Mr. Mark D'Avignon
U.S. Army Corps of Engineers
San Francisco District
1455 Market Street
San Francisco, CA 94103-1398

July 1, 2015

Dear Mr. D'Avignon:

On behalf of Ms. Jaclyn Gnusti of Moffatt & Nichol and Mr. Don Snaman of the Port of Redwood City, I have enclosed two copies of the results report "Characterization of the Sediment from the Port of Redwood City's Berths 1-4: Results of Dredge Materials Sampling and Analysis" for review at the July 8th DMMO meeting. In addition, an electronic copy of this report has been uploaded to the DMMO website "meeting area" at http://www.dmmosfbay.org for each of the DMMO participating agency representatives to review.

If you have any questions, please give me a call at (707) 207-7761. I look forward to hearing from you.

Sincerely,

Jeffrey Cotsifas
President

(w/ enc): Ms. Brenda Goeden, BCDC
Ms. Elizabeth Christian, SFRWQCB
Mr. Don Snaman, Port of Redwood City

(wo/ enc): Mr. Brian Ross, U.S. EPA
Mr. Al Franzoia, SLC
Mr. Arn Aarreberg, CDFW
Mr. Gary Stern, NMFS
Ms. Jaclyn Gnusti, Moffatt & Nichol
Mr. Jack Fink, Moffatt & Nichol

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DATA REPORT

Characterization of the Sediment from the Port of Redwood City's Berths 1-4: Results of Dredge Materials Sampling and Analysis

Permits, Certifications, or Leases
USACE: Permit# 27707S (expired 2014)
RWQCB: Certification CIWQC Place No 757775 (expired 2010)
BCDC: Permit #M93-77 (expired 2010)

Prepared for

Port of Redwood City
675 Seaport Boulevard
Redwood City, CA 94063

Prepared by

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534

July 2015

PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

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List of Acronyms

ALS	ALS Environmental
ASTM	American Society for Testing and Materials
BCDC	Bay Conservation and Development Commission
Calscience	Eurofins Calscience
CRRP	Cullinan Ranch Restoration Project
COC	Chain-of-custody
DMMO	Dredged Material Management Office
ERED	Environmental Residue Effects Database
ESC	Elutriate Suitability Concentrations
EC_{50}	50% Effect Concentration
EFH	Essential Fish Habitat
GPS	Global positioning system
g/L	Grams/liter
HDPE	High density polyethylene
ITM	Inland Testing Manual
LC_{50}	50% Lethality Concentration
LCS/LCSD	Laboratory Control/Laboratory Control Spike Duplicate
LOED	Lowest observed effect dose
LPC	Limiting permissible concentration
LTMS	Long Term Management Strategy
MDL	Method detection limit
MET	Modified Elutriate Test
µg/kg	Microgram per kilogram
µg/L	Microgram per liter
mg/kg	Milligram per kilogram
mg/L	Milligram per liter
MLLW	Mean lower low water
MRL	Method reporting limits
MS/MSD	Matrix spike/matrix spike duplicate
MWRP	Montezuma Wetlands Restoration Project
NOED	No observed effect dose
OCl	Organochlorine
OTM	Ocean Testing Manual

PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PER	Pacific EcoRisk, Inc.
Port	Port of Redwood City Berths 1-4
QA/QC	Quality assurance/quality control
RPD	Relative percent difference
SFRWQCB	San Francisco Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SAR	Sampling and Analysis Results Report
SD	Standard Deviation
SF Bay	San Francisco Bay
SF-11	Alcatraz disposal site 11
SF-DODS	San Francisco Deep Ocean Disposal Site
SLC	State Lands Commission
SOP	Standard operating procedures
SUAD	Suitable for unconfined aquatic disposal
TEG	TEG Oceanographic Services
TOC	Total organic carbon
TRV	Toxicity reference values
TSS	Total suspended solids
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFDA	U.S. Food and Drug Administration
USFWS	U.S. Fish and Wildlife Service
WAAS	Wide angle augmentation system
WET	Waste extraction testing
WQC	Water quality certification
WQO	Water quality objective
yds^3	Cubic yards

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Note Electronic copies provided at DMMO "meeting area" at http://www.dmmosfbay.org**:**

1. INTRODUCTION

The Port of Redwood City (Port), located on the western shoreline of South San Francisco Bay, in Redwood City, CA (Figures 1-1 through 1-3), is currently seeking 10-year U.S. Army Corps of Engineers (USACE) and Bay Conservation and Development Commission (BCDC) maintenance dredging permits, and a San Francisco Regional Water Quality Control Board (SFRWQCB) Water Quality Certification (WQC) for maintenance dredging of its Berths 1-4. In order to provide the chemical and biological characterization needed to permit this dredging, Pacific EcoRisk (PER) was contracted to perform sampling and testing of sediments collected from within the Port's Berths 1-4 (Figure 1-4). These sediments were subjected to full Inland Testing Manual/Ocean Testing Manual (ITM/OTM) testing (as per PN# 01-01 guidance) to determine the suitability for sediment placement at the Alcatraz disposal site (SF-11), San Francisco Deep Ocean Disposal Site (SF-DODS), or for beneficial reuse at a wetland restoration sites such as the Cullinan Ranch Restoration Project (CRRP) and Montezuma Wetlands Restoration Project (MWRP). This Data Report has been prepared to provide the required characterization of these sediments.

The Port requires dredging of its Berths 1-4 (Figure 1-4) to a depth of -34.0 ft. MLLW + 1.0 ft. over-dredge. Accordingly, sediments were sampled to a total depth of -35.0 ft. MLLW; in addition, a "Z-layer" sample consisting of the top 6 inches of the post-dredged mudline was collected at each sediment core location. Based on the most recent bathymetric survey, the total volume of the material within the channel requiring dredging is estimated to be approximately 38,330 cubic yards (yds^3) consisting of 29,980 yds^3 above project depth and 8,350 yds^3 of allowable overdepth. It is estimated that there will be approximately 47,913 yds^3 of material when dredging begins later this year. Typical estimated dredge depths and estimated volumes of dredged material to be removed, including side slope and over-depth, are summarized in Table 1-1. The proposed dredge footprint encompasses approximately 5.04 acres of the permitted 5.18 acre dredge limits.

Table 1-1. Port of Redwood City Episode 1 Dredging Volumes .

Location	Episode Dredge Footprint (Acres)	Proposed Depth (ft. MLLW)	Estimated Volume (yds^3)	Over-depth (ft.)	Estimated Volume (yds^3)	Permitted Depth + Over-depth (ft. MLLW)	Total Estimated Volume (yds^3)	Total Estimated Volume August 2015 (yds^3)*
Berths 1&2	3.03	-34	20,580	+1.0	5,100	-35	25,680	32,100
Berths 3&4	2.01	-34	9,400	+1.0	3,250	-35	12,650	15,813
Total:	**5.04**	-	29,980	-	8,350	-	**38,330**	**47,913**

* Dredge volumes are estimates based on a bathymetric survey performed on October 21, 2014 and include a 25% contingency; however the sampling and testing program was based on the current sediment volume of 38,330 yds^3.

1.1 Objectives of the Sediment Investigation

The objective of this sampling and analyses was to evaluate the proposed dredged material to determine whether it will represent an adverse impact during removal operations and placement at currently permitted disposal sites and/or future alternative disposal sites. The procedures for sediment sample collection, sample processing and preparation, physical and chemical analyses, biological testing and data analyses were presented in a previously approved Sampling and Analysis Plan (SAP [PER 2015]). The specific objectives of the SAP scope-of-work were as follows:

- Collect core samples from within the designated sampling areas following field protocol detailed in the SAP; and
- Conduct chemical and biological analyses to determine whether sediments are suitable for unconfined aquatic disposal (SUAD) at multiple disposal sites such as SF-11, and SF-DODS, or for beneficial reuse at wetland restoration sites such as CRRP and MWRP. Sediment samples will be archived to provide for any beneficial reuse site-specific requirements (i.e., waste extraction testing [WET]), if necessary.

1.2 Organization of this Document

Sample collection and handling procedures are discussed in Sections 2 and 3 of this report. Results of chemical analyses and biological toxicity testing are provided in Sections 4 through 6. Section 7 discusses quality control (QC) and Section 8 presents the conclusions regarding suitability of the material for unconfined aquatic disposal at SF-11 and SF-DODS, or for beneficial reuse at wetland restoration sites such as CRRP and MWRP.

Figure 1-1. Location Map: Port of Redwood City, Redwood City, CA

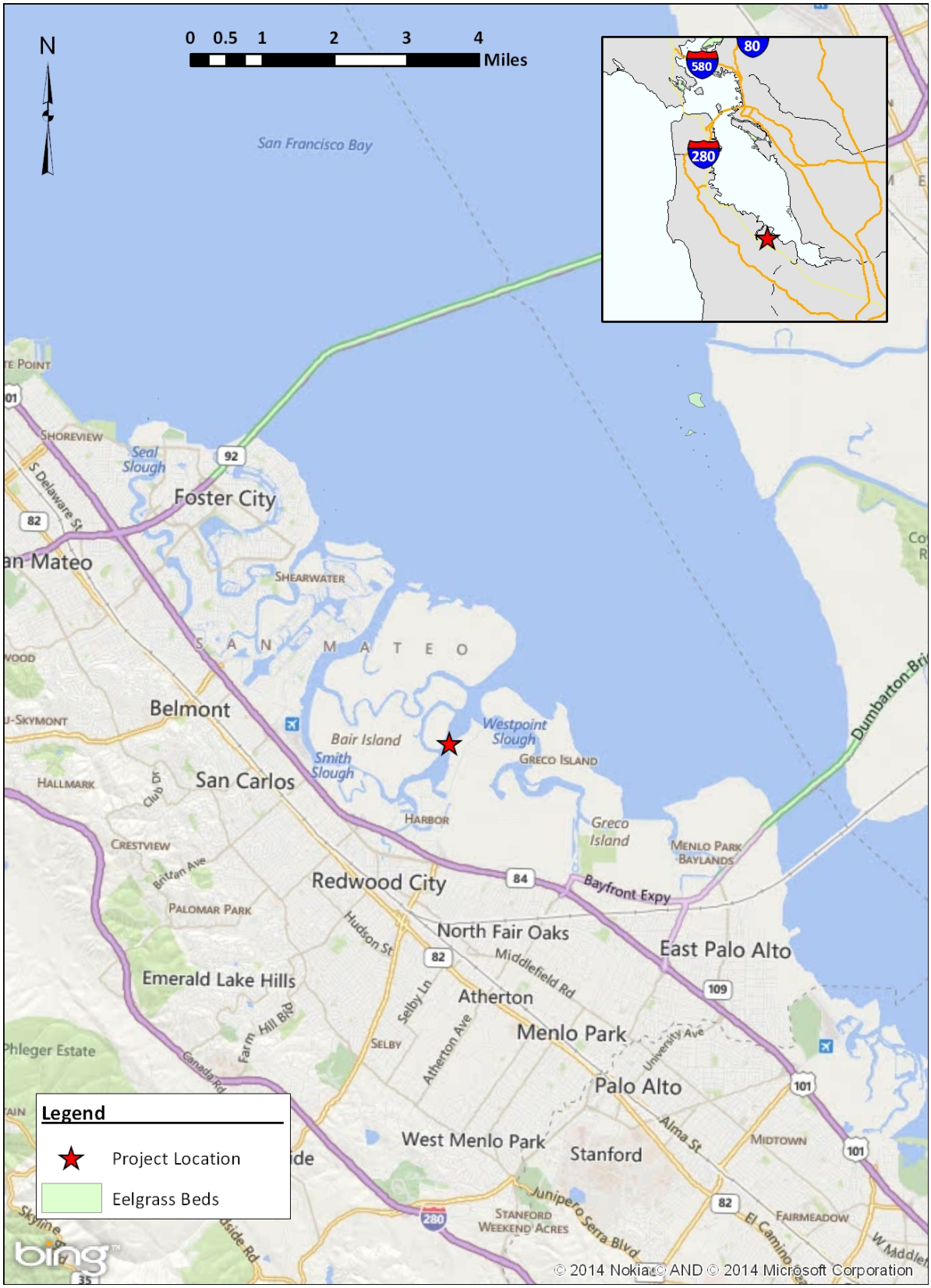
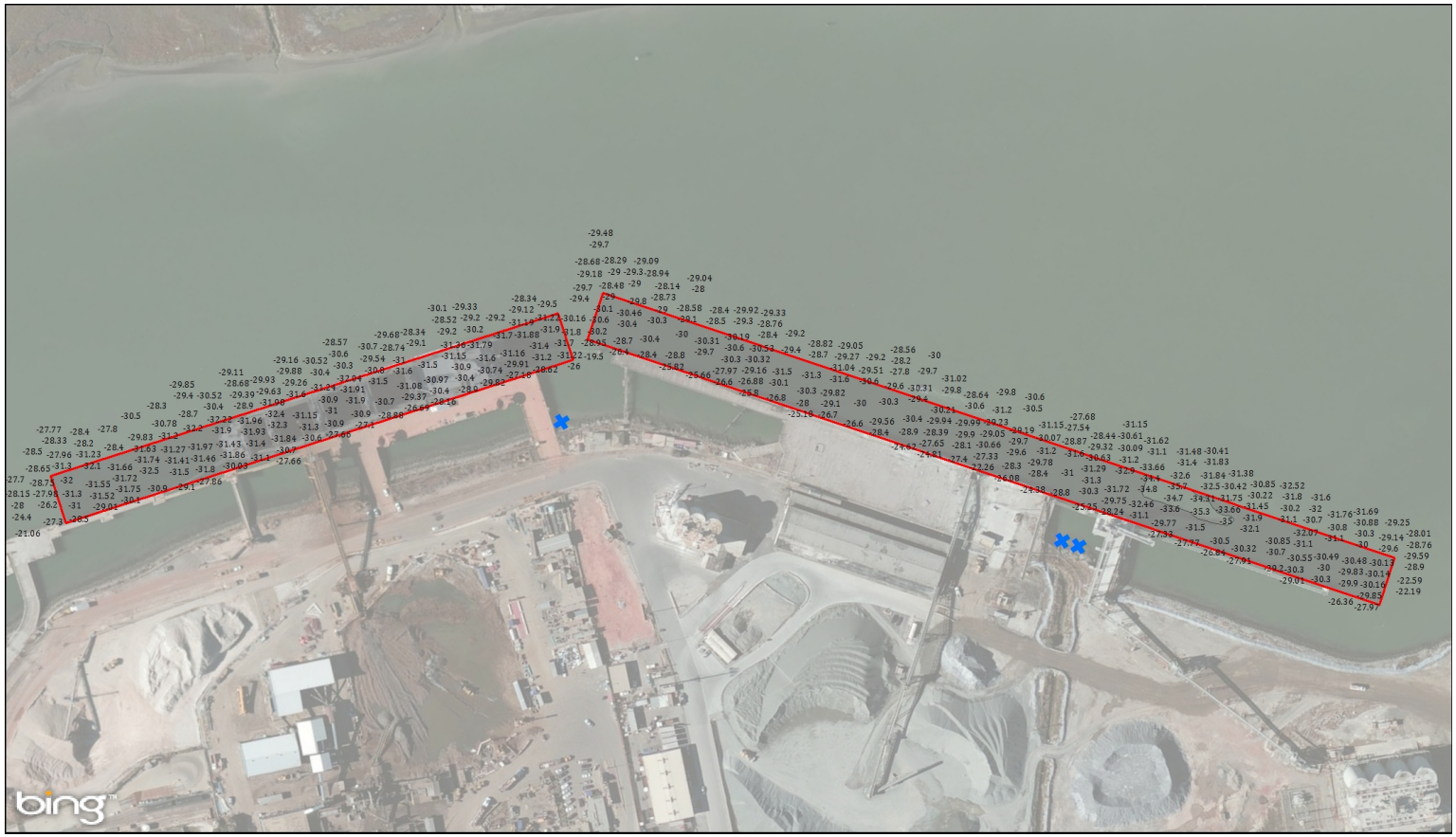


Figure 1-2. Vicinity Map #1: Port of Redwood City, Redwood City, CA

Figure 1-3. Vicinity Map #2: Port of Redwood City, Redwood City, CA



Legend

- Stormwater Outfalls
- Permitted Dredge Limits [5.18 acres]
- Episode Dredge Footprint [5.04 acres]

PACIFIC ECORISK ENVIRONMENTAL CONSULTING & TESTING

0 150 300 600 Feet

Horizontal Datum: NAD83
Map Projection: California State Plane
Coordinate System (SPCS), Zone 3
Units: Feet

Notes:
1. Bathymetric data from survey conducted on December 13, 2014 by PLS Surveys, Inc. and represent conditions at the time of survey.
2. Benchmark: Tidal benchmark 13 1974. EL = 12.97 FT. MLLW.
3. Bathymetric data shown represents water depths at a 0.0 tide.
4. Soundings taken by fathometer and are shown to the nearest tenth of a foot.
5. Soundings were taken using an ODOM Hydrotrac echosounder; horizontal location by Leica System "Viva" survey grade RTK GPS.
6. Software utilized is Coastal Oceanographics "Hypack". RTK GPS tides were used.
7. Map prepared by Pacific Ecorisk on February 6, 2015.

Figure 1-4. Site Map: Port of Redwood City's Berths 1-4

2. FIELD SEDIMENT SAMPLE COLLECTION

All sediments (and site water) were collected on February 4, 2015, in accordance with guidelines and procedures outlined in the SAP (PER 2015). All sediment sampling field activities were performed under the direction of Mr. Jeffrey Cotsifas (of PER). For the collection of the Port samples, TEG Oceanographic Services provided the sampling vessel, on-board positioning system, and sampling equipment; PER provided Field Scientists to oversee sediment core collection and the collection of site water. Ten cores were collected from within the proposed dredge limits, with five samples being collected within each of two dredge units, DU1 and DU2 (Table 2-1). On February 25, PER Field Scientists collected sediment from the SF-11 reference site for use in screening (Table 2-2). Final sample site positions were determined with a global positioning system (GPS) that uses U.S. Government Wide Angle Augmentation System (WAAS) differential correction data to identify each sampling location. Table 2-1 lists station identifiers, GPS coordinates, mudline elevations, and core penetration depths for all stations.

Table 2-1. Locations of Sampling Stations and Core Depths Achieved.

Dredge Unit (Area)	SAMPLE ID	Latitude (decimal-min)[A]	Longitude (decimal-min)[A]	Mudline Elevation (ft MLLW)	Core Penetration Depth (ft)	Cored Depth (ft MLLW)[B]
DU1	PRC-DU1-01	37° 30.7640’	-122° 12.6278’	-28.2	7.3	-35.5
	PRC-DU1-02	37° 30.7954’	-122° 12.5870’	-26.8	8.7	-35.5
	PRC-DU1-03	37° 30.8243’	-122° 12.5416’	-26.7	8.8	-35.5
	PRC-DU1-04	37° 30.8504’	-122° 12.5023’	-29.0	6.5	-35.5
	PRC-DU1-05	37° 30.8913’	-122° 12.4378’	-29.2	6.3	-35.5
DU2	PRC-DU2-01	37° 30.5980’	-122° 12.6951’	-28.8	6.7	-35.5
	PRC-DU2-02	37° 30.6385’	-122° 12.6825’	-30.4	5.1	-35.5
	PRC-DU2-03	37° 30.6769’	-122° 12.6709’	-28.4	7.1	-35.5
	PRC-DU2-04	37° 30.7046’	-122° 12.6622’	-28.7	6.8	-35.5
	PRC-DU2-05	37° 30.7347’	-122° 12.6532’	-30.1	5.4	-35.5

A - State Plane Coordinate System, California Zone 3, NAD 83.
B - Z-layer was collected and consisted of the last 0.5 ft of each sediment core from the point of refusal.

Table 2-2. Alcatraz Disposal site (SF-11) Reference Site Sample Location.

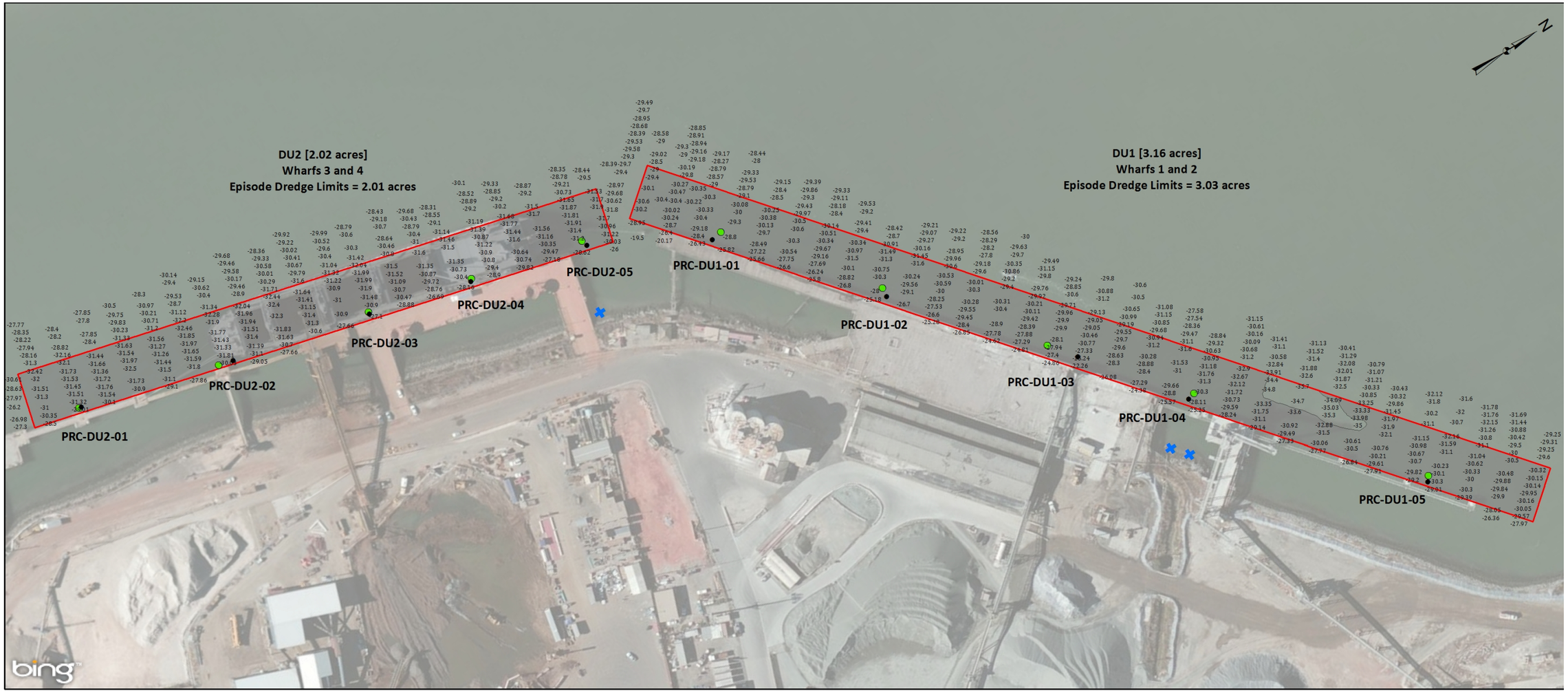
Sample ID	Latitude (decimal-min)[A]	Longitude (decimal-min)[A]
SF-11	37° 48.8031’	-122° 25.6494’

A - State Plane Coordinate System, California Zone 3, NAD 83.

All samples were collected using an appropriate coring device. All sediment cores were collected to the project depth plus over-depth. It should be noted that project depth plus over-depth could not be achieved at the proposed PRC-DU1-03 location; the sampling point was relocated ~65ft to

the west. For each core, an additional 0.5 ft core section was collected from immediately below the 'project depth plus over-depth' and was designated the 'Z-layer'. The sediment from the 'Z-layer' section was removed from each core and stored in a separate container. The remaining individual sediment cores were extruded and placed into food-grade polyethylene bags on board the sampling vessel. Aboard the vessel, samples were temporarily stored on ice (or frozen "blue ice") within insulated coolers until transport to the laboratory in Fairfield, CA by PER staff.

Upon receipt at PER, all samples were logged in and placed in cold storage at ≤4°C in the dark until needed. There were no unusual circumstances encountered during the fieldwork, and no major deviations from the SAP (PER 2015). Field log sheets are presented in Appendix A.



Legend

- Actual Locations Sampled February 5, 2015
- Proposed Sample Locations
- Stormwater Outfalls
- Permitted Dredge Limits [5.18 acres]
- Episode Dredge Footprint [5.04 acres]

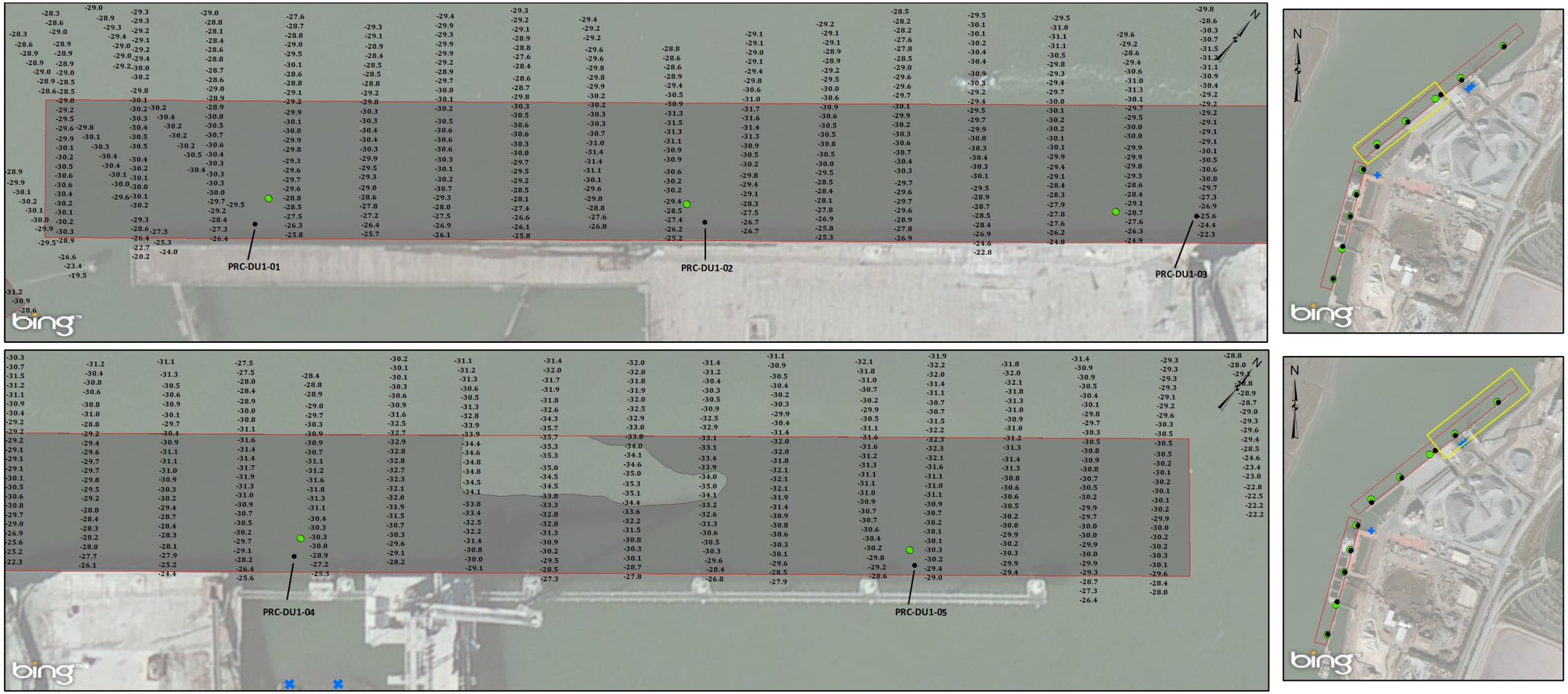
PACIFIC ECORISK ENVIRONMENTAL CONSULTING & TESTING

0 250 500 1,000 Feet

Horizontal Datum: NAD83
Map Projection: California State Plane
Coordinate System (SPCS), Zone 3
Units: Feet

Notes:
1. Bathymetric data from survey conducted on December 13, 2014 by PLS Surveys, Inc. and represent conditions at the time of survey.
2. Benchmark: Tidal benchmark 13 1974. EL = 12.97 FT. MLLW.
3. Bathymetric data shown represents water depths at a 0.0 tide.
4. Soundings taken by fathometer and are shown to the nearest tenth of a foot.
5. Soundings were taken using an ODOM Hydrotrac echosounder; horizontal location by Leica System "Viva" survey grade RTK GPS.
6. Software utilized is Coastal Oceanographics "Hypack". RTK GPS tides were used.
7. Map prepared by Pacific Ecorisk on February 6, 2015.

Figure 2-1. Port of Redwood City's Berths 1-4 Sample Locations



Legend

- Actual Sample Locations Sampled February 5, 2015
- Proposed Sample Locations
- Stormwater Outfalls
- Permitted Dredge Limits [5.18 acres]
- Episode Dredge Footprint [5.04 acres]

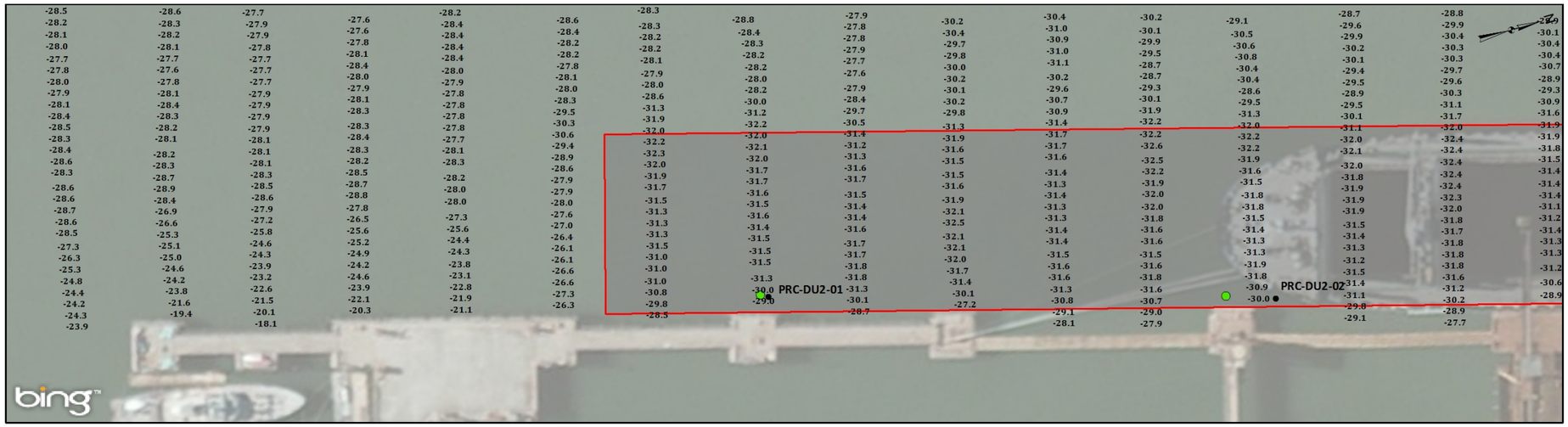
PACIFIC ECORISK ENVIRONMENTAL CONSULTING & TESTING

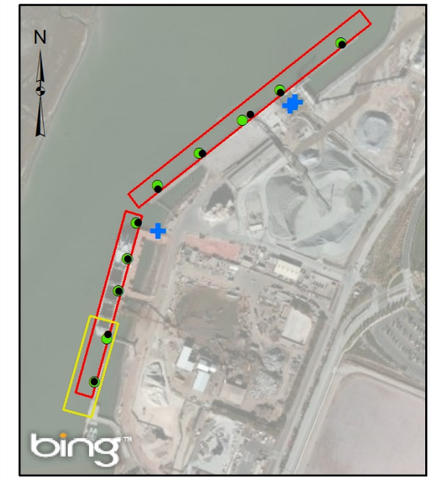
0 100 200 400 Feet

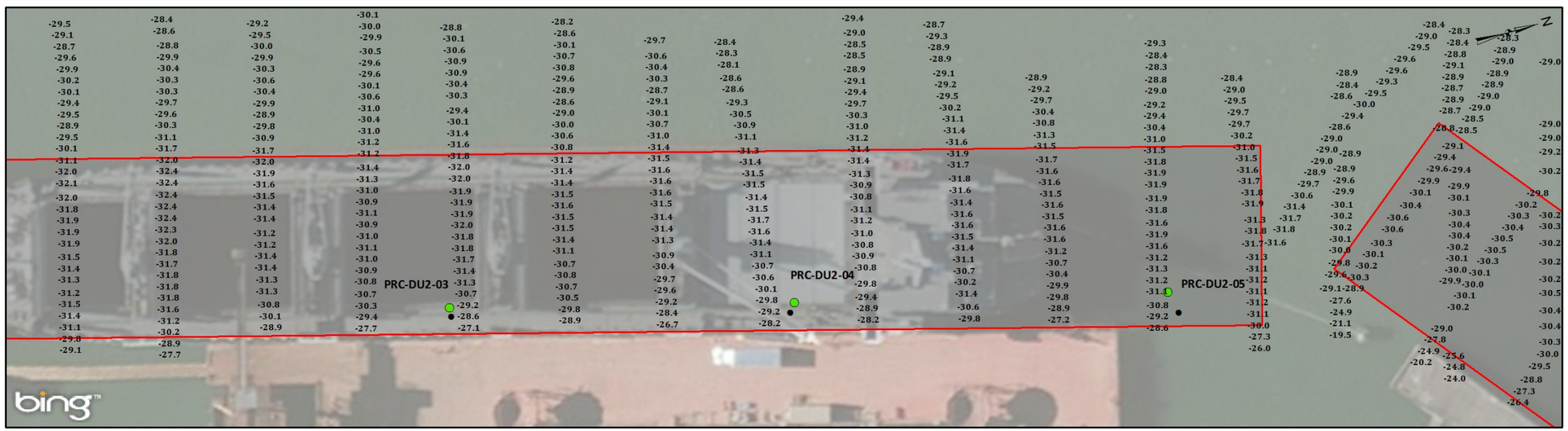
Horizontal Datum: NAD83
Map Projection: California State Plane
Coordinate System (SPCS), Zone 3
Units: Feet

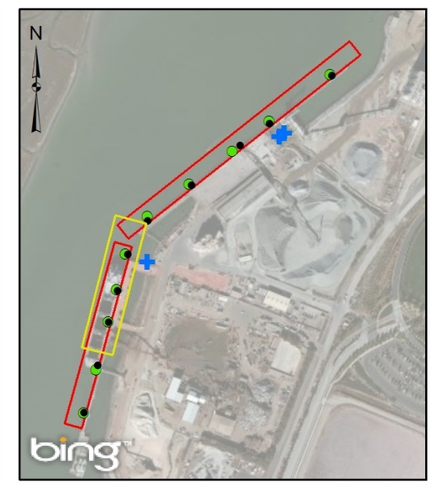
Notes:
1. Bathymetric data from survey conducted on December 13, 2014 by PLS Surveys, Inc. and represent conditions at the time of survey.
2. Benchmark: Tidal benchmark 13 1974. EL = 12.97 FT. MLLW.
3. Bathymetric data shown represents water depths at a 0.0 tide.
4. Soundings taken by fathometer and are shown to the nearest tenth of a foot.
5. Soundings were taken using an ODOM Hydrotrac echosounder; horizontal location by Leica System "Viva" survey grade RTK GPS.
6. Software utilized is Coastal Oceanographics "Hypack". RTK GPS tides were used.
7. Map prepared by Pacific Ecorisk on February 6, 2015.

Figure 2-2. Port of Redwood City's Berths 1 and 2 Sample Locations









Legend

- Actual Sample Locations Sampled February 5, 2015
- Proposed Sample Locations
- Stormwater Outfalls
- Permitted Dredge Limits [5.18 acres]
- Episode Dredge Footprint [5.04 acres]

PACIFIC ECORISK ENVIRONMENTAL CONSULTING & TESTING

0 100 200 400 Feet

Horizontal Datum: NAD83
Map Projection: California State Plane
Coordinate System (SPCS), Zone 3
Units: Feet

Notes:
1. Bathymetric data from survey conducted on December 13, 2014 by PLS Surveys, Inc. and represent conditions at the time of survey.
2. Benchmark: Tidal benchmark 13 1974. EL = 12.97 FT. MLLW.
3. Bathymetric data shown represents water depths at a 0.0 tide.
4. Soundings taken by fathometer and are shown to the nearest tenth of a foot.
5. Soundings were taken using an ODOM Hydrotrac echosounder; horizontal location by Leica System "Viva" survey grade RTK GPS.
6. Software utilized is Coastal Oceanographics "Hypack". RTK GPS tides were used.
7. Map prepared by Pacific Ecorisk on February 6, 2015.

Figure 2-3. Port of Redwood City's Berths 3 and 4 Sample Locations

3. SAMPLE PROCESSING

3.1 Homogenization and Compositing of Sediments

As described above, each core was divided into maintenance depth sections and Z-layer sections while aboard the sampling vessel. Homogenization and compositing of individual sediment cores was performed at the PER laboratory facility in Fairfield, CA. The maintenance depth sections from each individual core were individually homogenized in a stainless-steel bowl or high-density polyethylene (HDPE) container. A 500-mL sub-sample of the homogenized sediment from each individual sediment core was archived to allow for follow-up chemical analyses, should that prove necessary; archived samples will be stored frozen at -20 ± 10˚C for up to one [1] year after sample collection.

Proportionate amounts of the homogenized sediment from each of the DU1 individual sediment cores were composited and homogenized within a stainless steel container to form the "PRC-DU1-Comp" composite sediment. The DU2 sediment cores were similarly processed to form the "PRC-DU2-Comp" composite sample. Sub-samples of the PRC-DU1-Comp and PRC-DU2-Comp samples were frozen for archival storage as described above. Samples of the composited sediments were submitted for chemical and conventional analyses and toxicity testing. The Z-layer sediments were processed and archived in similar fashion. The SF-11 reference sediment was also homogenized and similarly processed.

All sediments were processed following procedures outlined in the SAP (PER 2015), with no deviations.

3.2 Shipping of Sediment Samples to the Analytical Laboratories

Prior to shipping to the analytical laboratory, sample containers were wrapped in bubble wrap and securely packed inside a cooler with ice packs or crushed ice. A temperature blank was included in each cooler. The original signed chain-of-custody (COC) forms were placed in a sealed plastic bag and taped to the inside lid of each cooler. Appropriate packaging tape was wrapped completely around each cooler. *This Side Up* arrow labels and a *Glass-Handle with Care* label were attached on each side and to the top of each cooler, respectively. Each cooler was then sealed with custody seals on both the front and the back lid seams.

The sediment samples were shipped via overnight delivery. The sub-contracting analytical laboratories have been instructed to not dispose of any samples for this project unless notified by PER in writing.

3.2.1 Chain-of-Custody (COC) Protocol

COC procedures were followed for all samples throughout the collection, handling, and analyses activities. The Sampling and Analysis Project Manager, or a designee, was responsible for all sample tracking and COC procedures. This person was responsible for final sample inventory, maintenance of sample custody documentation, and completion of COC forms prior to transferring samples to the analytical laboratory. A COC form accompanied each cooler of samples to the respective analytical laboratories. Each respective custodian of the samples signed the accompanying COC form; copies of the COC forms are retained in the project file.

4. RESULTS OF PHYSICAL/CHEMICAL ANALYSES

Sediment physical and chemical characteristics provide information about chemicals of concern in the sediment and their potential bioavailability, and about non-chemical factors that could affect toxicity. Analyses of the PRC-DU1-Comp and PRC-DU2-Comp sediment samples for the conventional and chemical parameters specified in the SAP (PER 2015) was performed by Eurofins Calscience Inc. (Calscience) and ALS Environmental (ALS). Conventional parameters included total organic carbon (TOC), total solids, and grain size. Chemical parameters included trace metals, PCBs, polycyclic aromatic hydrocarbons (PAHs), organochlorine (OCl) pesticides, butyltins, and dioxins. The results of these analyses are presented in Tables 4-1 thru 4-3 and in Sections 4.1 and 4.2; the full Data Reports submitted by Calscience and ALS are provided in Appendices B and C, respectively.

Based on the analytical results of the composite samples, and in consultation with the Port of Redwood City and the DMMO, additional chemical characterization of the Port sediments was performed and consisted of the following:

1. Analysis of the individual DU2 Z-layer samples for PAHs;
2. Analysis of the PRC-DU1-Comp-Z (Z-layer) sample for total PCBs and PAHs;
3. Analysis of the PRC-DU2-Comp-Z (Z-layer) sample for PAHs;
4. Performance of a Modified Elutriate Test (MET) on the DU1 composite sample; the resulting elutriate was analyzed for metals, total PAHs, total PCBs and total suspended solids (TSS);
5. Performance of a Modified Elutriate Test (MET) on the DU2 composite sample; the resulting elutriate was analyzed for metals, total PAHs, and total suspended solids (TSS); and
6. Performance of DI-WET tests on composite samples; the resulting extracts were analyzed for metals, total PAHs, and total PCBs for the DU1 composite, and for metals and total PAHs for the DU2 composite.

The results of these follow-up analyses are presented in Tables 4-2 through 4-6 and in Sections 4.2 through 4.6; the full Data Reports submitted by Eurofins Calscience for these follow-up analyses are provided in Appendices D-F.

The results of the physical and chemical analyses of the sediments were compared to:

- San Francisco Bay (SF Bay) ambient sediment concentrations (SFRWQCB 1998);
- the SF-DODS reference site database;
- SF Bay sediment Bioaccumulation Trigger Level (SFEI 2015);
- SF Bay sediment mercury and PCB TMDL thresholds;
- CRRP sediment screening levels (where they differ from the SF Bay ambient concentrations); and

- MWRP sediment screening levels (where they differ from the SF Bay ambient concentrations); and
- SFRWQCB Basin Plan Water Quality Objectives (WQOs).

4.1 PRC-DU1-Comp Composite Analytical Chemistry Results

The "PRC-DU1-COMP" site sediment was ~42.3% total solids with 98.8% fines (silts and clays). The TOC level was moderate (2.1%).

The metals analysis indicated that the cadmium concentration was slightly above SF Bay ambient levels (SFRWQCB 1998) and MWRP cover levels, but below the CRRP and MWRP foundation screening levels. Arsenic, lead, and mercury concentrations were above the SF-DODS reference site database screening levels. The remaining metal analytes were generally similar to SF Bay ambient levels and SF-DODS reference site database levels. Total butyltins were above the SF-DODS reference site database screening level.

Total DDT was measured at 16.7 μg/kg, which is above SF Bay ambient levels, CRRP and MWRP screening levels, and the SF-DODS reference site database, but below the SF Bay Bioaccumulation Trigger Level (SFEI 2015) and MWRP foundation screening levels. The remaining OCl pesticides were not detected above their respective method detection limits (MDLs).

