69		4.78	
OCDF	ND		5.71	7.00	

	Labeled Standard	%R	LCL-UCL	Qualifiers
IS	13C-2,3,7,8-TCDD	76.2	25 - 164	
	13C-1,2,3,7,8-PeCDD	79.5	25 - 181	
	13C-1,2,3,4,7,8-HxCDD	76.1	32 - 141	
	13C-1,2,3,6,7,8-HxCDD	74.8	28 - 130	
	13C-1,2,3,7,8,9-HxCDD	73.8	32 - 141	
	13C-1,2,3,4,6,7,8-HpCDD	65.8	23 - 140	
	13C-OCDD	60.4	17 - 157	
	13C-2,3,7,8-TCDF	67.3	24 - 169	
	13C-1,2,3,7,8-PeCDF	82.4	24 - 185	
	13C-2,3,4,7,8-PeCDF	82.9	21 - 178	
	13C-1,2,3,4,7,8-HxCDF	79.5	26 - 152	
	13C-1,2,3,6,7,8-HxCDF	77.1	26 - 123	
	13C-2,3,4,6,7,8-HxCDF	78.0	28 - 136	
	13C-1,2,3,7,8,9-HxCDF	76.3	29 - 147	
	13C-1,2,3,4,6,7,8-HpCDF	82.2	28 - 143	
	13C-1,2,3,4,7,8,9-HpCDF	76.2	26 - 138	
	13C-OCDF	64.8	17 - 157	
CRS	37Cl-2,3,7,8-TCDD	91.9	35 - 197	

Toxic Equivalent Quotient (TEQ) Data (pg/L)

TEQMinWHO2005Dioxin	0.00936

TOTALS

Total TCDD	ND	1.03
Total PeCDD	ND	1.01
Total HxCDD	ND	1.80
Total HpCDD	ND	11.3
Total TCDF	ND	1.13
Total PeCDF	ND	1.14
Total HxCDF	ND	1.11
Total HpCDF	ND	1.54

DL - Sample specifc estimated detection limit
EMPC - Estimated maximum possible concentration
MDL - Method detection limit
LCL-UCL- Lower control limit - upper control limit
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

DATA QUALIFIERS & ABBREVIATIONS

B	**This compound was also detected in the method blank**
Conc.	**Concentration**
D	**Dilution**
DL	**Detection limit**
E	**The associated compound concentration exceeded the calibration range of the instrument**
H	**Recovery and/or RPD was outside laboratory acceptance limits**
I	**Chemical Interference**
J	**The amount detected is below the Reporting Limit/LOQ**
LOD	**Limits of Detection**
LOQ	**Limits of Quantitation**
M	**Estimated Maximum Possible Concentration (CA Region 2 projects only)**
NA	**Not applicable**
ND	**Not Detected**
Q	**Ion ratio outside of 70-130% of Standard Ratio. (DOD PFAS projects only)**
TEQ	**Toxic Equivalency**
U	**Not Detected (specific projects only)**
*****	**See Cover Letter**

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	17-015-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-18
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2016026
Minnesota Department of Health	1322288
New Hampshire Environmental Accreditation Program	207717
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-008
Pennsylvania Department of Environmental Protection	014
Texas Commission on Environmental Quality	T104704189-17-8
Virginia Department of General Services	9077
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

Submit by Email*

Vista

CHAIN OF CUSTODY RECORD

FOR LABORATORY USE ONLY
Laboratory Project ID: 1801854 Temp 0.6 °C
Storage ID: WR-2 Storage Secured: Yes ☑ No ☐

TAT: (Check One)
Standard ◉ 21 days
Rush (surcharge may apply)
○ 14 days ○ 7 days Specify:

Project I.D.: **MBCSD H2 2018** P.O. #: Sampler: SRA (Name)

Invoice to: Name	Company	Address	City	State	Zip	Ph#	Fax #
Douglas A Coats	Marine Research Specialists	Same as below	Ventura	CA	93003	805.218.3662	

Relinquished by: (Printed Name and Signature) Date: 13 JUL 18 Time: 1930 Received by: (Signature and Printed Name) Date: 07/19/18 Time: 1010

Relinquished by: (Printed Name and Signature) Date: Time: Received by: (Signature and Printed Name) Date: Time:

See "Sample Log-in Checklist" for additional sample information

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 • Fax (916) 673-0106

Method of Shipment: FedEx

Tracking No.:

ATTN:

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	EPA1613 2378-TCDD	EPA1613 2378-TCDD/TCDF	EPA8290 PCDD/PCDF	EPA8290 2378-TCDD	EPA8290 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA8280 2378-TCDD	EPA8280 2378-TCDD/TCDF	EPA8280 PCDD/PCDF	EPA1668 TOTALS	EPA1668 COPLANAR PCBs	EPA1668 209 CONGENERS	EPA1614 PBDE	EPA1614 PAH	CARB429 WHO-29	
A.R.S. COMP EFF	7/18/18	0840	V1 ARS Comp	1		WW																1613B
	7/18/18	0840	Travel Blank	1																		Hold

Special Instructions/Comments: **Extract and analyze using EPA 1613B for tetra- through- octa chlorinated dioxins and furans.**

SEND DOCUMENTATION AND RESULTS TO:

Name: **Douglas A Coats**
Company: **Marine Research Specialists**
Address: **4744 TELEPHONE RD STE 3 PMB 315**
City: **Ventura** State: **CA** Zip: **93003**
Phone: **805.218.3662** Fax:
Email: **Marine@Rain.org**

Container Types: A = 1 Liter Amber, G = Glass Jar
P = PUF, T = MM5 Train, O = Other

***Bottle Preservative Type:** ☐ T = Thiosulfate, ☐ O = Other

Matrix Types: DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B=Blood/Serum O = Other

Vista Analytical Laboratory

Sample Log-in Checklist

Vista Work Order #: 1801854 **TAT** Std

Samples Arrival:	**Date/Time** 07/19/18 0941	**Initials:** VBLB	**Location:** WR-2 **Shelf/Rack:** NA
Logged In:	**Date/Time** 07/19/18 1643	**Initials:** KE	**Location:** WR-2 **Shelf/Rack:** B-1

Delivered By:	(FedEx)	UPS	On Trac	GSO	DHL	Hand Delivered	Other
Preservation:	(Ice)		(Blue Ice)		Dry Ice		None
Temp °C: 0.7 (uncorrected)	**Time:** 1009				**Thermometer ID:** IR-4		
Temp °C: 0.6 (corrected)	**Probe used:** Yes☐ No☑						

	YES	NO	NA
Adequate Sample Volume Received? *ONLY 1 LITER	KE	KE	*
Holding Time Acceptable?	KE		
Shipping Container(s) Intact?	VBLB		
Shipping Custody Seals Intact?	VBLB		
Shipping Documentation Present?	VBLB		
Airbill Trk # 7819 1854 0185	VBLB		
Sample Container Intact?	KE		
Sample Custody Seals Intact?			KE
Chain of Custody / Sample Documentation Present?	VBLB		
COC Anomaly/Sample Acceptance Form completed?			KE
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			KE

Preservation Documented:	$Na_2S_2O_3$	Trizma	None	Yes	No	NA
Shipping Container	(Vista)	Client	Retain	Return	Dispose	

Comments:

* NO BACKUP ONLY 1 LITER RECEIVED