Total PAHs were reported at 5,982 μg/kg, which is above SF Bay ambient levels, CRRP and MWRP cover material screening levels, the SF-DODS reference site database, and SF Bay Bioaccumulation Trigger Levels (SFEI 2015), but below the MWRP foundation material levels.

Total PCBs were reported at 57.4 μg/kg, which is above SF Bay ambient levels, CRRP screening concentration, MWRP cover levels, the SF-DODS reference database, the SF Bay Bioaccumulation Trigger Level, and the SF-Bay TMDL Threshold, but below MWRP foundation levels.

Dioxins (as Total TCDD TEQ) were reported as 0.0130 μg/kg, which is above the SF Bay Bioaccumulation Trigger Level.

Upon initial review of the sediment chemistry by the DMMO, PAHs, PCBs and dioxins were selected for further evaluation of bioaccumulation potential (discussed in Section 6, below) to determine suitability for placement at SF-DODS. In addition, the Z-layer composite sample was analyzed for PCBs, PAHs, and dioxins (see below).

4.1.1 Results of PCBs, PAHs and Dioxins Analyses of the PRC-DU1-Comp Z-Layer Core

The PRC-DU1-Comp-Z (Z-layer) sediment sample was analyzed for PCBs, PAHs, and dioxins to determine if the sediment layer that would be exposed after dredging operations would exceed the overlying PRC-DU1-Comp sediment concentrations, SF Bay ambient sediment concentrations (SFRWQCB 1998), SF Bay Bioaccumulation Trigger Levels (SFEI 2015), or any SF Bay TMDL thresholds (SFEI 2015).

Total PCBs were reported at 11.59 μg/kg, which is below SF Bay ambient levels, the SF Bay Bioaccumulation Trigger Level, and nearly 5x less than the overlying PRC-DU1-Comp concentration.

Total PAHs were reported at 4,116 μg/kg, which is above SF Bay ambient levels, but below the SF Bay Bioaccumulation Trigger Level, and below the overlying PRC-DU1-Comp concentration.

Dioxins (as Total TCDD TEQ) were reported as 0.0091 μg/kg, which is below the SF Bay Bioaccumulation Trigger Level, and the overlying PRC-DU1-Comp concentration.

4.2 PRC-DU2-Comp Composite Analytical Chemistry Results

The "PRC-DU2-Comp" site sediment was ~38.9% total solids with 97.6% fines (silts and clays). The TOC level was moderate (2.0%).

The results of metals analysis indicated that the zinc concentration was slightly above SF Bay ambient levels (SFRWQCB 1998), and CRRP and MWRP cover screening levels, but below SF-DODS reference site database levels, CRRP screening levels, and MWRP foundation screening levels. Arsenic, lead, and mercury concentrations were above the SF-DODS reference site database levels. The remaining metal analytes were generally similar to SF Bay ambient levels and SF-DODS database levels. Total butyltins were above the SF-DODS reference site database levels.

Total DDT was measured at 17.9 μg/kg, which is above SF Bay ambient levels, CRRP screening levels, and SF-DODS reference site database levels, but below the SF Bay Bioaccumulation Trigger Level (SFEI 2015). The remaining OCl pesticides were not detected above their respective MDLs.

Total PAHs were reported at 6,597 μg/kg, which is above SF Bay ambient levels, CRRP and MWRP cover screening levels, SF-DODS reference site database levels, and the SF Bay Bioaccumulation Trigger Level (SFEI 2015), but below MWRP foundation screening levels.

Total PCBs were reported at 15.99 μg/kg, which is above the SF-DODS reference site database level, but below SF Bay ambient levels, CRRP and MWRP cover screening levels, SF Bay Bioaccumulation Trigger Level (SFEI 2015), and MWRP foundation levels.

Dioxins (as Total TCDD TEQ) were reported as 0.0156 μg/kg, which is above the SF Bay Bioaccumulation Trigger Level.

Upon initial review of the sediment chemistry by the DMMO, PAHs and dioxins were selected for further evaluation of bioaccumulation potential (discussed in Section 6, below) to determine suitability for placement at SF-DODS. In addition, the Z-layer composite sample was analyzed for PCBs, PAHs, and dioxins (see below)

4.2.1 Results of PAH Analyses of the DU2 Z-Layer Cores

Composited Z-Layer Sample

The composited Z-layer sediment sample (PRC-DU2-Comp-Z) was analyzed for PAHs and dioxins to determine if the sediment layer that would be exposed after dredging operations would exceed the overlying PRC-DU2-Comp sediment concentration for these constituents, SF Bay ambient sediment concentrations (SFRWQCB 1998), or SF Bay Bioaccumulation Trigger Levels (SFEI 2015).

Total PAHs were reported at 9,207 μg/kg, which is above the SF Bay ambient levels, the SF Bay Bioaccumulation Trigger Level, and the overlying PRC-DU2-Comp concentration of 6,597 μg/kg.

Dioxins (as Total TCDD TEQ) were reported as 0.0111 μg/kg, which is slightly above the SF Bay ambient level, but below the overlying PRC-DU2-Comp concentration.

Based on the observation that total PAH levels were elevated in the PRC-DU2-Comp-Z sediments relative to the overlying PRC-DU2-Comp sediment total PAH concentration, the individual DU2 Z-layer core samples were analyzed for PAHs (see below).

Individual Z-Layer Core Samples

Total PAHs for PRC-DU2-01-Z, PRC-DU2-03-Z, PRC-DU2-04-Z, and PRC-DU2-05-Z were above the SF Bay ambient levels, the SF Bay Bioaccumulation Trigger Level, and the overlying PRC-DU1-Comp concentration. Total PAHs for PRC-DU2-02-Z were above SF Bay ambient levels and the SF Bay Bioaccumulation Trigger Level, but below the overlying PRC-DU1-Comp concentration.

4.3 Modified Elutriate Test Analytical Chemistry Results

The results of the MET elutriate analyses of the PRC-DU1-Comp and PRC-DU2-Comp samples are summarized in Table 4-4 and were evaluated to predict the concentrations of metals, PAHs and PCBs that would be present in decant water discharged from a wetland beneficial reuse site following the upland placement of dredged material. TSS, dissolved metals concentrations (mercury and selenium were evaluated on a total metals basis), total PAHs, and total PCB concentrations were determined and were compared to WQOs for surface waters as per the SF Bay Basin Plan (RWQCB 2007, 2008, and 2009), and to MRRP screening levels.

None of the PRC-DU1-Comp analyte concentrations exceeded the SFRWQCB Basin Plan WQOs or MRRP screening levels.

None of the PRC-DU2-Comp analyte concentrations exceeded the SFRWQCB Basin Plan WQOs or MRRP screening levels.

4.4 PRC-DU1-Comp DI-WET Analytical Chemistry Results

The results of the DI-WET extract analysis of the PRC-DU1-Comp and PRC-DU2-Comp samples are summarized in Table 4-5 and were evaluated to predict the potential concentrations of metals, total PAHs, and total PCBs that could leach out of dredged material placed as foundation material at the MWRP. Metals, total PAHs, and total PCB concentrations were determined and were compared to the MWRP screening criteria.

None of the analyte concentrations exceeded the MWRP screening criteria.

Table 4-1. Summary of Port of Redwood City Composite Sample Screening Level Exceedances.

Sample ID	Analytes Exceeding Bay Ambient Levels (SFRWQCB 1998)	Analytes Exceeding SF Bay TMDL Thresholds Trigger Level (SFEI 2014)	Analytes Exceeding SF Bay Bioaccumulation Trigger Level (SFEI 2014)	Analytes Exceeding SF-DODS Reference Area Database	Analytes Exceeding CRRP Screening Criteria	Analytes Exceeding MWRP Screening Criteria	
						Cover	Foundation
PRC-DU1-Comp	Cadmium, total PAHs, total PCBs, total DDTs, and Dioxins	total PCBs	Dioxins, total PAHs, total PCBs	Arsenic, Lead, Mercury, total Butyltins, total DDTs, and total PAHs, total PCBs	total PAHs, total PCBs, and total DDTs	Cadmium, total PAHs, total PCBs, and total DDTs	-
PRC-DU2-Comp	Zinc, total PAHs, total DDTs, and Dioxins	none	Dioxins and total PAHs	Arsenic, Lead, Mercury, total Butyltins, total DDTs, total PAHs, total PCBs	Zinc, total PAHs, and total DDTs	Zinc, total PAHs, and total DDTs	-

Table 4-2. Port of Redwood City 2015 Sediment Sample Chemistries.

Analyte	Units	Sample ID		Bay Background (RWQCB 1998)[1]	SF-DODS Database[2]	CRRP[3] Screening Criteria	MWRP[4] Screening Criteria	
		PRC-DU1-Comp	PRC-DU2-Comp	<100% fines			Cover	Foundation
Grain Size								
Gravel (>2.00 mm)	%, dry wt	0	0	<100% fines	16-60	NA	NA	NA
Sand (0.0625 mm to 2.00 mm)	%, dry wt	1.3	2.4					
Silt (0.0039 mm to 0.0625 mm)	%, dry wt	67.1	67.5		25-62			
Clay (< 0.0039 mm)	%, dry wt	31.7	30.1		13-24			
Percent fines (Silt+Clay)	%, dry wt	98.8	97.6		-			
% Solids	%	42.3	38.9	-	-	-	-	-
TOC	%	2.1	2.0	-	0.63-1.45	-	-	-
Metals								
Arsenic	mg/kg, dry wt	8.61 [B]	8.50 [B]	15.3	2.2-5.33	15.3	15.3	70
Cadmium	mg/kg, dry wt	0.37 [A,C]	0.32	0.33	0.3-0.6	0.7[3]	0.33	9.6
Chromium	mg/kg, dry wt	90.8	97.0	112	69.2-283	112	112	370
Copper	mg/kg, dry wt	52.4	67.7	68.1	18.3-86.3	68.1	68.1	270
Lead	mg/kg, dry wt	30.6 [B]	30.6 [B]	43.2	5.1-26	43.2	43.2	218
Mercury	mg/kg, dry wt	0.375 [B]	0.365 [B]	0.43 (0.47[a])	0.1-0.2	0.43	0.43	1.3
Nickel	mg/kg, dry wt	91.0	97.6	112	50.9-238	112	112	200
Selenium	mg/kg, dry wt	0.40	0.50	0.64	0.6-2.6	0.64	0.64	1.4
Silver	mg/kg, dry wt	0.574	0.607	0.58	0.2-1.0	0.58	0.58	3.7
Zinc	mg/kg, dry wt	146	169 [A,C,D]	158	60.8-288	158	158	410
Butyltins								
Butyltin	µg/kg, dry wt	<3.2	<3.6	-	-	-	-	-
Dibutyltin	µg/kg, dry wt	3.1 J	7.0 J	-	-	-	-	-
Tributyltin	µg/kg, dry wt	<3.5	4.9 J	-	-	-	-	-
Tetrabutyltin	µg/kg, dry wt	<1.7	<1.9	-	-	-	-	-
∑ detected Butyltins	**µg/kg, dry wt**	**3.1[B]**	**11.9[B]**	-	**≤1.3**	-	-	-

Table 4-2. *(continued)* Port of Redwood City 2015 Sediment Sample Chemistries.

Analyte	Units	Sample ID			Bay Background (RWQCB 1998)[1]	SF-DODS Database[2]	CRRP[3] Screening Criteria	MWRP[4] Screening Criteria	
		PRC-DU1-Comp	PRC-DU1-Comp-Z	PRC-DU2-Comp	<100% fines			Cover	Foundation
PCBs									
PCB 005/008	µg/kg, dry wt	<0.11	<0.34	<0.12	-	-	-	-	-
PCB 018	µg/kg, dry wt	<0.092	<0.16	<0.10	-	-	-	-	-
PCB 028	µg/kg, dry wt	0.36 J	0.21	<0.14	-	-	-	-	-
PCB 031	µg/kg, dry wt	<0.069	0.35	<0.076	-	-	-	-	-
PCB 033	µg/kg, dry wt	1.0	<0.27	0.93	-	-	-	-	-
PCB 044	µg/kg, dry wt	1.5	<0.19	<0.24	-	-	-	-	-
PCB 049	µg/kg, dry wt	0.77	0.32	0.25 J	-	-	-	-	-
PCB 052	µg/kg, dry wt	2.5	0.70	0.70	-	-	-	-	-
PCB 056	µg/kg, dry wt	<0.11	<0.28	<0.12	-	-	-	-	-
PCB 060	µg/kg, dry wt	<0.15	<0.32	<0.16	-	-	-	-	-
PCB 066	µg/kg, dry wt	0.77	0.32	0.37 J	-	-	-	-	-
PCB 070	µg/kg, dry wt	1.3	0.35	0.30 J	-	-	-	-	-
PCB 074	µg/kg, dry wt	0.47	<0.19	<0.12	-	-	-	-	-
PCB 087	µg/kg, dry wt	1.7	<0.24	<0.11	-	-	-	-	-
PCB 095	µg/kg, dry wt	4.4	<0.32	0.81	-	-	-	-	-
PCB 097	µg/kg, dry wt	2.5	<0.30	1.5	-	-	-	-	-
PCB 099	µg/kg, dry wt	2.0	0.64	0.62	-	-	-	-	-
PCB 101	µg/kg, dry wt	5.3	0.97	1.2	-	-	-	-	-
PCB 105	µg/kg, dry wt	1.6	<0.12	1.1	-	-	-	-	-
PCB 110	µg/kg, dry wt	4.6	<0.10	1.1	-	-	-	-	-
PCB 118	µg/kg, dry wt	4.0	<0.19	1.1	-	-	-	-	-
PCB 128	µg/kg, dry wt	1.0	<0.23	<0.10	-	-	-	-	-
PCB 132/153	µg/kg, dry wt	6.3	1.5	1.8	-	-	-	-	-
PCB 138/158	µg/kg, dry wt	5.0	1.3	1.2	-	-	-	-	-
PCB 141	µg/kg, dry wt	0.89	<0.25	<0.25	-	-	-	-	-
PCB 149	µg/kg, dry wt	3.0	0.99	0.82	-	-	-	-	-
PCB 151	µg/kg, dry wt	0.78	0.33	0.35 J	-	-	-	-	-
PCB 156	µg/kg, dry wt	0.64	<0.13	<0.17	-	-	-	-	-
PCB 170	µg/kg, dry wt	1.0	0.67	0.40 J	-	-	-	-	-
PCB 174	µg/kg, dry wt	0.72	0.37	<0.10	-	-	-	-	-
PCB 177	µg/kg, dry wt	0.40 J	0.41	<0.10	-	-	-	-	-
PCB 180	µg/kg, dry wt	1.5	1.0	0.79	-	-	-	-	-
PCB 183	µg/kg, dry wt	0.43 J	0.31	0.18 J	-	-	-	-	-
PCB 187	µg/kg, dry wt	0.97	0.85	0.47 J	-	-	-	-	-
PCB 194	µg/kg, dry wt	<0.097	<0.25	<0.11	-	-	-	-	-
PCB 195	µg/kg, dry wt	<0.075	<0.26	<0.082	-	-	-	-	-
PCB 201	µg/kg, dry wt	<0.10	<0.21	<0.11	-	-	-	-	-
PCB 203	µg/kg, dry wt	<0.082	<0.26	<0.089	-	-	-	-	-
∑ detected PCBs	**µg/kg, dry wt**	**57.4 [A,B,C,D,E,F]**	**11.59[B]**	**15.99[B]**	**21.6, 29.6[b], 18.0[c]**	**<MDL**	**22.7**	**22.7**	**180**

Table 4-2. *(continued)* Port of Redwood City 2015 Sediment Sample Chemistries.

Analyte	Units	Sample ID		Bay Background (RWQCB 1998)[1]	SF-DODS Database[2]	CRRP[3] Screening Criteria	MWRP[4] Screening Criteria	
		PRC-DU1-Comp	PRC-DU2-Comp	<100% fines			Cover	Foundation
Organochlorine Pesticides								
Aldrin	µg/kg, dry wt	<0.74	<0.81	1.1	-	1.1	1.1	-
alpha-BHC	µg/kg, dry wt	<0.76	<0.84	-	-	-	-	-
beta-BHC	µg/kg, dry wt	<0.62	<0.68	-	-	-	-	-
delta-BHC	µg/kg, dry wt	<0.60	<0.66	-	-	-	-	-
gamma-BHC (Lindane)	µg/kg, dry wt	<0.81	<0.89	-	-	-	-	-
Total BHCs	µg/kg, dry wt	0	0	0.78	-	0.78	0.78	-
Chlordane	µg/kg, dry wt	<7.7	<8.4	1.1 (37[c])	-	1.1	2.3	4.8
Dieldrin	µg/kg, dry wt	<0.78	<0.85	0.44 (1.9[c])	-	0.72	0.72	4.3
Endosulfan I	µg/kg, dry wt	<0.62	<0.68	-	-	-	-	-
Endosulfan II	µg/kg, dry wt	<0.66	<0.72	-	-	-	-	-
Endosulfan Sulfate	µg/kg, dry wt	<0.79	<087	-	-	-	-	-
Endrin	µg/kg, dry wt	<0.84	<0.93	0.78	-	0.78	0.78	-
Endrin Aldehyde	µg/kg, dry wt	<0.75	<0.63	-	-	-	-	-
Heptachlor	µg/kg, dry wt	<0.76	<0.83	-	-	-	-	-
Heptachlor Epoxide	µg/kg, dry wt	<0.84	<0.92	-	-	-	-	-
Methoxychlor	µg/kg, dry wt	<0.76	<0.84	-	-	-	-	-
Toxaphene	µg/kg, dry wt	<15	<16	-	-	-	-	-
2,4'-DDD	µg/kg, dry wt	<0.80	0.98 J	-	-	-	-	-
4,4'-DDD	µg/kg, dry wt	4.2	5.9	-	-	-	-	-
2,4'-DDE	µg/kg, dry wt	<0.72	<0.79	-	-	-	-	-
4,4'-DDE	µg/kg, dry wt	8.3	9.8	-	-	-	-	-
2,4'-DDT	µg/kg, dry wt	<0.71	<0.78	-	-	-	-	-
4,4'-DDT	µg/kg, dry wt	4.2	1.2	-	-	-	-	-
∑ detected DDTs	**µg/kg, dry wt**	**16.7 [A,B,C,D]**	**17.9 [A,B,C,D]**	**7.0, (50[c])**	**≤2.1**	**7.0**	**7.0**	**100**

Table 4-2. *(continued)* Port of Redwood City 2015 Sediment Sample Chemistries.

Analyte	Units	Sample ID				Bay Background (RWQCB 1998)[1]	SF-DODS Database[2]	CRRP[3] Screening Criteria	MWRP[4] Screening Criteria	
		PRC-DU1-Comp	PRC-DU1-Comp-Z	PRC-DU2-Comp	PRC-DU2-Comp-Z	<100% fines			Cover	Foundation
PAHs										
Acenaphthene	µg/kg, dry wt	110	37	72	150	26.6	-	-	-	-
Acenaphthylene	µg/kg, dry wt	39 J	27	66	74	31.7	-	-	-	-
Anthracene	µg/kg, dry wt	150	71	160	200	88	-	-	-	-
Benzo(a)anthracene	µg/kg, dry wt	290	210	500	500	244	-	-	-	-
Benzo(a)pyrene	µg/kg, dry wt	420	400	610	800	412	-	-	-	-
Benzo(b)fluoranthene	µg/kg, dry wt	390	350	670	850	371	-	-	-	-
Benzo(e)pyrene	µg/kg, dry wt	280	250	400	510	294	-	-	-	-
Benzo(g,h,i)perylene	µg/kg, dry wt	360	330	440	500	310	-	-	-	-
Benzo(k)fluoranthene	µg/kg, dry wt	320	270	510	600	258	-	-	-	-
Biphenyl	µg/kg, dry wt	20 J	11	14 J	17	12.9	-	-	-	-
Chrysene	µg/kg, dry wt	430	330	740	840	289	-	-	-	-
Dibenzo(a,h)anthracene	µg/kg, dry wt	72	61	110	120	32.7	-	-	-	-
2,6-Dimethylnaphthalene	µg/kg, dry wt	38 J	17	39 J	32	12.1	-	-	-	-
Fluoranthene	µg/kg, dry wt	770	500	41 J	1400	514	-	-	-	-
Fluorene	µg/kg, dry wt	120	53	57	110	25.3	-	-	-	-
Indeno(1,2,3-c,d)pyrene	µg/kg, dry wt	260	240	330	370	382	-	-	-	-
2-Methylnaphthalene	µg/kg, dry wt	21 J	9.9	15 J	14	19.4	-	-	-	-
1-Methylnaphthalene	µg/kg, dry wt	12 J	7.5	<10	11	12.1	-	-	-	-
1-Methylphenanthrene	µg/kg, dry wt	<7.7	ND	<8.3	<3.7	31.7	-	-	-	-
Naphthalene	µg/kg, dry wt	91	31	34 J	46	55.8	-	-	-	-
Perylene	µg/kg, dry wt	160	160	230	250	145	-	-	-	-
Phenanthrene	µg/kg, dry wt	480	100	320	360	237	-	-	-	-
Pyrene	µg/kg, dry wt	1100	630	1200	1400	665	-	-	-	-
1,6,7-Trimethylnaphthalene	µg/kg, dry wt	12 J	8.3	8.8 J	12	-	-	-	-	-
Dibenzothiophene	µg/kg, dry wt	37 J	12	30 J	41	-	-	-	-	-
∑ detected PAHs	**µg/kg, dry wt**	**5,982 [A,B,C,D, E]**	**4,116 [A,B,C,D]**	**6,597[A,B,C,D, E]**	**9,207 [A,B,C,D, E]**	**3,390 (4,500[c])**	**≤192**	**3,390**	**3,390**	**44,792**
Dioxins (Total TCDD TEQ)	µg/kg, dry wt	0.0130[A]	0.00901	0.0156[A]	0.0111[A]	0.01[c]	-	0.02[3]	-	**-**

1 - San Francisco Regional Water Quality Control Board (1998) Staff Report: Ambient Concentrations of Toxic Chemicals in San Francisco Bay Sediments. May 1998.
2 - SF–DODS Reference Database (USEPA 2015).
3 - U.S. Fish and Wildlife Service Biological Opinion on the Effects of the Proposed Cullinan Ranch Restoration Project, Napa and Solano Counties, California (USFWS 2010).
4 - Montezuma Wetlands Restoration Project Waste Discharge Requirements Order No. R2-2012-0087 (SFRWQCB 2012).
a - Mercury concentration SF Bay TMDL threshold (= 99th percentile for San Francisco Bay [SFEI 2015]).
b - Total PCB concentration SF Bay TMDL threshold (= 99th percentile for San Francisco Bay [SFEI 2015]).
c - San Francisco Bay Bioaccumulation Trigger Level (USACE/USEPA 2011, SFEI 2015).
J - Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.
A - Value exceeds Bay Background (RWQCB 1998).
B - Value exceeds SF DODS Database.
C - Value exceeds MWRP Screening criteria.
D - Value exceeds CRRP Screening criteria.
E - Value exceeds SF-Bay Bioaccumulation Trigger Threshold.
F - Value exceeds SF-Bay TMDL Threshold.

Table 4-3. PRC-DU2 Individual Z-Layer Sediment Sample Chemistries.

Analyte	Units	Sample ID					Bay Background (RWQCB 1998)[1]	SF-DODS	CRRP[3]	MWRP[4] Screening Criteria	
		PRC-DU2-01-Z	PRC-DU2-02-Z	PRC-DU2-03-Z	PRC-DU2-04-Z	PRC-DU2-05-Z	<100% fines	Database[2]	Screening Criteria	Cover	Foundation
% Solids	%	44.0	41.1	43.4	44.0	43.8	-	-	-	-	-
TOC	%	1.9	1.9	1.9	1.8	1.9	-	0.63-1.45	-	-	-
PAHs											
Acenaphthene	µg/kg, dry wt	640	12 J	59 J	140	<27	26.6	-	-	-	-
Acenaphthylene	µg/kg, dry wt	110	40	100 J	270	50 J	31.7	-	-	-	-
Anthracene	µg/kg, dry wt	880	75	250	530	130	88	-	-	-	-
Benzo(a)anthracene	µg/kg, dry wt	1400	210	920	2600	330	244	-	-	-	-
Benzo(a)pyrene	µg/kg, dry wt	1200	510	1000	1800	860	412	-	-	-	-
Benzo(b)fluoranthene	µg/kg, dry wt	1400	500	1100	3700	1000	371	-	-	-	-
Benzo(e)pyrene	µg/kg, dry wt	730	320	640	1700	550	294	-	-	-	-
Benzo(g,h,i)perylene	µg/kg, dry wt	650	330	510	790	430	310	-	-	-	-
Benzo(k)fluoranthene	µg/kg, dry wt	930	360	870	2400	660	258	-	-	-	-
Biphenyl	µg/kg, dry wt	23 J	13 J	<21	21 J	<21	12.9	-	-	-	-
Chrysene	µg/kg, dry wt	1900	330	1500	6300	670	289	-	-	-	-
Dibenzo(a,h)anthracene	µg/kg, dry wt	190	73	140	310	120	32.7	-	-	-	-
2,6-Dimethylnaphthalene	µg/kg, dry wt	80 J	50	50 J	60 J	41 J	12.1	-	-	-	-
Fluoranthene	µg/kg, dry wt	4600	300	3100	17000	600	514	-	-	-	-
Fluorene	µg/kg, dry wt	310	24 J	72 J	96 J	<36	25.3	-	-	-	-
Indeno(1,2,3-c,d)pyrene	µg/kg, dry wt	530	280	440	830	380	382	-	-	-	-
2-Methylnaphthalene	µg/kg, dry wt	<26	15 J	<27	28 J	<27	19.4	-	-	-	-
1-Methylnaphthalene	µg/kg, dry wt	<26	7.4 J	<27	<26	<27	12.1	-	-	-	-
1-Methylphenanthrene	µg/kg, dry wt	<28	<6.1	<29	270	<28	31.7	-	-	-	-
Naphthalene	µg/kg, dry wt	98 J	43	62 J	41 J	<40	55.8	-	-	-	-
Perylene	µg/kg, dry wt	440	210	380	510	320	145	-	-	-	-
Phenanthrene	µg/kg, dry wt	1500	120	380	740	170	237	-	-	-	-
Pyrene	µg/kg, dry wt	4200	740	2600	14000	1400	665	-	-	-	-
1,6,7-Trimethylnaphthalene	µg/kg, dry wt	<22	<4.8	<22	<22	<22	-	-	-	-	-
Dibenzothiophene	µg/kg, dry wt	190	11 J	52 J	100 J	<15	-	-	-	-	-
∑ detected PAHs	**µg/kg, dry wt**	**22,001** [A,B,C,D, E]	**4,562** [A,B,C,D, E]	**14,225** [A,B,C,D, E]	**54,236** [A,B,C,D, E]	**7,711** [A,B,C,D, E]	**3,390 (4,500[c])**	**≤192**	**3,390**	**3,390**	**44,792**

1 - San Francisco Regional Water Quality Control Board (1998) Staff Report: Ambient Concentrations of Toxic Chemicals in San Francisco Bay Sediments. May 1998.
2 - SF–DODS Reference Database (USEPA 2015).
3 - U.S. Fish and Wildlife Service Biological Opinion on the Effects of the Proposed Cullinan Ranch Restoration Project, Napa and Solano Counties, California (USFWS 2010).
4 - Montezuma Wetlands Restoration Project Waste Discharge Requirements Order No. R2-2012-0087 (SFRWQCB 2012).
a - Mercury concentration SF Bay TMDL threshold (= 99th percentile for San Francisco Bay [SFEI 2015]).
b - Total PCB concentration SF Bay TMDL threshold (= 99th percentile for San Francisco Bay [SFEI 2015]).
c - San Francisco Bay Bioaccumulation Trigger Level (USACE/USEPA 2011, SFEI 2015).
J - Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate.
All concentrations reported as being below the laboratory MDL are reported above as < the MDL.
A - Value exceeds Bay Background (RWQCB 1998).
B - Value exceeds SF DODS Database.
C - Value exceeds MWRP Screening criteria.
D - Value exceeds CRRP Screening criteria.
E - Value exceeds SF-Bay Bioaccumulation Trigger Threshold

Table 4-4. Port of Redwood City Sediment MET Sample Chemistries.

Analyte	Units	PRC-DU1-Comp	SFRWQCB Basin Plan Water Quality Objectives		Montezuma Screening Criteria[1]
			Continuous Conc. (4-day avg.)	Maximum Conc. (1-hr avg.)	
PCBs					
PCB 005/008	µg/L	<0.00071	-	-	-
PCB 018	µg/L	<0.00041	-	-	-
PCB 028	µg/L	<0.00065	-	-	-
PCB 031	µg/L	<0.00040	-	-	-
PCB 033	µg/L	<0.00057	-	-	-
PCB 044	µg/L	<0.00076	-	-	-
PCB 049	µg/L	<0.00077	-	-	-
PCB 052	µg/L	<0.00050	-	-	-
PCB 056	µg/L	<0.00074	-	-	-
PCB 060	µg/L	<0.00097	-	-	-
PCB 066	µg/L	<0.00056	-	-	-
PCB 070	µg/L	<0.00037	-	-	-
PCB 074	µg/L	<0.00042	-	-	-
PCB 087	µg/L	<0.00049	-	-	-
PCB 095	µg/L	<0.00081	-	-	-
PCB 097	µg/L	<0.00068	-	-	-
PCB 099	µg/L	<0.00059	-	-	-
PCB 101	µg/L	<0.00057	-	-	-
PCB 105	µg/L	<0.00037	-	-	-
PCB 110	µg/L	<0.00049	-	-	-
PCB 118	µg/L	<0.00048	-	-	-
PCB 128	µg/L	<0.00069	-	-	-
PCB 132/153	µg/L	<0.0012	-	-	-
PCB 138/158	µg/L	<0.0011	-	-	-
PCB 141	µg/L	<0.00076	-	-	-
PCB 149	µg/L	<0.00050	-	-	-
PCB 151	µg/L	<0.00060	-	-	-
PCB 156	µg/L	<0.00050	-	-	-
PCB 170	µg/L	<0.00055	-	-	-
PCB 174	µg/L	<0.00054	-	-	-
PCB 177	µg/L	<0.00056	-	-	-
PCB 180	µg/L	<0.00070	-	-	-
PCB 183	µg/L	<0.00052	-	-	-
PCB 187	µg/L	<0.00055	-	-	-
PCB 194	µg/L	<0.00041	-	-	-
PCB 195	µg/L	<0.00035	-	-	-
PCB 201	µg/L	<0.00071	-	-	-
PCB 203	µg/L	<0.00038	-	-	-
∑ detected PCBs	µg/L	0	0.03[a]	-	not detected

Table 4-4 (continued). Port of Redwood City Sediment MET Sample Chemistries.

Analyte	Units	Port of Redwood City		SFRWQCB Basin Plan Water Quality Objectives		Montezuma Screening Criteria[1]
		PRC-DU1-Comp	PRC-DU2-Comp	Continuous Conc. (4-day avg.)	Maximum Conc. (1-hr avg.)	
PAHs						
Acenaphthene	µg/L	0.67	0.47	-	-	-
Acenaphthylene	µg/L	<0.018	<0.018	-	-	-
Anthracene	µg/L	<0.034	<0.035	-	-	-
Benzo(a)anthracene	µg/L	<0.024	0.036 J	-	-	-
Benzo(a)pyrene	µg/L	<0.037	<0.037	-	-	-
Benzo(b)fluoranthene	µg/L	<0.025	0.036 J	-	-	-
Benzo(e)pyrene	µg/L	<0.010	0.029 J	-	-	-
Benzo(g,h,i)perylene	µg/L	<0.022	0.031 J	-	-	-
Benzo(k)fluoranthene	µg/L	<0.024	0.032 J	-	-	-
Biphenyl	µg/L	<0.014	<0.014	-	-	-
Chrysene	µg/L	<0.019	0.039 J	-	-	-
Dibenzo(a,h)anthracene	µg/L	<0.027	<0.027	-	-	-
2,6-Dimethylnaphthalene	µg/L	<0.022	<0.022	-	-	-
Fluoranthene	µg/L	0.18 J	0.24	-	-	-
Fluorene	µg/L	<0.025	<0.025	-	-	-
Indeno(1,2,3-c,d)pyrene	µg/L	<0.022	<0.022	-	-	-
2-Methylnaphthalene	µg/L	<0.027	<0.027	-	-	-
1-Methylnaphthalene	µg/L	<0.029	<0.029	-	-	-
1-Methylphenanthrene	µg/L	<0.026	<0.027	-	-	-
Naphthalene	µg/L	<0.023	<0.023	-	-	-
Perylene	µg/L	<0.017	<0.017	-	-	-
Phenanthrene	µg/L	<0.031	<0.031	-	-	-
Pyrene	µg/L	0.033 J	0.037 J	-	-	-
1,6,7-Trimethylnaphthalene	µg/L	<0.11	<0.11	-	-	-
Dibenzothiophene	µg/L	<0.055	<0.055	-	-	-
∑ detected PAHs	µg/L	0.883	0.95	-	-	15

Table 4-4. (continued) Port of Redwood City Sediment MET Sample Chemistries.

Analyte	Units	Port of Redwood City		SFRWQCB Basin Plan Water Quality Objectives		Montezuma Screening Criteria[1]
		PRC-DU1-Comp	PRC-DU2-Comp	Continuous Conc. (4-day avg.)	Maximum Conc. (1-hr avg.)	
Metals						
Dissolved Arsenic	µg/L	2.93	28.8	36[a]	69[a]	69[a]
Dissolved Cadmium	µg/L	0.0422	0.0594	9.3[a]	42[a]	3.9[g]
Dissolved Chromium	µg/L	<0.164	0.322 J	50[a,f]	1100[a,f]	16[h]
Dissolved Copper	µg/L	1.14	1.13	6.0[d]	9.4[d]	9.4[d]
Dissolved Lead	µg/L	0.0519	0.0750	8.1[a]	210[a]	65
Total Mercury	µg/L	0.00393	0.00880	- [e]	2.1[c]	2.1[c]
Dissolved Nickel	µg/L	3.04	2.49	8.2[b]	74[b]	74[b]
Total Selenium	µg/L	0.1573.04	0.153	5[a]	20[a]	20[a]
Dissolved Silver	µg/L	<0.00822	<0.00822	- [f]	1.9[a]	1.9[a]
Dissolved Zinc	µg/L	1.99	2.97	81[a]	90[a]	90[a]
TSS	mg/L	5.4	9.0	-	-	100

1 - Montezuma Wetlands Restoration Project Waste Discharge Requirements Order No. R2-2012-0087 (SFRWQCB 2012).
a - California Toxics Rule Criteria (USEPA 2000).
b - USEPA National Recommended Ambient Water Quality Criteria.
c - SFRWQCB Basin Plan Amendment 2008.
d - SFRWQCB Basin Plan Amendment 2009.
e - No criteria available.
f - WQO is for Chromium VI; however, it may be met as total Chromium.
g - Assumes a hardness of 100 mg/L as $CaCO_3$.
h - Value is for chromium IV and can be met as total chromium.
J -Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate. All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

Table 4-5. Port of Redwood City Sediment DI-WET Sample Chemistries.

Analyte	Units	PRC-DU1-Comp	SFRWQCB Basin Plan Water Quality Objectives		Montezuma Screening Criteria[1]
			Continuous Conc. (4-day avg.)	Maximum Conc. (1-hr avg.)	
PCBs					
PCB 005/008	µg/L	<0.00072	-	-	-
PCB 018	µg/L	<0.00042	-	-	-
PCB 028	µg/L	<0.00066	-	-	-
PCB 031	µg/L	<0.00041	-	-	-
PCB 033	µg/L	<0.00059	-	-	-
PCB 044	µg/L	<0.00078	-	-	-
PCB 049	µg/L	<0.00078	-	-	-
PCB 052	µg/L	<0.00051	-	-	-
PCB 056	µg/L	<0.00076	-	-	-
PCB 060	µg/L	<0.00099	-	-	-
PCB 066	µg/L	<0.00057	-	-	-
PCB 070	µg/L	<0.00038	-	-	-
PCB 074	µg/L	<0.00043	-	-	-
PCB 087	µg/L	<0.00050	-	-	-
PCB 095	µg/L	<0.00082	-	-	-
PCB 097	µg/L	<0.00069	-	-	-
PCB 099	µg/L	<0.00060	-	-	-
PCB 101	µg/L	<0.00058	-	-	-
PCB 105	µg/L	<0.00038	-	-	-
PCB 110	µg/L	<0.00050	-	-	-
PCB 118	µg/L	<0.00049	-	-	-
PCB 128	µg/L	<0.00070	-	-	-
PCB 132/153	µg/L	<0.0012	-	-	-
PCB 138/158	µg/L	<0.0011	-	-	-
PCB 141	µg/L	<0.00078	-	-	-
PCB 149	µg/L	<0.00050	-	-	-
PCB 151	µg/L	<0.00061	-	-	-
PCB 156	µg/L	<0.00051	-	-	-
PCB 170	µg/L	<0.00056	-	-	-
PCB 174	µg/L	<0.00055	-	-	-
PCB 177	µg/L	<0.00057	-	-	-
PCB 180	µg/L	<0.00072	-	-	-
PCB 183	µg/L	<0.00053	-	-	-
PCB 187	µg/L	<0.00056	-	-	-
PCB 194	µg/L	<0.00042	-	-	-
PCB 195	µg/L	<0.00035	-	-	-
PCB 201	µg/L	<0.00072	-	-	-
PCB 203	µg/L	<0.00039	-	-	-
∑ detected PCBs	µg/L	0	0.03[a]	-	not detected

Table 4-5. (continued) Port of Redwood City Sediment DI-WET Sample Chemistries.

Analyte	Units	Port of Redwood City		SFRWQCB Basin Plan Water Quality Objectives		Montezuma Screening Criteria[1]
		PRC-DU1-Comp	PRC-DU2-Comp	Continuous Conc. (4-day avg.)	Maximum Conc. (1-hr avg.)	
PAHs						
Acenaphthene	µg/L	0.13 J	0.11 J	-	-	-
Acenaphthylene	µg/L	<0.018	<0.018	-	-	-
Anthracene	µg/L	<0.034	<0.034	-	-	-
Benzo(a)anthracene	µg/L	<0.024	0.049 J	-	-	-
Benzo(a)pyrene	µg/L	<0.036	0.050 J	-	-	-
Benzo(b)fluoranthene	µg/L	<0.025	0.063 J	-	-	-
Benzo(e)pyrene	µg/L	<0.010	0.044 J	-	-	-
Benzo(g,h,i)perylene	µg/L	0.025 J	0.038 J	-	-	-
Benzo(k)fluoranthene	µg/L	<0.023	0.039 J	-	-	-
Biphenyl	µg/L	<0.014	<0.014	-	-	-
Chrysene	µg/L	<0.019	0.045 J	-	-	-
Dibenzo(a,h)anthracene	µg/L	<0.027	<0.027	-	-	-
2,6-Dimethylnaphthalene	µg/L	<0.022	0.025 J	-	-	-
Fluoranthene	µg/L	0.069 J	0.20 J	-	-	-
Fluorene	µg/L	0.051 J	0.030 J	-	-	-
Indeno(1,2,3-c,d)pyrene	µg/L	<0.022	<0.022	-	-	-
2-Methylnaphthalene	µg/L	<0.026	<0.026	-	-	-
1-Methylnaphthalene	µg/L	0.035 J	<0.028	-	-	-
1-Methylphenanthrene	µg/L	<0.026	<0.026	-	-	-
Naphthalene	µg/L	0.30	0.055 J	-	-	-
Perylene	µg/L	<0.017	<0.017	-	-	-
Phenanthrene	µg/L	0.074 J	0.055 J	-	-	-
Pyrene	µg/L	0.077 J	0.19 J	-	-	-
1,6,7-Trimethylnaphthalene	µg/L	<0.11	<0.11	-	-	-
Dibenzothiophene	µg/L	<0.054	<0.054	-	-	-
∑ detected PAHs	µg/L	0.761	0.993	-	-	15

Table 4-5. (continued) Port of Redwood City Sediment DI-WET Sample Chemistries.

Analyte	Units	Port of Redwood City		SFRWQCB Basin Plan Water Quality Objectives		Montezuma Screening Criteria[1]
		PRC-DU1-Comp	PRC-DU2-Comp	Continuous Conc. (4-day avg.)	Maximum Conc. (1-hr avg.)	
Metals						
Dissolved Arsenic	µg/L	35.7	27.6	36[a]	69[a]	69[a]
Dissolved Cadmium	µg/L	0.0158 J	0.0161 J	9.3[a]	42[a]	3.9[g]
Dissolved Chromium	µg/L	0.772	1.87	50[a,f]	1100[a,f]	16[h]
Dissolved Copper	µg/L	0.445	0.633	6.0[d]	9.4[d]	9.4[d]
Dissolved Lead	µg/L	0.0998	0.229	8.1[a]	210[a]	65
Total Mercury	µg/L	<0.161	<0.161	- [e]	2.1[c]	2.1[c]
Dissolved Nickel	µg/L	0.822	1.16	8.2[b]	74[b]	74[b]
Total Selenium	µg/L	0.150	0.100	5[a]	20[a]	20[a]
Dissolved Silver	µg/L	0.0226 J	0.123	- [f]	1.9[a]	1.9[a]
Dissolved Zinc	µg/L	1.03	2.29	81[a]	90[a]	90[a]

1 - Montezuma Wetlands Restoration Project Waste Discharge Requirements Order No. R2-2012-0087 (SFRWQCB 2012).
a - California Toxics Rule Criteria (USEPA 2000).
b - USEPA National Recommended Ambient Water Quality Criteria.
c - SFRWQCB Basin Plan Amendment 2008.
d - SFRWQCB Basin Plan Amendment 2009.
e - No criteria available.
f - WQO is for Chromium VI; however, it may be met as total Chromium.
g - Assumes a hardness of 100 mg/L as $CaCO_3$.
h - Value is for chromium IV and can be met as total chromium.
J -Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate. All concentrations reported as being below the laboratory MDL are reported above as < the MDL.

5. RESULTS OF BIOLOGICAL TESTING

Eight different biological tests were performed for each site composite sample:

1. A 10-day amphipod survival test with the amphipod *Leptocheirus plumulosus*,
2. A 10-day juvenile polychaete survival test with the polychaete *Neanthes arenaceodentata*,
3. A 48-hr bivalve embryo survival and development test with the mussel *Mytilus galloprovincialis*,
4. A 96-hr mysid survival test with the mysid shrimp *Americamysis bahia*,
5. A 96-hr larval fish survival test with the estuarine fish *Menidia beryllina*,
6. A 96-hr modified elutriate mysid survival test with *Americamysis bahia,*
7. A 28-day bioaccumulation test with the clam *Macoma nasuta*, and
8. A 28-day bioaccumulation test with the polychaete *Nereis virens*.

All tests were performed following appropriate protocols as outlined in the SAP (PER 2015). Test data and summaries of the statistical analyses for the bioassay results are provided in Appendices G-V. Summaries of test conditions and test acceptability criteria are provided in Appendix W.

5.1 Benthic Toxicity Testing

Solid-phase bioassays were conducted with the amphipod *L. plumulosus* and the polychaete *N. arenaceodentata*. A summary of the measured concentrations of total ammonia and total sulfides in the sediment porewaters, and summary tables of the total ammonia concentrations measured in the test overlying waters are presented in Appendix G.

Positive and negative Control treatments were tested concurrently with the bioassays. The positive Control for both species consisted of a 96-hr waterborne reference toxicant test. The results of these tests were compared to PER's in-house reference toxicant test response databases to determine whether these test organisms were responding to toxic stress in a typical fashion. The negative Control for *L. plumulosus* and *N. arenaceodentata* consisted of a homogenized mixture of previously-collected clean reference site sediments that has been maintained at the PER Lab.

ITM/OTM guidance requires that site sediment results be compared with disposal site and/or reference site sediment results or a reference site database (if available) to determine the potential impact of whole sediment on benthic organisms at and beyond the boundaries of the disposal site (USEPA/USACE 1991, USEPA/USACE 1998). As detailed in the ITM/OTM, comparative guidelines for acceptance were followed as listed below:

1. If survival is greater in the proposed dredged sediments than in reference site sediment(s) or the reference site sediment database, the proposed dredged sediments are ***not*** acutely toxic to benthic organisms.

2. If a reduction in the survival response between the site sediment and in the reference sediment (or the 'reference site database survival') is ≤20% for amphipods or ≤10% for polychaetes, the test sediments are ***not*** acutely toxic to benthic organisms.
3. If a reduction in the survival response between the site sediment and in the reference sediment (or the 'reference site database survival') is >20% for amphipods or >10% for polychaetes, then the respective survival responses must be statistically compared. If a statistically significant reduction in survival is observed for the site sediment, then the site sediment is considered to be acutely toxic to benthic organisms. Statistical analyses are not performed when reference site database values are used.

5.1.1 Sediment Porewater Characterization

Prior to the initiation of the sediment testing, the composited sediment samples were removed from refrigerated storage and re-homogenized in a large stainless steel bowl. Aliquots of the re-homogenized composite sediment were then centrifuged at 2,500 g for 15 minutes; the resulting supernatant porewater was carefully collected and analyzed for ammonia and total sulfides (Table 5-1).

Table 5-1. Sediment Porewater Initial Water Ammonia Levels.

Sample ID	pH	Total Ammonia (mg/L N)	Total Sulfide (mg/L)
PRC-DU1-Comp	7.78	31.5	0.060
PRC-DU2-Comp	7.87	33.6	0.157

5.1.2 Purging of Sediment Porewater Ammonia for the Amphipod and Polychaete Tests

The initial sediment porewater ammonia concentrations (Table 5-1) exceeded the USACE guidelines-recommended threshold of 15 mg/L; accordingly these sediments were purged of ammonia by daily replacement of the overlying water with fresh 28 ppt seawater coupled with aeration until the porewater total ammonia levels were below 15 mg/L, after which the test was initiated. The sediment porewater ammonia data (along with sediment porewater water quality characteristics measured at test termination) are presented in Appendix G.

5.1.3 Effects of the Port of Redwood City Berths 1-4 Sediments on *Leptocheirus plumulosus*.

The results of these tests are summarized in Table 5-2. There was 98% survival in the Lab Control treatment, indicating an acceptable survival response by the test organisms; there was also 98% survival on the SF-11 reference site sediment. There was also 98% survival in each of the Port sediment samples. There was no reduction in survival in the site sediment relative to the SF-DODS Reference Site Database survival response (90.5%) and the SF-11 reference sediment survival response (98%); there was also no reduction in survival in the site sediment relative to the Lab Control. These test results indicate that the site sediments are ***not*** toxic to amphipods. The test data and summary of statistical analyses for this testing are presented in Appendix H.

Table 5-2. *Leptocheirus plumulosus* Survival in the Berths 1-4 Sediments.

Sediment Site	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	95	95	100	100	98
SF-DODS Database	-	-	-	-	-	90.5
SF-11	100	95	95	100	100	98
PRC-DU1-Comp	100	100	95	95	100	98
PRC-DU2-Comp	100	100	90	100	100	98

5.1.3.1 Reference Toxicant Toxicity to *Leptocheirus plumulosus* - The results of this test are presented in Table 5-3. The LC_{50} for this test was consistent with PER's reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion. The test data and summary of statistical analyses for this test are presented in Appendix I.

Table 5-3. Reference Toxicant Testing: Effects of KCl on *Leptocheirus plumulosus*.

KCl Treatment (g/L)	Mean % Survival
Lab Control	90
0.25	85
0.5	**60***
1	**20***
2	**0***
4	**0***
LC_{50} =	0.64 g/L KCl
Typical Response Range (mean ± 2 SD) =	0.46 – 1.40 g/L KCl

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

5.1.4 Effects of the Berths 1-4 Sediments on *Neanthes arenaceodentata*

The results of these tests are summarized in Table 5-4. There was 100% survival in the Lab Control treatment, indicating an acceptable survival response by the test organisms; there was also 100% survival in the SF-11 reference site sediment. There was ≥96% survival in the site sediments; the difference in survival in the site sediment relative to the SF-11 reference sediment and SF-DODS reference site database polycheate survival response was <10%. There was also no reduction in survival in the site sediment relative to the Lab Control. These test results indicate that the site sediments are ***not*** toxic to polychaetes. The test data and summary of statistical analyses for this testing are presented in Appendix J.

Table 5-4. *Neanthes arenaceodentata* Survival in the Berths 1-4 Sediments.

Sediment Site	% Survival in Test Replicates					Mean % Survival
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	100	100	100	100
SF-DODS reference database	-	-	-	-	-	98
SF-11	100	100	100	100	100	100
PRC-DU1-Comp	100	80	100	100	100	96
PRC-DU2-Comp	100	90	100	100	100	98

5.1.4.1 Reference Toxicant Toxicity to *Neanthes arenaceodentata* - The results of this test are presented in Table 5-5. The LC_{50} for this test was consistent with PER's reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion. The test data and summary of statistical analyses for this test are presented in Appendix K.

Table 5-5. Reference Toxicant Testing: Effects of KCl on *Neanthes arenaceodentata*.

KCl Treatment (g/L)	Mean % Survival
Lab Control	90
0.25	100
0.5	100
1	80
2	70
4	**0***
LC_{50} =	2.07 g/L KCl
Typical Response Range (mean ± 2 SD) =	1.06 – 2.08 g/L KCl

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

5.2 Water Column (Sediment Elutriate) Toxicity Testing

The 48-hr bivalve embryo development toxicity test with *M. galloprovincialis* and 96-hr survival tests with *A. bahia* and *M. beryllina* were performed on sediment elutriates to assess the effects of dredged material disposal in the water column. Detailed toxicity test results are presented in Section 5.2.1.

Positive and negative Lab Control treatments were tested concurrently with the site sediment elutriate. The positive Lab Control consisted of a 'waterborne' reference toxicant testing; the results of these tests were compared to PER's reference toxicant test response databases to determine whether the test organisms were responding to toxic stress in a typical fashion. The

negative Lab Control (and dilution media) consisted of 0.45 μm-filtered natural seawater (obtained from the UC Davis Granite Canyon Marine Laboratory, Carmel, CA), diluted to a test salinity of 30 ppt via addition of Type 1 lab water (reverse-osmosis de-ionized water). As an additional QA measure, the site water that was collected from the same area as the sediment cores and which was mixed with the sediments to prepare the 100% elutriates was also tested.

The test results for the sediment composite elutriate were compared with the test organism responses at the negative Lab Control treatment to determine the potential impact of the proposed dredged materials on pelagic organisms at and beyond the boundaries of the disposal site (USEPA/USACE 1991,1998). The following criteria were used for suitability determinations:

1. If the survival response and/or normal embryo development response in the 100% sediment elutriate treatment is ≥ the Control (clean seawater) treatment response(s), the dredged material is ***not*** predicted to be acutely toxic to water column organisms.
2. If the reduction in survival response and/or normal embryo development response in the 100% sediment elutriate treatment relative to the Control treatment is ≤10%, there is no need for statistical analyses and no indication of water column toxicity attributable to the test sediments.
3. If the reduction in survival response and/or normal embryo development response in the 100% sediment elutriate treatment relative to the Control treatment is >10%, then the data must be evaluated statistically to determine the magnitude of toxicity. If there is >50% survival or normal embryo development in the 100% elutriate treatment, the LC_{50}/EC_{50} is assumed to be ≥100%. If there is <50% survival or normal embryo development in at least one of the elutriate treatments, then an LC_{50}/EC_{50} should be calculated and compared with existing acceptability standards (i.e., the elutriate suitability concentration [ESC]).

In order for the material to be determined suitable for disposal at SF-11 and SF-DODS, it must be in compliance with the federal narrative water quality standard. Compliance with the narrative water quality standard is determined by evaluating whether the dredge material concentration, after mixing, would exceed 1% of the LC_{50} or EC_{50} value calculated from the sediment elutriate test (whichever is most conservative), outside of the mixing zone. ESC calculations are presented in Appendix L. Detailed toxicity test results are presented in Section 5.2.1.

Table 5-6. Results of the Berths 1-4 Sediment Elutriate Toxicity tests.

Elutriate Treatment	Test Species	Survival LC50	Development EC50	Predicted Elutriate Concentration[A]	Factored EC50[B]	Pass LPC?[C]
PRC-DU1-Comp	*M. galloprovincialis*	>100% elutriate	>100% elutriate	-[D]	-[D]	**YES**
	A. bahia	>100% elutriate				
	M. beryllina	>100% elutriate				
PRC-DU2-Comp	*M. galloprovincialis*	64.4% elutriate	69.1% elutriate	0.0875	0.644	**YES**
	A. bahia	>100% elutriate				
	M. beryllina	>100% elutriate				

A – Predicted elutriate concentration at the edge of the disposal site mixing zone.
B – The factored EC50 is the lowest reported test EC50 for a site sediment with a conservative factor of 100 applied to the EC50.
C – If the elutriate concentration at the edge of the mixing zone is less than the factored EC50, the sediment passes the limited permissible concentration (LPC) test and the narrative water quality standard for toxicity is met.
D – If the lowest reported test EC50 is >100% elutriate, the sediment passes the LPC test and the narrative water quality standard is met.

5.2.1 Toxicity of Berths 1-4 Sediment Elutriates to *Mytilus galloprovincialis*

The results of these tests are summarized below in Tables 5-7 and 5-8. There was ≥92.4% survival and ≥97.9% normal development in the Lab Control treatments, indicating acceptable responses by the test organisms. The survival LC_{50} and normal development EC_{50} values for the PRC-DU1-Comp sediment were both >100% elutriate. The survival LC_{50} values for the PRC-DU2-Comp sediment was ≥64.4% elutriate; the normal development EC_{50} value was ≥69.1% elutriate. The test data and the summary of statistical analyses for these tests are presented in Appendix M.

Table 5-7. Effects of PRC-DU1-Comp Sediment Elutriate on *Mytilus galloprovincialis*.

Elutriate Treatment	Mean % Survival	Mean % Normal Development
Lab Control	98.2	97.9
1%	95.6	97.7
10%	99.4	98.6
25%	98	97.9
50%	99.2	98.4
100%	**69.2***	**68.6***
Site Water	94.2	98.7
Salt Control	95.8	98.8
Survival LC_{50} or Development EC_{50} =	>100% elutriate[a]	>100% elutriate[a]

* The response at this test treatment was significantly less than the Lab Control treatment response at $p < 0.05$.
a - Due to the absence of significant impairment, the LC_{50}/EC_{50} could not be calculated but can be determined by inspection to be >100% elutriate.

Table 5-8. Effects of PRC-DU2-Comp Sediment Elutriate on *Mytilus galloprovincialis*.

Elutriate Treatment	Mean % Survival	Mean % Normal Development
Lab Control	92.4	98.7
1%	99.1	98.4
10%	94.3	98.2
25%	93.5	98.5
50%	88.7	**95.4***
100%	**0***	**0***
Site Water	94.2	98.7
Salt Control	95.8	98.8
Survival LC_{50} or Development EC_{50} =	64.4% elutriate	69.1% elutriate

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

5.2.1.1 Reference Toxicant Toxicity to *Mytilus galloprovincialis* Embryos - The results of this test are presented in Table 5-9. The EC_{50} for this test was consistent with the typical response range established by the reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion. The test data and summary of statistical analyses for this test are presented in Appendix N.

Table 5-9. Reference Toxicant Testing: Effects of KCl on *Mytilus galloprovincialis*.

KCl Treatment (g/L)	Mean % Normal Embryo Development
Lab Control	99.4
0.5	98.8
1	99.5
2	**85.1***
3	**0***
4	**0***
EC_{50} =	2.26 g/L KCl
Typical Response Range (mean ± 2 SD)	1.80 – 2.77 g/L KCl

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

5.2.2 Toxicity of Berths 1-4 Sediment Elutriates to *Americamysis bahia*

The results of these tests are summarized below in Tables 5-10 and 5-11. There was ≥98% survival in the Lab Control treatments, indicating acceptable survival response by the test organisms. The survival LC_{50} values for the PRC-DU1-Comp and PRC-DU2-Comp sediments were both >100% elutriate. The test data and summary of statistical analyses for these tests are presented in Appendix O.

Table 5-10. Effects of PRC-DU1-Comp Sediment Elutriate on *Americamysis bahia*.

Test Treatment	Mean % Survival
Lab Control	98
1%	94
10%	100
25%	98
50%	98
100%	100
Site Water	92
LC_{50} =	>100% elutriate[a]

a - Due to the absence of significant impairment, the LC_{50} could not be calculated but can be determined by inspection to be >100% elutriate.

Table 5-11. Effects of PRC-DU2-Comp Sediment Elutriate on *Americamysis bahia*.

Test Treatment	Mean % Survival
Lab Control	100
1%	100
10%	100
25%	100
50%	100
100%	98
Site Water	92
LC_{50} =	>100% elutriate[a]

a - Due to the absence of significant impairment, the LC_{50} could not be calculated but can be determined by inspection to be >100% elutriate.

5.2.2.1 Reference Toxicant Toxicity to *Americamysis bahia* - The results of this test are presented in Table 5-12. The LC_{50} for this test was consistent with the typical response range established by the reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion. The test data and summary of statistical analyses for this test are presented in Appendix P.

Table 5-12. Reference Toxicant Testing: Effects of KCl on *Americamysis bahia*.

KCl Treatment (g/L)	Mean % Survival
Lab Control	95
0.125	100
0.25	97.5
0.5	100
1	**0***
2	**0***
LC_{50} =	0.71 g/L KCl
Typical Response Range (mean ± 2 SD) =	0.56 – 0.76 g/L KCl

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

5.2.3 Toxicity of the Berths 1-4 Sediment Elutriates to *Menidia beryllina*

The results of these tests are summarized below in Tables 5-13 and 5-14. There was ≥96% survival in the Lab Control treatments, indicating acceptable survival response by the test organisms. The survival LC_{50} values for the PRC-DU1-Comp and PRC-DU2-Comp sediments were both >100% elutriate. The test data and summary of statistical analyses for these tests are presented in Appendix Q.

Table 5-13. Effects of PRC-DU1-Comp Sediment Elutriate on *Menidia beryllina*.

Test Treatment	Mean % Survival
Lab Control	96
1%	98
10%	98
25%	98
50%	98
100%	90
Site Water	92
LC_{50} =	>100% elutriate[a]

a - Due to the absence of significant impairment, the LC_{50} could not be calculated but can be determined by inspection to be >100% elutriate.

Table 5-14. Effects of PRC-DU2-Comp Sediment Elutriate on *Menidia beryllina*.

Test Treatment	Mean % Survival
Lab Control	100
1%	100
10%	98
25%	98
50%	100
100%	90
Site Water	92
LC_{50} =	>100% elutriate[a]

a - Due to the absence of significant impairment, the LC_{50} could not be calculated but can be determined by inspection to be >100% elutriate.

5.2.3.1 Reference Toxicant Toxicity to *Menidia beryllina* - The results of this test are presented in Table 5-15. The LC_{50} for this test was consistent with the typical response range established by the reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion. The test data and summary of statistical analyses for this test are presented in Appendix R.

Table 5-15. Reference Toxicant Testing: Effects of KCl on *Menidia beryllina.*

KCl Treatment (g/L)	Mean % Survival
Lab Control	90
0.125	95
0.25	90
0.5	95
1	75
2	**0***
LC_{50} =	1.24 g/L KCl
Typical Response Range (mean ± 2 SD) =	0.90 – 1.40 g/L KCl

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

5.2.4 Toxicity of the Berths 1-4 Sediment METs to *Americamysis bahia*

The results of the modified elutriate tests (MET) are summarized below in Table 5-16. There was 100% survival at the Lab Control treatment, indicating an acceptable survival response by the test organisms; there was also 100% survival at the Site Water. There was 98% survival in both of the PRC-DU1-Comp and PRC-DU2-Comp elutriates, neither of which was significantly less than the Control. The test data and summary of statistical analyses for this testing are presented in Appendix S.

Table 5-16. Effects of Berths 1-4 MET Elutriates on *Americamysis bahia*.

Test Treatment	Mean % Survival
Lab Control	100
Site Water	100
PRC-DU1-Comp	98
PRC-DU2-Comp	98

5.2.4.1 Reference Toxicant Toxicity to *Americamysis bahia* - The results of this test are presented in Table 5-17. The LC_{50} for this test was consistent with the typical response range established by the reference toxicant test database for this species, indicating that these test organisms were responding to toxic stress in a typical fashion. The test data and summary of statistical analyses for this test are presented in Appendix T.

Table 5-17. Reference Toxicant Testing: Effects of KCl on *Americamysis bahia*.

KCl Treatment (g/L)	Mean % Survival
Lab Control	95
0.125	100
0.25	97.5
0.5	100
1	**0***
2	**0***
LC_{50} =	0.71 g/L KCl
Typical Response Range (mean ± 2 SD) =	0.56 – 0.76 g/L KCl

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

5.2.5 Sediment Bioaccumulation Testing

Sediment bioaccumulation testing was conducted using the bivalve *M. nasuta* and the polychaete *N. virens*. A summary table of the total ammonia concentrations measured in the test overlying waters during the performance of the testing are presented in Appendix G. Negative Lab Control treatments were tested concurrently with the bioassays and consisted of "clean" sediment collected from near the vicinity from which the *N. virens* was originally collected. The test organism survival results for the bioaccumulation test exposures are presented in Tables 5-18

and 5-19 for *M. nasuta* and *N. virens*, respectively. The results of chemical analyses of *M. nasuta* and *N. virens* tissues are presented in Section 6.

5.2.5.1 Sediment Bioaccumulation Test Data for *Macoma nasuta* - The percentage of bivalves that survived in each of the test replicates is summarized below in Table 5-18. The test data for these tests are presented in Appendix U.

Table 5-18. Sediment Bioaccumulation Testing with *Macoma nasuta*.

Sample I.D.	Percent of Bivalves that Survived					Mean
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	95	95	100	95	95	96
PRC-DU1-Comp	100	95	95	100	100	98
PRC-DU2-Comp	95	95	100	95	100	97

Note - All treatments were initiated with 20 clams per replicate.

5.2.5.2 Sediment Bioaccumulation Test Data for *Nereis virens* - The percentage of polychaetes that survived in each of the test replicates is summarized below in Table 5-19. The test data for these tests are presented in Appendix V.

Table 5-19. Sediment Bioaccumulation Testing with *Nereis virens*.

Sample I.D.	Percent of Polychaetes that Survived					Mean
	Rep A	Rep B	Rep C	Rep D	Rep E	
Lab Control	100	100	100	90	100	100
PRC-DU1-Comp	100	90	100	100	100	98
PRC-DU2-Comp	100	100	90	100	100	98

Note - All treatments were initiated with 10 polychaetes per replicate.

6. CHEMICAL ANALYSES OF BIVALVE AND POLYCHAETE TISSUES

As per DMMO guidance, the tissue samples from the PRC-DU1-Comp sediment bioaccumulation tests were analyzed for PAHs, PCBs, and dioxins; the PRC-DU2-Comp tissues were analyzed for PAHs and dioxins. Tissue analyte concentrations were determined on composite samples comprised of tissue subsampled from each bioaccumulation test replicate. The results of these analyses are summarized in Tables 6-1 through 6-6. The full Eurofins Data Report for the *M. nasuta* and *N. virens* tissue analyses are presented in Appendix X.

Table 6-1. *Macoma nasuta* Tissue PCB Concentrations (µg/kg, wet wt).

Analyte	Test Initiation (T_0)	Control (T_{28})	PRC-DU1-Comp	SF-DODS Reference Database
PCB 008	<0.10	<0.10	<0.10	
PCB 018	<0.098	<0.098	<0.098	
PCB 028	<0.13	<0.13	<0.13	
PCB 031	<0.11	<0.46	<0.57	
PCB 033	<0.49	<0.50	<0.49	
PCB 044	<0.35	<0.35	<0.35	
PCB 049	<0.11	<0.11	<0.11	
PCB 052	<0.39	<0.39	<0.39	
PCB 056	<0.36	<0.36	<0.36	
PCB 060	<0.097	<0.097	<0.097	
PCB 066	<0.59	<0.59	<0.59	
PCB 070	<0.28	<0.28	<0.28	
PCB 074	<0.29	<0.29	0.30 J	
PCB 087	<0.16	<0.16	<0.16	
PCB 095	<0.15	<0.15	<0.15	
PCB 097	<0.18	<0.18	<0.18	
PCB 099	<0.14	<0.14	<0.14	
PCB 101	<0.39	<0.39	0.43 J	
PCB 105	<0.10	<0.10	<0.10	
PCB 110	<0.34	<0.34	<0.34	
PCB 118	<0.11	<0.11	<0.11	
PCB 128	<0.16	<0.16	<0.16	
PCB 132	<0.20	<0.20	<0.20	
PCB 138	<0.091	<0.091	0.15 J	
PCB 141	<0.49	<0.50	<0.49	
PCB 149	<0.12	<0.12	<0.12	
PCB 151	<0.089	<0.089	<0.089	
PCB 153	<0.13	<0.13	0.18 J	
PCB 156	<0.56	<0.56	<0.56	
PCB 158	<0.096	<0.096	<0.096	
PCB 170	<0.38	<0.38	<0.38	
PCB 174	<0.13	<0.13	<0.13	
PCB 177	<0.38	<0.38	<0.38	
PCB 180	<0.34	<0.34	<0.34	
PCB 183	<0.15	<0.15	<0.15	
PCB 187	<0.083	<0.083	<0.083	
PCB 194	<0.070	<0.070	<0.070	
PCB 195	<0.33	<0.33	<0.33	
PCB 201	<0.14	<0.14	<0.14	
PCB 203	<0.29	<0.29	<0.29	
Total PCBs	**0**	**0**	**1.06 J**	**nd - 4.2**

All results below laboratory method detection limit (MDL) are reported as < MDL.

J - Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit; the reported value is therefore an estimate.

Table 6-2. *Nereis virens* Tissue PCB Concentrations (µg/kg, wet wt).

Analyte	Test Initiation (T_0)	Control (T_{28})	PRC-DU1-Comp	SF-DODS Reference Database
PCB 008	<0.11	<0.12	<0.11	
PCB 018	<0.11	<0.12	<0.11	
PCB 028	<0.15	<0.15	<0.14	
PCB 031	<0.28	<0.42	<0.36	
PCB 033	<0.65	<0.87	<0.55	
PCB 044	<0.39	<0.40	<0.37	
PCB 049	<0.13	<0.13	<0.12	
PCB 052	<0.43	<0.45	<0.41	
PCB 056	<0.40	<0.41	<0.38	
PCB 060	<0.11	<0.11	<0.11	
PCB 066	<0.65	<0.67	<0.62	
PCB 070	<0.31	<0.32	<0.29	
PCB 074	<0.32	<0.33	<0.31	
PCB 087	<0.18	<0.19	<0.17	
PCB 095	<0.17	<0.17	<0.16	
PCB 097	<0.20	<0.21	<0.19	
PCB 099	<0.16	<0.16	<0.15	
PCB 101	<0.43	<0.45	<0.41	
PCB 105	<0.11	<0.12	<0.11	
PCB 110	<0.38	<0.39	<0.36	
PCB 118	<0.13	<0.13	<0.12	
PCB 128	<0.18	<0.19	<0.17	
PCB 132	<0.22	<0.23	<0.21	
PCB 138	0.48 J	0.43 J	0.29 J	
PCB 141	<0.55	<0.57	<0.52	
PCB 149	<0.14	<0.14	<0.13	
PCB 151	<0.098	<0.11	<0.093	
PCB 153	0.76	0.93	0.58	
PCB 156	<1.1	<0.64	<0.58	
PCB 158	<0.11	<0.11	<0.10	
PCB 170	<0.42	<0.43	<0.40	
PCB 174	<0.19	<0.15	<0.14	
PCB 177	<0.42	<0.43	<0.40	
PCB 180	<0.71	<0.78	<0.36	
PCB 183	<0.17	<0.17	<0.16	
PCB 187	0.33 J	0.33 J	0.14 J	
PCB 194	<0.077	<0.28	<0.12	
PCB 195	<0.37	<0.38	<0.35	
PCB 201	<0.16	<0.16	<0.15	
PCB 203	<0.45	<0.46	<0.31	
Total PCBs	**1.57**	**1.69**	**1.01**	**nd**

All results below laboratory method detection limit (MDL) are reported as < MDL.

J - Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit; the reported value is therefore an estimate.

Table 6-3. *Macoma nasuta* Tissue Concentrations of PAHs (ng/g, wet wt).

PAH Analyte	Test Initiation (T_0)	Control (T_{28})	PRC-DU1-Comp (T_{28})	PRC-DU2-Comp (T_{28})	SF-DODS Reference Database
Acenaphthene [A]	**<2.6**	**<2.7**	**5.4 J**	**3.0 J**	
Acenaphthylene [A]	**<1.3**	**<1.3**	**<1.3**	**<1.3**	
Anthracene [A]	**<1.3**	**<1.3**	**6.6 J**	**6.3 J**	
Benzo(a)anthracene[B]	<2.6	2.8 J	13	34	
Benzo(a)pyrene[B]	<2.6	<2.7	9.1	17	
Benzo(b)fluoranthene[B]	<2.6	3.3 J	15	31	
Benzo(e)pyrene[C]	<13	<13	<13	15 J	
Benzo(g,h,i)perylene[B]	<2.6	<2.7	3.6 J	4.6 J	
Benzo(k)fluoranthene[B]	<2.6	<2.7	6.5 J	13	
Biphenyl[C]	<2.6	<2.7	<2.7	<2.6	
Chrysene[B]	<1.3	3.5 J	15	37	
Dibenzo(a,h)anthracene[B]	<2.6	<2.7	<2.7	<2.6	
Dibenzothiophene[C]	<2.6	<2.7	2.8 J	3.1 J	
2,6-Dimethylnaphthalene[C]	<2.6	<2.7	<2.7	<2.6	
Fluoranthene[B]	<2.6	8.7	80	170	
Fluorene [A]	**<2.6**	**<2.7**	**6.0 J**	**<2.6**	
Indeno(1,2,3-cd)pyrene[B]	<2.6	<2.7	<2.7	3.2 J	
1-Methylnapthalene[C]	<2.6	<2.7	<2.7	<2.6	
2-Methylnapthalene[C]	<2.6	<2.7	<2.7	<2.6	
1-Methylphenanthrene[C]	4.1 J	5.1 J	12	13	
Naphthalene [A]	**<2.6**	**<2.7**	**45**	**<2.6**	
Perylene[C]	<2.6	<2.7	2.8 J	4.6 J	
Phenanthrene [A]	**<2.6**	**<2.7**	**33**	**17**	
Pyrene[B]	<2.6	7.1	100	180	
2,3,5-Trimethylnapthalen[C]	<2.6	<2.7	<2.7	<2.6	
Total LPAHs	**0**	**0**	**96**	**26.3**	**10**
Total HPAHs	**4.1 J**	**30.5**	**259.8**	**525.5**	**26**
Total PAHs	**4.1 J**	**30.5**	**355.8**	**551.8**	**33**

A - SF-DODS database low molecular weight PAH (LPAH).
B - SF-DODS database high molecular weight PAH (HPAH).
C - Additional RMP PAHs
All results below laboratory method detection limit (MDL) are reported as < MDL.
J = Detected above the detection limit but below the reporting limit.

Table 6-4. *Nereis virens* Tissue Concentrations of PAHs (ng/g, wet wt).

PAH Analyte	Test Initiation (T_0)	Control (T_{28})	PRC-DU1-Comp (T_{28})	PRC-DU2-Comp (T_{28})	SF-DODS Reference Database
Acenaphthene [A]	**<2.6**	**<2.7**	**<2.6**	**<2.6**	
Acenaphthylene [A]	**<1.3**	**<1.3**	**<1.3**	**<1.3**	
Anthracene [A]	**<1.3**	**<1.3**	**<1.3**	**<1.3**	
Benzo(a)anthracene[B]	<2.6	<2.7	<2.6	<2.6	
Benzo(a)pyrene[B]	<2.6	2.9 J	<2.6	<2.6	
Benzo(b)fluoranthene[B]	<2.6	<2.7	<2.6	<2.6	
Benzo(e)pyrene[C]	<13	<13	<13	<13	
Benzo(g,h,i)perylene[B]	<2.6	<2.7	<2.6	<2.6	
Benzo(k)fluoranthene[B]	<2.6	<2.7	<2.6	<2.6	
Biphenyl[C]	<2.6	<2.7	<2.6	<2.6	
Chrysene[B]	<1.3	<1.3	<1.3	<1.3	
Dibenzo(a,h)anthracene[B]	<2.6	<2.7	<2.6	<2.6	
Dibenzothiophene[C]	<2.6	<2.7	<2.6	<2.6	
2,6-Dimethylnaphthalene[C]	<2.6	<2.7	<2.6	<2.6	
Fluoranthene[B]	<2.6	<2.7	<2.6	5.1 J	
Fluorene [A]	**<2.6**	**<2.7**	**<2.6**	**<2.6**	
Indeno(1,2,3-cd)pyrene[B]	<2.6	<2.7	<2.6	<2.6	
1-Methylnapthalene[C]	<2.6	<2.7	<2.6	<2.6	
2-Methylnapthalene[C]	<2.6	<2.7	<2.6	<2.6	
1-Methylphenanthrene[C]	<2.6	<2.7	<2.6	<2.6	
Naphthalene [A]	**<2.6**	**<2.7**	**<2.6**	**<2.6**	
Perylene[C]	<2.6	<2.7	<2.6	<2.6	
Phenanthrene [A]	**<2.6**	**<2.7**	**<2.6**	**<2.6**	
Pyrene[B]	<2.6	<2.7	<2.6	4.0 J	
2,3,5-Trimethylnapthalen[C]	<2.6	<2.7	<2.6	<2.6	
Total LPAHs	**0**	**0**	**0**	**0**	**11**
Total HPAHs	**0**	**2.9 J**	**0**	**9.1 J**	**25**
Total PAHs	**0**	**2.9 J**	**0**	**9.1 J**	**36**

A - SF-DODS database low molecular weight PAH (LPAH).
B - SF-DODS database high molecular weight PAH (HPAH).
C - Additional RMP PAHs.
All results below laboratory method detection limit (MDL) are reported as < MDL.
J = Detected above the detection limit but below the reporting limit.

Table 6-5. *Macoma nasuta* Tissue Dioxins Concentrations (µg/kg, wet wt) and Lipids (%).

Analyte	Test Initiation (T_0)	Control (T_{28})	PRC-DU1-Comp	PRC-DU2-Comp	SF-DODS Reference Database
Dioxins (Total TCDD TEQ)	0.0936	0.299	0.270	0.276	-
% Lipids	0.79	0.67	0.51	0.59	-

Table 6-6. *Nereis virens* Tissue Dioxins Concentrations (µg/kg, wet wt) and Lipids (%).

Analyte	Test Initiation (T_0)	Control (T_{28})	PRC-DU1-Comp	PRC-DU2-Comp	SF-DODS Reference Database
Dioxins (Total TCDD TEQ)	0.610	0.489	0.574	0.344	-
% Lipids	0.4	0.48	2.7	2.0	-

6.1 Evaluation of Sediment Bioaccumulation Test Tissue Concentrations

Evaluation of bioaccumulation data was consistent with ITM/OTM guidelines and DMMO guidance and was performed as follows:

1. Test organism tissue contaminant concentrations were compared to the SF-DODS reference database; if a tissue concentration was less than the database range of concentrations, then no further evaluation was performed. If the tissue concentration was greater than the database range of concentrations, then further assessment was performed;
2. Tissue contaminant concentrations greater than the SF-DODS reference database were steady-state corrected using the best available data and then compared to available U.S. Food & Drug Administration (USFDA) action levels. If the test organism tissue concentrations are greater than USFDA action levels, then the dredged material was predicted to result in benthic bioaccumulation of contaminants;
3. Tissue concentrations greater than the SF-DODS reference database, but less than available USFDA action levels or for which no USFDA action level exists, were compared to tissue concentration "effects" data deemed most relevant to the test species obtained from peer-reviewed literature [from the USACE ERED database (http//wes.army.mil/el/ered/index.html; 2015)]. If a tissue analyte concentration was less than effects data concentrations, then no further evaluation was performed for that analyte. If the test organism tissue concentration was greater than effects data concentrations, then the magnitude of the exceedance was evaluated along with an assessment of potential food chain effects.

Comparisons of tissue concentrations to the SF-DODS reference database are presented in Section 6.2; for the test organism tissue concentrations that were above the SF-DODS reference database range, comparison to available tissue effects data are presented Section 6.3.

6.2 Comparison of Tissue Concentrations to SF-DODS Reference Database

The *M. nasuta* and *N. virens* tissue concentrations were compared to the SF-DODS reference database; tissue analytes for which the measured concentration exceeded the database range of concentrations are listed in Table 6-7.

Table 6-7. Tissue Analytes whose Concentrations Exceeded SF-DODS Reference Tissue Database Values.

Sample ID	*Macoma nasuta* Tissues	*Nereis virens* Tissues
PRC-DU1-Comp	Total PAHs	Total PCBs
PRC-DU2-Comp	Total PAHs	none

PRC-DU1-Comp bivalve tissue total PCBs indicated that these compounds would not accumulate above the SF-DODS reference database screening levels for bivalves. The bivalve total PAH tissue concentrations were above the SF-DODS reference database screening level for both DU1 and DU2.

PRC-DU1-Comp polychaete tissue total PCBs were slightly above screening levels. The polychaete total PAH tissue concentrations were below the SF-DODS reference database screening level for both DU1 and DU2..

6.3 Comparison of Tissue PCB and PAH Concentrations to Tissue Residue Effects Data

As *M. nasuta* tissue total PAH concentrations exceed the SF-DODS reference database levels for PRC-DU1-Comp and the PRC-DU2-Comp, and *N. virens* tissue total PCB concentrations exceeded SF-DODS reference database levels for PRC-DU1-Comp, further assessment of the *M. nasuta* and *N. virens* tissue concentrations for these analytes was performed (i.e., comparison to USACE ERED effects data). The results of this assessment are presented in Sections 6.3-6.5.

Dioxins

It should be noted that that there are no tissue screening levels for dioxins in the SF-DODS reference site database. In addition, the USACE ERED database was unavailable to perform a literature search for peer-approved data assessing co-occurring dioxin tissue burden levels and observed effects to marine invertebrates. Furthermore, spiking studies have indicated that aquatic invertebrates are insensitive to dioxins and there is a large body of evidence indicating that 2,3,7,8-TCDD, the most potent dioxin, is not toxic to aquatic invertebrates (Barber et al 1998). Investigators have exposed cladocera (Adams et al 1986, Isensee et al 1975, Yockimm et al 1978), midges (West et al 1997), mosquito larvae (Miller et al 1973), sandworms (Rubinstein et

al 1990), oligochaete worms [Miller et al 1973 and West et al 1997], snails (Isensee et al 1975, Yockimm et al 1978, and Miller et al 1973), clams (Rubinstein et al 1990), and grass shrimp (Rubinstein et al 1990) to dioxins and have shown no effects on these benthic and epibenthic organisms. The lack of dioxin sensitivity in aquatic invertebrates may be explained by the apparent lack of the cytoplasmic aryl hydrocarbon (Ah) receptor that is considered to be a requirement for the manifestation of 2,3,7,8-TCDD related effects (Poland and Glover 1980). Hahn et al. (1994) failed to detect the Ah receptor in nine species of aquatic invertebrates (including three species of arthropods, three molluscs, two annelids, and one echinoderm), supporting this assumption. Based on the literature suggesting that dioxins would likely not affect benthic invertebrates, further assessment was not performed.

6.3.1 Development of Toxicity Reference Values (TRV) Using the USACE ERED

As there are currently no screening levels promulgated for determination of ecological effects at SF-DODS, and consistent with ITM/OTM and USACE ERED guidance, toxicity reference values (TRV) were developed using PAB and PAH "effects" data from the USACE ERED database, using data for species most relevant to *M. nasuta* and *N. virens*. These TRVs were used to screen tissue burden levels to determine if the potential for adverse effects from disposal of the sediments exist.

Available relevant data for each of the compounds identified in organism tissues as exceeding the SF-DODS reference database are presented in Tables 6-8 and 6-9. The TRV was established as equivalent to the lesser of the reported no-observed-effect dose (NOED) or lowest observed-effect dose (LOED); in the absence of a NOED or LOED value, the TRV was calculated by applying an uncertainty factor of 20 to the reported ED_{50} value (USACHPPM 2000).

For each compound evaluated, the lowest TRV was selected, regardless of species, to ensure that a conservative screening was applied.

Table 6-8. Summary of ERED Tissue PCB 'Effect' Concentrations Used to Determine Potential Benthic Impacts.

Species	Reported "Effects" Concentration (µg/kg wet wt)	Type of Effect	Toxicity Endpoint	Life stage	ERED Reference
Asterias rubens (starfish)	146	development	LOED	adult	den Besten *et al*. 1989
Asterias rubens (starfish)	324	development	LOED	adult	den Besten *et al*. 1989
Asterias rubens (starfish)	19,200	reproduction	LOED	adult	den Besten *et al*. 1990
Lytechinus pictus (urchin)	647	growth	ED15[a]	adult	Zheng *et al*. 2003
***Lytechinus pictus* (urchin)**	**127***	**growth**	**NOED**	**adult**	**Zheng *et al*. 2003**

ED = Effect Dose; LOED - lowest observed effect dose; NOED = no observed effect dose.
* Most sensitive "Effects" Concentration selected for use in TRV development.
A – As there was no ED50 value available from this study, the ED15 was used without application of an uncertainty factor.

Table 6-9. Summary of ERED Tissue PAH 'Effect' Concentrations Used to Determine Potential Benthic Impacts.

PAH	Species	Reported "Effects" Concentration (µg/kg ww)	TRV (µg/kg ww)	Type of Effect	Toxicity Endpoint	Lifestage	Reference
Acenaphthene	*Mytilus edulis*	29,400	**1,470***	behavior	ED50	adult	Donkin et al 1989
Benzo(a)pyrene	*Mytilus edulis*	300	**300***	reproduction	LOED	not listed	Ertman et al. 1995
Fluoranthene	*Capitella sp*.	43,8000	43,8000	growth	NOED	adult	Bach et al. 2005
Fluoranthene	*Mytilus edulis*	627,000	31,350	behavior	ED50	adult	Donkin et al 1989
Fluoranthene	*Mytilus edulis*	220	**220***	reproduction	LOED	not listed	Ertman et al. 1995
Phenanthrene	*Mytilus edulis*	30,700	1,535	behavior	ED50	adult	Donkin et al 1989
Phenanthrene	*Nereis arenaceodentata*	780	780	behavior	LOED	immature	Emery et al. 1996
Phenanthrene	*Nereis arenaceodentata*	780	780	growth	LOED	immature	Emery et al. 1996
Phenanthrene	*Nereis arenaceodentata*	780*	**780***	reproduction	LOED	immature	Emery et al. 1996
Phenanthrene	*Nereis arenaceodentata*	780	780	mortality	NOED	immature	Emery et al. 1996
Pyrene	*Mytilus edulis*	189,000	**9,450***	behavior	ED50	adult	Donkin et al 1989

ED = Effect Dose; LD = Lethal Dose; LOED - lowest observed effect dose; NOED = no observed effect dose.
* For each of the PAHs, the most sensitive "Effects" Concentration selected for use in TRV development.

6.3.2 Comparison of Tissue Analyte Concentrations to Toxicity Reference Values

As the bioaccumulation tests were 28-days in duration and may not represent "steady-state" conditions for some of the compounds that exceeded the SF-DODS reference site database values, an estimation of steady-state was performed for each compound using available information (ASTM 2013, USACE 2010) prior to comparison to TRV values. For compounds for which there was no steady-state correction factor, steady-state was estimated based on the compounds' octanol-water partitioning coefficient (K_{ow}), as per the ITM (USEPA/USACE 1998).

None of the tissue concentrations exceeded the "effects" TRV values (Tables 6-10 to 6-12).

6.4 Comparison of Tissue Analyte Concentrations to USFDA Action Levels

Steady-state corrected tissue results were compared to available USFDA action levels. It should be noted that since there are no USFDA action levels for PAHs, no comparison was performed for these compounds. The *M. nasuta* and *N. virens* PCB tissue concentrations were below the USFDA action level.

6.5 Potential for Trophic Transfer and Biomagnification

The depth at SF-DODS is approximately 3,000 meters, resulting in substantial "dilution" of any dredged materials as they settle through the water column. Given this dilution and the reduction in any eventual bioaccumulation of the subsequent bedded sediments at SF-DODS that should be expected (relative to the bioaccumulation in *M. nasuta* and *N. virens* in the current "non-diluted" sediments), it seems unlikely that significant uptake of PAHs by resident benthic organisms would occur. Furthermore, it is recognized that bivalves accumulate PAHs due to their inability to metabolize them (Sirota and Uthe 1981), whereas fish and other invertebrates are capable of metabolizing PAHs, and typically have lower tissue PAH levels (Reichert et al. 1985; Lemaire et al. 1990); this is supported by the current bioaccumulation test results in which *M. nasuta* exhibited higher accumulation of PAHs than did *N. virens*. Due to the ability of most organisms to metabolize PAHs, it is generally assumed that trophic transfer and biomagnification of PAHs is not toxicologically problematic for food webs (Suedel et al 1994); this is supported by studies showing that while primary consumers and detritivores can accumulate PAHs, predators usually contain low levels (Clement et al. 1994; Hellou et al. 1991; Lemaire et al. 1993; Niimi and Dookran 1989). The relevant peer-reviewed literature regarding the bioaccumulation of PAHs in the aquatic environment suggests that the PAH accumulation in benthic organism tissues resulting from exposure to these sediments after disposal at SF-DODS would not have an adverse effect on upper trophic level consumers.

Table 6-10. Comparison of *Nereis virens* 28-day Tissue Concentrations (µg/kg, wet wt) to USACE ERED Database.

Site	Chemical	Mean Tissue Concentration	Steady State Correction Factor	Steady State Corrected Mean Tissue Concentration	TRV	Exceedance of TRV?
PRC-DU1-Comp	PCB Congeners	1.01	1.85[A]	1.87	127	no

A - ASTM E1688.

Table 6-11. Comparison of *Macoma nasuta* 28-day Tissue Concentrations (µg/kg, wet wt) to USACE ERED Database.

Site	Chemical	Mean Tissue Concentration	Steady State Correction Factor	Steady State Corrected Mean Tissue Concentration	TRV	Exceedance of TRV?
PRC-DU1-Comp	Acenaphthene	5.4 J	1.00[A]	5.4 J	1,470	no
	Benzo(a)pyrene	9.1	1.02[B]	9.3	300	no
	Fluoranthene	80	1.03[C]	82.4	220	no
	Phenanthrene	33	1.00[C]	33	780	no
	Pyrene	100	1.13[C]	113	9,450	no
PRC-DU2-Comp	Acenaphthene	3.0 J	1.00[A]	3.0 J	1,470	no
	Benzo(a)pyrene	17	1.02[B]	17.3	300	no
	Fluoranthene	170	1.03[C]	175.1	220	no
	Phenanthrene	17	1.00[C]	17	780	no
	Pyrene	180	1.13[C]	203.4	9,450	no

A - Based on assessment of Kow (USACE/USEPA 1998).
B - Average for *Macoma nasuta* as reported in USACE 2010.
C - Average for *Macoma nasuta* as reported in ASTM E1688 and USACE 2010.
J - Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate; as a result, J-flagged values are not identified as exceeding screening criteria.

Table 6-12. Comparison of *Nereis virens* 28-day Tissue Concentrations (µg/kg, wet wt) to USACE ERED Database.

Site	Chemical	Mean Tissue Concentration	Steady State Correction Factor	Steady State Corrected Mean Tissue Concentration	TRV	Exceedance of TRV?
PRC-DU2-Comp	Fluoranthene	5.1 J	1.00[A]	5.1 J	220	no
	Pyrene	4.0 J	1.00[A]	4.0 J	9,450	no

A - Average for *Macoma nasuta* as reported in ASTM E1688 and USACE 2010
J - Analyte detected below the method reporting limit (MRL) and the reported value is therefore an estimate; as a result, J-flagged values are not identified as exceeding screening criteria.

7. QUALITY CONTROL REVIEW

Any analyses that did not comply with the analytical laboratory QA/QC limits are presented below (also, see final analytical reports in Appendices B, C, D, E, and X for full case narratives).

The QA/QC review entailed reviewing the contract lab Data Report(s) for sample integrity, correct methodology, and compliance with all appropriate Lab QA/QC requirements. The overall data quality assessment found that all data were usable. Appendices B, C, D, and E contain the conventional and chemical analyses reports, which include contract laboratory QA/QC narratives; Appendix X contains the tissue analysis reports.

7.1 Sediment Conventional and Chemical Analytical QA/QC Summary

Eurofins Calscience Report 15-02-1248

Metals – Zinc exceeded quality control (QC) criteria for percent recovery in the Matrix Spike (MS) and Matrix Spike Duplicate (MSD). QC results were flagged with the appropriate qualifiers and were released with no further action since the Laboratory Control Sample (LCS) was in control.

OCl Pesticides – Several pesticides exceeded QC criteria for Relative Percent Difference (RPD) and/or percent recoveries. QC results were flagged with the appropriate qualifiers and were released with no further action since the LCS was in control.

PAHs – Several compounds exceeded QC criteria for RPD and/or percent recoveries. QC results were flagged with the appropriate qualifiers and were released with no further action since the LCS was in control.

Eurofins Calscience Report 15-03-1625

All QC parameters were within the established control limits.

Eurofins Calscience Report 15-05-0017

All QC parameters were within the established control limits.

ALS Report E1500230

Dioxins – The method blank contained low levels of various analytes at or below the Method Reporting Limit (MRL).

The LCS/Laboratory Control Sample Duplicate (LCSD) samples were analyzed and reported in lieu of an MS/MSD for the extraction batch. 1,2,3,4,6,7,8-HpCDD, OCDD, and OCDF were outside the percent recoveries for EQ1500199-02 (LCS) and 03 (LCSD). This was traced back to high level samples in the batch.

Recovery levels of several compounds standards were outside the acceptance limits and were flagged. In all cases, the signal-to-noise ratios were greater than 10:1 and detection limits were below MRL.

Ion abundance ratios associated with select compounds were outside the QC limits and were flagged. These compounds were reported with an estimated maximum possible concentration for the associated compound.

7.2 Modified Elutriate Conventional and Chemical Analytical QA/QC Summary

Eurofins Calscience Report 15-02-1337
All QC parameters were within the established control limits.

Eurofins Calscience Report 15-05-0012
All QC parameters were within the established control limits.

7.3 DI WET Conventional and Chemical Analytical QA/QC Summary

Eurofins Calscience Report 15-05-0018
All QC parameters were within the established control limits.

7.4 Tissue Chemistry QA/QC Summary

Eurofins Calscience Report 15-04-2231
PAHs – The LCS and/or LCSD recovery for benzo(b)fluoranthene were outside the stated QC window but within marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC standards.

7.5 Biological Testing QA/QC Summary

The biological testing of the sediments incorporated standard QA/QC procedures to ensure that the test results were valid. Standard QA/QC procedures included the use of negative Lab Controls, positive Lab Controls, test replicates, and measurements of water quality during testing.

Quality assurance procedures that were used for sediment testing are consistent with methods described in the USEPA/USACE (1998). Sediments for the bioassay testing were stored appropriately at ≤4°C and were used within the 8-week holding time period. Sediment interstitial water characteristics were within test acceptability limits at the start of the tests. The overlying water in the benthic sediment toxicity tests and the sediment bioaccumulation tests consisted of high-quality natural seawater diluted to the test salinity using Type 1 lab water. Sediment

elutriates were prepared using site water, and high-quality natural seawater diluted to the test salinity using Type 1 lab water was used as the dilution medium.

All measurements of routine water quality characteristics were performed as described in the PER Lab Standard Operating Procedures (SOPs). All biological testing water quality conditions were within the appropriate limits. Laboratory instruments were calibrated daily according to Lab SOPs, and calibration data were logged and initialed. Standard test conditions are presented in Appendix W.

Negative Lab Control – The biological responses for all the test organisms at the negative Lab Control treatments were within acceptable limits for the sediment and sediment elutriate tests.

Positive Lab Control – The accuracy of the responses of the test organisms to toxic stress was evaluated using positive Lab Controls (reference toxicant testing). The key test concentration-response LC and/or EC point estimates determined for each of the test species were all within the respective typical response ranges for these species, indicating that these test organisms were responding to toxic stress in a typical fashion.

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

8. SUMMARY

The sediments proposed for dredging in support of the Port of Redwood City Berths 1-4 maintenance dredging project were analyzed to determine the suitability for sediment placement at the Alcatraz disposal site (SF-11), San Francisco Deep Ocean Disposal Site (SF-DODS), or for beneficial reuse at the CRRP, MWRP, and Winter Island wetland restoration sites.

Summaries of the chemical and biological evaluations assessing each of these potential placement/disposal options are provided below in Sections 8-1 through 8-3; Table 8-1 summarizes these conclusions and recommendations. All remaining sediment samples will be archived for up to a year should additional site-specific analytical chemistry be required for other alternative disposal sites.

It should be noted that the Z-layer results for DU2 (Berths 3&4) indicated that the total PAH concentration in the predicted post dredge mudline will be elevated relative to the dredge material proposed for removal. As a result, additional testing may be required prior to dredging to assess applicability of and alternate dredge depth; however, suitability of the proposed dredged material for unconfined aquatic disposal or placement at an upland beneficial reuse site can be determined with the existing results.

8.1 Unconfined Aquatic Disposal at SF-11

Although the composite sediment samples had multiple analytes whose measured concentrations exceeded the SF Bay ambient levels, the benthic toxicity test results indicated that these compounds were not biologically available to cause toxicity in the 10-day sediment tests. The narrative water quality objective (WQO) was met for the sediment elutriate tests.

Comparison of the analytical chemistry results to SF Bay specific thresholds currently used by the DMMO for in-Bay placement indicated that:

1. PRC-DU1-Comp
    a. dioxins and total PAHs were above SF Bay Bioaccumulation Trigger Levels (SFEI 2015);
    b. total PCBs in the PRC-DU1-Comp sample were above the SF Bay PCB TMDL Threshold, precluding placement of PRC-DU1-Comp sediments in SF Bay.
2. PRC-DU2-Comp
    a. Dioxins and total PAHs in the PRC-DU2-Comp were above the SF Bay Bioaccumulation Trigger Level (SFEI 2014); sediments above this threshold cannot be placed in SF Bay without further testing. While bioaccumulation testing was performed on PRC-DU2-Comp sediments, subsequent assessment to determine suitability for placement in SF Bay was not performed.

Based on these data, the Port sediments would currently be considered not suitable for unconfined aquatic disposal (NUAD) at SF-11.

8.2 Unconfined Aquatic Disposal at SF-DODs

Although the composite sediment samples had one or more analytes whose measured concentration(s) exceeded the SF-DODS reference site database levels, the benthic toxicity test results indicated that these compounds were not biologically available to cause toxicity in the 10-day sediment tests. In addition, the narrative WQO was met for the sediment elutriate tests.

Comparison of bioaccumulation test tissue PCB and PAH concentrations to the SF-DODS database indicated that tissue levels for these compounds were either below the SF-DODS reference site tissue screening values or below "effects" data obtained from the USACE ERED database, suggesting the measured tissue concentrations were below effect levels.

Based on these results, all of the Port's sediments would be considered suitable for unconfined aquatic disposal (SUAD) at SF-DODS.

8.3 Placement at CRRP and MWRP Upland Beneficial Reuse Sites

Although the Port composite sediment samples had multiple analytes whose measured concentrations exceeded placement site screening levels, the benthic toxicity test results indicated that these compounds were not biologically available to cause toxicity in the 10-day sediment tests.

Modified elutriate testing indicated that any decant water from the placement of dredged material at a beneficial reuse site would be in compliance with each site's waste discharge requirements.

Comparison of the sediment analyte concentrations to CRRP and MWRP screening levels indicated that the sediments would not be considered suitable for use as cover material due to screening level exceedances for dioxins, total PCBs, or PAHs; however, the analytical chemistry results indicated that sediments would be considered suitable for use as foundation material at the MWRP beneficial reuse site.

DI-WET testing, which is performed on sediments proposed for use as foundation material, indicated that leachate resulting from placement of the dredged material at the MWRP beneficial reuse site would be in compliance with MWRP waste discharge requirements.

Based on these data, the Port's sediments would currently not be considered suitable for use as cover material at the CRRP and MWRP dredged material beneficial reuse sites; however sediments should be considered suitable for placement as foundation material in deep-cells at MWRP.

Table 8-1. Suitability Findings.

Sample ID	Bulk Sediment Chemistry Exceedances				MET Analytical Chemistries	Bioassays			Bioaccumulation	Suitability Findings for 2015
	SF Bay Ambient	SF Bay Bioccumulation Threshold	SF Bay TMDL	SF-DODS		Solid Phase	Water Column	MET		
PRC-DU1-Comp	Cadmium, total PAHs, total PCBs, and total DDTs	Dioxins, total PAHs, total PCBs	total PCBs	Arsenic, Cadmium, Lead, Mercury, total Butyltins, total DDTs, and total PAHs, total PCBs	Pass	Pass	LPC Pass	Pass	No TRV Exceedance	NUAD at SF-11 and cover material at CRRP, MWRP and Winter Island. SUAD at SF-DODS, and for foundation placement at MWRP
PRC-DU2-Comp	Zinc, total PAHs, and total DDTs	Dioxins, total PAHs	none	Arsenic, Lead, Mercury, total Butyltins, total DDTs[a], and total PAHs, total PCBs	Pass	Pass	LPC Pass	Pass	No TRV Exceedance	NUAD at SF-11 and cover material at CRRP, MWRP and Winter Island. SUAD at SF-DODS, and for foundation placement at MWRP

LPC = Limited permissible concentration.
NUAD = Not suitable for unconfined aquatic disposal.
PAH = Polycyclic aromatic hydrocarbon.
SF-11 = Alcatraz disposal site
SF-DODS = San Francisco Deep Ocean Disposal Site.
SUAD = Suitable for unconfined aquatic disposal.
TRV = Toxicity Reference Value.

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Appendix A

Sampling Field Logs and Data Sheets

Pacific EcoRisk
Environmental Consulting and Testing

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534
Phone: (707) 207-7760
Fax: (707) 207-7916

Sediment Core Collection Form

Station ID: PRC- DU 1-01 **Date:** 02/4/15

Project Name: Port of Redwood City **Project No.:** 23613

Lat/Northing: 37.°30. ~~7669~~ 7640' **Long/Easting:** 122° 12.6278'

Vertical Datum: MLLW MLW Other:

Depth Measurement: Sounder Leadline

Project Depth: -34.0' **Overdredge:** 1.0'+ 0.5' Z-layer

	Attempt 1	Attempt 2
Time:	12:30	
(A) Measured Water Depth	~~34.0~~ 36.2	
(B) Tide Height	8.0'	
(C) Mudline Elevation (A–B=C)	~~26.0'~~ 28.2'	
(D) Calculated Core Length (PD+OD-C=D)	~~9.5'~~ 7.3'	
Estimated Penetration	7.3'	
Description of Core Drive	Smooth	
Refusal Encountered?	No	
Total Core Length Recovered	7.3'	

Core Characteristics

Sediment Type	cobble, gravel, sand C M F, silt clay, organic matter	cobble, gravel, sand C M F, silt clay, organic matter
Sediment Color	gray, black, brown, brown surface, olivine	gray, black, brown, brown surface, olivine
Sediment Odor	None, slight, mod, strong H_2S, petroleum, septic	None, slight, mod, strong H_2S, petroleum, septic
Any Layering Homogenous	Homogenous	

Comments: Sample Collected in line with face of wharf fenders. ~~station was located on the~~
- Bottom 0.5' of Core retained as Z-layer
- 2 cores Collected for volume

Recorded by: [signature]

Pacific EcoRisk
Environmental Consulting and Testing

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534
Phone: (707) 207-7760
Fax: (707) 207-7916

Sediment Core Collection Form

Station ID: PRC- DU1-02 **Date:** 02/4/15

Project Name: Port of Redwood City **Project No.:** Z3613

Lat/Northing: 37°30.7954' ~~37 30.7544 7954~~ **Long/Easting:** 122° 12.3870'

Vertical Datum: (MLLW) MLW Other:

Depth Measurement: Sounder (Leadline)

Project Depth: -34.0' **Overdredge:** 1.0'+ 0.5' Z-layer

	Attempt 1	Attempt 2
Time:	13:21	
(A) Measured Water Depth	34.5'	
(B) Tide Height	7.7	
(C) Mudline Elevation (A–B=C)	26.8	
(D) Calculated Core Length (PD+OD-C=D)	8.7	
Estimated Penetration	8.7	
Description of Core Drive	Smooth	
Refusal Encountered?	No	
Total Core Length Recovered	8.7	

Core Characteristics

Sediment Type	cobble, gravel, sand C M F, (silt clay), organic matter	cobble, gravel, sand C M F, silt clay, organic matter
Sediment Color	(gray), black, brown, (brown surface), olivine	gray, black, brown, brown surface, olivine
Sediment Odor	(None), slight, mod, strong H_2S, petroleum, septic	None, slight, mod, strong H_2S, petroleum, septic
Any Layering Homogenous	Homogenous	

Comments: - Bottom 0.5' of Core was returned as the Z-Layer.
- 2 Cores Collected for volume
- Sample collected in line with face of wharf fenders, ~~off~~ off of fender.

Recorded by: DC

Pacific EcoRisk
Environmental Consulting and Testing

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534
Phone: (707) 207-7760
Fax: (707) 207-7916

27.3

Sediment Core Collection Form

Station ID: PRC- DU1-03 **Date:** 02/4/15

Project Name: Port of Redwood City **Project No.:** 23613

ATT#2 37°30.8243' ATT#2 122° 12.5416'

Lat/Northing: 37°30.8308' **Long/Easting:** 122°12.5616'

Vertical Datum: MLLW MLW Other:

Depth Measurement: Sounder Leadline

Project Depth: -34.0' **Overdredge:** 1.0'+ 0.5' Z-layer

	Attempt 1	Attempt 2
Time:	1415	1445
(A) Measured Water Depth	32.0'	32.7'
(B) Tide Height	6.8'	6.0'
(C) Mudline Elevation (A–B=C)	25.2'	26.7'
(D) Calculated Core Length (PD+OD-C=D)	10.3'	8.8'
Estimated Penetration	~~1.0'~~ 0.5'	8.8'
Description of Core Drive	Hard refusal	Smooth. Then the last 1 of drive had significant resistance
Refusal Encountered?	Yes	No
Total Core Length Recovered	0.0'	8.8'

Core Characteristics

Sediment Type	cobble, gravel, sand C M F, silt clay, organic matter	cobble, gravel, sand C M F, silt clay, organic matter
Sediment Color	gray, black, brown, brown surface, olivine	gray, black, brown, brown surface, olivine
Sediment Odor	None, slight, mod, strong H_2S, petroleum, septic	None, slight, mod, strong H_2S, petroleum, septic
Any Layering Homogenous		Homogenous

Comments: - Bottom 0.5' retained as Z-Layer
- Due to hard refusal @ ~~[illegible]~~ proposed site moved ~17m SW along wharf from old location.
- 2 cores collected for volume at 2nd location, ~6' off of the face of the wharf

Recorded by: [signature]

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Environmental Consulting and Testing

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Sediment Core Collection Form

Station ID: PRC- DU1-04 **Date:** 02/4/15

Project Name: Port of Redwood City **Project No.:** 23613

Lat/Northing: 37° 30.8504' **Long/Easting:** 122°12.5023'

Vertical Datum: (MLLW) MLW Other:

Depth Measurement: Sounder (Leadline)

Project Depth: -34.0' **Overdredge:** 1.0'+ 0.5' Z-layer

	Attempt 1	Attempt 2
Time:	1545	
(A) Measured Water Depth	33.5'	
(B) Tide Height	4.5'	
(C) Mudline Elevation (A–B=C)	29.0'	
(D) Calculated Core Length (PD+OD-C=D)	6.5'	
Estimated Penetration	6.5'	
Description of Core Drive	Smooth	
Refusal Encountered?	No	
Total Core Length Recovered	6.5'	

Core Characteristics

Sediment Type	cobble, gravel, sand C M F, (silt clay), organic matter	cobble, gravel, sand C M F, silt clay, organic matter
Sediment Color	(gray) black, brown, (brown surface), olivine	gray, black, brown, brown surface, olivine
Sediment Odor	(None), slight, mod, strong H_2S, petroleum, septic	None, slight, mod, strong H_2S, petroleum, septic
Any Layering Homogenous	Homogenous	

Comments: Bottom 0.5' of Core retained as Z-Layer
- 2 Cores Collected for volume.
- Cores collected ~8' off the face of the wharf

Recorded by: [signature]

Pacific EcoRisk
Environmental Consulting and Testing

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534
Phone: (707) 207-7760
Fax: (707) 207-7916

Sediment Core Collection Form

Station ID: PRC-DC1-05 **Date:** 02/4/15

Project Name: Port of Redwood City **Project No.:** 23613

Lat/Northing: 37° 30.8913' **Long/Easting:** 122° 12.4378'

Vertical Datum: (MLLW) MLW Other:

Depth Measurement: Sounder (Leadline)

Project Depth: -34.0' **Overdredge:** 1.0'+ 0.5' Z-layer

	Attempt 1	Attempt 2
Time:	1630	
(A) Measured Water Depth	32.3'	
(B) Tide Height	3.1'	
(C) Mudline Elevation (A–B=C)	29.2'	
(D) Calculated Core Length (PD+OD-C=D)	6.3'	
Estimated Penetration	6.3'	
Description of Core Drive	Smooth	
Refusal Encountered?	No	
Total Core Length Recovered	6.3'	

Core Characteristics

Sediment Type	cobble, gravel, sand C M F, (silt clay), organic matter	cobble, gravel, sand C M F, silt clay, organic matter
Sediment Color	(gray), (black), brown, (brown surface), olivine	gray, black, brown, brown surface, olivine
Sediment Odor	(None), slight, mod, strong H_2S, petroleum, septic	None, slight, mod, strong H_2S, petroleum, septic
Any Layering Homogenous	Homogenous	

Comments: Bottom 0.5' retained as Z-layer
- 2 cores collected for volume.
- Cores collected ~ 8' off the face of the wharf.

Recorded by: DG

Pacific EcoRisk
Environmental Consulting and Testing

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534
Phone: (707) 207-7760
Fax: (707) 207-7916

30.7

Sediment Core Collection Form

Station ID: PRC- DU2-01 **Date:** 02/4/15

Project Name: Port of Redwood City **Project No.:** 23613

Lat/Northing: 37°30.5980' **Long/Easting:** 122°12.6951'

Vertical Datum: (MLLW) MLW Other:

Depth Measurement: (Sounder) Leadline

Project Depth: -34.0' **Overdredge:** 1.0'+ 0.5' Z-layer

	Attempt 1	Attempt 2
Time:	08:30	
(A) Measured Water Depth	32.0'	
(B) Tide Height	3.2'	
(C) Mudline Elevation (A–B=C)	28.8	
(D) Calculated Core Length (PD+OD-C=D)	36.7	
Estimated Penetration	6.7'	
Description of Core Drive	Smooth	
Refusal Encountered?	No	
Total Core Length Recovered	6.7'	

Core Characteristics

Sediment Type	cobble, gravel, sand C M F, (silt clay), organic matter	cobble, gravel, sand C M F, silt clay, organic matter
Sediment Color	(gray), black, brown, (brown surface), olivine	gray, black, brown, brown surface, olivine
Sediment Odor	(None), slight, mod, strong H_2S, petroleum, septic	None, slight, mod, strong H_2S, petroleum, septic
Any Layering Homogenous	Homogenous	

Comments: Bottom 0.5' of core retained as Z-layer
- 2 Cores Collected for volume
- Cores collected ~8' off the face of the wharf

Recorded by: [signature]

Pacific EcoRisk
Environmental Consulting and Testing

Pacific EcoRisk
2250 Cordelia Road
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Phone: (707) 207-7760
Fax: (707) 207-7916

Sediment Core Collection Form

Station ID: PRC-DU2-02 **Date:** 02/4/15

Project Name: Port of Redwood City **Project No.:** 23613

Lat/Northing: 37° 30.6385' **Long/Easting:** 122° 12.6825'

Vertical Datum: (MLLW) MLW Other:

Depth Measurement: ~~Sounder~~ (Leadline)

Project Depth: -34.0' **Overdredge:** 1.0'+ 0.5' Z-layer

	Attempt 1	Attempt 2
Time:	09:20	
(A) Measured Water Depth	~~4.6~~ 35.0'	
(B) Tide Height	4.6'	
(C) Mudline Elevation (A–B=C)	30.4	
(D) Calculated Core Length (PD+OD-C=D)	5.1'	
Estimated Penetration	5.1'	
Description of Core Drive	Smooth	
Refusal Encountered?	No	
Total Core Length Recovered	5.1'	

Core Characteristics

Sediment Type	cobble, gravel, sand C M F, (silt clay), organic matter	cobble, gravel, sand C M F, silt clay, organic matter
Sediment Color	(gray), black, brown, brown surface, olivine	gray, black, brown, brown surface, olivine
Sediment Odor	(None), slight, mod, strong H_2S, petroleum, septic	None, slight, mod, strong H_2S, petroleum, septic
Any Layering Homogenous	Homogenous	

Comments: Bottom 0.5' of Core retained as Z-layer
- 2 Cores Collected for volume
- Cores Collected ~6' off the face of the Wharf

Recorded by: DB

Pacific EcoRisk
Environmental Consulting and Testing

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534
Phone: (707) 207-7760
Fax: (707) 207-7916

Sediment Core Collection Form

Station ID: PRC- DU2-03 **Date:** 02/4/15

Project Name: Port of Redwood City **Project No.:** 23613

Lat/Northing: 37°30.6769' **Long/Easting:** 122°12.6709'

Vertical Datum: (MLLW) MLW Other:

Depth Measurement: Sounder (Leadline)

Project Depth: -34.0' **Overdredge:** 1.0'+ 0.5' Z-layer

	Attempt 1	Attempt 2
Time:	0945	
(A) Measured Water Depth	33.6'	
(B) Tide Height	5.2'	
(C) Mudline Elevation (A–B=C)	28.4'	
(D) Calculated Core Length (PD+OD-C=D)	7.1'	
Estimated Penetration	7.1'	
Description of Core Drive	SMOOTH	
Refusal Encountered?	No	
Total Core Length Recovered	7.1'	

Core Characteristics

Sediment Type	cobble, gravel, sand C M F, (silt clay), organic matter	cobble, gravel, sand C M F, silt clay, organic matter
Sediment Color	(gray), black, brown, (brown surface), olivine	gray, black, brown, brown surface, olivine
Sediment Odor	(None), slight, mod, strong H_2S, petroleum, septic	None, slight, mod, strong H_2S, petroleum, septic
Any Layering Homogenous	Homogenous	

Comments: - Retained bottom 0.5' as Z-layer
- 2 cores collected for volume
- Cores collected ~8' off the face of the wharf

Recorded by: [signature]

Pacific EcoRisk
Environmental Consulting and Testing

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534
Phone: (707) 207-7760
Fax: (707) 207-7916

Sediment Core Collection Form

Station ID: PRC- DU2-04 **Date:** 02/4/15

Project Name: Port of Redwood City **Project No.:** 23613

Lat/Northing: 37°30.7046' **Long/Easting:** 122°12.6622'

Vertical Datum: (MLLW) MLW Other:

Depth Measurement: Sounder (Leadline)

Project Depth: -34.0' **Overdredge:** 1.0'+ 0.5' Z-layer

	Attempt 1	Attempt 2
Time:	10:30	
(A) Measured Water Depth	35.0'	
(B) Tide Height	6.3'	
(C) Mudline Elevation (A–B=C)	28.7'	
(D) Calculated Core Length (PD+OD-C=D)	6.8'	
Estimated Penetration	6.8'	
Description of Core Drive	Smooth	
Refusal Encountered?	No	
Total Core Length Recovered	6.8'	

Core Characteristics

Sediment Type	cobble, gravel, sand C M F, (silt clay), organic matter	cobble, gravel, sand C M F, silt clay, organic matter
Sediment Color	(gray), black, brown, (brown surface), olivine	gray, black, brown, brown surface, olivine
Sediment Odor	(None), slight, mod, strong H_2S, petroleum, septic	None, slight, mod, strong H_2S, petroleum, septic
Any Layering Homogenous	Homogenous	

Comments: - retained bottom 0.5' of core on Z-layer
- 2 cores collected for volume
- Cores collected ~8' off the face of the wharf

Recorded by: [signature]

Pacific EcoRisk
Environmental Consulting and Testing

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534
Phone: (707) 207-7760
Fax: (707) 207-7916

Sediment Core Collection Form

Station ID: PRC- DU2-05 **Date:** 02/4/15

Project Name: Port of Redwood City **Project No.:** 23613

Lat/Northing: 37° 30. ~~7358'~~ 7347' **Long/Easting:** 122° 12. ~~6506'~~ 6532'

Vertical Datum: (MLLW) MLW Other:

Depth Measurement: Sounder (Leadline)

Project Depth: -34.0' **Overdredge:** 1.0'+ 0.5' Z-layer

	Attempt 1	Attempt 2
Time:	11:20	
(A) Measured Water Depth	~~7.35.3~~ 37.5	
(B) Tide Height	7.4'	
(C) Mudline Elevation (A–B=C)	~~27.9'~~ 30.1	
(D) Calculated Core Length (PD+OD-C=D)	~~7.8~~ 5.4	
Estimated Penetration	5.4'	
Description of Core Drive	SMOOTH	
Refusal Encountered?	No	
Total Core Length Recovered	5.4'	

Core Characteristics

Sediment Type	cobble, gravel, sand C M F, (silt clay), organic matter	cobble, gravel, sand C M F, silt clay, organic matter
Sediment Color	(gray) black, brown, (brown surface), olivine	gray, black, brown, brown surface, olivine
Sediment Odor	(None), slight, mod, strong H_2S, petroleum, septic	None, slight, mod, strong H_2S, petroleum, septic
Any Layering Homogenous	Homogenous	

Comments: - Retained bottom 0.5' of core as Z-Layer
- 2 cores collected for volume.
- Core collected ~30' off end of wharf, in-line with the fenders along the face of the wharf

Recorded by: DG

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

CHAIN-OF-CUSTODY RECORD

Results To:	PER	Invoice To:	Same
Address:	2250 Cordelia Road Fairfield, CA	Address:	
Phone:		Phone:	
Attn:		Attn:	
E-mail:		E-mail:	
Project Name:			
P.O.#/Ref:			

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Grab/ Comp	Container Number	Container Type
1	Port of Redwood City Site water	4/28/15	1130		Grab	4	5 gal cubis
2							
3							
4							
5							
6							
7							
8							
9							
10							

Samples Collected By:

Comments/Special Instruction:

RELINQUISHED BY:	RECEIVED BY:
Signature: [signature]	Signature: Robert Dee
Print: Corey Alvarado	Print: Robert Dee
Organization: PER	Organization: PER
Date: 4/28/15 Time: 1330	Date: 4/28/15 Time: 1330
RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:
Print:	Print:
Organization:	Organization:
Date: Time:	Date: Time:

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

Appendix B

Results of the Sediment Analyses: Data Reports Submitted by Eurofins Calscience

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WORK ORDER NUMBER: 15-02-1248

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Pacific Ecorisk

Client Project Name: Port of Redwood City

Attention: Jeff Cotsifas
2250 Cordelia Road
Fairfield, CA 94534-1912

Approved for release on 03/13/2015 by:
Danielle Gonsman
Project Manager

ResultLink

Email your PM

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Work Order Number: 15-02-1248

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CASE NARRATIVE

Calscience Work Order No.: 15-02-1248
Project ID: Port of Redwood City / 23613

Provided below is a narrative of our analytical effort, including any unique features or anomalies encountered as part of the analysis of the sediment samples.

Sample Condition on Receipt

Four sediment samples were received for this project on February, 18th, 2015. The samples were transferred to the laboratory in an ice-chest with wet ice, following strict chain-of-custody (COC) procedures. The temperature of the samples upon receipt at the laboratory was 2.0°C. All samples were given laboratory identification numbers, logged into the Laboratory Information Management System (LIMS) and then stored under refrigeration pending chemistry testing.

Tests Performed

Total Solids by SM 2540B (M)
Particle Size by ASTM D4464 (M)
Total Organic Carbon by EPA 9060A
Trace Metals by EPA 6020
Mercury by EPA 7471A
PCB Congeners by EPA 8270C SIM
PAHs by EPA 8270C SIM
OC Pesticides by EPA 8081A
Organotins by Krone et al.

Selenium by EPA 7742 and Cadmium by EPA 6020 were subcontracted to ALS, Kelso WA.

A laboratory duplicate analysis was performed on sample PRC-DU1-Comp.

Data Summary

All samples were homogenized prior to preparation and analysis.

Holding times

All samples were analyzed outside the EPA Method recommended holding time (in solid samples). However, the sediment samples were frozen after collection and Eurofins Calscience follows standard SWAMP guidelines and the Puget Sound Protocol (USEPA/PSWQAT, 1997, Table 2) for holding times in sediment samples, which states holding times may be extended up to one year if stored frozen at -18°C after collection. Therefore, the sample results have not been flagged as exceeding the EPA Method recommended holding times.

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Calibration

Frequency and control criteria for initial and continuing calibration verifications were met.

Reporting Limits

The results were evaluated to the MDL, and where applicable, “J” flags were reported.

The sediment sample results and reporting limits were dry weight corrected.

Blanks

Concentrations of target analytes in the method blanks were found to be below the RLs and MDLs for all tests.

Laboratory Control Samples

A Laboratory Control Sample (LCS/LCSD) analysis was performed at the required frequencies, and unless otherwise noted, all parameters were within the established control limits.

Matrix Spikes

Matrix spike analyses were performed for each applicable analysis at the required frequencies. Project sample PRC-DU1-Comp was used for matrix spiking. All parameters were within the control limits with the following exceptions: Zinc exceeds QC criteria for % recovery in the MS/MSD. Several pesticide and PAH compounds showed RPDs and/or % recoveries outside of QC criteria. QC results have been flagged with the appropriate qualifiers and are released with no further action since the LCS recoveries were in control.

Surrogates

Surrogate recoveries for all applicable tests and samples were within the established control limits.

Laboratory Duplicate

A lab dup was analyzed for all analyses for sample PRC-DU1-Comp. The RPDs between the two samples were within acceptance limits.

Acronyms

LCS - Laboratory Control Sample
MS/MSD- Matrix Spike/Matrix Spike Duplicate
RPD- Relative Percent Difference

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Work Order Narrative

Work Order: 15-02-1248 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 02/18/15. They were assigned to Work Order 15-02-1248.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Sample Summary

Client:	Pacific Ecorisk 2250 Cordelia Road Fairfield, CA 94534-1912	Work Order:	15-02-1248
		Project Name:	Port of Redwood City
		PO Number:	
		Date/Time Received:	02/18/15 09:45
		Number of Containers:	7
Attn:	Jeff Cotsifas		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
PRC-DU1-Comp	15-02-1248-1	02/02/15 12:30	2	Sediment
PRC-DU1-Comp	15-02-1248-2	02/02/15 12:30	1	Sediment
PRC-DU2-Comp	15-02-1248-3	02/02/15 08:30	1	Sediment
PRC-DU2-Comp	15-02-1248-4	02/02/15 08:30	1	Sediment
PRC-DU1-Comp-LAB DUP	15-02-1248-5	02/02/15 12:30	1	Sediment
PRC-DU1-Comp-LAB DUP	15-02-1248-6	02/02/15 12:30	1	Sediment

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	EPA 9060A
		Units:	%
Project: Port of Redwood City			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-02-1248-1-A**	**02/02/15 12:30**	**Sediment**	**TOC 5**	**03/02/15**	**03/02/15 18:18**	**F0302TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	2.1	0.12	0.029	1.00	

PRC-DU2-Comp	**15-02-1248-3-A**	**02/02/15 08:30**	**Sediment**	**TOC 5**	**03/02/15**	**03/02/15 18:18**	**F0302TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	2.0	0.13	0.031	1.00	

PRC-DU1-Comp-LAB DUP	**15-02-1248-5-A**	**02/02/15 12:30**	**Sediment**	**TOC 5**	**03/02/15**	**03/02/15 18:18**	**F0302TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	2.1	0.12	0.029	1.00	

Method Blank	**099-06-013-1189**	**N/A**	**Solid**	**TOC 5**	**03/02/15**	**03/02/15 18:18**	**F0302TOCL1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	ND	0.050	0.012	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	SM 2540 B (M)
		Units:	%
Project: Port of Redwood City			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-02-1248-1-BB**	**02/02/15 12:30**	**Sediment**	**N/A**	**02/20/15**	**02/20/15 16:00**	**F0220TSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	42.3	0.100	0.100	1.00	BV,BU

PRC-DU2-Comp	**15-02-1248-3-AA**	**02/02/15 08:30**	**Sediment**	**N/A**	**02/20/15**	**02/20/15 16:00**	**F0220TSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	38.9	0.100	0.100	1.00	BV,BU

PRC-DU1-Comp-LAB DUP	**15-02-1248-5-BB**	**02/02/15 12:30**	**Sediment**	**N/A**	**02/20/15**	**02/20/15 16:00**	**F0220TSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	42.4	0.100	0.100	1.00	BV,BU

Method Blank	**099-05-019-2830**	**N/A**	**Solid**	**N/A**	**02/20/15**	**02/20/15 16:00**	**F0220TSB1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	ND	0.100	0.100	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3050B
		Method:	EPA 6020
		Units:	mg/kg
Project: Port of Redwood City			Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-02-1248-1-AA**	**02/02/15 12:30**	**Sediment**	**ICP/MS 04**	**02/21/15**	**02/24/15 21:17**	**150221L01E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	8.61	0.236	0.206	1.00	
Chromium	90.8	0.236	0.147	1.00	
Copper	52.4	0.236	0.0991	1.00	
Lead	30.6	0.236	0.156	1.00	
Nickel	91.0	0.236	0.120	1.00	
Silver	0.574	0.236	0.0740	1.00	
Zinc	146	2.36	1.88	1.00	

PRC-DU2-Comp	**15-02-1248-3-AA**	**02/02/15 08:30**	**Sediment**	**ICP/MS 04**	**02/21/15**	**02/24/15 21:20**	**150221L01E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	8.50	0.257	0.224	1.00	
Chromium	97.0	0.257	0.160	1.00	
Copper	67.7	0.257	0.108	1.00	
Lead	30.6	0.257	0.169	1.00	
Nickel	97.6	0.257	0.130	1.00	
Silver	0.607	0.257	0.0805	1.00	
Zinc	169	2.57	2.04	1.00	

PRC-DU1-Comp-LAB DUP	**15-02-1248-5-AA**	**02/02/15 12:30**	**Sediment**	**ICP/MS 04**	**02/21/15**	**02/26/15 16:55**	**150221L01E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	8.71	0.236	0.206	1.00	
Chromium	90.3	0.236	0.146	1.00	
Copper	50.4	0.236	0.0989	1.00	
Lead	30.6	0.236	0.155	1.00	
Nickel	92.7	0.236	0.119	1.00	
Silver	0.364	0.236	0.0738	1.00	
Zinc	144	2.36	1.87	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3050B
		Method:	EPA 6020
		Units:	mg/kg
Project: Port of Redwood City			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-15-254-292**	**N/A**	**Solid**	**ICP/MS 04**	**02/21/15**	**02/26/15 12:07**	**150221L01E**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	ND	0.100	0.0873	1.00	
Chromium	ND	0.100	0.0621	1.00	
Copper	ND	0.100	0.0419	1.00	
Lead	ND	0.100	0.0659	1.00	
Nickel	ND	0.100	0.0506	1.00	
Silver	ND	0.100	0.0313	1.00	
Zinc	ND	1.00	0.795	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 7471A Total
		Method:	EPA 7471A
		Units:	mg/kg
Project: Port of Redwood City			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-02-1248-1-AA**	**02/02/15 12:30**	**Sediment**	**Mercury 05**	**02/23/15**	**02/23/15 15:36**	**150223L03E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	0.375	0.0450	0.0132	1.00	

PRC-DU2-Comp	**15-02-1248-3-AA**	**02/02/15 08:30**	**Sediment**	**Mercury 05**	**02/23/15**	**02/23/15 15:48**	**150223L03E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	0.365	0.0523	0.0153	1.00	

PRC-DU1-Comp-LAB DUP	**15-02-1248-5-AA**	**02/02/15 12:30**	**Sediment**	**Mercury 05**	**02/23/15**	**02/23/15 15:50**	**150223L03E**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	0.376	0.0449	0.0132	1.00	

Method Blank	**099-16-278-109**	**N/A**	**Solid**	**Mercury 05**	**02/23/15**	**02/23/15 15:21**	**150223L03E**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.0200	0.00587	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	ASTM D4464 (M)
		Units:	%
Project: Port of Redwood City			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-02-1248-2-A**	**02/02/15 12:30**	**Sediment**	**LPSA 1**	**N/A**	**02/19/15 13:04**	

Parameter	Result	Qualifiers
Clay (less than 0.00391mm)	31.65	
Silt (0.00391 to 0.0625mm)	67.10	
Total Silt and Clay (0 to 0.0625mm)	98.75	
Very Fine Sand (0.0625 to 0.125mm)	1.25	
Fine Sand (0.125 to 0.25mm)	ND	
Medium Sand (0.25 to 0.5mm)	ND	
Coarse Sand (0.5 to 1mm)	ND	
Very Coarse Sand (1 to 2mm)	ND	
Gravel (greater than 2mm)	ND	

PRC-DU2-Comp	**15-02-1248-4-A**	**02/02/15 08:30**	**Sediment**	**LPSA 1**	**N/A**	**02/19/15 13:08**	

Parameter	Result	Qualifiers
Clay (less than 0.00391mm)	30.14	
Silt (0.00391 to 0.0625mm)	67.50	
Total Silt and Clay (0 to 0.0625mm)	97.64	
Very Fine Sand (0.0625 to 0.125mm)	2.36	
Fine Sand (0.125 to 0.25mm)	ND	
Medium Sand (0.25 to 0.5mm)	ND	
Coarse Sand (0.5 to 1mm)	ND	
Very Coarse Sand (1 to 2mm)	ND	
Gravel (greater than 2mm)	ND	

PRC-DU1-Comp-LAB DUP	**15-02-1248-6-A**	**02/02/15 12:30**	**Sediment**	**LPSA 1**	**N/A**	**02/19/15 13:13**	

Parameter	Result	Qualifiers
Clay (less than 0.00391mm)	30.73	
Silt (0.00391 to 0.0625mm)	69.15	
Total Silt and Clay (0 to 0.0625mm)	99.88	
Very Fine Sand (0.0625 to 0.125mm)	0.12	
Fine Sand (0.125 to 0.25mm)	ND	
Medium Sand (0.25 to 0.5mm)	ND	
Coarse Sand (0.5 to 1mm)	ND	
Very Coarse Sand (1 to 2mm)	ND	
Gravel (greater than 2mm)	ND	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8081A
		Units:	ug/kg
Project: Port of Redwood City			Page 1 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-02-1248-1-BB**	**02/02/15 12:30**	**Sediment**	**GC 44**	**02/26/15**	**03/03/15 17:17**	**150226L24**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Aldrin	ND	2.4	0.74	1.00	
Alpha-BHC	ND	2.4	0.76	1.00	
Beta-BHC	ND	2.4	0.62	1.00	
Delta-BHC	ND	2.4	0.60	1.00	
Gamma-BHC	ND	2.4	0.81	1.00	
Chlordane	ND	24	7.7	1.00	
Dieldrin	ND	2.4	0.78	1.00	
2,4'-DDD	ND	2.4	0.80	1.00	
2,4'-DDE	ND	2.4	0.72	1.00	
2,4'-DDT	ND	2.4	0.71	1.00	
4,4'-DDD	4.2	2.4	0.74	1.00	
4,4'-DDE	8.3	2.4	0.70	1.00	
4,4'-DDT	4.2	2.4	0.79	1.00	
Endosulfan I	ND	2.4	0.62	1.00	
Endosulfan II	ND	2.4	0.66	1.00	
Endosulfan Sulfate	ND	2.4	0.79	1.00	
Endrin	ND	2.4	0.84	1.00	
Endrin Aldehyde	ND	2.4	0.57	1.00	
Endrin Ketone	ND	2.4	0.82	1.00	
Heptachlor	ND	2.4	0.76	1.00	
Heptachlor Epoxide	ND	2.4	0.84	1.00	
Methoxychlor	ND	2.4	0.76	1.00	
Toxaphene	ND	47	15	1.00	
Alpha Chlordane	1.8	2.4	0.75	1.00	J
Gamma Chlordane	1.7	2.4	0.75	1.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,5,6-Tetrachloro-m-Xylene	123	25-145	
Decachlorobiphenyl	138	24-168	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8081A
		Units:	ug/kg
Project: Port of Redwood City			Page 2 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-Comp	**15-02-1248-3-AA**	**02/02/15 08:30**	**Sediment**	**GC 44**	**02/26/15**	**03/03/15 17:32**	**150226L24**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Aldrin	ND	2.6	0.81	1.00	
Alpha-BHC	ND	2.6	0.84	1.00	
Beta-BHC	ND	2.6	0.68	1.00	
Delta-BHC	ND	2.6	0.66	1.00	
Gamma-BHC	ND	2.6	0.89	1.00	
Chlordane	ND	26	8.4	1.00	
Dieldrin	ND	2.6	0.85	1.00	
2,4'-DDD	0.98	2.6	0.87	1.00	J
2,4'-DDE	ND	2.6	0.79	1.00	
2,4'-DDT	ND	2.6	0.78	1.00	
4,4'-DDD	5.9	2.6	0.82	1.00	
4,4'-DDE	9.8	2.6	0.77	1.00	
4,4'-DDT	1.2	2.6	0.86	1.00	J
Endosulfan I	ND	2.6	0.68	1.00	
Endosulfan II	ND	2.6	0.72	1.00	
Endosulfan Sulfate	ND	2.6	0.87	1.00	
Endrin	ND	2.6	0.93	1.00	
Endrin Aldehyde	ND	2.6	0.63	1.00	
Endrin Ketone	ND	2.6	0.90	1.00	
Heptachlor	ND	2.6	0.83	1.00	
Heptachlor Epoxide	ND	2.6	0.92	1.00	
Methoxychlor	ND	2.6	0.84	1.00	
Toxaphene	ND	52	16	1.00	
Alpha Chlordane	1.7	2.6	0.83	1.00	J
Gamma Chlordane	1.8	2.6	0.82	1.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,5,6-Tetrachloro-m-Xylene	119	25-145	
Decachlorobiphenyl	140	24-168	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8081A
		Units:	ug/kg
Project: Port of Redwood City			Page 3 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp-LAB DUP	**15-02-1248-5-BB**	**02/02/15 12:30**	**Sediment**	**GC 44**	**02/26/15**	**03/03/15 17:46**	**150226L24**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Aldrin	ND	2.3	0.74	1.00	
Alpha-BHC	ND	2.3	0.76	1.00	
Beta-BHC	ND	2.3	0.62	1.00	
Delta-BHC	ND	2.3	0.60	1.00	
Gamma-BHC	ND	2.3	0.81	1.00	
Chlordane	ND	23	7.7	1.00	
Dieldrin	ND	2.3	0.77	1.00	
2,4'-DDD	ND	2.3	0.79	1.00	
2,4'-DDE	ND	2.3	0.72	1.00	
2,4'-DDT	ND	2.3	0.71	1.00	
4,4'-DDD	3.3	2.3	0.74	1.00	
4,4'-DDE	5.8	2.3	0.70	1.00	
4,4'-DDT	1.1	2.3	0.79	1.00	J
Endosulfan I	ND	2.3	0.62	1.00	
Endosulfan II	ND	2.3	0.66	1.00	
Endosulfan Sulfate	ND	2.3	0.79	1.00	
Endrin	ND	2.3	0.84	1.00	
Endrin Aldehyde	ND	2.3	0.57	1.00	
Endrin Ketone	ND	2.3	0.81	1.00	
Heptachlor	ND	2.3	0.75	1.00	
Heptachlor Epoxide	ND	2.3	0.83	1.00	
Methoxychlor	ND	2.3	0.76	1.00	
Toxaphene	ND	47	15	1.00	
Alpha Chlordane	1.6	2.3	0.75	1.00	J
Gamma Chlordane	1.6	2.3	0.75	1.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,5,6-Tetrachloro-m-Xylene	119	25-145	
Decachlorobiphenyl	136	24-168	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8081A
		Units:	ug/kg
Project: Port of Redwood City			Page 4 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-858-338**	**N/A**	**Solid**	**GC 44**	**02/26/15**	**03/03/15 13:00**	**150226L24**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Aldrin	ND	1.0	0.31	1.00	
Alpha-BHC	ND	1.0	0.32	1.00	
Beta-BHC	ND	1.0	0.26	1.00	
Delta-BHC	ND	1.0	0.26	1.00	
Gamma-BHC	ND	1.0	0.35	1.00	
Chlordane	ND	10	3.3	1.00	
Dieldrin	ND	1.0	0.33	1.00	
2,4'-DDD	ND	1.0	0.34	1.00	
2,4'-DDE	ND	1.0	0.31	1.00	
2,4'-DDT	ND	1.0	0.30	1.00	
4,4'-DDD	ND	1.0	0.32	1.00	
4,4'-DDE	ND	1.0	0.30	1.00	
4,4'-DDT	ND	1.0	0.33	1.00	
Endosulfan I	ND	1.0	0.26	1.00	
Endosulfan II	ND	1.0	0.28	1.00	
Endosulfan Sulfate	ND	1.0	0.34	1.00	
Endrin	ND	1.0	0.36	1.00	
Endrin Aldehyde	ND	1.0	0.24	1.00	
Endrin Ketone	ND	1.0	0.35	1.00	
Heptachlor	ND	1.0	0.32	1.00	
Heptachlor Epoxide	ND	1.0	0.36	1.00	
Methoxychlor	ND	1.0	0.32	1.00	
Toxaphene	ND	20	6.3	1.00	
Alpha Chlordane	ND	1.0	0.32	1.00	
Gamma Chlordane	ND	1.0	0.32	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2,4,5,6-Tetrachloro-m-Xylene	96	25-145	
Decachlorobiphenyl	109	24-168	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City			Page 1 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-02-1248-1-BB**	**02/02/15 12:30**	**Sediment**	**GC/MS EEE**	**02/25/15**	**02/26/15 16:48**	**150225L07**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	110	47	8.5	2.00	
Acenaphthylene	39	47	7.2	2.00	J
Anthracene	150	47	3.8	2.00	
Benzo (a) Anthracene	290	47	7.4	2.00	
Benzo (a) Pyrene	420	47	4.8	2.00	
Benzo (b) Fluoranthene	390	47	4.8	2.00	
Benzo (e) Pyrene	280	47	7.1	2.00	
Benzo (g,h,i) Perylene	360	47	4.5	2.00	
Benzo (k) Fluoranthene	320	47	6.6	2.00	
Biphenyl	20	47	6.6	2.00	J
Chrysene	430	47	5.5	2.00	
Dibenz (a,h) Anthracene	72	47	4.9	2.00	
2,6-Dimethylnaphthalene	38	47	7.9	2.00	J
Fluoranthene	770	47	4.7	2.00	
Fluorene	120	47	6.9	2.00	
Indeno (1,2,3-c,d) Pyrene	260	47	5.0	2.00	
2-Methylnaphthalene	21	47	8.5	2.00	J
1-Methylnaphthalene	12	47	9.4	2.00	J
1-Methylphenanthrene	ND	47	7.7	2.00	
Naphthalene	91	47	14	2.00	
Perylene	160	47	8.2	2.00	
Phenanthrene	480	47	4.8	2.00	
Pyrene	1100	47	4.7	2.00	
1,6,7-Trimethylnaphthalene	12	47	6.7	2.00	J
Dibenzothiophene	37	47	6.4	2.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	66	14-146	
Nitrobenzene-d5	57	18-162	
p-Terphenyl-d14	75	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City			Page 2 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-Comp	**15-02-1248-3-AA**	**02/02/15 08:30**	**Sediment**	**GC/MS EEE**	**02/25/15**	**02/26/15 17:09**	**150225L07**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	72	51	9.2	2.00	
Acenaphthylene	66	51	7.7	2.00	
Anthracene	160	51	4.1	2.00	
Benzo (a) Anthracene	500	51	8.0	2.00	
Benzo (a) Pyrene	610	51	5.2	2.00	
Benzo (b) Fluoranthene	670	51	5.2	2.00	
Benzo (e) Pyrene	400	51	7.7	2.00	
Benzo (g,h,i) Perylene	440	51	4.8	2.00	
Benzo (k) Fluoranthene	510	51	7.1	2.00	
Biphenyl	14	51	7.1	2.00	J
Chrysene	740	51	6.0	2.00	
Dibenz (a,h) Anthracene	110	51	5.3	2.00	
2,6-Dimethylnaphthalene	39	51	8.5	2.00	J
Fluoranthene	41	51	5.0	2.00	J
Fluorene	57	51	7.5	2.00	
Indeno (1,2,3-c,d) Pyrene	330	51	5.4	2.00	
2-Methylnaphthalene	15	51	9.2	2.00	J
1-Methylnaphthalene	ND	51	10	2.00	
1-Methylphenanthrene	ND	51	8.3	2.00	
Naphthalene	34	51	15	2.00	J
Perylene	230	51	8.9	2.00	
Phenanthrene	320	51	5.2	2.00	
Pyrene	1200	51	5.1	2.00	
1,6,7-Trimethylnaphthalene	8.8	51	7.2	2.00	J
Dibenzothiophene	30	51	6.9	2.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	62	14-146	
Nitrobenzene-d5	50	18-162	
p-Terphenyl-d14	70	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City			Page 3 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp-LAB DUP	**15-02-1248-5-BB**	**02/02/15 12:30**	**Sediment**	**GC/MS EEE**	**02/25/15**	**02/26/15 17:29**	**150225L07**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	110	47	8.5	2.00	
Acenaphthylene	29	47	7.1	2.00	J
Anthracene	130	47	3.8	2.00	
Benzo (a) Anthracene	230	47	7.3	2.00	
Benzo (a) Pyrene	360	47	4.8	2.00	
Benzo (b) Fluoranthene	340	47	4.8	2.00	
Benzo (e) Pyrene	240	47	7.1	2.00	
Benzo (g,h,i) Perylene	350	47	4.5	2.00	
Benzo (k) Fluoranthene	280	47	6.6	2.00	
Biphenyl	20	47	6.5	2.00	J
Chrysene	310	47	5.5	2.00	
Dibenz (a,h) Anthracene	66	47	4.9	2.00	
2,6-Dimethylnaphthalene	30	47	7.8	2.00	J
Fluoranthene	740	47	4.6	2.00	
Fluorene	110	47	6.9	2.00	
Indeno (1,2,3-c,d) Pyrene	250	47	5.0	2.00	
2-Methylnaphthalene	26	47	8.5	2.00	J
1-Methylnaphthalene	15	47	9.4	2.00	J
1-Methylphenanthrene	ND	47	7.7	2.00	
Naphthalene	100	47	14	2.00	
Perylene	150	47	8.2	2.00	
Phenanthrene	470	47	4.8	2.00	
Pyrene	1100	47	4.7	2.00	
1,6,7-Trimethylnaphthalene	12	47	6.6	2.00	J
Dibenzothiophene	37	47	6.4	2.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	63	14-146	
Nitrobenzene-d5	52	18-162	
p-Terphenyl-d14	64	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City			Page 4 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-437-120**	**N/A**	**Solid**	**GC/MS EEE**	**02/25/15**	**02/26/15 11:05**	**150225L07**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	ND	10	1.8	1.00	
Acenaphthylene	ND	10	1.5	1.00	
Anthracene	ND	10	0.81	1.00	
Benzo (a) Anthracene	ND	10	1.6	1.00	
Benzo (a) Pyrene	ND	10	1.0	1.00	
Benzo (b) Fluoranthene	ND	10	1.0	1.00	
Benzo (e) Pyrene	ND	10	1.5	1.00	
Benzo (g,h,i) Perylene	ND	10	0.94	1.00	
Benzo (k) Fluoranthene	ND	10	1.4	1.00	
Biphenyl	ND	10	1.4	1.00	
Chrysene	ND	10	1.2	1.00	
Dibenz (a,h) Anthracene	ND	10	1.0	1.00	
2,6-Dimethylnaphthalene	ND	10	1.7	1.00	
Fluoranthene	ND	10	0.98	1.00	
Fluorene	ND	10	1.5	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	10	1.1	1.00	
2-Methylnaphthalene	ND	10	1.8	1.00	
1-Methylnaphthalene	ND	10	2.0	1.00	
1-Methylphenanthrene	ND	10	1.6	1.00	
Naphthalene	ND	10	3.0	1.00	
Perylene	ND	10	1.7	1.00	
Phenanthrene	ND	10	1.0	1.00	
Pyrene	ND	10	0.99	1.00	
1,6,7-Trimethylnaphthalene	ND	10	1.4	1.00	
Dibenzothiophene	ND	10	1.3	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	76	14-146	
Nitrobenzene-d5	64	18-162	
p-Terphenyl-d14	72	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 1 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-02-1248-1-BB**	**02/02/15 12:30**	**Sediment**	**GC/MS HHH**	**02/26/15**	**03/03/15 18:26**	**150226L23**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB005/008	ND	0.94	0.11	1.00	
PCB018	ND	0.47	0.092	1.00	
PCB028	0.36	0.47	0.13	1.00	J
PCB031	ND	0.47	0.069	1.00	
PCB033	1.0	0.47	0.081	1.00	
PCB044	1.5	0.47	0.22	1.00	
PCB049	0.77	0.47	0.20	1.00	
PCB052	2.5	0.47	0.12	1.00	
PCB056	ND	0.47	0.11	1.00	
PCB060	ND	0.47	0.15	1.00	
PCB066	0.77	0.47	0.18	1.00	
PCB070	1.3	0.47	0.11	1.00	
PCB074	0.47	0.47	0.11	1.00	
PCB087	1.7	0.47	0.096	1.00	
PCB095	4.4	0.47	0.12	1.00	
PCB097	2.5	0.47	0.10	1.00	
PCB099	2.0	0.47	0.13	1.00	
PCB101	5.3	0.47	0.12	1.00	
PCB105	1.6	0.47	0.099	1.00	
PCB110	4.6	0.47	0.11	1.00	
PCB118	4.0	0.47	0.14	1.00	
PCB128	1.0	0.47	0.092	1.00	
PCB132/153	6.3	0.94	0.16	1.00	
PCB138/158	5.0	0.94	0.18	1.00	
PCB141	0.89	0.47	0.23	1.00	
PCB149	3.0	0.47	0.11	1.00	
PCB151	0.78	0.47	0.15	1.00	
PCB156	0.64	0.47	0.16	1.00	
PCB170	1.0	0.47	0.12	1.00	
PCB174	0.72	0.47	0.091	1.00	
PCB177	0.40	0.47	0.093	1.00	J
PCB180	1.5	0.47	0.072	1.00	
PCB183	0.43	0.47	0.076	1.00	J

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 2 of 8

Parameter	Result	RL	MDL	DF	Qualifiers
PCB187	0.97	0.47	0.091	1.00	
PCB194	ND	0.47	0.097	1.00	
PCB195	ND	0.47	0.075	1.00	
PCB201	ND	0.47	0.10	1.00	
PCB203	ND	0.47	0.082	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	51	50-150	
p-Terphenyl-d14	79	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 3 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-Comp	**15-02-1248-3-AA**	**02/02/15 08:30**	**Sediment**	**GC/MS HHH**	**02/26/15**	**03/03/15 18:52**	**150226L23**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB005/008	ND	1.0	0.12	1.00	
PCB018	ND	0.51	0.10	1.00	
PCB028	ND	0.51	0.14	1.00	
PCB031	ND	0.51	0.076	1.00	
PCB033	0.93	0.51	0.089	1.00	
PCB044	ND	0.51	0.24	1.00	
PCB049	0.25	0.51	0.22	1.00	J
PCB052	0.70	0.51	0.13	1.00	
PCB056	ND	0.51	0.12	1.00	
PCB060	ND	0.51	0.16	1.00	
PCB066	0.37	0.51	0.19	1.00	J
PCB070	0.30	0.51	0.12	1.00	J
PCB074	ND	0.51	0.12	1.00	
PCB087	ND	0.51	0.11	1.00	
PCB095	0.81	0.51	0.13	1.00	
PCB097	1.5	0.51	0.11	1.00	
PCB099	0.62	0.51	0.14	1.00	
PCB101	1.2	0.51	0.13	1.00	
PCB105	1.1	0.51	0.11	1.00	
PCB110	1.1	0.51	0.12	1.00	
PCB118	1.1	0.51	0.15	1.00	
PCB128	ND	0.51	0.10	1.00	
PCB132/153	1.8	1.0	0.17	1.00	
PCB138/158	1.2	1.0	0.19	1.00	
PCB141	ND	0.51	0.25	1.00	
PCB149	0.82	0.51	0.12	1.00	
PCB151	0.35	0.51	0.16	1.00	J
PCB156	ND	0.51	0.17	1.00	
PCB170	0.40	0.51	0.13	1.00	J
PCB174	ND	0.51	0.10	1.00	
PCB177	ND	0.51	0.10	1.00	
PCB180	0.79	0.51	0.078	1.00	
PCB183	0.18	0.51	0.083	1.00	J

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 4 of 8

Parameter	Result	RL	MDL	DF	Qualifiers
PCB187	0.47	0.51	0.099	1.00	J
PCB194	ND	0.51	0.11	1.00	
PCB195	ND	0.51	0.082	1.00	
PCB201	ND	0.51	0.11	1.00	
PCB203	ND	0.51	0.089	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	53	50-150	
p-Terphenyl-d14	85	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 5 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp-LAB DUP	**15-02-1248-5-BB**	**02/02/15 12:30**	**Sediment**	**GC/MS HHH**	**02/26/15**	**03/02/15 19:53**	**150226L23**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB005/008	ND	0.94	0.11	1.00	
PCB018	ND	0.47	0.092	1.00	
PCB028	0.33	0.47	0.13	1.00	J
PCB031	ND	0.47	0.069	1.00	
PCB033	1.3	0.47	0.081	1.00	
PCB044	0.85	0.47	0.22	1.00	
PCB049	0.58	0.47	0.20	1.00	
PCB052	1.7	0.47	0.12	1.00	
PCB056	ND	0.47	0.11	1.00	
PCB060	ND	0.47	0.15	1.00	
PCB066	0.68	0.47	0.18	1.00	
PCB070	0.98	0.47	0.11	1.00	
PCB074	0.43	0.47	0.11	1.00	J
PCB087	0.87	0.47	0.096	1.00	
PCB095	2.5	0.47	0.12	1.00	
PCB097	1.9	0.47	0.10	1.00	
PCB099	1.3	0.47	0.13	1.00	
PCB101	3.2	0.47	0.12	1.00	
PCB105	1.2	0.47	0.099	1.00	
PCB110	2.7	0.47	0.11	1.00	
PCB118	2.4	0.47	0.14	1.00	
PCB128	0.67	0.47	0.092	1.00	
PCB132/153	4.0	0.94	0.16	1.00	
PCB138/158	2.8	0.94	0.18	1.00	
PCB141	0.50	0.47	0.23	1.00	
PCB149	1.9	0.47	0.11	1.00	
PCB151	0.50	0.47	0.14	1.00	
PCB156	0.31	0.47	0.16	1.00	J
PCB170	0.78	0.47	0.12	1.00	
PCB174	0.61	0.47	0.091	1.00	
PCB177	0.39	0.47	0.093	1.00	J
PCB180	1.1	0.47	0.071	1.00	
PCB183	0.34	0.47	0.075	1.00	J

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 6 of 8

Parameter	Result	RL	MDL	DF	Qualifiers
PCB187	0.82	0.47	0.090	1.00	
PCB194	ND	0.47	0.096	1.00	
PCB195	ND	0.47	0.075	1.00	
PCB201	ND	0.47	0.10	1.00	
PCB203	ND	0.47	0.082	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	57	50-150	
p-Terphenyl-d14	59	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 7 of 8

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-16-418-53**	**N/A**	**Solid**	**GC/MS HHH**	**02/26/15**	**03/02/15 13:27**	**150226L23**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB005/008	ND	0.40	0.047	1.00	
PCB018	ND	0.20	0.039	1.00	
PCB028	ND	0.20	0.055	1.00	
PCB031	ND	0.20	0.029	1.00	
PCB033	ND	0.20	0.035	1.00	
PCB044	ND	0.20	0.092	1.00	
PCB049	ND	0.20	0.086	1.00	
PCB052	ND	0.20	0.051	1.00	
PCB056	ND	0.20	0.048	1.00	
PCB060	ND	0.20	0.063	1.00	
PCB066	ND	0.20	0.075	1.00	
PCB070	ND	0.20	0.048	1.00	
PCB074	ND	0.20	0.046	1.00	
PCB087	ND	0.20	0.041	1.00	
PCB095	ND	0.20	0.050	1.00	
PCB097	ND	0.20	0.043	1.00	
PCB099	ND	0.20	0.054	1.00	
PCB101	ND	0.20	0.051	1.00	
PCB105	ND	0.20	0.042	1.00	
PCB110	ND	0.20	0.046	1.00	
PCB118	ND	0.20	0.059	1.00	
PCB128	ND	0.20	0.039	1.00	
PCB132/153	ND	0.40	0.067	1.00	
PCB138/158	ND	0.40	0.075	1.00	
PCB141	ND	0.20	0.098	1.00	
PCB149	ND	0.20	0.048	1.00	
PCB151	ND	0.20	0.062	1.00	
PCB156	ND	0.20	0.066	1.00	
PCB170	ND	0.20	0.050	1.00	
PCB174	ND	0.20	0.039	1.00	
PCB177	ND	0.20	0.040	1.00	
PCB180	ND	0.20	0.030	1.00	
PCB183	ND	0.20	0.032	1.00	
PCB187	ND	0.20	0.039	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 8 of 8

Parameter	Result	RL	MDL	DF	Qualifiers
PCB194	ND	0.20	0.041	1.00	
PCB195	ND	0.20	0.032	1.00	
PCB201	ND	0.20	0.044	1.00	
PCB203	ND	0.20	0.035	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	65	50-150	
p-Terphenyl-d14	62	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3550B (M)
		Method:	Organotins by Krone et al.
		Units:	ug/kg
Project: Port of Redwood City			Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-02-1248-1-BB**	**02/02/15 12:30**	**Sediment**	**GC/MS Y**	**02/24/15**	**02/26/15 16:37**	**150224L24**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibutyltin	3.1	7.0	1.7	1.00	J
Monobutyltin	ND	7.0	3.2	1.00	
Tetrabutyltin	ND	7.0	1.7	1.00	
Tributyltin	ND	7.0	3.5	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Tripentyltin	81	27-135	

PRC-DU2-Comp	**15-02-1248-3-AA**	**02/02/15 08:30**	**Sediment**	**GC/MS Y**	**02/24/15**	**02/26/15 16:52**	**150224L24**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibutyltin	7.0	7.7	1.9	1.00	J
Monobutyltin	ND	7.7	3.6	1.00	
Tetrabutyltin	ND	7.7	1.9	1.00	
Tributyltin	4.9	7.7	3.8	1.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
Tripentyltin	77	27-135	

PRC-DU1-Comp-LAB DUP	**15-02-1248-5-BB**	**02/02/15 12:30**	**Sediment**	**GC/MS Y**	**02/24/15**	**02/26/15 17:08**	**150224L24**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibutyltin	3.1	7.0	1.7	1.00	J
Monobutyltin	ND	7.0	3.2	1.00	
Tetrabutyltin	ND	7.0	1.7	1.00	
Tributyltin	ND	7.0	3.5	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Tripentyltin	70	27-135	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3550B (M)
		Method:	Organotins by Krone et al.
		Units:	ug/kg
Project: Port of Redwood City			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-07-016-1238**	**N/A**	**Solid**	**GC/MS Y**	**02/24/15**	**02/26/15 12:27**	**150224L24**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibutyltin	ND	3.0	0.73	1.00	
Monobutyltin	ND	3.0	1.4	1.00	
Tetrabutyltin	ND	3.0	0.74	1.00	
Tributyltin	ND	3.0	1.5	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Tripentyltin	81	27-135	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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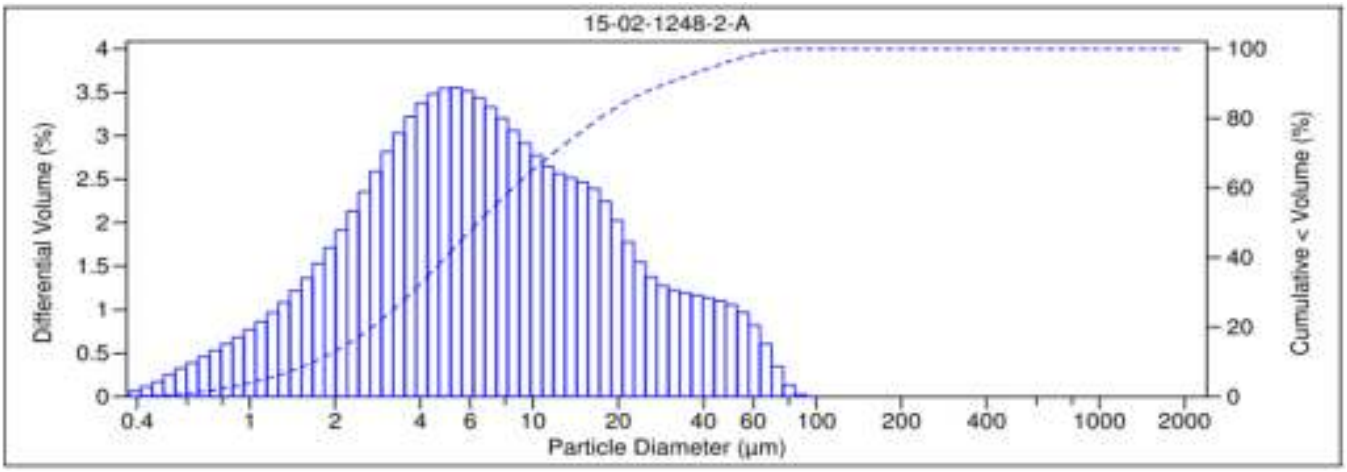
PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

Pacific EcoRisk		Date Sampled:	02/02/15
		Date Received:	02/18/15
		Work Order No:	15-02-1248
		Date Analyzed:	02/19/15
		Method:	ASTM D4464M
Project:	Port of Redwood City / 23613		Page 1 of 3

Sample ID	Depth ft	Description	Mean Grain Size mm
PRC-DU1-Comp		Silt	0.012

Particle Size Distribution, wt by percent								Total Silt & Clay
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	
0.00	0.00	0.00	0.00	0.00	1.25	67.10	31.65	98.75



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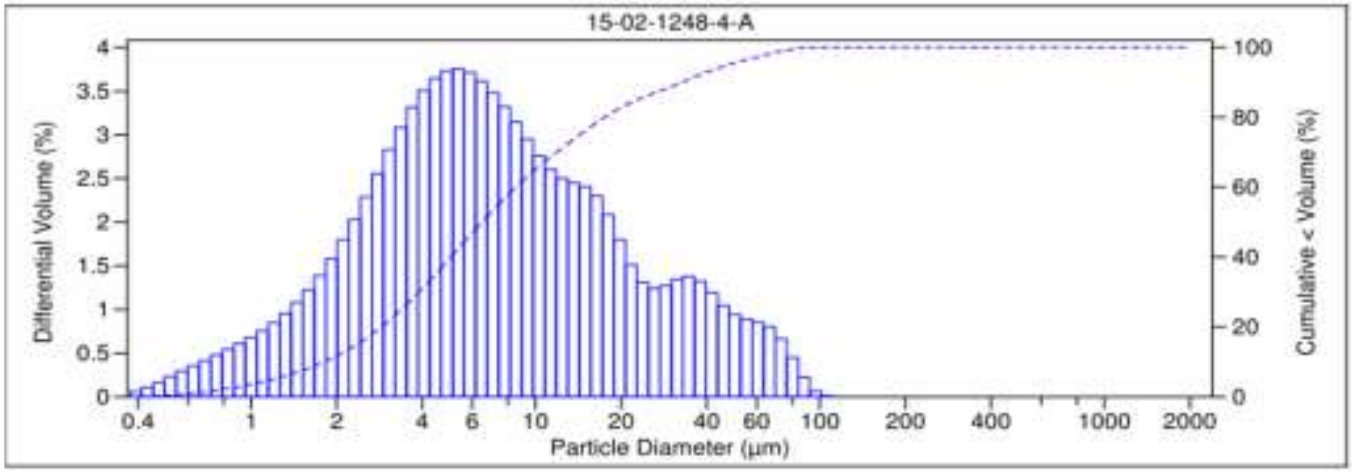
PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

Pacific EcoRisk		Date Sampled:	02/02/15
		Date Received:	02/18/15
		Work Order No:	15-02-1248
		Date Analyzed:	02/19/15
		Method:	ASTM D4464M
Project:	Port of Redwood City / 23613		Page 2 of 3

Sample ID	Depth ft	Description	Mean Grain Size mm
PRC-DU2-Comp		Silt	0.012

Particle Size Distribution, wt by percent								Total Silt & Clay
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	
0.00	0.00	0.00	0.00	0.00	2.36	67.50	30.14	97.64



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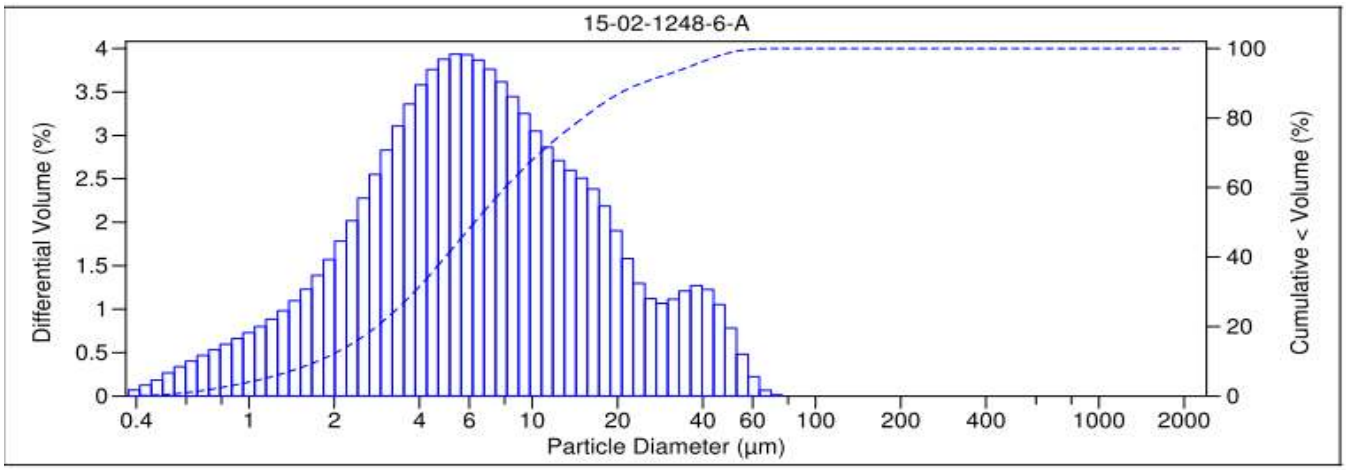
PARTICLE SIZE SUMMARY

(ASTM D422 / D4464M)

Pacific EcoRisk		Date Sampled:	02/02/15
		Date Received:	02/18/15
		Work Order No:	15-02-1248
		Date Analyzed:	02/19/15
		Method:	ASTM D4464M
Project:	Port of Redwood City / 23613		Page 3 of 3

Sample ID	Depth ft	Description	Mean Grain Size mm
PRC-DU1-Comp-LAB DUP		Silt	0.010

Particle Size Distribution, wt by percent								Total Silt & Clay
Total Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt	Clay	
0.00	0.00	0.00	0.00	0.00	0.12	69.15	30.73	99.88



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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	EPA 9060A
Project: Port of Redwood City			Page 1 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Comp	**Sample**	**Sediment**	**TOC 5**	**03/02/15**	**03/02/15 18:18**	**F0302TOCS3**
PRC-DU1-Comp	**Matrix Spike**	**Sediment**	**TOC 5**	**03/02/15**	**03/02/15 18:18**	**F0302TOCS3**
PRC-DU1-Comp	**Matrix Spike Duplicate**	**Sediment**	**TOC 5**	**03/02/15**	**03/02/15 18:18**	**F0302TOCS3**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Carbon, Total Organic	0.8700	3.000	3.250	79	3.120	75	75-125	4	0-25	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3050B
		Method:	EPA 6020
Project: Port of Redwood City			Page 2 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Comp	**Sample**	**Sediment**	**ICP/MS 04**	**02/21/15**	**02/24/15 21:17**	**150221S01A**
PRC-DU1-Comp	**Matrix Spike**	**Sediment**	**ICP/MS 04**	**02/21/15**	**02/24/15 20:49**	**150221S01A**
PRC-DU1-Comp	**Matrix Spike Duplicate**	**Sediment**	**ICP/MS 04**	**02/21/15**	**02/24/15 21:03**	**150221S01A**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Arsenic	3.642	25.00	28.27	99	29.08	102	80-120	3	0-20	
Chromium	38.42	25.00	63.45	100	64.32	104	80-120	1	0-20	
Copper	22.17	25.00	48.87	107	51.13	116	80-120	5	0-20	
Lead	12.96	25.00	38.08	100	38.85	104	80-120	2	0-20	
Nickel	38.51	25.00	63.32	99	64.66	105	80-120	2	0-20	
Silver	0.2429	12.50	12.82	101	12.83	101	80-120	0	0-20	
Zinc	61.61	25.00	93.21	126	92.66	124	80-120	1	0-20	3

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 7471A Total
		Method:	EPA 7471A
Project: Port of Redwood City			Page 3 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Comp	**Sample**	**Sediment**	**Mercury 05**	**02/23/15**	**02/23/15 15:36**	**150223S03A**
PRC-DU1-Comp	**Matrix Spike**	**Sediment**	**Mercury 05**	**02/23/15**	**02/23/15 15:39**	**150223S03A**
PRC-DU1-Comp	**Matrix Spike Duplicate**	**Sediment**	**Mercury 05**	**02/23/15**	**02/23/15 15:41**	**150223S03A**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Mercury	0.1587	0.8350	1.047	106	1.043	106	76-136	0	0-16	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8081A
Project: Port of Redwood City			Page 4 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Comp	**Sample**	**Sediment**	**GC 44**	**02/26/15**	**03/03/15 17:17**	**150226S24B**
PRC-DU1-Comp	**Matrix Spike**	**Sediment**	**GC 44**	**02/26/15**	**03/03/15 16:49**	**150226S24B**
PRC-DU1-Comp	**Matrix Spike Duplicate**	**Sediment**	**GC 44**	**02/26/15**	**03/03/15 17:03**	**150226S24B**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Aldrin	ND	5.000	4.803	96	4.813	96	50-135	0	0-25	
Alpha-BHC	ND	5.000	4.802	96	4.826	97	50-135	1	0-25	
Beta-BHC	ND	5.000	4.514	90	4.679	94	50-135	4	0-25	
Delta-BHC	ND	5.000	4.855	97	5.202	104	50-135	7	0-25	
Gamma-BHC	ND	5.000	4.984	100	5.016	100	50-135	1	0-25	
Dieldrin	ND	5.000	5.530	111	5.552	111	50-135	0	0-25	
4,4'-DDD	1.763	5.000	6.225	89	6.239	90	50-135	0	0-25	
4,4'-DDE	3.502	5.000	6.280	56	6.264	55	50-135	0	0-25	
4,4'-DDT	1.796	5.000	6.689	98	6.888	102	50-135	3	0-25	
Endosulfan I	ND	5.000	4.407	88	4.522	90	50-135	3	0-25	
Endosulfan II	ND	5.000	4.702	94	4.939	99	50-135	5	0-25	
Endosulfan Sulfate	ND	5.000	6.022	120	6.153	123	50-135	2	0-25	
Endrin	ND	5.000	6.186	124	6.230	125	50-135	1	0-25	
Endrin Aldehyde	ND	5.000	0.3142	6	0.5759	12	50-135	59	0-25	3,4
Endrin Ketone	ND	5.000	5.675	113	5.777	116	50-135	2	0-25	
Heptachlor	ND	5.000	2.732	55	2.626	53	50-135	4	0-25	
Heptachlor Epoxide	ND	5.000	6.830	137	5.535	111	50-135	21	0-25	3
Methoxychlor	ND	5.000	6.353	127	6.474	129	50-135	2	0-25	
Alpha Chlordane	ND	5.000	5.242	105	5.219	104	50-135	0	0-25	
Gamma Chlordane	ND	5.000	5.100	102	5.080	102	50-135	0	0-25	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
Project: Port of Redwood City			Page 5 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Comp	**Sample**	**Sediment**	**GC/MS EEE**	**02/25/15**	**02/26/15 16:48**	**150225S07**
PRC-DU1-Comp	**Matrix Spike**	**Sediment**	**GC/MS EEE**	**02/25/15**	**02/26/15 16:08**	**150225S07**
PRC-DU1-Comp	**Matrix Spike Duplicate**	**Sediment**	**GC/MS EEE**	**02/25/15**	**02/26/15 16:28**	**150225S07**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acenaphthene	48.34	200.0	134.2	43	135.0	43	40-160	1	0-20	
Acenaphthylene	ND	200.0	91.02	46	102.0	51	40-160	11	0-20	
Anthracene	63.62	200.0	137.8	37	148.0	42	40-160	7	0-20	3
Benzo (a) Anthracene	121.2	200.0	194.4	37	215.8	47	40-160	10	0-20	3
Benzo (a) Pyrene	175.7	200.0	255.0	40	303.5	64	40-160	17	0-20	
Benzo (b) Fluoranthene	166.4	200.0	249.3	41	308.3	71	40-160	21	0-20	4
Benzo (g,h,i) Perylene	150.8	200.0	254.3	52	260.7	55	40-160	3	0-20	
Benzo (k) Fluoranthene	136.3	200.0	210.3	37	265.9	65	40-160	23	0-20	3,4
Chrysene	182.8	200.0	243.9	31	267.4	42	40-160	9	0-20	3
Dibenz (a,h) Anthracene	30.28	200.0	108.4	39	121.8	46	40-160	12	0-20	3
Fluoranthene	325.5	200.0	440.1	57	486.6	81	40-160	10	0-20	
Fluorene	48.80	200.0	136.1	44	134.0	43	40-160	2	0-20	
Indeno (1,2,3-c,d) Pyrene	111.2	200.0	203.0	46	211.5	50	40-160	4	0-20	
2-Methylnaphthalene	ND	200.0	64.58	32	75.68	38	40-160	16	0-20	3
1-Methylnaphthalene	ND	200.0	57.94	29	71.84	36	40-160	21	0-20	3,4
Naphthalene	38.38	200.0	83.86	23	97.10	29	40-160	15	0-20	3
Phenanthrene	203.9	200.0	296.1	46	280.5	38	40-160	5	0-20	3
Pyrene	462.1	200.0	623.3	81	635.2	87	40-160	2	0-46	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
Project: Port of Redwood City			Page 6 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Comp	**Sample**	**Sediment**	**GC/MS HHH**	**02/26/15**	**03/03/15 18:26**	**150226S23B**
PRC-DU1-Comp	**Matrix Spike**	**Sediment**	**GC/MS HHH**	**02/28/15**	**03/03/15 15:00**	**150226S23B**
PRC-DU1-Comp	**Matrix Spike Duplicate**	**Sediment**	**GC/MS HHH**	**02/28/15**	**03/03/15 15:26**	**150226S23B**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
PCB018	ND	50.00	40.75	82	41.12	82	50-150	1	0-25	
PCB028	ND	50.00	48.16	96	44.50	89	50-150	8	0-25	
PCB044	0.6522	50.00	38.60	76	41.10	81	50-150	6	0-25	
PCB052	1.044	50.00	37.73	73	38.67	75	50-150	2	0-25	
PCB066	0.3244	50.00	46.68	93	45.97	91	50-150	2	0-25	
PCB101	2.229	50.00	42.76	81	41.97	79	50-150	2	0-25	
PCB105	0.6741	50.00	44.80	88	43.48	86	50-150	3	0-25	
PCB118	1.674	50.00	46.67	90	44.70	86	50-150	4	0-25	
PCB128	0.4233	50.00	36.18	72	36.42	72	50-150	1	0-25	
PCB170	0.4248	50.00	41.71	83	46.46	92	50-150	11	0-25	
PCB180	0.6507	50.00	38.38	75	37.93	75	50-150	1	0-25	
PCB187	0.4099	50.00	41.52	82	40.26	80	50-150	3	0-25	
PCB195	ND	50.00	46.07	92	52.12	104	50-150	12	0-25	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3550B (M)
		Method:	Organotins by Krone et al.
Project: Port of Redwood City			Page 7 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Comp	**Sample**	**Sediment**	**GC/MS Y**	**02/24/15**	**02/26/15 16:37**	**150224S24C**
PRC-DU1-Comp	**Matrix Spike**	**Sediment**	**GC/MS Y**	**02/24/15**	**02/26/15 14:16**	**150224S24C**
PRC-DU1-Comp	**Matrix Spike Duplicate**	**Sediment**	**GC/MS Y**	**02/24/15**	**02/26/15 14:32**	**150224S24C**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Tetrabutyltin	ND	100.0	85.31	85	78.20	78	33-129	9	0-36	
Tributyltin	ND	100.0	60.94	61	53.95	54	34-142	12	0-50	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - PDS

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3050B
		Method:	EPA 6020
Project: Port of Redwood City			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	PDS/PDSD Batch Number
PRC-DU1-Comp	**Sample**	**Sediment**	**ICP/MS 04**	**02/21/15 00:00**	**02/24/15 21:17**	**150221S01A**
PRC-DU1-Comp	**PDS**	**Sediment**	**ICP/MS 04**	**02/21/15 00:00**	**02/24/15 21:06**	**150221S01A**

Parameter	Sample Conc.	Spike Added	PDS Conc.	PDS %Rec.	%Rec. CL	Qualifiers
Arsenic	3.642	25.00	29.76	104	75-125	
Chromium	38.42	25.00	63.47	100	75-125	
Copper	22.17	25.00	47.67	102	75-125	
Lead	12.96	25.00	38.72	103	75-125	
Nickel	38.51	25.00	62.88	97	75-125	
Silver	0.2429	12.50	12.68	100	75-125	
Zinc	61.61	25.00	89.38	111	75-125	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Sample Duplicate

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	SM 2540 B (M)
Project: Port of Redwood City			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
15-02-1247-1	**Sample**	**Sediment**	**N/A**	**02/20/15 00:00**	**02/20/15 16:00**	**F0220TSD1**
15-02-1247-1	**Sample Duplicate**	**Sediment**	**N/A**	**02/20/15 00:00**	**02/20/15 16:00**	**F0220TSD1**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Total	43.50	42.90	1	0-10	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	EPA 9060A
Project: Port of Redwood City			Page 1 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-06-013-1189	**LCS**	**Solid**	**TOC 5**	**03/02/15**	**03/02/15 18:18**	**F0302TOCL1**
099-06-013-1189	**LCSD**	**Solid**	**TOC 5**	**03/02/15**	**03/02/15 18:18**	**F0302TOCL1**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Carbon, Total Organic	0.6000	0.5104	85	0.5546	92	80-120	8	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3050B
		Method:	EPA 6020
Project: Port of Redwood City			Page 2 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-254-292	**LCS**	**Solid**	**ICP/MS 04**	**02/21/15**	**02/24/15 16:38**	**150221L01E**
099-15-254-292	**LCSD**	**Solid**	**ICP/MS 04**	**02/21/15**	**02/24/15 16:42**	**150221L01E**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Arsenic	25.00	26.45	106	26.96	108	80-120	2	0-20	
Chromium	25.00	27.51	110	27.93	112	80-120	2	0-20	
Copper	25.00	27.16	109	27.20	109	80-120	0	0-20	
Lead	25.00	25.61	102	26.08	104	80-120	2	0-20	
Nickel	25.00	26.12	104	26.39	106	80-120	1	0-20	
Silver	12.50	13.35	107	13.33	107	80-120	0	0-20	
Zinc	25.00	27.34	109	27.54	110	80-120	1	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 7471A Total
		Method:	EPA 7471A
Project: Port of Redwood City			Page 3 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-16-278-109	**LCS**	**Solid**	**Mercury 05**	**02/23/15**	**02/23/15 15:23**	**150223L03E**
099-16-278-109	**LCSD**	**Solid**	**Mercury 05**	**02/23/15**	**02/23/15 15:59**	**150223L03E**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Mercury	0.8350	0.9593	115	0.8537	102	82-124	12	0-16	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8081A
Project: Port of Redwood City			Page 4 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-858-338	**LCS**	**Solid**	**GC 44**	**02/26/15**	**03/03/15 12:32**	**150226L24**
099-12-858-338	**LCSD**	**Solid**	**GC 44**	**02/26/15**	**03/03/15 12:46**	**150226L24**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	ME CL	RPD	RPD CL	Qualifiers
Aldrin	5.000	4.904	98	4.885	98	50-135	36-149	0	0-25	
Alpha-BHC	5.000	4.942	99	4.934	99	50-135	36-149	0	0-25	
Beta-BHC	5.000	4.990	100	4.972	99	50-135	36-149	0	0-25	
Delta-BHC	5.000	5.419	108	5.339	107	50-135	36-149	1	0-25	
Gamma-BHC	5.000	5.177	104	5.155	103	50-135	36-149	0	0-25	
Dieldrin	5.000	5.386	108	5.341	107	50-135	36-149	1	0-25	
4,4'-DDD	5.000	5.556	111	5.492	110	50-135	36-149	1	0-25	
4,4'-DDE	5.000	5.444	109	5.404	108	50-135	36-149	1	0-25	
4,4'-DDT	5.000	5.638	113	5.611	112	50-135	36-149	0	0-25	
Endosulfan I	5.000	5.072	101	5.040	101	50-135	36-149	1	0-25	
Endosulfan II	5.000	5.457	109	5.405	108	50-135	36-149	1	0-25	
Endosulfan Sulfate	5.000	5.314	106	5.243	105	50-135	36-149	1	0-25	
Endrin	5.000	5.709	114	5.618	112	50-135	36-149	2	0-25	
Endrin Aldehyde	5.000	5.433	109	5.342	107	50-135	36-149	2	0-25	
Endrin Ketone	5.000	5.808	116	5.712	114	50-135	36-149	2	0-25	
Heptachlor	5.000	5.372	107	5.349	107	50-135	36-149	0	0-25	
Heptachlor Epoxide	5.000	5.226	105	5.214	104	50-135	36-149	0	0-25	
Methoxychlor	5.000	5.899	118	5.857	117	50-135	36-149	1	0-25	
Alpha Chlordane	5.000	5.201	104	5.186	104	50-135	36-149	0	0-25	
Gamma Chlordane	5.000	5.053	101	5.032	101	50-135	36-149	0	0-25	

Total number of LCS compounds: 20
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
Project: Port of Redwood City			Page 5 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-437-120	**LCS**	**Solid**	**GC/MS EEE**	**02/25/15**	**02/26/15 11:24**	**150225L07**
099-14-437-120	**LCSD**	**Solid**	**GC/MS EEE**	**02/25/15**	**02/26/15 11:45**	**150225L07**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	ME CL	RPD	RPD CL	Qualifiers
Acenaphthene	100.0	81.78	82	84.86	85	48-108	38-118	4	0-11	
Acenaphthylene	100.0	79.85	80	81.90	82	40-160	20-180	3	0-20	
Anthracene	100.0	73.79	74	74.76	75	40-160	20-180	1	0-20	
Benzo (a) Anthracene	100.0	71.00	71	71.65	72	40-160	20-180	1	0-20	
Benzo (a) Pyrene	100.0	72.05	72	72.77	73	40-160	20-180	1	0-20	
Benzo (b) Fluoranthene	100.0	73.28	73	75.54	76	40-160	20-180	3	0-20	
Benzo (g,h,i) Perylene	100.0	72.84	73	74.68	75	40-160	20-180	2	0-20	
Benzo (k) Fluoranthene	100.0	70.85	71	76.95	77	40-160	20-180	8	0-20	
Chrysene	100.0	76.50	76	79.38	79	40-160	20-180	4	0-20	
Dibenz (a,h) Anthracene	100.0	73.00	73	74.93	75	40-160	20-180	3	0-20	
Fluoranthene	100.0	75.08	75	74.99	75	40-160	20-180	0	0-20	
Fluorene	100.0	80.33	80	83.58	84	40-160	20-180	4	0-20	
Indeno (1,2,3-c,d) Pyrene	100.0	71.06	71	72.67	73	40-160	20-180	2	0-20	
2-Methylnaphthalene	100.0	74.70	75	74.96	75	40-160	20-180	0	0-20	
1-Methylnaphthalene	100.0	70.67	71	69.33	69	40-160	20-180	2	0-20	
Naphthalene	100.0	76.02	76	76.16	76	40-160	20-180	0	0-20	
Phenanthrene	100.0	77.85	78	78.87	79	40-160	20-180	1	0-20	
Pyrene	100.0	75.26	75	76.04	76	40-160	20-180	1	0-16	

Total number of LCS compounds: 18
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
Project: Port of Redwood City			Page 6 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-16-418-53	**LCS**	**Solid**	**GC/MS HHH**	**02/26/15**	**03/03/15 11:58**	**150226L23**
099-16-418-53	**LCSD**	**Solid**	**GC/MS HHH**	**02/26/15**	**03/03/15 12:24**	**150226L23**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	ME CL	RPD	RPD CL	Qualifiers
PCB018	50.00	46.02	92	45.16	90	50-150	33-167	2	0-25	
PCB028	50.00	47.99	96	47.75	95	50-150	33-167	1	0-25	
PCB044	50.00	45.59	91	45.56	91	50-150	33-167	0	0-25	
PCB052	50.00	41.63	83	41.42	83	50-150	33-167	1	0-25	
PCB066	50.00	50.53	101	49.10	98	50-150	33-167	3	0-25	
PCB101	50.00	44.72	89	44.23	88	50-150	33-167	1	0-25	
PCB105	50.00	44.18	88	45.03	90	50-150	33-167	2	0-25	
PCB118	50.00	46.19	92	46.70	93	50-150	33-167	1	0-25	
PCB128	50.00	37.84	76	37.41	75	50-150	33-167	1	0-25	
PCB170	50.00	52.84	106	50.34	101	50-150	33-167	5	0-25	
PCB180	50.00	37.80	76	38.36	77	50-150	33-167	1	0-25	
PCB187	50.00	41.57	83	41.86	84	50-150	33-167	1	0-25	
PCB195	50.00	60.41	121	56.81	114	50-150	33-167	6	0-25	

Total number of LCS compounds: 13
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	02/18/15
2250 Cordelia Road		Work Order:	15-02-1248
Fairfield, CA 94534-1912		Preparation:	EPA 3550B (M)
		Method:	Organotins by Krone et al.
Project: Port of Redwood City			Page 7 of 7

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-07-016-1238	**LCS**	**Solid**	**GC/MS Y**	**02/24/15**	**02/26/15 12:42**	**150224L24**
099-07-016-1238	**LCSD**	**Solid**	**GC/MS Y**	**02/24/15**	**02/26/15 12:58**	**150224L24**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Tetrabutyltin	100.0	92.49	92	97.48	97	40-142	5	0-20	
Tributyltin	100.0	66.18	66	70.67	71	33-147	7	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Glossary of Terms and Qualifiers

Work Order: 15-02-1248 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CHAIN-OF-CUSTODY RECORD

15-02-1248

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	Drew Gantner
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas / Drew Gantner
Project Name:	Port of Redwood City
PO Number:	23613

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	* See Analyte List	Grain Size Analysis									
1 1	PRC-DU1-Comp	2/2/15	12:30	Sed	2	500ml glass	X										
2	PRC-DU1-Comp	2/2/15	12:30	Sed	1	poly bag		X									
2 3	PRC-DU2-Comp	2/2/15	08:30	Sed	1	500ml glass	X										
4	PRC-DU2-Comp	2/2/15	08:30	Sed	1	poly bag		X									
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	

Correct Containers:	**Yes**	**No**	
Sample Temperature:	**Ambient**	**Cold**	**Warm**
Sample Preservative:	**Yes**	**No**	
Turnaround Time:	**STD**	**Specify:**	

Comments:

Perform duplicate, MS/MSD, etc. on PRC-DU1-Comp .

14 Day TAT.

All analytes are to be reported on a wet weight basis

RELIQUINSHED BY

Signature:	[illegible]	**Signature:**	Tom O'Malley TO 650
Print:	PADRICK ANDERSON	**Print:**	Tom O'MALLEY
Organization:	PER	**Organization:**	ECI
DATE:	2-17-15	**TIME:** 1045	**DATE:** 2/17/15 **TIME:** 1730

RECEIVED BY

Signature:	T O'Malley	**Signature:**	[illegible]
Print:	Tom O'MALLEY	**Print:**	FREDY SORIANO
Organization:	ECI	**Organization:**	
DATE:	2/17/15	**TIME:** 1045	**DATE:** 2/18/15 **TIME:** 0945

*MATRIX CODES: (SED = Sediment); (FW = Freshwater); (WW = Wastewater); (STRMW = Stormwater)

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ANALYTE LIST

Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

Project Proponent: **Pacific EcoRisk**
Project #: Port of Redwood City - 23613
Site #: PRC-DU1-Comp, PRC-DU2-Comp

(1248)

ANALYTE	METHOD	TARGETED MRL	ANALYSIS REQUESTED
Solids, Total	EPA160.3	0.10%	X
Total Organic Carbon	EPA 415.1	0.10%	X
Particle Size	ASTM 1992	0.10%	X
Arsenic	6020	2 mg/kg	X
Cadmium	6020	0.3 mg/kg	X
Chromium	6020	5 mg/kg	X
Copper	6020	5 mg/kg	X
Lead	6020	5 mg/kg	X
Nickel	6020	5 mg/kg	X
Silver	6020	0.2 mg/kg	X
Zinc	6020	1 mg/kg	X
Mercury	7471A	0.02 mg/kg	X
Selenium	7742	0.1 mg/kg	X
2,4'-DDD	8081 B	2 µg/kg	X
2,4'-DDE	8081 B	2 µg/kg	X
2,4'-DDT	8081 B	2 µg/kg	X
4,4'-DDD	8081 B	2 µg/kg	X
4,4'-DDE	8081 B	2 µg/kg	X
4,4'-DDT	8081 B	2 µg/kg	X
Aldrin	8081 B	2 µg/kg	X
alpha-BHC	8081 B	2 µg/kg	X
alpha-Chlordane	8081 B	2 µg/kg	X
beta-BHC	8081 B	2 µg/kg	X
Chlordane	8081 B	20 µg/kg	X
delta-BHC	8081 B	2 µg/kg	X
Dieldrin	8081 B	2 µg/kg	X
Endosulfan I	8081 B	2 µg/kg	X
Endosulfan II	8081 B	2 µg/kg	X
Endosulfan Sulfate	8081 B	2 µg/kg	X
Endrin	8081 B	2 µg/kg	X
Endrin Aldehyde	8081 B	2 µg/kg	X
gamma-BHC (Lindane)	8081 B	2 µg/kg	X
gamma-Chlordane	8081 B	2 µg/kg	X
Heptachlor	8081 B	2 µg/kg	X
Heptachlor Epoxide	8081 B	2 µg/kg	X
Toxaphene	8081 B	20 µg/kg	X
PCB 008	8082 ECD or 8270C	0.5 µg/kg	X
PCB 018	8082 ECD or 8270C	0.5 µg/kg	X
PCB 028	8082 ECD or 8270C	0.5 µg/kg	X
PCB 031	8082 ECD or 8270C	0.5 µg/kg	X
PCB 033	8082 ECD or 8270C	0.5 µg/kg	X
PCB 044	8082 ECD or 8270C	0.5 µg/kg	X
PCB 049	8082 ECD or 8270C	0.5 µg/kg	X
PCB 052	8082 ECD or 8270C	0.5 µg/kg	X
PCB 056	8082 ECD or 8270C	0.5 µg/kg	X
PCB 060	8082 ECD or 8270C	0.5 µg/kg	X
PCB 066	8082 ECD or 8270C	0.5 µg/kg	X
PCB 070	8082 ECD or 8270C	0.5 µg/kg	X
PCB 074	8082 ECD or 8270C	0.5 µg/kg	X
PCB 087	8082 ECD or 8270C	0.5 µg/kg	X
PCB 095	8082 ECD or 8270C	0.5 µg/kg	X
PCB 097	8082 ECD or 8270C	0.5 µg/kg	X
PCB 099	8082 ECD or 8270C	0.5 µg/kg	X
PCB 101	8082 ECD or 8270C	0.5 µg/kg	X
PCB 105	8082 ECD or 8270C	0.5 µg/kg	X
PCB 110	8082 ECD or 8270C	0.5 µg/kg	X
PCB 118	8082 ECD or 8270C	0.5 µg/kg	X
PCB 128	8082 ECD or 8270C	0.5 µg/kg	X
PCB 132	8082 ECD or 8270C	0.5 µg/kg	X
PCB 138	8082 ECD or 8270C	0.5 µg/kg	X
PCB 141	8082 ECD or 8270C	0.5 µg/kg	X
PCB 149	8082 ECD or 8270C	0.5 µg/kg	X
PCB 151	8082 ECD or 8270C	0.5 µg/kg	X

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ANALYTE LIST

Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

1248

Project Proponent: **Pacific EcoRisk**
Project #: Port of Redwood City - 23613
Site #: PRC-DU1-Comp, PRC-DU2-Comp

ANALYTE	METHOD	TARGETED MRL	ANALYSIS REQUESTED
PCB 153	8082 ECD or 8270C	0.5 µg/kg	X
PCB 156	8082 ECD or 8270C	0.5 µg/kg	X
PCB 158	8082 ECD or 8270C	0.5 µg/kg	X
PCB 170	8082 ECD or 8270C	0.5 µg/kg	X
PCB 174	8082 ECD or 8270C	0.5 µg/kg	X
PCB 177	8082 ECD or 8270C	0.5 µg/kg	X
PCB 180	8082 ECD or 8270C	0.5 µg/kg	X
PCB 183	8082 ECD or 8270C	0.5 µg/kg	X
PCB 187	8082 ECD or 8270C	0.5 µg/kg	X
PCB 194	8082 ECD or 8270C	0.5 µg/kg	X
PCB 195	8082 ECD or 8270C	0.5 µg/kg	X
PCB 201	8082 ECD or 8270C	0.5 µg/kg	X
PCB 203	8082 ECD or 8270C	0.5 µg/kg	X
Acenaphthene	8270C	20 µg/kg	X
Acenaphthylene	8270C	20 µg/kg	X
Anthracene	8270C	20 µg/kg	X
Benz(a)anthracene	8270C	20 µg/kg	X
Benzo(a)pyrene	8270C	20 µg/kg	X
Benzo(e)pyrene	8270C	20 µg/kg	X
Benzo(b)fluoranthene	8270C	20 µg/kg	X
Benzo(g,h,i)perylene	8270C	20 µg/kg	X
Benzo(k)fluoranthene	8270C	20 µg/kg	X
Biphenyl	8270C	20 µg/kg	X
Chrysene	8270C	20 µg/kg	X
Dibenz(a,h)anthracene	8270C	20 µg/kg	X
Dibenzothiophene	8270C	20 µg/kg	X
Dimethylnapthalene 2, 6-	8270C	20 µg/kg	X
Fluoranthene	8270C	20 µg/kg	X
Fluorene	8270C	20 µg/kg	X
Indeno(1,2,3-cd)pyrene	8270C	20 µg/kg	X
Methylnapthalene, 1-	8270C	20 µg/kg	X
Methylnapthalene, 2-	8270C	20 µg/kg	X
Methylphenanthrene, 1-	8270C	20 µg/kg	X
Naphthalene	8270C	20 µg/kg	X
Perylene	8270C	20 µg/kg	X
Phenanthrene	8270C	20 µg/kg	X
Pyrene	8270C	20 µg/kg	X
Trimethylnapthalene, 2, 3, 5-	8270C	20 µg/kg	X
Di-butyltin	Krone 1989	10 µg/kg	X
Mono-Butyltin	Krone 1989	10 µg/kg	X
Tetra-butyltin	Krone 1989	10 µg/kg	X
Tri-butyltin	Krone 1989	10 µg/kg	X
QA/QC			
If possible, please use MVC-Comp to perform duplicate and MS/MSD on sample run. Standard TAT.			X

If you have any questions regarding this request as checked, please call Jeff Cotsifas at (707)207-7760

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GSO

800-322-5555 www.gso.com

1248

Ship From
CAL SCIENCE- CONCORD
ALAN KEMP
5063 COMMERCIAL CIRCLE
#H
CONCORD, CA 94520

Tracking #: 526969089

NPS

Ship To
CEL
SAMPLE RECEIVING
7440 LINCOLN WAY
GARDEN GROVE, CA 92841

ORC
GARDEN GROVE

A

COD: $0.00
Weight: 0 lb(s)
Reference:
SCHNITZER STEEL, PACIFIC ECORISK
Delivery Instructions:

D92845A

34236956

Signature Type: REQUIRED

Print Date: 2/17/2015 2:02 PM

LABEL INSTRUCTIONS:

Do not copy or reprint this label for additional shipments - each package must have a unique barcode.

Use the "Print Label" button on this page to print the shipping label on a laser or inkjet printer. Securely attach this label to your package, do not cover the barcode.

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WORK ORDER #: 15-02-1248

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: Pacific EcoRisk

DATE: 02/18/15

TEMPERATURE: Thermometer ID: SC4 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 1 . 8 °C + 0.2 °C (CF) = 2 . 0 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ Received at ambient temperature, placed on ice for transport by Courier.

Ambient Temperature: ☐ Air ☐ Filter Checked by: 836

CUSTODY SEALS INTACT:

☑ Cooler ☐ _____ ☐ No (Not Intact) ☐ Not Present ☐ N/A Checked by: 836

☐ Sample ☐ _____ ☐ No (Not Intact) ☑ Not Present Checked by: 965

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☐	☐	☑
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☐	☐	☑
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☑16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☑ Z

Aqueous: ☐VOA ☐VOAh ☐VOAna_2 ☐125AGB ☐125AGBh ☐125AGBp ☐1AGB ☐1AGBna_2 ☐1AGBs ☐500AGB ☐500AGJ ☐500AGJs ☐250AGB ☐250CGB ☐250CGBs ☐1PB ☐1PBna ☐500PB ☐250PB ☐250PBn ☐125PB ☐125PBznna ☐100PJ ☐100PJna_2 ☐_____ ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:**_____ **Labeled/Checked by:** 965

Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelope **Reviewed by:** 689

Preservative: h: HCL n: HNO_3 na_2: $Na_2S_2O_3$ na: NaOH p: H_3PO_4 s: H_2SO_4 u: Ultra-pure znna: $ZnAc_2$+NaOH f: Filtered **Scanned by:** 689

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Subcontractor Analysis Report

Work Order: 15-02-1248 Page 1 of 1

One or more samples in this work order have tests that were subcontracted. The subcontract report(s) follows.

For subcontracted tests, please reference the laboratory information noted below.

1. ALS - Columbia Analytical Services, Inc. - Kelso,WA CA ELAP 2286
   EPA 6020 Cadmium
   EPA 7742 Selenium

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ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

March 09, 2015

Analytical Report for Service Request No: K1501742

Danielle Gonsman
Calscience Environmental Laboratory, Inc.
7440 Lincoln Way
Garden Grove, CA 92841-1427

RE: 15-02-1248

Dear Danielle,

Enclosed are the results of the sample(s) submitted to our laboratory February 20, 2015
For your reference, these analyses have been assigned our service request number **K1501742.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at howard.holmes@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Howard Holmes
Project Manager

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

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Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

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ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjlabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

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Chain of Custody

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ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

eurofins | Calscience

7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1427
TEL: (714) 895-5494 . FAX: (714) 894-7501

TO: ALS
1317 S. 13th Avenue
Kelso, WA 98626 USA

CHAIN OF CUSTODY RECORD

DATE: 02/19/15
PAGE: 1 OF 1

K150174

LABORATORY CLIENT: Eurofins Calscience, Inc.	CLIENT PROJECT NAME / NUMBER: 15-02-1248
ADDRESS: 7440 Lincoln Way	P.O. NO.: 15-02-1248
CITY: Garden Grove, CA 92841-1427	PROJECT CONTACT: Danielle Gonsman
TEL: (714) 895-5494 / E-MAIL: DanielleGonsman@EurofinsUS.com	TEMP BLANK:
	SAMPLER(S): (PRINT)
	LAB USE ONLY

TURNAROUND TIME
___SAME DAY __24 HR ____48HR ____72 HR __5 DAYS X 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
ARCHIVE SAMPLES UNTIL ____/____/____

All analytes are to be reported on a ~~wet~~ DRY weight basis

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Cd by 6020	EPA 7742 Se	MS/MSD
	PRC-DU1-Comp	02/02/15	12:30	SED	1-4OZ	X	X	X
	PRC-DU2-Comp	02/02/15	08:30	SED	1-4OZ	X	X	
	PRC-DU1-Comp-LAB DUP	02/02/15	12:30	SED	1-4OZ	X	X	

Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
(Eurofins Calscience)	Fedex 772949 79	2/19/15	1240
Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
		2/20/15	0940
Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:

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PC H2

Cooler Receipt and Preservation Form

Client / Project: Calscience Service Request **K15** C1742

Received: 2/20/15 Opened: 2/20/15 By: KD Unloaded: 2/20/15 By: KD

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? 1, Front

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected. Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-.3	-.2	—	—	+.1	337		7729 4979 2195	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page _____ ***of*** _____

General Chemistry

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Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Eurofins Calscience Environmental Laboratory	**Service Request:**	K1501742
Project:	15-02-1248	**Date Collected:**	02/2/15
Sample Matrix:	Soil	**Date Received:**	02/20/15
Analysis Method:	160.3 Modified	**Units:**	Percent
Prep Method:	None	**Basis:**	As Received

Solids, Total

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
PRC-DU1-Comp	K1501742-001	**41.8**	-	-	1	02/20/15 15:43	
PRC-DU2-Comp	K1501742-002	**37.7**	-	-	1	02/20/15 15:43	
PRC-DU1-Comp-LAB DUP	K1501742-003	**41.7**	-	-	1	02/20/15 15:43	

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ALS Group USA, Corp.
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QA/QC Report

Client:	Eurofins Calscience Environmental Laboratory	**Service Request:**	K1501742
Project	15-02-1248	**Date Collected:**	02/02/15
Sample Matrix:	Soil	**Date Received:**	02/20/15
		Date Analyzed:	02/20/15

Replicate Sample Summary
General Chemistry Parameters

Sample Name:	PRC-DU1-Comp	**Units:**	Percent
Lab Code:	K1501742-001	**Basis:**	As Received

Analyte Name	Analysis Method	MRL	MDL	Sample Result	Duplicate Sample K1501742-001DUP Result	Average	RPD	RPD Limit
Solids, Total	160.3 Modified	-	-	41.8	41.8	41.8	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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Metals

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ALS Group USA, Corp.
dba ALS Environmental

Metals
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INORGANIC ANALYSIS DATA PACKAGE

Client:	Eurofins Calscience Environmenta	**Service Request:**	K1501742
Project No.:	NA	**Date Collected:**	02/02/15
Project Name:	15-02-1248	**Date Received:**	02/20/15
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: PRC-DU1-Comp **Lab Code:** K1501742-001

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	6020A	0.016	0.006	5.0	02/23/15	02/24/15	0.370		
Selenium	7742	0.08	0.02	2.0	02/23/15	03/05/15	0.40		

% Solids: 41.8

Comments:

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ALS Group USA, Corp.
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Metals
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INORGANIC ANALYSIS DATA PACKAGE

Client:	Eurofins Calscience Environmenta	**Service Request:**	K1501742
Project No.:	NA	**Date Collected:**	02/02/15
Project Name:	15-02-1248	**Date Received:**	02/20/15
Matrix:	SOIL	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: PRC-DU2-Comp **Lab Code:** K1501742-002

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	6020A	0.017	0.006	5.0	02/23/15	02/24/15	0.317		
Selenium	7742	0.09	0.03	2.0	02/23/15	03/05/15	0.50		

% Solids: 37.7

Comments:

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ALS Group USA, Corp.
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Metals
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INORGANIC ANALYSIS DATA PACKAGE

Client: Eurofins Calscience Environmenta
Service Request: K1501742
Project No.: NA
Date Collected: 02/02/15
Project Name: 15-02-1248
Date Received: 02/20/15
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: PRC-DU1-Comp-LAB DUP
Lab Code: K1501742-003

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	6020A	0.016	0.006	5.0	02/23/15	02/24/15	0.337		
Selenium	7742	0.08	0.02	2.0	02/23/15	03/05/15	0.39		

% Solids: 41.7

Comments:

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Metals
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INORGANIC ANALYSIS DATA PACKAGE

Client: Eurofins Calscience Environmenta
Service Request: K1501742
Project No.: NA
Date Collected:
Project Name: 15-02-1248
Date Received:
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: Method Blank
Lab Code: KQ1501618-04

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Cadmium	6020A	0.020	0.007	5.0	02/23/15	02/24/15	0.035		

% Solids: 100.0

Comments:

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- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client: Eurofins Calscience Environmenta
Service Request: K1501742
Project No.: NA
Date Collected:
Project Name: 15-02-1248
Date Received:
Matrix: SOIL
Units: mg/Kg
Basis: DRY

Sample Name: Method Blank
Lab Code: KQ1501619-03

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Selenium	7742	0.10	0.03	2.0	02/23/15	03/05/15	0.03	U	

% Solids: 100.0

Comments:

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ALS Group USA, Corp.
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Metals

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SPIKE SAMPLE RECOVERY

Client: Eurofins Calscience Environmenta **Service Request:** K1501742

Project No.: NA **Units:** MG/KG

Project Name: 15-02-1248 **Basis:** DRY

Matrix: SOIL **% Solids:** 41.8

Sample Name: PRC-DU1-CompS **Lab Code:** K1501742-001S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Cadmium	75 - 125	8.335		0.370		8.0	99.6		6020A
Selenium	75 - 125	3.42		0.40		3.22	93.8		7742

An empty field in the Control Limit column indicates the control limit is not applicable

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Metals

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DUPLICATES

Client: Eurofins Calscience Environmenta **Service Request:** K1501742

Project No.: NA **Units:** MG/KG

Project Name: 15-02-1248 **Basis:** DRY

Matrix: SOIL **% Solids:** 41.8

Sample Name: PRC-DU1-CompD **Lab Code:** K1501742-001D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Cadmium	20	0.370		0.318		15.1		6020A
Selenium		0.40		0.41		2.5		7742

An empty field in the Control Limit column indicates the control limit is not applicable.

Form VI - IN

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ALS Group USA, Corp.
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Metals
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LABORATORY CONTROL SAMPLE

Client: Eurofins Calscience Environmenta **Service Request:** K1501742

Project No.: NA

Project Name: 15-02-1248

Aqueous LCS Source: **Solid LCS Source:** ERA D080-540

Analyte	Aqueous (ug/L) True	Aqueous (ug/L) Found	Aqueous (ug/L) %R	Solid (mg/kg) True	Solid (mg/kg) Found	Solid (mg/kg) C	Solid (mg/kg) Limits	Solid (mg/kg) %R
Cadmium				182.0	211.0		74 126	115.9
Selenium				150	150		67 133	100.0

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Appendix C

Analytical Chemistry Laboratory Data Reports Submitted by ALS Environmental (Dioxins)

March 26, 2015 Service Request No:E1500230

Jeffrey Cotsifas
Pacific EcoRisk Laboratories
2250 Cordelia Road
Fairfield, CA 94534

Laboratory Results for: Port of Redwood City

Dear Jeffrey,

Enclosed are the results of the sample(s) submitted to our laboratory March 11, 2015
For your reference, these analyses have been assigned our service request number **E1500230.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current TNI standards, where applicable, and except as noted in the laboratory case narrative provided. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the final complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. In accordance to the TNI 2009 Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Please contact me if you have any questions. My extension is 2279. You may also contact me via email at Arthi.Kodur@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Arthi Kodur
Project Manager

ADDRESS 10450 Stancliff Rd., Suite 210, Houston, TX 77099
PHONE +1 713 266 1599 | FAX +1 713 266 0130
ALS Group USA, Corp.
dba ALS Environmental

Certificate of Analysis

ALS Environmental - Houston HRMS
10450 Stancliff Rd, Suite 210, Houston TX 77099
Phone (713)266-1599 Fax (713)266-0130
www.alsglobal.com

RIGHT SOLUTIONS | RIGHT PARTNER

ALS ENVIRONMENTAL

Client:	Pacific EcoRisk Laboratories	**Service Request No.:**	E1500230
Project:	Port of Redwood City	**Date Received:**	3/11/15
Sample Matrix:	Sediment		

ALS ENVIRONMENTAL NARRATIVE

All analyses were performed in adherence to the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Two sediment samples were received for analysis at ALS Environmental on 3/11/15.

The following discrepancies were noted upon initial sample inspection: no custody seals on cooler. The exceptions are also noted on the cooler receipt and preservation form included in this data package.

The samples were received at 0°C in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Samples were kept frozen from clients end to extend the holding time.

Data Validation Notes and Discussion

B flags – Method Blanks

The Method Blank EQ1500199-01 contained low levels of 1234678-HpCDD, OCDD, 1234678-HpCDF and OCDF at or below the Method Reporting Limit (MRL).

MS/MSD

EQ1500199: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of an MS/MSD for this extraction batch. 1234678-HpCDD, OCDD and OCDF were outside the percent recoveries for EQ1500199-02 (LCS) and 03 (DLCS). The outages can be traced back to high level samples in the batch.

2378-TCDF

Samples analyzed on the DB-5MSUI column were analyzed under conditions were sufficient separation between 2,3,7,8-TCDF and its closest eluter was achieved. Confirmation of this result was not required.

Y flags – Labeled Standards

Quantification of the native 2,3,7,8-substituted analytes is based on isotopic dilution, which automatically corrects for variation in extraction efficiency and provides accurate values even with poor recovery. Samples that had recoveries of labeled standards outside the acceptance limits are qualified with 'Y' flags on the Labeled Compound summary pages. In all cases, the signal-to-noise ratios are greater than 10:1 and detection limit were below the Method Reporting Limit.

K flags

EMPC - When the ion abundance ratios associated with a particular compound are outside the QC limits, samples are flagged with a 'K' flag. A 'K' flag indicates an estimated maximum possible concentration for the associated compound.

Detection Limits

Detection limits are calculated for each analyte in each sample by measuring the height of the noise level for each quantitation ion for the associated labeled standard. The concentration equivalent to 2.5 times the height of the noise is then calculated using the appropriate response factor and the weight of the sample. The calculated concentration equals the detection limit.

The TEQ Summary results for each sample have been calculated by ALS ENVIRONMENTAL/Houston to include:

- WHO-2005 TEFs, The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds (M. Van den Berg et al., Toxicological Sciences 93(2):223-241, 2006)
- Non-detected compounds are not included in the 'Total'

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS group USA Corp dba ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

Client: Pacific EcoRisk Laboratories **Service Request:**E1500230
Project: Port of Redwood City

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
E1500230-001	PRC-DU1-Comp	2/2/2015	1230
E1500230-002	PRC-DU2-Comp	2/2/2015	0830

Service Request Summary

Folder #: **E1500230**
Client Name: Pacific EcoRisk Laboratories
Project Name: Port of Redwood City
Project Number:

Report To: Jeffrey Cotsifas
Pacific EcoRisk Laboratories
2250 Cordelia Road
Fairfield, CA 94534
USA
Phone Number: 707-207-7760
Cell Number:
Fax Number: 707-207-7916
E-mail: cotsifas@pacificecorisk.com

Project Chemist: Arthi Kodur
Originating Lab: HOUSTON
Logged By: LMCCRINK
Date Received: 03/11/15
Internal Due Date: 4/1/2015
QAP: LAB QAP
Qualifier Set: HRMS Qualifier Set
Formset: Lab Standard
Merged?: Y
Report to MDL?: Y
P.O. Number:
EDD: No EDD Specified

2 4 oz-Glass Jar WM CLEAR Teflon Liner Unpreserved
Location: EHRMS-WIC 1C
Pressure Gas:

				HOUSTON	
Lab Samp No.	**Client Samp No**	**Matrix**	**Collected**	PCDD PCDF/8290	Total Solids/ALS SOP
E1500230-001	PRC-DU1-Comp	Sediment	02/02/15 1230	II	II
E1500230-002	PRC-DU2-Comp	Sediment	02/02/15 0830	II	II

Folder Comments:

samples were rcvd out of recommend holding time (ak 3/11/15)

Printed 3/26/2015 6:15:11 PM

Service Request Summary

Folder #:	**E1500230**	Project Chemist:	Arthi Kodur
Client Name:	Pacific EcoRisk Laboratories	Originating Lab:	HOUSTON
Project Name:	Port of Redwood City	Logged By:	LMCCRINK
Project Number:		Date Received:	03/11/15
Report To:	Jeffrey Cotsifas Pacific EcoRisk Laboratories 2250 Cordelia Road Fairfield, CA 94534 USA	Internal Due Date:	4/1/2015
		QAP:	LAB QAP
		Qualifier Set:	HRMS Qualifier Set
		Formset:	Lab Standard
		Merged?:	Y
Phone Number:	707-207-7760	Report to MDL?:	Y
Cell Number:		P.O. Number:	
Fax Number:	707-207-7916	EDD:	No EDD Specified
E-mail:	cotsifas@pacificecorisk.com		

2 4 oz-Glass Jar WM CLEAR Teflon Liner Unpreserved

Location: EHRMS-WIC 1C

Pressure Gas:

Test Comments:

Group	Test/Method	Samples	Comments
Semivoa GCMS	PCDD PCDF/8290	2	full list (ak 3/11/15) samples rcvd outside of recommended holding time
Semivoa GCMS	Total Solids/ALS SOP	2	full list (ak 3/11/15) samples rcvd outside of recommended holding time

Data Qualifiers

HRMS Qualifier Set

B Indicates the associated analyte was found in the method blank at >1/10th the reported value.
E Estimated value. The reported concentration is above the calibration range of the instrument.
H Sample extracted and/or analyzed out of suggested holding time.
J Estimated value. The reported concentration is below the MRL.
K The ion abundance ratio between the primary and secondary ions were outside of theoretical acceptance limits. Reported concentration is a conservative estimate, however EMPC correction was not applied.
P Chlorodiphenyl ether interference was present at the retention time of the target analyte. Reported result should be considered an estimate.
Q Monitored lock-mass indicates matrix-interference. Reported result is estimated.
S Signal saturated detector. Result reported from dilution.
U Compound was analyzed for, but was not detected (ND).
X See Case Narrative.
Y Isotopically Labeled Standard recovery outside of acceptance limits. In all cases, the signal-to-nois ratios are greater than 10:1, making the recoveries acceptable.
i The MDL/MRL have been elevated due to a matrix interference.

Acronyms

Cal	Calibration
Conc	CONCentration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient

ALS Environmental

State Certifications, Accreditations, and Licenses

Agency	Number	Expire Date
American Association for Laboratory Accreditation	2897.01	11/30/2015
Arizona Department of Health Services	AZ0793	5/27/2015
Arkansas Department of Environmental Quality	14-038-0	6/16/2015
Florida Department of Health	E87611	6/30/2015
Hawaii Department of Health	TX02694	6/30/2015
Illinois Environmental Protection Agency	200057	10/6/2015
Louisiana Department of Environmental Quality	03048	6/30/2015
Louisiana Department of Health and Hospitals	LA150026	12/31/2015
Maine Center for Disease Control and Prevention	2014019	6/5/2016
Maryland Department of the Environment	343	6/30/2015
Michigan Depratment of Environmental Quality	9971	6/30/2015
Minnesota Department of Health	840911	12/31/2015
Nebraska Department of Health and Human Services	NE-OS-25-13	6/30/2015
Nevada Department of Concervation and Natural Resources	TX014112013-2	7/31/2015
New Jersey Department of Environmental Protection	NLC140001	6/30/2015
New Mexico Environment Department	TX02694	6/30/2015
New York Department of Health	11707	4/1/2015
Oklahoma Department of Environmental Quality	2014 124	8/31/2015
Oklahoma Department of Environmental Quality	2014-124	8/31/2015
Pennsylvania Department of Environmental Protection	68-03441	6/30/2015
Tennessee Department of Environment and Concervation	04016	6/30/2015
Texas Commision on Environmental Quality	TX104704216-14-5	6/30/2015
United States Department of Agriculture	P330-14-00067	2/21/2017
Utah Department of Health Environmental Laboratory Certification	TX02694	7/31/2015
Washington Department of Health	c819	11/14/2015
West Virginia Department of Environmental Protection	347	6/30/2015

ALS ENVIRONMENTAL – Houston

Data Processing/Form Production and Peer Review Signatures

SR# Unique ID E1500230 DB-5 DB-5MSUI DB-225 SPB-Octyl

First Level - Data Processing - to be filled by person generating the forms

Date:	Analyst:	Samples:
03/20/15	JC	-001,-002

Second Level - Data Review – to be filled by person doing peer review

Date:	Analyst:	Samples:
03/20/15	[illegible]	001,002

PEER REVIEW PAGE

Chain of Custody

ALS Environmental - Houston HRMS
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www.alsglobal.com

Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CHAIN-OF-CUSTODY RECORD

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	Drew Gantner
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas / Drew Gantner
Project Name:	Port of Redwood City
PO Number:	23613

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	Dioxins (total TCDD TEQ) (EPA 8290) RL=1ng/kg
1	PRC-DU1-Comp	2/2/15	12:30	Sed	1	Glass jar	X
2	PRC-DU2-Comp	2/2/15	08:30	Sed	1	Glass jar	X
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							

Correct Containers:	Yes	No	
Sample Temperature:	Ambient	Cold	Warm
Sample Preservative:	Yes	No	
Turnaround Time:	STD	Specify:	

Comments:

14 Day TAT.

RELIQUINSHED BY

Signature:	[signature]	Signature:	
Print:	A. Gantner	Print:	
Organization: PER		Organization:	
DATE: 3/10/15	TIME: 1330	DATE:	TIME:

RECEIVED BY

Signature:		Signature:	[signature]
Print:		Print:	Lisa McCrink
Organization:		Organization:	
DATE:	TIME:	DATE: 3/11/15	TIME: 1100

*MATRIX CODES: (SED = Sediment); (FW = Freshwater); (WW = Wastewater); (STRMW = Stormwater)

ALS Environmental

Cooler Receipt Form

Project Chemist: AK

Client/Project: Pacific EcoRisk

Thermometer ID: SM0

Date/Time Received: 3/11/15 1100 Initials: LM

Date/Time Logged in: 3/11/15 1200 Initials: LM

1. Method of delivery: ○ US Mail ✓ Fed Ex ○ UPS ○ DHL ○ Courier ○ Client

2. Samples received in: ✓ Cooler ✓ Box ○ Envelope ○ Other

3. Were custody seals on coolers? ○ Yes ✓ No

Were they intact? ○ Yes ○ No ✓ N/A

Were they signed and dated? ○ Yes ○ No ✓ N/A

If yes, how many and where? none

4. Packing Material: ○ Inserts ○ Baggies ✓ Bubble Wrap ✓ Gel Packs ○ Wet Ice ○ Sleeves ○ Other

5. Foreign or Regulated Soil? ○ Yes ✓ No Location of Sampling:

Cooler Tracking Number	COC ID	Date Opened	Time Opened	Opened By	Temp. °C	Temp Blank?
7730 9506 5609		3/11/15	1105	LM	0	☐
						☐
						☐
						☐

6. Were custody papers properly filled out (ink, signed, dated, etc)? ✓ Yes ○ No

7. Did all bottles arrive in good condition (not broken, no signs of leakage)? ✓ Yes ○ No

8. Were all sample labels complete (i.e., sample ID, analysis, preservation, etc)? ✓ Yes ○ No

9. Were appropriate bottles/containers and volumes received for the requested tests? ✓ Yes ○ No

10. Did sample labels and tags agree with custody documents? ✓ Yes ○ No

Notes, Discrepancies, & Resolutions:

Service request Label: E1500230 5
Pacific EcoRisk Laboratories
8290 Dioxin

Effective 10/04/2013

ALS Environmental - Houston HRMS

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SAMPLE ACCEPTANCE POLICY

This policy outlines the criteria samples must meet to be accepted by ALS Environmental – Houston HRMS.

Cooler Custody Seals (desirable, mandatory if specified in SAP):

- ✓ Intact on outside of cooler, signed and dated

Chain-of-Custody (COC) documentation (mandatory):

The following is required on each COC:

- ✓ Sample ID, the location, date and time of collection, collector's name, preservation type, sample type, and any other special remarks concerning the sampleThe COC must be completed in ink.
- ✓ Signature and date of relinquishing party.

In the absence of a COC at sample receipt, the COC will be requested from the client.

Sample Integrity (mandatory):

Samples are inspected upon arrival to ensure that sample integrity was not compromised during transfer to the laboratory.

- ✓ Sample containers must arrive in good condition (not broken or leaking).
- ✓ Samples must be labeled appropriately, including Sample IDs, and requested test using durable labels and indelible ink.
- ✓ The correct type of sample bottle must be used for the method requested.
- ✓ An appropriate sample volume, or weight, must be received.
- ✓ Sample IDs and number of containers must reconcile with the COC.
- ✓ Samples must be received within the method defined holding time.

Temperature Requirement (varies by sample matrix):

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6ºC.
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10ºC.
- ✓ Air samples are shipped and stored cold, at 0 to 6ºC
- ✓ The sample temperature must be recorded on the COC

All cooler inspections are documented on the Cooler Receipt Form (CRF). A separate CRF is completed for each service request. Any samples not meeting the above criteria are noted on the CRF and the Project Manager notified. The Project Manager must resolve any sample integrity issues with the client prior to proceeding with the analysis. Such resolutions are documented in writing and filed with the project folder. Data associated with samples received outside of this acceptance policy will be qualified on the case narrative of the final report

Preparation Information Benchsheets

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RIGHT SOLUTIONS | RIGHT PARTNER

Preparation Information Benchsheet

Prep Run#: 231253 **Prep WorkFlow:** OrgExtDioxS(30) **Status:** Prepped
Team: Semivoa GCMS/DEDWARDS **Prep Method:** Method **Prep Date/Time:** 3/16/15 07:35 AM

#	Lab Code	Client ID	B#	Method /Test	pH	Matrix	Amt. Ext.	Sample Description
1	E1500230-001	PRC-DU1-Comp	.01	8290/PCDD PCDF		Sediment	10.054g	Watery Green Sediment
2	E1500230-002	PRC-DU2-Comp	.01	8290/PCDD PCDF		Sediment	10.208g	Watery Green Sediment
3	EQ1500199-01	MB		8290/PCDD PCDF		Solid	10.277g	
4	EQ1500199-02	LCS		8290/PCDD PCDF		Solid	10.494g	
5	EQ1500199-03	DLCS		8290/PCDD PCDF		Solid	10.162g	
6	K1501100-001	B-1 2-3.5'	.02	8290/PCDD PCDF		Soil	10.355g	Moist Brown Sediment Crumbles
7	K1501100-004	B-1 6.5-9'	.02	8290/PCDD PCDF		Soil	10.148g	Moist Brown Sediment
8	K1501100-005	B-1 9-10'	.02	8290/PCDD PCDF		Soil	10.073g	Moist Brown Sediment
9	K1501100-006	B-3 5-6.5'	.02	8290/PCDD PCDF		Soil	10.164g	Black Soft Soil
10	K1501100-009	C-3 5-6.5'	.02	8290/PCDD PCDF		Soil	10.373g	Black Soft Soil
11	K1501100-012	D-1 2-3.5'	.02	8290/PCDD PCDF		Soil	10.006g	Brown Moist Sand
12	K1501100-015	E-4 5-6.5'	.02	8290/PCDD PCDF		Soil	10.094g	Black Moist Sludge
13	K1501100-016	E-4 6.5-9'	.02	8290/PCDD PCDF		Soil	10.272g	Brown Moist Crumbles Sediment
14	K1501100-017	E-4 9-10'	.02	8290/PCDD PCDF		Soil	10.206g	Tannish Moist Mud
15	K1501100-018	F-3 4-5.5'	.02	8290/PCDD PCDF		Soil	10.143g	Black Moist Mud

Spiking Solutions

Name: 1613B Matrix Working Standard Inventory ID 79278 Logbook Ref: 2-20 ng/ml 79278 DE 3/4/15 Expires On: 03/04/2016

EQ1500199-02	100.00µL	EQ1500199-03	100.00µL

Name: 8290/1613B Cleanup Working Standard Inventory ID 79294 Logbook Ref: 79294 LM 3/5/15 8ng/mL Expires On: 03/05/2016

E1500230-001	100.00µL	E1500230-002	100.00µL	EQ1500199-01	100.00µL	EQ1500199-02	100.00µL	EQ1500199-03	100.00µL	K1501100-001	100.00µL
K1501100-004	100.00µL	K1501100-005	100.00µL	K1501100-006	100.00µL	K1501100-009	100.00µL	K1501100-012	100.00µL	K1501100-015	100.00µL
K1501100-016	100.00µL	K1501100-017	100.00µL	K1501100-018	100.00µL						

Name: 1613B Labeled Working Standard Inventory ID 79431 Logbook Ref: 2-4 ng/ml 79431 DE 3/12/15 Expires On: 08/19/2015

E1500230-001	1,000.00µL	E1500230-002	1,000.00µL	EQ1500199-01	1,000.00µL	EQ1500199-02	1,000.00µL	EQ1500199-03	1,000.00µL	K1501100-001	1,000.00µL
K1501100-004	1,000.00µL	K1501100-005	1,000.00µL	K1501100-006	1,000.00µL	K1501100-009	1,000.00µL	K1501100-012	1,000.00µL	K1501100-015	1,000.00µL

Name: 1613B Labeled Working Standard Inventory ID 79546 Logbook Ref: 2-4 ng/ml 79546 DE 3/16/15 Expires On: 08/19/2015

K1501100-016	1,000.00µL	K1501100-017	1,000.00µL	K1501100-018	1,000.00µL

Preparation Information Benchsheet

Prep Run#: 231253 **Prep WorkFlow:** OrgExtDioxS(30) **Status:** Prepped
Team: Semivoa GCMS/DEDWARDS **Prep Method:** Method **Prep Date/Time:** 3/16/15 07:35 AM

Preparation Materials

Carbon, High Purity	LM 3/4/15 (79266)	Ethyl Acetate 99.9% Minimum EtOAc	LM 2/27/15 (79153)	Glass Wool	AL 2/17/15 (78802)
Sulfuric Acid Reagent Grade H2SO4	LM 3/4/15 (79265)	Hexanes 95%	LM 3/4/15 (79263)	Dichloromethane (Methylene Chloride) 99.9% MeCl2	LM 2/20/15 (78906)
Sodium Chloride Reagent Grade NaCl	C2-65-5 (38670)	Sodium Hydroxide Reagent Grade NaOH	LM 09/02/14 (74232)	Sodium Sulfate Anhydrous Reagent Grade Na2SO4	LM 11/25/14 (76864)
Tridecane (n-Tridecane)	AL 03/10/15 (79360)	Silica Gel Reagent Grade	AL 03/13/15 (79494)	Toluene 99.9% Minimum	LM 3/4/15 (79264)

Preparation Steps

Step:	Extraction	Step:	Acid Clean	Step:	Silica Gel Clean	Step:	Final Volume
Started:	3/16/15 07:35	Started:	3/17/15 06:15	Started:	3/17/15 08:15	Started:	3/17/15 17:50
Finished:	3/17/15 04:30	Finished:	3/17/15 06:45	Finished:	3/17/15 09:45	Finished:	3/17/15 18:20
By:	DEDWARDS	By:	CDIAZ	By:	CDIAZ	By:	LMCCRINK
Comments		Comments		Comments		Comments	

Comments: _____

Reviewed By: ak Date: 3/18/15

Chain of Custody

Relinquished By: _____ Date: _____

Received By: _____ Date: _____

Extracts Examined

Yes No

Analytical Results

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www.alsglobal.com

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	02/02/15 12:30
Sample Matrix:	Sediment	**Date Received:**	03/11/15 11:00
Sample Name:	PRC-DU1-Comp	**Units:**	ng/Kg
Lab Code:	E1500230-001	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/19/15 13:29
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.054g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-5MSUI
Data File Name:	P235009	**Blank File Name:**	P235018
ICAL Date:	10/28/14	**Cal Ver. File Name:**	P235004

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	0.333	1.28			1
1,2,3,7,8-PeCDD	1.01**J**		0.397	6.41	1.52	1.001	1
1,2,3,4,7,8-HxCDD	ND	U	0.687	6.41			1
1,2,3,6,7,8-HxCDD	18.8		0.750	6.41	1.21	1.000	1
1,2,3,7,8,9-HxCDD	2.92**J**		0.688	6.41	1.15	1.006	1
1,2,3,4,6,7,8-HpCDD	431		1.84	6.41	1.05	1.000	1
OCDD	2780		0.588	12.8	0.91	1.000	1
2,3,7,8-TCDF	1.43		0.212	1.28	0.89	1.001	1
1,2,3,7,8-PeCDF	1.22**J**		0.343	6.41	1.37	1.000	1
2,3,4,7,8-PeCDF	3.23**JK**		0.355	6.41	1.30	1.001	1
1,2,3,4,7,8-HxCDF	7.70		0.767	6.41	1.24	1.000	1
1,2,3,6,7,8-HxCDF	2.19**JK**		0.718	6.41	1.76	1.000	1
1,2,3,7,8,9-HxCDF	2.40**J**		0.803	6.41	1.06	1.001	1
2,3,4,6,7,8-HxCDF	3.80**J**		0.783	6.41	1.38	1.000	1
1,2,3,4,6,7,8-HpCDF	154		0.950	6.41	1.04	1.000	1
1,2,3,4,7,8,9-HpCDF	10.2		1.12	6.41	1.06	1.000	1
OCDF	907		0.344	12.8	0.87	1.005	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	02/02/15 12:30
Sample Matrix:	Sediment	**Date Received:**	03/11/15 11:00
Sample Name:	PRC-DU1-Comp	**Units:**	ng/Kg
Lab Code:	E1500230-001	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/19/15 13:29
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.054g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-5MSUI
Data File Name:	P235009	**Blank File Name:**	P235018
ICAL Date:	10/28/14	**Cal Ver. File Name:**	P235004

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	ND	U	0.333	1.28			1
Total Penta-Dioxins	5.06**J**		0.397	6.41	1.57		1
Total Hexa-Dioxins	85.2		0.708	6.41	1.27		1
Total Hepta-Dioxins	1020		1.84	6.41	1.05		1
Total Tetra-Furans	8.47		0.212	1.28	0.68		1
Total Penta-Furans	16.0		0.195	6.41	1.44		1
Total Hexa-Furans	198		0.766	6.41	1.12		1
Total Hepta-Furans	845		1.03	6.41	1.04		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	02/02/15 12:30
Sample Matrix:	Sediment	**Date Received:**	03/11/15 11:00
Sample Name:	PRC-DU1-Comp	**Units:**	Percent
Lab Code:	E1500230-001	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/19/15 13:29
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.054g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-5MSUI
Data File Name:	P235009	**Blank File Name:**	P235018
ICAL Date:	10/28/14	**Cal Ver. File Name:**	P235004

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1449.175	72		40-135	0.78	1.022
13C-1,2,3,7,8-PeCDD	2000	1574.089	79		40-135	1.58	1.192
13C-1,2,3,4,7,8-HxCDD	2000	1367.446	68		40-135	1.27	0.991
13C-1,2,3,6,7,8-HxCDD	2000	1220.965	61		40-135	1.27	0.994
13C-1,2,3,4,6,7,8-HpCDD	2000	1197.260	60		40-135	1.10	1.066
13C-OCDD	4000	1912.164	48		40-135	0.92	1.140
13C-2,3,7,8-TCDF	2000	1505.297	75		40-135	0.79	0.993
13C-1,2,3,7,8-PeCDF	2000	1606.466	80		40-135	1.62	1.149
13C-2,3,4,7,8-PeCDF	2000	1623.801	81		40-135	1.62	1.183
13C-1,2,3,4,7,8-HxCDF	2000	1327.210	66		40-135	0.53	0.971
13C-1,2,3,6,7,8-HxCDF	2000	1293.134	65		40-135	0.53	0.974
13C-1,2,3,7,8,9-HxCDF	2000	1420.791	71		40-135	0.53	1.008
13C-2,3,4,6,7,8-HxCDF	2000	1317.736	66		40-135	0.53	0.988
13C-1,2,3,4,6,7,8-HpCDF	2000	1145.278	57		40-135	0.45	1.042
13C-1,2,3,4,7,8,9-HpCDF	2000	1372.942	69		40-135	0.44	1.080
37Cl-2,3,7,8-TCDD	800	678.951	85		40-135	NA	1.023

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	02/02/15 12:30
Sample Matrix:	Sediment	**Date Received:**	03/11/15 11:00
Sample Name:	PRC-DU1-Comp	**Units:**	ng/Kg
Lab Code:	E1500230-001	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method: 8290

Prep Method: Method

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	ND	0.333	1.28	1	1	
1,2,3,7,8-PeCDD	**1.01**	0.397	6.41	1	1	1.01
1,2,3,4,7,8-HxCDD	ND	0.687	6.41	1	0.1	
1,2,3,6,7,8-HxCDD	**18.8**	0.750	6.41	1	0.1	1.88
1,2,3,7,8,9-HxCDD	**2.92**	0.688	6.41	1	0.1	0.292
1,2,3,4,6,7,8-HpCDD	**431**	1.84	6.41	1	0.01	4.31
OCDD	**2780**	0.588	12.8	1	0.0003	0.834
2,3,7,8-TCDF	**1.43**	0.212	1.28	1	0.1	0.143
1,2,3,7,8-PeCDF	**1.22**	0.343	6.41	1	0.03	0.0366
2,3,4,7,8-PeCDF	**3.23**	0.355	6.41	1	0.3	0.969
1,2,3,4,7,8-HxCDF	**7.70**	0.767	6.41	1	0.1	0.770
1,2,3,6,7,8-HxCDF	**2.19**	0.718	6.41	1	0.1	0.219
1,2,3,7,8,9-HxCDF	**2.40**	0.803	6.41	1	0.1	0.240
2,3,4,6,7,8-HxCDF	**3.80**	0.783	6.41	1	0.1	0.380
1,2,3,4,6,7,8-HpCDF	**154**	0.950	6.41	1	0.01	1.54
1,2,3,4,7,8,9-HpCDF	**10.2**	1.12	6.41	1	0.01	0.102
OCDF	**907**	0.344	12.8	1	0.0003	0.272
		Total TEQ				13.0

2005 WHO TEFs, ND = 0

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	02/02/15 12:30
Sample Matrix:	Sediment	**Date Received:**	03/11/15 11:00
Sample Name:	PRC-DU1-Comp	**Units:**	Percent
Lab Code:	E1500230-001	**Basis:**	As Received

Total Solids Run Create

Analysis Method:	ALS SOP	**Date Analyzed:**	03/17/15 11:30
	7.095g		NA
			E-Balance-01

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Solids	38.8		-	-			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	02/02/15 08:30
Sample Matrix:	Sediment	**Date Received:**	03/11/15 11:00
Sample Name:	PRC-DU2-Comp	**Units:**	ng/Kg
Lab Code:	E1500230-002	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/19/15 14:17
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.208g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-5MSUI
Data File Name:	P235010	**Blank File Name:**	P235018
ICAL Date:	10/28/14	**Cal Ver. File Name:**	P235004

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	0.402	**JK**	0.265	1.26	0.45	1.001	1
1,2,3,7,8-PeCDD	1.21	**JK**	0.520	6.31	0.90	1.001	1
1,2,3,4,7,8-HxCDD	1.83	**JK**	0.745	6.31	0.95	1.000	1
1,2,3,6,7,8-HxCDD	20.4		0.792	6.31	1.30	1.000	1
1,2,3,7,8,9-HxCDD	4.49	**J**	0.736	6.31	1.19	1.007	1
1,2,3,4,6,7,8-HpCDD	469		1.59	6.31	1.06	1.000	1
OCDD	3490		0.959	12.6	0.90	1.000	1
2,3,7,8-TCDF	2.69		0.174	1.26	0.67	1.001	1
1,2,3,7,8-PeCDF	2.01	**J**	0.431	6.31	1.56	1.001	1
2,3,4,7,8-PeCDF	4.61	**J**	0.437	6.31	1.47	1.001	1
1,2,3,4,7,8-HxCDF	9.10		0.581	6.31	1.26	1.000	1
1,2,3,6,7,8-HxCDF	3.10	**J**	0.568	6.31	1.39	1.000	1
1,2,3,7,8,9-HxCDF	2.55	**J**	0.552	6.31	1.15	1.000	1
2,3,4,6,7,8-HxCDF	5.87	**J**	0.621	6.31	1.24	1.000	1
1,2,3,4,6,7,8-HpCDF	148		1.02	6.31	1.00	1.000	1
1,2,3,4,7,8,9-HpCDF	11.0		1.14	6.31	1.14	1.000	1
OCDF	729		0.618	12.6	0.88	1.005	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	02/02/15 08:30
Sample Matrix:	Sediment	**Date Received:**	03/11/15 11:00
Sample Name:	PRC-DU2-Comp	**Units:**	ng/Kg
Lab Code:	E1500230-002	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/19/15 14:17
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.208g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-5MSUI
Data File Name:	P235010	**Blank File Name:**	P235018
ICAL Date:	10/28/14	**Cal Ver. File Name:**	P235004

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	4.60		0.265	1.26	0.69		1
Total Penta-Dioxins	2.68	**J**	0.520	6.31	1.50		1
Total Hexa-Dioxins	135		0.757	6.31	1.30		1
Total Hepta-Dioxins	1400		1.59	6.31	1.06		1
Total Tetra-Furans	18.5		0.174	1.26	0.68		1
Total Penta-Furans	22.7		0.167	6.31	1.55		1
Total Hexa-Furans	206		0.581	6.31	1.30		1
Total Hepta-Furans	740		1.08	6.31	1.00		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	02/02/15 08:30
Sample Matrix:	Sediment	**Date Received:**	03/11/15 11:00
Sample Name:	PRC-DU2-Comp	**Units:**	Percent
Lab Code:	E1500230-002	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/19/15 14:17
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.208g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-5MSUI
Data File Name:	P235010	**Blank File Name:**	P235018
ICAL Date:	10/28/14	**Cal Ver. File Name:**	P235004

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1580.685	79		40-135	0.78	1.022
13C-1,2,3,7,8-PeCDD	2000	1607.874	80		40-135	1.63	1.192
13C-1,2,3,4,7,8-HxCDD	2000	1220.515	61		40-135	1.29	0.990
13C-1,2,3,6,7,8-HxCDD	2000	1066.585	53		40-135	1.30	0.993
13C-1,2,3,4,6,7,8-HpCDD	2000	987.147	49		40-135	1.09	1.064
13C-OCDD	4000	1551.107	39	**Y**	40-135	0.92	1.138
13C-2,3,7,8-TCDF	2000	1570.752	79		40-135	0.80	0.993
13C-1,2,3,7,8-PeCDF	2000	1586.533	79		40-135	1.62	1.149
13C-2,3,4,7,8-PeCDF	2000	1631.918	82		40-135	1.63	1.182
13C-1,2,3,4,7,8-HxCDF	2000	1233.547	62		40-135	0.53	0.969
13C-1,2,3,6,7,8-HxCDF	2000	1151.929	58		40-135	0.52	0.972
13C-1,2,3,7,8,9-HxCDF	2000	1228.234	61		40-135	0.53	1.007
13C-2,3,4,6,7,8-HxCDF	2000	1204.776	60		40-135	0.54	0.986
13C-1,2,3,4,6,7,8-HpCDF	2000	964.838	48		40-135	0.44	1.040
13C-1,2,3,4,7,8,9-HpCDF	2000	1206.775	60		40-135	0.44	1.077
37Cl-2,3,7,8-TCDD	800	703.705	88		40-135	NA	1.023

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	02/02/15 08:30
Sample Matrix:	Sediment	**Date Received:**	03/11/15 11:00
Sample Name:	PRC-DU2-Comp	**Units:**	ng/Kg
Lab Code:	E1500230-002	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method: 8290

Prep Method: Method

Toxicity Equivalency Quotient

Analyte Name	Result	DL	MRL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	**0.402**	0.265	1.26	1	1	0.402
1,2,3,7,8-PeCDD	**1.21**	0.520	6.31	1	1	1.21
1,2,3,4,7,8-HxCDD	**1.83**	0.745	6.31	1	0.1	0.183
1,2,3,6,7,8-HxCDD	**20.4**	0.792	6.31	1	0.1	2.04
1,2,3,7,8,9-HxCDD	**4.49**	0.736	6.31	1	0.1	0.449
1,2,3,4,6,7,8-HpCDD	**469**	1.59	6.31	1	0.01	4.69
OCDD	**3490**	0.959	12.6	1	0.0003	1.05
2,3,7,8-TCDF	**2.69**	0.174	1.26	1	0.1	0.269
1,2,3,7,8-PeCDF	**2.01**	0.431	6.31	1	0.03	0.0603
2,3,4,7,8-PeCDF	**4.61**	0.437	6.31	1	0.3	1.38
1,2,3,4,7,8-HxCDF	**9.10**	0.581	6.31	1	0.1	0.910
1,2,3,6,7,8-HxCDF	**3.10**	0.568	6.31	1	0.1	0.310
1,2,3,7,8,9-HxCDF	**2.55**	0.552	6.31	1	0.1	0.255
2,3,4,6,7,8-HxCDF	**5.87**	0.621	6.31	1	0.1	0.587
1,2,3,4,6,7,8-HpCDF	**148**	1.02	6.31	1	0.01	1.48
1,2,3,4,7,8,9-HpCDF	**11.0**	1.14	6.31	1	0.01	0.110
OCDF	**729**	0.618	12.6	1	0.0003	0.219
		Total TEQ				15.6

2005 WHO TEFs, ND = 0

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	02/02/15 08:30
Sample Matrix:	Sediment	**Date Received:**	03/11/15 11:00
Sample Name:	PRC-DU2-Comp	**Units:**	Percent
Lab Code:	E1500230-002	**Basis:**	As Received

Total Solids Run Create

Analysis Method:	ALS SOP	**Date Analyzed:**	03/17/15 11:30
	7.135g		NA
			E-Balance-01

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Solids	38.8		-	-			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ng/Kg
Lab Code:	EQ1500199-01	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/19/15 21:11
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.277g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-5MSUI
Data File Name:	P235018	**Blank File Name:**	P235018
ICAL Date:	10/28/14	**Cal Ver. File Name:**	P235015

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	0.173	0.487			1
1,2,3,7,8-PeCDD	ND	U	0.184	2.43			1
1,2,3,4,7,8-HxCDD	ND	U	0.269	2.43			1
1,2,3,6,7,8-HxCDD	ND	U	0.278	2.43			1
1,2,3,7,8,9-HxCDD	ND	U	0.262	2.43			1
1,2,3,4,6,7,8-HpCDD	0.836**JK**		0.302	2.43	1.47	1.000	1
OCDD	3.95**J**		0.298	4.87	0.87	1.000	1
2,3,7,8-TCDF	ND	U	0.185	0.487			1
1,2,3,7,8-PeCDF	ND	U	0.140	2.43			1
2,3,4,7,8-PeCDF	ND	U	0.138	2.43			1
1,2,3,4,7,8-HxCDF	ND	U	0.156	2.43			1
1,2,3,6,7,8-HxCDF	ND	U	0.148	2.43			1
1,2,3,7,8,9-HxCDF	ND	U	0.181	2.43			1
2,3,4,6,7,8-HxCDF	ND	U	0.149	2.43	2.90	1.001	1
1,2,3,4,6,7,8-HpCDF	0.266**JK**		0.131	2.43	0.60	1.000	1
1,2,3,4,7,8,9-HpCDF	ND	U	0.180	2.43			1
OCDF	1.46**JK**		0.136	4.87	0.74	1.005	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ng/Kg
Lab Code:	EQ1500199-01	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/19/15 21:11
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.277g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-5MSUI
Data File Name:	P235018	**Blank File Name:**	P235018
ICAL Date:	10/28/14	**Cal Ver. File Name:**	P235015

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	ND	U	0.173	0.487			1
Total Penta-Dioxins	ND	U	0.184	2.43			1
Total Hexa-Dioxins	ND	U	0.270	2.43			1
Total Hepta-Dioxins	ND	U	0.302	2.43			1
Total Tetra-Furans	ND	U	0.185	0.487			1
Total Penta-Furans	ND	U	0.0990	2.43			1
Total Hexa-Furans	ND	U	0.158	2.43			1
Total Hepta-Furans	ND	U	0.153	2.43			1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	Percent
Lab Code:	EQ1500199-01	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/19/15 21:11
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.277g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-5MSUI
Data File Name:	P235018	**Blank File Name:**	P235018
ICAL Date:	10/28/14	**Cal Ver. File Name:**	P235015

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1654.986	83		40-135	0.77	1.022
13C-1,2,3,7,8-PeCDD	2000	1931.858	97		40-135	1.57	1.193
13C-1,2,3,4,7,8-HxCDD	2000	1573.381	79		40-135	1.39	0.991
13C-1,2,3,6,7,8-HxCDD	2000	1514.957	76		40-135	1.22	0.994
13C-1,2,3,4,6,7,8-HpCDD	2000	1706.566	85		40-135	1.06	1.067
13C-OCDD	4000	3115.620	78		40-135	0.90	1.141
13C-2,3,7,8-TCDF	2000	1644.143	82		40-135	0.81	0.993
13C-1,2,3,7,8-PeCDF	2000	1890.211	95		40-135	1.64	1.149
13C-2,3,4,7,8-PeCDF	2000	1981.904	99		40-135	1.67	1.183
13C-1,2,3,4,7,8-HxCDF	2000	1534.947	77		40-135	0.52	0.971
13C-1,2,3,6,7,8-HxCDF	2000	1566.040	78		40-135	0.53	0.974
13C-1,2,3,7,8,9-HxCDF	2000	1656.114	83		40-135	0.54	1.009
13C-2,3,4,6,7,8-HxCDF	2000	1647.189	82		40-135	0.53	0.988
13C-1,2,3,4,6,7,8-HpCDF	2000	1622.344	81		40-135	0.45	1.042
13C-1,2,3,4,7,8,9-HpCDF	2000	1723.000	86		40-135	0.46	1.080
37Cl-2,3,7,8-TCDD	800	435.089	54		40-135	NA	1.023

Accuracy & Precision

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QA/QC Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Analyzed:**	03/25/15
Sample Matrix:	Sediment	**Date Extracted:**	03/16/15

Duplicate Lab Control Sample Summary
Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Units:**	ng/Kg
Prep Method:	Method	**Basis:**	Dry
		Analysis Lot:	437945

	Lab Control Sample EQ1500199-02			Duplicate Lab Control Sample EQ1500199-03					
Analyte Name	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
1,2,3,4,6,7,8-HpCDD	144	95.3	151 *	147	98.4	149 *	70-130	2	25
1,2,3,4,7,8-HxCDD	101	95.3	106	104	98.4	106	70-130	3	25
1,2,3,6,7,8-HxCDD	101	95.3	106	103	98.4	105	70-130	2	25
1,2,3,7,8,9-HxCDD	101	95.3	106	101	98.4	103	70-130	<1	25
1,2,3,7,8-PeCDD	98.1	95.3	103	100	98.4	102	70-130	2	25
2,3,7,8-TCDD	19.0	19.1	100	19.4	19.7	99	70-130	2	25
OCDD	539	191	283 *	536	197	273 *	70-130	<1	25
1,2,3,4,6,7,8-HpCDF	114	95.3	120	120	98.4	122	70-130	5	25
1,2,3,4,7,8,9-HpCDF	89.9	95.3	94	90.8	98.4	92	70-130	<1	25
1,2,3,4,7,8-HxCDF	91.2	95.3	96	92.8	98.4	94	70-130	2	25
1,2,3,6,7,8-HxCDF	89.9	95.3	94	90.7	98.4	92	70-130	<1	25
1,2,3,7,8,9-HxCDF	88.5	95.3	93	92.2	98.4	94	70-130	4	25
1,2,3,7,8-PeCDF	93.6	95.3	98	95.0	98.4	97	70-130	1	25
2,3,4,6,7,8-HxCDF	90.3	95.3	95	92.5	98.4	94	70-130	2	25
2,3,4,7,8-PeCDF	93.9	95.3	99	94.6	98.4	96	70-130	<1	25
2,3,7,8-TCDF	19.1	19.1	100	19.5	19.7	99	70-130	2	25
OCDF	307	191	161 *	308	197	157 *	70-130	<1	25

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	ng/Kg
Lab Code:	EQ1500199-02	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/25/15 20:57
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.494g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5MSUI
Data File Name:	P177105	**Blank File Name:**	P235018
ICAL Date:	10/18/14	**Cal Ver. File Name:**	P177096

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	19.0		0.0960	0.476	0.77	1.001	1
1,2,3,7,8-PeCDD	98.1		0.0677	2.38	1.60	1.000	1
1,2,3,4,7,8-HxCDD	101		0.0374	2.38	1.27	1.000	1
1,2,3,6,7,8-HxCDD	101		0.0399	2.38	1.28	1.000	1
1,2,3,7,8,9-HxCDD	101		0.0360	2.38	1.26	1.007	1
1,2,3,4,6,7,8-HpCDD	144		0.0716	2.38	1.04	1.000	1
OCDD	539		0.206	4.76	0.90	1.000	1
2,3,7,8-TCDF	19.1		0.107	0.476	0.77	1.001	1
1,2,3,7,8-PeCDF	93.6		0.0728	2.38	1.57	1.000	1
2,3,4,7,8-PeCDF	93.9		0.0662	2.38	1.60	1.000	1
1,2,3,4,7,8-HxCDF	91.2		0.0797	2.38	1.24	1.000	1
1,2,3,6,7,8-HxCDF	89.9		0.0741	2.38	1.26	1.000	1
1,2,3,7,8,9-HxCDF	88.5		0.0807	2.38	1.26	1.000	1
2,3,4,6,7,8-HxCDF	90.3		0.0794	2.38	1.24	1.000	1
1,2,3,4,6,7,8-HpCDF	114		0.163	2.38	1.04	1.000	1
1,2,3,4,7,8,9-HpCDF	89.9		0.172	2.38	1.03	1.000	1
OCDF	307		0.133	4.76	0.92	1.005	1

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Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	ng/Kg
Lab Code:	EQ1500199-02	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/25/15 20:57
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.494g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5MSUI
Data File Name:	P177105	**Blank File Name:**	P235018
ICAL Date:	10/18/14	**Cal Ver. File Name:**	P177096

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	19.0		0.0960	0.476	0.77		1
Total Penta-Dioxins	98.1		0.0677	2.38	1.60		1
Total Hexa-Dioxins	307		0.0377	2.38	1.33		1
Total Hepta-Dioxins	177		0.0716	2.38	1.08		1
Total Tetra-Furans	19.4		0.107	0.476	0.86		1
Total Penta-Furans	188		0.0393	2.38	1.72		1
Total Hexa-Furans	379		0.0784	2.38	1.31		1
Total Hepta-Furans	286		0.167	2.38	1.04		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	Percent
Lab Code:	EQ1500199-02	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/25/15 20:57
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.494g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5MSUI
Data File Name:	P177105	**Blank File Name:**	P235018
ICAL Date:	10/18/14	**Cal Ver. File Name:**	P177096

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1575.760	79		40-135	0.77	1.019
13C-1,2,3,7,8-PeCDD	2000	2292.702	115		40-135	1.58	1.176
13C-1,2,3,4,7,8-HxCDD	2000	1494.741	75		40-135	1.28	0.991
13C-1,2,3,6,7,8-HxCDD	2000	1310.975	66		40-135	1.26	0.994
13C-1,2,3,4,6,7,8-HpCDD	2000	1450.067	73		40-135	1.08	1.065
13C-OCDD	4000	2528.709	63		40-135	0.90	1.140
13C-2,3,7,8-TCDF	2000	1429.914	71		40-135	0.78	0.992
13C-1,2,3,7,8-PeCDF	2000	1958.771	98		40-135	1.60	1.136
13C-2,3,4,7,8-PeCDF	2000	2110.413	106		40-135	1.60	1.166
13C-1,2,3,4,7,8-HxCDF	2000	1294.237	65		40-135	0.52	0.972
13C-1,2,3,6,7,8-HxCDF	2000	1242.743	62		40-135	0.53	0.975
13C-1,2,3,7,8,9-HxCDF	2000	1531.871	77		40-135	0.52	1.008
13C-2,3,4,6,7,8-HxCDF	2000	1316.972	66		40-135	0.52	0.988
13C-1,2,3,4,6,7,8-HpCDF	2000	1115.678	56		40-135	0.44	1.041
13C-1,2,3,4,7,8,9-HpCDF	2000	1496.585	75		40-135	0.45	1.078
37Cl-2,3,7,8-TCDD	800	709.762	89		40-135	NA	1.020

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Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA
Sample Name:	Duplicate Lab Control Sample	**Units:**	ng/Kg
Lab Code:	EQ1500199-03	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/25/15 21:45
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.162g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5MSUI
Data File Name:	P177106	**Blank File Name:**	P235018
ICAL Date:	10/18/14	**Cal Ver. File Name:**	P177096

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	19.4		0.0874	0.492	0.77	1.001	1
1,2,3,7,8-PeCDD	100		0.0588	2.46	1.60	1.000	1
1,2,3,4,7,8-HxCDD	104		0.0453	2.46	1.26	1.000	1
1,2,3,6,7,8-HxCDD	103		0.0482	2.46	1.26	1.000	1
1,2,3,7,8,9-HxCDD	101		0.0434	2.46	1.25	1.007	1
1,2,3,4,6,7,8-HpCDD	147		0.119	2.46	1.03	1.000	1
OCDD	536		0.0741	4.92	0.89	1.000	1
2,3,7,8-TCDF	19.5		0.0811	0.492	0.74	1.001	1
1,2,3,7,8-PeCDF	95.0		0.0479	2.46	1.57	1.000	1
2,3,4,7,8-PeCDF	94.6		0.0467	2.46	1.57	1.000	1
1,2,3,4,7,8-HxCDF	92.8		0.0732	2.46	1.24	1.000	1
1,2,3,6,7,8-HxCDF	90.7		0.0692	2.46	1.24	1.000	1
1,2,3,7,8,9-HxCDF	92.2		0.0778	2.46	1.26	1.000	1
2,3,4,6,7,8-HxCDF	92.5		0.0732	2.46	1.25	1.000	1
1,2,3,4,6,7,8-HpCDF	120		0.277	2.46	1.07	1.000	1
1,2,3,4,7,8,9-HpCDF	90.8		0.303	2.46	1.05	1.000	1
OCDF	308		0.106	4.92	0.90	1.005	1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA
Sample Name:	Duplicate Lab Control Sample	**Units:**	ng/Kg
Lab Code:	EQ1500199-03	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/25/15 21:45
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.162g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5MSUI
Data File Name:	P177106	**Blank File Name:**	P235018
ICAL Date:	10/18/14	**Cal Ver. File Name:**	P177096

Native Analyte Results

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
Total Tetra-Dioxins	19.4		0.0874	0.492	0.77		1
Total Penta-Dioxins	100		0.0588	2.46	1.60		1
Total Hexa-Dioxins	312		0.0456	2.46	1.29		1
Total Hepta-Dioxins	180		0.119	2.46	1.03		1
Total Tetra-Furans	21.4		0.0811	0.492	0.70		1
Total Penta-Furans	194		0.0293	2.46	1.35		1
Total Hexa-Furans	387		0.0732	2.46	1.31		1
Total Hepta-Furans	296		0.289	2.46	1.07		1

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	Pacific EcoRisk Laboratories	**Service Request:**	E1500230
Project:	Port of Redwood City	**Date Collected:**	NA
Sample Matrix:	Sediment	**Date Received:**	NA
Sample Name:	Duplicate Lab Control Sample	**Units:**	Percent
Lab Code:	EQ1500199-03	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analysis Method:	8290	**Date Analyzed:**	03/25/15 21:45
Prep Method:	Method	**Date Extracted:**	3/16/15
Sample Amount:	10.162g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5MSUI
Data File Name:	P177106	**Blank File Name:**	P235018
ICAL Date:	10/18/14	**Cal Ver. File Name:**	P177096

Labeled Standard Results

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	% Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	2000	1568.994	78		40-135	0.77	1.019
13C-1,2,3,7,8-PeCDD	2000	1878.015	94		40-135	1.59	1.176
13C-1,2,3,4,7,8-HxCDD	2000	1477.291	74		40-135	1.33	0.991
13C-1,2,3,6,7,8-HxCDD	2000	1306.720	65		40-135	1.20	0.994
13C-1,2,3,4,6,7,8-HpCDD	2000	1389.941	69		40-135	1.04	1.065
13C-OCDD	4000	2362.459	59		40-135	0.88	1.140
13C-2,3,7,8-TCDF	2000	1427.052	71		40-135	0.79	0.992
13C-1,2,3,7,8-PeCDF	2000	1712.808	86		40-135	1.59	1.136
13C-2,3,4,7,8-PeCDF	2000	1715.775	86		40-135	1.58	1.167
13C-1,2,3,4,7,8-HxCDF	2000	1302.997	65		40-135	0.52	0.972
13C-1,2,3,6,7,8-HxCDF	2000	1255.496	63		40-135	0.53	0.975
13C-1,2,3,7,8,9-HxCDF	2000	1461.762	73		40-135	0.53	1.008
13C-2,3,4,6,7,8-HxCDF	2000	1321.497	66		40-135	0.52	0.988
13C-1,2,3,4,6,7,8-HpCDF	2000	1050.471	53		40-135	0.45	1.041
13C-1,2,3,4,7,8,9-HpCDF	2000	1383.233	69		40-135	0.44	1.078
37Cl-2,3,7,8-TCDD	800	705.071	88		40-135	NA	1.020

Appendix D

MET Analytical Chemistry Laboratory Data Report Submitted by Eurofins Calscience

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WORK ORDER NUMBER: 15-02-1337

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Pacific Ecorisk

Client Project Name: Port of Redwood City / 23613

Attention: Jeff Cotsifas
2250 Cordelia Road
Fairfield, CA 94534-1912

Approved for release on 03/09/2015 by:
Danielle Gonsman
Project Manager

ResultLink

Email your PM

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Work Order Number: 15-02-1337

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Work Order Narrative

Work Order: 15-02-1337 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 02/19/15. They were assigned to Work Order 15-02-1337.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Sample Summary

Client:	Pacific Ecorisk 2250 Cordelia Road Fairfield, CA 94534-1912	Work Order:	15-02-1337
		Project Name:	Port of Redwood City / 23613
		PO Number:	
		Date/Time Received:	02/19/15 08:40
		Number of Containers:	16
Attn:	Jeff Cotsifas		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
PRC-DU1-MET	15-02-1337-1	02/18/15 12:01	8	Sea Water
PRC-DU2-MET	15-02-1337-2	02/18/15 12:00	4	Sea Water
PRC-DU1-MET LAB DUP	15-02-1337-3	02/18/15 12:01	4	Sea Water

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Analytical Report

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	SM 2540 D
		Units:	mg/L
Project: Port of Redwood City / 23613			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-MET	**15-02-1337-1-G**	**02/18/15 12:01**	**Sea Water**	**N/A**	**02/24/15**	**02/24/15 17:00**	**F0224TSSL2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	5.4	1.0	0.95	1.00	

PRC-DU2-MET	**15-02-1337-2-D**	**02/18/15 12:00**	**Sea Water**	**N/A**	**02/24/15**	**02/24/15 17:00**	**F0224TSSL2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	9.0	1.0	0.95	1.00	

PRC-DU1-MET LAB DUP	**15-02-1337-3-H**	**02/18/15 12:01**	**Sea Water**	**N/A**	**02/24/15**	**02/24/15 17:00**	**F0224TSSL2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	5.8	1.0	0.95	1.00	

Method Blank	**099-09-010-7060**	**N/A**	**Aqueous**	**N/A**	**02/24/15**	**02/24/15 17:00**	**F0224TSSL2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total Suspended	ND	1.0	0.95	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	EPA 1631E Total
		Method:	EPA 1631E
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-MET	**15-02-1337-1-F**	**02/18/15 12:01**	**Sea Water**	**Hg/AF 1**	**02/23/15**	**02/23/15 00:00**	**150223L01**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	0.00393	0.000500	0.000113	1.00	

PRC-DU2-MET	**15-02-1337-2-C**	**02/18/15 12:00**	**Sea Water**	**Hg/AF 1**	**02/23/15**	**02/23/15 00:00**	**150223L01**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	0.00880	0.000500	0.000113	1.00	

PRC-DU1-MET LAB DUP	**15-02-1337-3-E**	**02/18/15 12:01**	**Sea Water**	**Hg/AF 1**	**02/23/15**	**02/23/15 00:00**	**150223L01**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	0.00391	0.000500	0.000113	1.00	

Method Blank	**099-15-224-75**	**N/A**	**Aqueous**	**Hg/AF 1**	**02/23/15**	**02/23/15 00:00**	**150223L01**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.000500	0.000113	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	EPA 3005A Total
		Method:	EPA 1640
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-MET	**15-02-1337-1-C**	**02/18/15 12:01**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**02/27/15 00:32**	**150226L02**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Selenium	0.157	0.0500	0.0121	1.00	

PRC-DU2-MET	**15-02-1337-2-A**	**02/18/15 12:00**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**02/27/15 18:28**	**150226L02**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Selenium	0.153	0.0500	0.0121	1.00	

PRC-DU1-MET LAB DUP	**15-02-1337-3-C**	**02/18/15 12:01**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**02/27/15 18:23**	**150226L02**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Selenium	0.167	0.0500	0.0121	1.00	

Method Blank	**099-13-067-492**	**N/A**	**Aqueous**	**ICP/MS 05**	**02/26/15**	**02/26/15 19:06**	**150226L02**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Selenium	ND	0.0500	0.0121	1.00	

Return to Contents

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	EPA 3005A Filt.
		Method:	EPA 1640
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-MET	**15-02-1337-1-B**	**02/18/15 12:01**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**02/27/15 00:40**	**150226L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cadmium	0.0422	0.0300	0.00567	1.00	
Chromium	ND	0.500	0.164	1.00	
Copper	1.14	0.0300	0.00898	1.00	B
Lead	0.0519	0.0300	0.0135	1.00	
Nickel	3.04	0.0500	0.00607	1.00	B
Silver	ND	0.0500	0.00822	1.00	
Zinc	1.99	0.500	0.0736	1.00	B

PRC-DU1-MET	**15-02-1337-1-B**	**02/18/15 12:01**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**02/27/15 18:33**	**150226L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	2.93	0.0300	0.0122	1.00	

PRC-DU2-MET	**15-02-1337-2-B**	**02/18/15 12:00**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**02/27/15 02:23**	**150226L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cadmium	0.0594	0.0300	0.00567	1.00	
Chromium	0.322	0.500	0.164	1.00	J
Copper	1.13	0.0300	0.00898	1.00	B
Lead	0.0750	0.0300	0.0135	1.00	
Nickel	2.49	0.0500	0.00607	1.00	B
Silver	ND	0.0500	0.00822	1.00	
Zinc	2.97	0.500	0.0736	1.00	B

PRC-DU2-MET	**15-02-1337-2-B**	**02/18/15 12:00**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**03/03/15 18:39**	**150226L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	28.8	0.300	0.122	10.0	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	EPA 3005A Filt.
		Method:	EPA 1640
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-MET LAB DUP	**15-02-1337-3-B**	**02/18/15 12:01**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**02/27/15 02:31**	**150226L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Cadmium	0.0498	0.0300	0.00567	1.00	
Chromium	ND	0.500	0.164	1.00	
Copper	1.19	0.0300	0.00898	1.00	B
Lead	0.0662	0.0300	0.0135	1.00	
Nickel	3.15	0.0500	0.00607	1.00	B
Silver	ND	0.0500	0.00822	1.00	
Zinc	2.20	0.500	0.0736	1.00	B

PRC-DU1-MET LAB DUP	**15-02-1337-3-B**	**02/18/15 12:01**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**02/27/15 18:58**	**150226L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	2.99	0.0300	0.0122	1.00	

Method Blank	**099-15-823-130**	**N/A**	**Aqueous**	**ICP/MS 05**	**02/26/15**	**02/26/15 19:14**	**150226L02F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	ND	0.0300	0.0122	1.00	
Cadmium	ND	0.0300	0.00567	1.00	
Chromium	ND	0.500	0.164	1.00	
Copper	0.0108	0.0300	0.00898	1.00	J
Lead	ND	0.0300	0.0135	1.00	
Nickel	0.0111	0.0500	0.00607	1.00	J
Silver	ND	0.0500	0.00822	1.00	
Zinc	0.143	0.500	0.0736	1.00	J

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	EPA 1631E Total
		Method:	EPA 1631E
Project: Port of Redwood City / 23613			Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-MET	**Sample**	**Sea Water**	**Hg/AF 1**	**02/23/15**	**02/23/15 00:00**	**150223S01**
PRC-DU1-MET	**Matrix Spike**	**Sea Water**	**Hg/AF 1**	**02/23/15**	**02/23/15 00:00**	**150223S01**
PRC-DU1-MET	**Matrix Spike Duplicate**	**Sea Water**	**Hg/AF 1**	**02/23/15**	**02/23/15 00:00**	**150223S01**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Mercury	0.003930	0.02000	0.02757	118	0.02750	118	71-125	0	0-24	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	EPA 3005A Total
		Method:	EPA 1640
Project: Port of Redwood City / 23613			Page 2 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-MET	**Sample**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**02/27/15 00:32**	**150226S02**
PRC-DU1-MET	**Matrix Spike**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**02/27/15 00:16**	**150226S02**
PRC-DU1-MET	**Matrix Spike Duplicate**	**Sea Water**	**ICP/MS 05**	**02/26/15**	**02/27/15 00:24**	**150226S02**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Arsenic	2.950	0.5000	3.392	4X	3.435	4X	50-150	4X	0-20	Q
Cadmium	0.04221	0.5000	0.4886	89	0.4840	88	50-150	1	0-20	
Chromium	ND	5.000	5.345	107	5.406	108	50-150	1	0-20	
Copper	1.091	0.5000	1.631	108	1.626	107	50-150	0	0-20	
Lead	0.2308	0.5000	0.7230	98	0.7047	95	50-150	3	0-20	
Nickel	3.367	0.5000	3.383	4X	3.402	4X	50-150	4X	0-20	Q
Selenium	0.1565	0.5000	0.6423	97	0.6758	104	50-150	5	0-20	
Silver	ND	0.2500	0.1537	61	0.1470	59	50-150	4	0-20	
Zinc	2.175	5.000	6.217	81	6.084	78	50-150	2	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Sample Duplicate

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	SM 2540 D
Project: Port of Redwood City / 23613			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
PRC-DU1-MET	**Sample**	**Sea Water**	**N/A**	**02/24/15 00:00**	**02/24/15 17:00**	**F0224TSSD2**
PRC-DU1-MET	**Sample Duplicate**	**Sea Water**	**N/A**	**02/24/15 00:00**	**02/24/15 17:00**	**F0224TSSD2**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Total Suspended	5.400	5.600	4	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	SM 2540 D
Project: Port of Redwood City / 23613			Page 1 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-09-010-7060	**LCS**	**Aqueous**	**N/A**	**02/24/15**	**02/24/15 17:00**	**F0224TSSL2**
099-09-010-7060	**LCSD**	**Aqueous**	**N/A**	**02/24/15**	**02/24/15 17:00**	**F0224TSSL2**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Solids, Total Suspended	100.0	91.00	91	88.00	88	80-120	3	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	EPA 1631E Total
		Method:	EPA 1631E
Project: Port of Redwood City / 23613			Page 2 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-224-75	**LCS**	**Aqueous**	**Hg/AF 1**	**02/23/15**	**02/23/15 00:00**	**150223L01**
099-15-224-75	**LCSD**	**Aqueous**	**Hg/AF 1**	**02/23/15**	**02/23/15 00:00**	**150223L01**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Mercury	0.02000	0.01644	82	0.01916	96	71-125	15	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	EPA 3005A Total
		Method:	EPA 1640
Project: Port of Redwood City / 23613			Page 3 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-13-067-492	**LCS**	**Aqueous**	**ICP/MS 05**	**02/26/15**	**02/26/15 20:17**	**150226L02**
099-13-067-492	**LCSD**	**Aqueous**	**ICP/MS 05**	**02/26/15**	**02/26/15 20:25**	**150226L02**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Selenium	0.5000	0.5302	106	0.5001	100	70-130	6	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	02/19/15
2250 Cordelia Road		Work Order:	15-02-1337
Fairfield, CA 94534-1912		Preparation:	EPA 3005A Filt.
		Method:	EPA 1640
Project: Port of Redwood City / 23613			Page 4 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-823-130	**LCS**	**Aqueous**	**ICP/MS 05**	**02/26/15**	**02/26/15 20:17**	**150226L02F**
099-15-823-130	**LCSD**	**Aqueous**	**ICP/MS 05**	**02/26/15**	**02/26/15 20:25**	**150226L02F**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Arsenic	0.5000	0.5479	110	0.5206	104	70-130	5	0-20	
Cadmium	0.5000	0.5339	107	0.5251	105	70-130	2	0-20	
Chromium	5.000	5.352	107	5.890	118	70-130	10	0-20	
Copper	0.5000	0.5413	108	0.5382	108	70-130	1	0-20	
Lead	0.5000	0.5214	104	0.5323	106	70-130	2	0-20	
Nickel	0.5000	0.5238	105	0.5306	106	70-130	1	0-20	
Silver	0.2500	0.2869	115	0.2966	119	70-130	3	0-20	
Zinc	5.000	5.623	112	5.471	109	70-130	3	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Glossary of Terms and Qualifiers

Work Order: 15-02-1337 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CalScience CHAIN-OF-CUSTODY RECORD

15-02-1337

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Road Fairifeld, CA 94534
Sampled By:	Padrick Anderson
Phone:	707-207-7760
FAX:	707-207-7916
Project Manager:	Jeffrey Cotsifas
Project Name:	Port of Redwood City
PO Number:	23613

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	Dissolved Arsenic (EPA 6010B/6020) Target RL=0.5	Dissolved Cadmium (EPA 6010B/6020) Target RL=0.2	Dissolved Chromium (EPA 6010B/6020) Target RL=0.5	Dissolved Copper (EPA 6010B/6020) Target RL=0.5	Dissolved Lead (EPA 6010B/6020) Target RL=1 ug/L)	Total Mercury (EPA 7470A) Target RL=0.02ug/L	Dissolved Nickel (EPA 6010B/6020) Target RL=0.5 ug/L	Total Selenium (EPA 6010B/6020) Target RL=0.5 ug/L	Dissolved Silver (EPA 6010/6020) Target RL=0.2 ug/L	Dissolved Zinc (EPA 6010B/6020) Target RL=4 ug/L	Total Suspended Solids (SM2540D) Target RL = 5 mg/L
1	PRC-DU1-MET	02/18/15	12:01	MET	8	Multiple	X	X	X	X	X	X	X	X	X	X	X
2	PRC-DU2-MET	02/18/15	12:00	MET	4	Multiple	X	X	X	X	X	X	X	X	X	X	X
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Correct Containers:	**Yes**	**No**	
Sample Temperature:	**Ambient**	**Cold**	**Warm**
Sample Preservative:	**Yes**	**No**	
Turnaround Time:	**STD**	**Specify:**	

Comments:

Perform duplicate, MS/MSD, etc. on PRC-DU1-MET.

Samples currently NOT preserved or filtered.

DU2 - Limited sample volume

Sample date and time are when the sample was extracted after 24 hour settling period.

RELIQUINSHED BY

Signature:	[illegible]	**Signature:**	Tom O'Malley TO 650
Print:	P. ANDERSON	**Print:**	Tom O'Malley
Organization:	PER	**Organization:**	ECI
DATE:	2-18-15	**TIME:** 1300	**DATE:** 2/18/15 **TIME:** 1730

RECEIVED BY

Signature:	Tom O'Malley	**Signature:**	[illegible]
Print:	Tom O'Malley	**Print:**	J. PATEL
Organization:	ECI	**Organization:**	ECI
DATE:	2/18/15	**TIME:** 1300	**DATE:** 2/19/15 **TIME:** 0840

***MATRIX CODES**: (**SED** = Sediment); (**FW** = Freshwater); (**WW** = Wastewater); (**STRMW** = Stormwater)

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Table 5-1. *(cont.)* Analytical Chemistry Testing Program: Sediment and Tissue Standard List of Analytes, Methods, and Targeted Reporting Limits.

Analyte	Method Used	SAP Targeted MRL
Biphenyl	EPA 8270C	20 µg/kg
Chrysene	EPA 8270C	20 µg/kg
Dibenz(a,h)anthracene	EPA 8270C	20 µg/kg
Dibenzothiophene	EPA 8270C	20 µg/kg
Dimethylnaphthalene, 2,6-	EPA 8270C	20 µg/kg
Fluoranthene	EPA 8270C	20 µg/kg
Fluorene	EPA 8270C	20 µg/kg
Indeno(1,2,3-cd)pyrene	EPA 8270C	20 µg/kg
Methylnaphthalene, 1-	EPA 8270C	20 µg/kg
Methylnaphthalene, 2-	EPA 8270C	20 µg/kg
Methylphenanthrene, 1-	EPA 8270C	20 µg/kg
Naphthalene	EPA 8270C	20 µg/kg
Perylene	EPA 8270C	20 µg/kg
Phenanthrene	EPA 8270C	20 µg/kg
Pyrene	EPA 8270C	20 µg/kg
Trimethylnaphthalene, 2,3,5-	EPA 8270C	20 µg/kg
PCBs (RMP 40) PCB-8, PCB-18, PCB-28, PCB-31, PCB-33, PCB-44, PCB-49, PCB-52, PCB-56, PCB-60, PCB-66, PCB-70, PCB-74, PCB-87, PCB-95, PCB-97, PCB-99, PCB-101, PCB-105, PCB-110, PCB-118, PCB-128, PCB-132, PCB-138, PCB-141, PCB-149, PCB-151, PCB-153, PCB-156, PCB-158, 170, PCB-174, PCB-177, PCB-180, PCB-183, PCB-187, PCB-194, PCB-195, PCB-201, PCB-203.	EPA 8082 ECD or EPA 8270C	0.5 µg/kg
Dioxins (Total TCDD TEQ)	EPA 8290	1 ng/kg
Grain Size	ASTM 1992	±0.1%
Total Solids	EPA 160.3	±0.1%
Total Organic Carbon (TOC)	EPA 415.1	±0.1%

NOTES: µg/kg – microgram/kilogram; mg/kg – milligram/kilogram; PAH - polycyclic aromatic hydrocarbons; PCB - polychlorinated biphenyls

Table 5-2. Proposed Modified Elutriate Test (MET) Analytical Program: Standard List of Analytes, Methods, and Targeted Reporting Limits.

Analyte	Method Used	SAP Targeted MRL
Metals		
Dissolved Arsenic	EPA 6020	0.5 µg/L
Dissolved Cadmium	EPA 6020	0.02 µg/L
Dissolved Chromium	EPA 6020	0.2 µg/L
Dissolved Copper	EPA 6020	0.1 µg/L
Dissolved Lead	EPA 6020	0.02 µg/L
Total Mercury	EPA 1631A	0.005 µg/L
Dissolved Nickel	EPA 6020	0.2 µg/L
Total Selenium	EPA 6020	1 µg/L
Dissolved Silver	EPA 6020	0.02 µg/L
Dissolved Zinc	EPA 6020	0.5 µg/L
Total Suspended Solids (TSS)	SM2540D	5 mg/L

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GSO

800-322-5555 www.gso.com

1337

Ship From
CAL SCIENCE- CONCORD
ALAN KEMP
5063 COMMERCIAL CIRCLE
#H
CONCORD, CA 94520

Ship To
CEL
SAMPLE RECEIVING
7440 LINCOLN WAY
GARDEN GROVE, CA 92841

COD: $0.00
Weight: 0 lb(s)
Reference:
PHILLIPS 66, PACIFIC ECORISK, AIS
Delivery Instructions:

Signature Type: REQUIRED

Tracking #: 526984098

NPS

ORC
GARDEN GROVE

A

D92845A

34293501

Print Date: 2/18/2015 2:02 PM

LABEL INSTRUCTIONS:

Do not copy or reprint this label for additional shipments - each package must have a unique barcode.

Use the "Print Label" button on this page to print the shipping label on a laser or inkjet printer. Securely attach this label to your package, do not cover the barcode.

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WORK ORDER #: 15-02-1337

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: Pacific EcoRisk

DATE: 02/19/15

TEMPERATURE: Thermometer ID: SC4 (Criteria: 0.0 °C – 6.0 °C, not frozen except sediment/tissue)

Temperature 2.5 °C + 0.2 °C (CF) = 2.7 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ Received at ambient temperature, placed on ice for transport by Courier.

Ambient Temperature: ☐ Air ☐ Filter Checked by: 15

CUSTODY SEALS INTACT:

☑ Cooler ☐ _____ ☐ No (Not Intact) ☐ Not Present ☐ N/A Checked by: 15

☐ Sample ☐ _____ ☐ No (Not Intact) ☑ Not Present Checked by: 846

SAMPLE CONDITION:

	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ No analysis requested. ☐ Not relinquished. ☐ No date/time relinquished.			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Proper containers and sufficient volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Aqueous samples received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfides ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation noted on COC or sample container	☑	☐	☐
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☐	☐	☑
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☐4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐_____

Aqueous: ☐VOA ☐VOAh ☐VOAna_2 ☐125AGB ☐125AGBh ☐125AGBp ☐1AGB ☐1AGBna_2 ☐1AGBs

☐500AGB ☐500AGJ ☐500AGJs ☐250AGB* ☑250CGB ☐250CGBs* ☐1PB ☐1PBna ☐500PB

*☑250PB (2) ☐250PBn ☐125PB ☐125PBznna ☐100PJ ☐100PJna_2 ~~☑250C~~ 846 2/19/15 ☐_____ ☐_____

Air: ☐Tedlar® ☐Canister **Other:** ☐_____ **Trip Blank Lot#:**_____ **Labeled/Checked by:** 846

Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelope **Reviewed by:** 687

Preservative: h: HCL n: HNO_3 na_2:$Na_2S_2O_3$ na: NaOH p: H_3PO_4 s: H_2SO_4 u: Ultra-pure znna: $ZnAc_2$+NaOH f: Filtered **Scanned by:** 687

*(1) Recv'd. 2-1liter plastic container
4-250 ml " " 1846
2- " " clear glass " 1846

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WORK ORDER NUMBER: 15-05-0012

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Pacific Ecorisk

Client Project Name: Port of Redwood City / 23613

Attention: Jeff Cotsifas
2250 Cordelia Road
Fairfield, CA 94534-1912

Nicole Scott for

Approved for release on 05/13/2015 by:
Danielle Gonsman
Project Manager

ResultLink

Email your PM

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Work Order Number: 15-05-0012

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6 Chain-of-Custody/Sample Receipt Form. 15

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Work Order Narrative

Work Order: 15-05-0012 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 05/01/15. They were assigned to Work Order 15-05-0012.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Sample Summary

Client:	Pacific Ecorisk 2250 Cordelia Road Fairfield, CA 94534-1912	Work Order:	15-05-0012
		Project Name:	Port of Redwood City / 23613
		PO Number:	
		Date/Time Received:	05/01/15 09:45
		Number of Containers:	5
Attn:	Jeff Cotsifas		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
PRC-DU1-Comp-MET	15-05-0012-1	04/30/15 09:30	3	Sea Water
PRC-DU2-Comp-MET	15-05-0012-2	04/30/15 09:36	2	Sea Water

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0012
Fairfield, CA 94534-1912		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 1 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp-MET	**15-05-0012-1-B**	**04/30/15 09:30**	**Sea Water**	**GC/MS AAA**	**05/06/15**	**05/07/15 19:56**	**150506L09**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibenzothiophene	ND	0.20	0.055	1.00	
Naphthalene	ND	0.20	0.023	1.00	
2-Methylnaphthalene	ND	0.20	0.027	1.00	
1-Methylnaphthalene	ND	0.20	0.029	1.00	
Acenaphthylene	ND	0.20	0.018	1.00	
Acenaphthene	0.67	0.20	0.021	1.00	
Fluorene	ND	0.20	0.025	1.00	
Phenanthrene	ND	0.20	0.031	1.00	
Anthracene	ND	0.20	0.034	1.00	
Fluoranthene	0.18	0.20	0.027	1.00	J
Pyrene	0.033	0.20	0.025	1.00	J
Benzo (a) Anthracene	ND	0.20	0.024	1.00	
Chrysene	ND	0.20	0.019	1.00	
Benzo (k) Fluoranthene	ND	0.20	0.024	1.00	
Benzo (b) Fluoranthene	ND	0.20	0.025	1.00	
Benzo (a) Pyrene	ND	0.20	0.037	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	0.20	0.022	1.00	
Dibenz (a,h) Anthracene	ND	0.20	0.027	1.00	
Benzo (g,h,i) Perylene	ND	0.20	0.022	1.00	
Benzo (e) Pyrene	ND	0.20	0.010	1.00	
Perylene	ND	0.20	0.017	1.00	
Biphenyl	ND	0.20	0.014	1.00	
1-Methylphenanthrene	ND	0.20	0.026	1.00	
2,6-Dimethylnaphthalene	ND	0.20	0.022	1.00	
1,6,7-Trimethylnaphthalene	ND	0.20	0.11	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	87	28-139	
2-Fluorobiphenyl	87	33-144	
p-Terphenyl-d14	85	23-160	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0012
Fairfield, CA 94534-1912		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 2 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-Comp-MET	**15-05-0012-2-B**	**04/30/15 09:36**	**Sea Water**	**GC/MS AAA**	**05/06/15**	**05/07/15 20:16**	**150506L09**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibenzothiophene	ND	0.20	0.055	1.00	
Naphthalene	ND	0.20	0.023	1.00	
2-Methylnaphthalene	ND	0.20	0.027	1.00	
1-Methylnaphthalene	ND	0.20	0.029	1.00	
Acenaphthylene	ND	0.20	0.018	1.00	
Acenaphthene	0.47	0.20	0.021	1.00	
Fluorene	ND	0.20	0.025	1.00	
Phenanthrene	ND	0.20	0.031	1.00	
Anthracene	ND	0.20	0.035	1.00	
Fluoranthene	0.24	0.20	0.028	1.00	
Pyrene	0.037	0.20	0.025	1.00	J
Benzo (a) Anthracene	0.036	0.20	0.024	1.00	J
Chrysene	0.039	0.20	0.019	1.00	J
Benzo (k) Fluoranthene	0.032	0.20	0.024	1.00	J
Benzo (b) Fluoranthene	0.036	0.20	0.025	1.00	J
Benzo (a) Pyrene	ND	0.20	0.037	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	0.20	0.022	1.00	
Dibenz (a,h) Anthracene	ND	0.20	0.027	1.00	
Benzo (g,h,i) Perylene	0.031	0.20	0.022	1.00	J
Benzo (e) Pyrene	0.029	0.20	0.010	1.00	J
Perylene	ND	0.20	0.017	1.00	
Biphenyl	ND	0.20	0.014	1.00	
1-Methylphenanthrene	ND	0.20	0.027	1.00	
2,6-Dimethylnaphthalene	ND	0.20	0.022	1.00	
1,6,7-Trimethylnaphthalene	ND	0.20	0.11	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	78	28-139	
2-Fluorobiphenyl	76	33-144	
p-Terphenyl-d14	77	23-160	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0012
Fairfield, CA 94534-1912		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 3 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-280-105**	**N/A**	**Aqueous**	**GC/MS AAA**	**05/06/15**	**05/07/15 18:37**	**150506L09**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibenzothiophene	ND	0.20	0.054	1.00	
Naphthalene	ND	0.20	0.023	1.00	
2-Methylnaphthalene	ND	0.20	0.026	1.00	
1-Methylnaphthalene	ND	0.20	0.028	1.00	
Acenaphthylene	ND	0.20	0.018	1.00	
Acenaphthene	ND	0.20	0.021	1.00	
Fluorene	ND	0.20	0.024	1.00	
Phenanthrene	ND	0.20	0.031	1.00	
Anthracene	ND	0.20	0.034	1.00	
Fluoranthene	ND	0.20	0.027	1.00	
Pyrene	ND	0.20	0.025	1.00	
Benzo (a) Anthracene	ND	0.20	0.024	1.00	
Chrysene	ND	0.20	0.019	1.00	
Benzo (k) Fluoranthene	ND	0.20	0.023	1.00	
Benzo (b) Fluoranthene	ND	0.20	0.025	1.00	
Benzo (a) Pyrene	ND	0.20	0.036	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	0.20	0.022	1.00	
Dibenz (a,h) Anthracene	ND	0.20	0.027	1.00	
Benzo (g,h,i) Perylene	ND	0.20	0.022	1.00	
Benzo (e) Pyrene	ND	0.20	0.010	1.00	
Perylene	ND	0.20	0.017	1.00	
Biphenyl	ND	0.20	0.014	1.00	
1-Methylphenanthrene	ND	0.20	0.026	1.00	
2,6-Dimethylnaphthalene	ND	0.20	0.022	1.00	
1,6,7-Trimethylnaphthalene	ND	0.20	0.11	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	72	28-139	
2-Fluorobiphenyl	81	33-144	
p-Terphenyl-d14	71	23-160	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0012
Fairfield, CA 94534-1912		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 1 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp-MET	**15-05-0012-1-A**	**04/30/15 09:30**	**Sea Water**	**GC/MS HHH**	**05/06/15**	**05/07/15 18:06**	**150506L15A**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB005/008	ND	0.0039	0.00071	1.00	
PCB018	ND	0.0020	0.00041	1.00	
PCB028	ND	0.0020	0.00065	1.00	
PCB031	ND	0.0020	0.00040	1.00	
PCB033	ND	0.0020	0.00057	1.00	
PCB044	ND	0.0020	0.00076	1.00	
PCB049	ND	0.0020	0.00077	1.00	
PCB052	ND	0.0020	0.00050	1.00	
PCB056	ND	0.0020	0.00074	1.00	
PCB060	ND	0.0020	0.00097	1.00	
PCB066	ND	0.0020	0.00056	1.00	
PCB070	ND	0.0020	0.00037	1.00	
PCB074	ND	0.0020	0.00042	1.00	
PCB087	ND	0.0020	0.00049	1.00	
PCB095	ND	0.0020	0.00081	1.00	
PCB097	ND	0.0020	0.00068	1.00	
PCB099	ND	0.0020	0.00059	1.00	
PCB101	ND	0.0020	0.00057	1.00	
PCB105	ND	0.0020	0.00037	1.00	
PCB110	ND	0.0020	0.00049	1.00	
PCB118	ND	0.0020	0.00048	1.00	
PCB128	ND	0.0020	0.00069	1.00	
PCB132/153	ND	0.0039	0.0012	1.00	
PCB138/158	ND	0.0039	0.0011	1.00	
PCB141	ND	0.0020	0.00076	1.00	
PCB149	ND	0.0020	0.00050	1.00	
PCB151	ND	0.0020	0.00060	1.00	
PCB156	ND	0.0020	0.00050	1.00	
PCB170	ND	0.0020	0.00055	1.00	
PCB174	ND	0.0020	0.00054	1.00	
PCB177	ND	0.0020	0.00056	1.00	
PCB180	ND	0.0020	0.00070	1.00	
PCB183	ND	0.0020	0.00052	1.00	
PCB187	ND	0.0020	0.00055	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0012
Fairfield, CA 94534-1912		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 2 of 4

Parameter	Result	RL	MDL	DF	Qualifiers
PCB194	ND	0.0020	0.00041	1.00	
PCB195	ND	0.0020	0.00035	1.00	
PCB201	ND	0.0020	0.00071	1.00	
PCB203	ND	0.0020	0.00038	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	111	50-150	
p-Terphenyl-d14	141	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0012
Fairfield, CA 94534-1912		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 3 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-16-414-38**	**N/A**	**Aqueous**	**GC/MS HHH**	**05/06/15**	**05/07/15 16:49**	**150506L15A**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB005/008	ND	0.0040	0.00072	1.00	
PCB018	ND	0.0020	0.00042	1.00	
PCB028	ND	0.0020	0.00066	1.00	
PCB031	ND	0.0020	0.00041	1.00	
PCB033	ND	0.0020	0.00059	1.00	
PCB044	ND	0.0020	0.00078	1.00	
PCB049	ND	0.0020	0.00078	1.00	
PCB052	ND	0.0020	0.00051	1.00	
PCB056	ND	0.0020	0.00076	1.00	
PCB060	ND	0.0020	0.00099	1.00	
PCB066	ND	0.0020	0.00057	1.00	
PCB070	ND	0.0020	0.00038	1.00	
PCB074	ND	0.0020	0.00043	1.00	
PCB087	ND	0.0020	0.00050	1.00	
PCB095	ND	0.0020	0.00082	1.00	
PCB097	ND	0.0020	0.00069	1.00	
PCB099	ND	0.0020	0.00060	1.00	
PCB101	ND	0.0020	0.00058	1.00	
PCB105	ND	0.0020	0.00038	1.00	
PCB110	ND	0.0020	0.00050	1.00	
PCB118	ND	0.0020	0.00049	1.00	
PCB128	ND	0.0020	0.00070	1.00	
PCB132/153	ND	0.0040	0.0012	1.00	
PCB138/158	ND	0.0040	0.0011	1.00	
PCB141	ND	0.0020	0.00078	1.00	
PCB149	ND	0.0020	0.00050	1.00	
PCB151	ND	0.0020	0.00061	1.00	
PCB156	ND	0.0020	0.00051	1.00	
PCB170	ND	0.0020	0.00056	1.00	
PCB174	ND	0.0020	0.00055	1.00	
PCB177	ND	0.0020	0.00057	1.00	
PCB180	ND	0.0020	0.00072	1.00	
PCB183	ND	0.0020	0.00053	1.00	
PCB187	ND	0.0020	0.00056	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0012
Fairfield, CA 94534-1912		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 4 of 4

Parameter	Result	RL	MDL	DF	Qualifiers
PCB194	ND	0.0020	0.00042	1.00	
PCB195	ND	0.0020	0.00035	1.00	
PCB201	ND	0.0020	0.00072	1.00	
PCB203	ND	0.0020	0.00039	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	59	50-150	
p-Terphenyl-d14	72	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0012
Fairfield, CA 94534-1912		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PAHs
Project: Port of Redwood City / 23613			Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-280-105	**LCS**	**Aqueous**	**GC/MS AAA**	**05/06/15**	**05/07/15 17:57**	**150506L09**
099-14-280-105	**LCSD**	**Aqueous**	**GC/MS AAA**	**05/06/15**	**05/11/15 16:15**	**150506L09**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	ME CL	RPD	RPD CL	Qualifiers
Naphthalene	2.000	1.555	78	1.345	67	21-133	2-152	15	0-25	
2-Methylnaphthalene	2.000	1.785	89	1.509	75	21-140	1-160	17	0-25	
1-Methylnaphthalene	2.000	1.596	80	1.374	69	20-140	0-160	15	0-25	
Acenaphthylene	2.000	1.746	87	1.501	75	33-145	14-164	15	0-25	
Acenaphthene	2.000	1.855	93	1.601	80	55-121	44-132	15	0-25	
Fluorene	2.000	1.930	96	1.664	83	59-121	49-131	15	0-25	
Phenanthrene	2.000	1.671	84	1.463	73	54-120	43-131	13	0-25	
Anthracene	2.000	1.606	80	1.370	68	27-133	9-151	16	0-25	
Fluoranthene	2.000	1.670	84	1.441	72	26-137	8-156	15	0-25	
Pyrene	2.000	1.610	80	1.412	71	45-129	31-143	13	0-25	
Benzo (a) Anthracene	2.000	1.601	80	1.367	68	33-143	15-161	16	0-25	
Chrysene	2.000	1.812	91	1.600	80	17-168	0-193	12	0-25	
Benzo (k) Fluoranthene	2.000	1.895	95	1.641	82	24-159	2-182	14	0-25	
Benzo (b) Fluoranthene	2.000	1.442	72	1.162	58	24-159	2-182	21	0-25	
Benzo (a) Pyrene	2.000	1.460	73	1.265	63	17-163	0-187	14	0-25	
Indeno (1,2,3-c,d) Pyrene	2.000	1.403	70	1.259	63	25-175	0-200	11	0-25	
Dibenz (a,h) Anthracene	2.000	1.405	70	1.280	64	25-175	0-200	9	0-25	
Benzo (g,h,i) Perylene	2.000	1.512	76	1.370	69	25-157	3-179	10	0-25	

Total number of LCS compounds: 18
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0012
Fairfield, CA 94534-1912		Preparation:	EPA 3510C
		Method:	EPA 8270C SIM PCB Congeners
Project: Port of Redwood City / 23613			Page 2 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-16-414-38	**LCS**	**Aqueous**	**GC/MS HHH**	**05/06/15**	**05/07/15 15:58**	**150506L15A**
099-16-414-38	**LCSD**	**Aqueous**	**GC/MS HHH**	**05/06/15**	**05/07/15 16:23**	**150506L15A**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	ME CL	RPD	RPD CL	Qualifiers
PCB018	0.5000	0.3282	66	0.3244	65	50-150	33-167	1	0-25	
PCB028	0.5000	0.3701	74	0.3660	73	50-150	33-167	1	0-25	
PCB044	0.5000	0.3590	72	0.3522	70	50-150	33-167	2	0-25	
PCB052	0.5000	0.3653	73	0.3618	72	50-150	33-167	1	0-25	
PCB066	0.5000	0.4052	81	0.4028	81	50-150	33-167	1	0-25	
PCB101	0.5000	0.3774	75	0.3720	74	50-150	33-167	1	0-25	
PCB105	0.5000	0.4034	81	0.4019	80	50-150	33-167	0	0-25	
PCB118	0.5000	0.4163	83	0.4118	82	50-150	33-167	1	0-25	
PCB128	0.5000	0.3868	77	0.3838	77	50-150	33-167	1	0-25	
PCB170	0.5000	0.3724	74	0.3689	74	50-150	33-167	1	0-25	
PCB180	0.5000	0.4074	81	0.3975	79	50-150	33-167	2	0-25	
PCB187	0.5000	0.3917	78	0.3784	76	50-150	33-167	3	0-25	
PCB195	0.5000	0.4322	86	0.4245	85	50-150	33-167	2	0-25	

Total number of LCS compounds: 13
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

Return to Contents

RPD: Relative Percent Difference. CL: Control Limits

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Glossary of Terms and Qualifiers

Work Order: 15-05-0012 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CHAIN-OF-CUSTODY RECORD

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	Drew Gantner
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas / Drew Gantner
Project Name:	Port of Redwood City
PO Number:	23613

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	PCBs (See Attached List)	PAHs (See Attached List)	~~Dioxins (PCDD PCDF/8290 TCDD TEQ) (See Attached List)~~								
1	PRC-DU1-Comp MET	4/30/15	09:30	MET	3	1-L Amber	X	X	X								
2	~~PRC-DU1-Comp-MET-DUP~~	~~4/30/15~~	~~09:33~~	~~MET~~	~~3~~	~~1-L Amber~~	~~X~~	~~X~~	~~X~~								
3	PRC-DU2-Comp-MET	4/30/15	09:36	MET	2	1-L Amber		X									
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	

Correct Containers:	Yes	No	
Sample Temperature:	Ambient	Cold	Warm
Sample Preservative:	Yes	No	
Turnaround Time:	STD	Specify:	

Comments:

~~Please Run QC analysis on PRC-DU1-COMP-MET-DUP~~

RELIQUINSHED BY

Signature:	A Gantner	Signature:	
Print:	Andrew Gantner	Print:	
Organization: PER		Organization:	
DATE: 4/30/15	TIME: 1324	DATE:	TIME:

RECEIVED BY

Signature:	Tom O'Malley	Signature:	
Print:	Tom O'Malley	Print:	
Organization: EC		Organization:	
DATE: 4/30/15	TIME: 1324	DATE:	TIME:

*MATRIX CODES: (SED = Sediment); (FW = Freshwater); (WW = Wastewater); (STRMW = Stormwater)

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Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CHAIN-OF-CUSTODY RECORD

15-05-0012

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	Drew Gantner
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas / Drew Gantner
Project Name:	Port of Redwood City
PO Number:	23613

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	PCBs (See Attached List)	PAHs (See Attached List)	Dioxins (PCDD PCDF/8290 TCDD TEQ) (See Attached List)								
1	PRC-DU1-Comp MET	4/30/15	09:30	MET	3	1-L Amber	X	X	X								
2	~~PRC-DU1-Comp-MET-DUP~~	~~4/30/15~~	~~09:33~~	~~MET~~	~~3~~	~~1-L Amber~~	~~X~~	~~X~~	~~X~~								
2 ~~3~~	PRC-DU2-Comp-MET	4/30/15	09:36	MET	2	1-L Amber		X	X								
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	

Correct Containers:	Yes	No	
Sample Temperature:	Ambient	Cold	Warm
Sample Preservative:	Yes	No	
Turnaround Time:	STD	Specify:	

Comments:

~~Please Run QC analysis on PRC-DU1-COMP-MET-DUP~~

RELIQUINSHED BY

Signature:	[signature]	**Signature:**	Tom O'Malley to GSO
Print:	Andrew Gantner	**Print:**	Tom O'Malley
Organization:	PER	**Organization:**	ECI
DATE: 4/30/15	**TIME:** 1324	**DATE:** 4/30/15	**TIME:** 1730

RECEIVED BY

Signature:	Tom O'Malley	**Signature:**	[signature]
Print:	Tom O'Malley	**Print:**	PRECY SORIANO
Organization:	ECI	**Organization:**	EY
DATE: 4/30/15	**TIME:** 1324	**DATE:** 5/01/15	**TIME:** 0945

***MATRIX CODES**: (**SED** = Sediment); (**FW** = Freshwater); (**WW** = Wastewater); (**STRMW** = Stormwater)

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ANALYTE LIST

Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

0012

Project Proponent:	Pacific EcoRisk
Project #:	Port of Redwood City
Site #:	PRC-DU2-Comp-MET

ANALYTE	METHOD	TARGETED MRL	ANALYSIS REQUESTED
Acenaphthene	8270C	20 µg/kg	X
Acenaphthylene	8270C	20 µg/kg	X
Anthracene	8270C	20 µg/kg	X
Benz(a)anthracene	8270C	20 µg/kg	X
Benzo(a)pyrene	8270C	20 µg/kg	X
Benzo(e)pyrene	8270C	20 µg/kg	X
Benzo(b)fluoranthene	8270C	20 µg/kg	X
Benzo(g,h,i)perylene	8270C	20 µg/kg	X
Benzo(k)fluoranthene	8270C	20 µg/kg	X
Biphenyl	8270C	20 µg/kg	X
Chrysene	8270C	20 µg/kg	X
Dibenz(a,h)anthracene	8270C	20 µg/kg	X
Dibenzothiophene	8270C	20 µg/kg	X
Dimethylnapthalene 2, 6-	8270C	20 µg/kg	X
Fluoranthene	8270C	20 µg/kg	X
Fluorene	8270C	20 µg/kg	X
Indeno(1,2,3-cd)pyrene	8270C	20 µg/kg	X
Methylnapthalene, 1-	8270C	20 µg/kg	X
Methylnapthalene, 2-	8270C	20 µg/kg	X
Methylphenanthrene, 1-	8270C	20 µg/kg	X
Naphthalene	8270C	20 µg/kg	X
Perylene	8270C	20 µg/kg	X
Phenanthrene	8270C	20 µg/kg	X
Pyrene	8270C	20 µg/kg	X
Trimethylnapthalene, 2, 3, 5-	8270C	20 µg/kg	X
Dioxins (Total TCDD TEQ)	8290	1 ng/kg	X
QA/QC			
If possible, please use PRC-DU1-Comp-DUP to perform duplicate and MS/MSD on sample run. Standard TAT.			X

If you have any questions regarding this request as checked, please call Jeff Cotsifas at (707)207-7760

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ANALYTE LIST

Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

0012

Project Proponent: Pacific EcoRisk
Project #: Port of Redwood City
Site #: PRC-DU1-Comp-MET
~~PRC-DU1-Comp-MET-DUP~~

ANALYTE	METHOD	TARGETED MRL	ANALYSIS REQUESTED
PCB 008	8082 ECD or 8270C	0.5 µg/kg	X
PCB 018	8082 ECD or 8270C	0.5 µg/kg	X
PCB 028	8082 ECD or 8270C	0.5 µg/kg	X
PCB 031	8082 ECD or 8270C	0.5 µg/kg	X
PCB 033	8082 ECD or 8270C	0.5 µg/kg	X
PCB 044	8082 ECD or 8270C	0.5 µg/kg	X
PCB 049	8082 ECD or 8270C	0.5 µg/kg	X
PCB 052	8082 ECD or 8270C	0.5 µg/kg	X
PCB 056	8082 ECD or 8270C	0.5 µg/kg	X
PCB 060	8082 ECD or 8270C	0.5 µg/kg	X
PCB 066	8082 ECD or 8270C	0.5 µg/kg	X
PCB 070	8082 ECD or 8270C	0.5 µg/kg	X
PCB 074	8082 ECD or 8270C	0.5 µg/kg	X
PCB 087	8082 ECD or 8270C	0.5 µg/kg	X
PCB 095	8082 ECD or 8270C	0.5 µg/kg	X
PCB 097	8082 ECD or 8270C	0.5 µg/kg	X
PCB 099	8082 ECD or 8270C	0.5 µg/kg	X
PCB 101	8082 ECD or 8270C	0.5 µg/kg	X
PCB 105	8082 ECD or 8270C	0.5 µg/kg	X
PCB 110	8082 ECD or 8270C	0.5 µg/kg	X
PCB 118	8082 ECD or 8270C	0.5 µg/kg	X
PCB 128	8082 ECD or 8270C	0.5 µg/kg	X
PCB 132	8082 ECD or 8270C	0.5 µg/kg	X
PCB 138	8082 ECD or 8270C	0.5 µg/kg	X
PCB 141	8082 ECD or 8270C	0.5 µg/kg	X
PCB 149	8082 ECD or 8270C	0.5 µg/kg	X
PCB 151	8082 ECD or 8270C	0.5 µg/kg	X
PCB 153	8082 ECD or 8270C	0.5 µg/kg	X
PCB 156	8082 ECD or 8270C	0.5 µg/kg	X
PCB 158	8082 ECD or 8270C	0.5 µg/kg	X
PCB 170	8082 ECD or 8270C	0.5 µg/kg	X
PCB 174	8082 ECD or 8270C	0.5 µg/kg	X
PCB 177	8082 ECD or 8270C	0.5 µg/kg	X
PCB 180	8082 ECD or 8270C	0.5 µg/kg	X
PCB 183	8082 ECD or 8270C	0.5 µg/kg	X
PCB 187	8082 ECD or 8270C	0.5 µg/kg	X
PCB 194	8082 ECD or 8270C	0.5 µg/kg	X
PCB 195	8082 ECD or 8270C	0.5 µg/kg	X
PCB 201	8082 ECD or 8270C	0.5 µg/kg	X
PCB 203	8082 ECD or 8270C	0.5 µg/kg	X
Acenaphthene	8270C	20 µg/kg	X
Acenaphthylene	8270C	20 µg/kg	X
Anthracene	8270C	20 µg/kg	X
Benz(a)anthracene	8270C	20 µg/kg	X
Benzo(a)pyrene	8270C	20 µg/kg	X
Benzo(e)pyrene	8270C	20 µg/kg	X
Benzo(b)fluoranthene	8270C	20 µg/kg	X
Benzo(g,h,i)perylene	8270C	20 µg/kg	X
Benzo(k)fluoranthene	8270C	20 µg/kg	X
Biphenyl	8270C	20 µg/kg	X
Chrysene	8270C	20 µg/kg	X
Dibenz(a,h)anthracene	8270C	20 µg/kg	X
Dibenzothiophene	8270C	20 µg/kg	X
Dimethylnapthalene 2, 6-	8270C	20 µg/kg	X
Fluoranthene	8270C	20 µg/kg	X
Fluorene	8270C	20 µg/kg	X
Indeno(1,2,3-cd)pyrene	8270C	20 µg/kg	X
Methylnapthalene, 1-	8270C	20 µg/kg	X
Methylnapthalene, 2-	8270C	20 µg/kg	X
Methylphenanthrene, 1-	8270C	20 µg/kg	X
Naphthalene	8270C	20 µg/kg	X
Perylene	8270C	20 µg/kg	X
Phenanthrene	8270C	20 µg/kg	X
Pyrene	8270C	20 µg/kg	X
Trimethylnapthalene, 2, 3, 5-	8270C	20 µg/kg	X
Dioxins (Total TCDD TEQ)	8290	1 ng/kg	X
QA/QC			X

~~If possible, please use PRC-DU1-Comp-DUP to perform duplicate and MS/MSD on sample run. Standard TAT.~~

If you have any questions regarding this request as checked, please call Jeff Cotsifas at (707)207-7760

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GSO

800-322-5555 www.gso.com

0012

Ship From
CAL SCIENCE- CONCORD
ALAN KEMP
5063 COMMERCIAL CIRCLE
#H
CONCORD, CA 94520

Ship To
CEL
SAMPLE RECEIVING
7440 LINCOLN WAY
GARDEN GROVE, CA 92841

COD: $0.00
Weight: 0 lb(s)
Reference:
PACIFIC ECORISK, MONTEZUMA WETLANDS(AMEC)
Delivery Instructions:

Signature Type: REQUIRED

Tracking #: 527773018

NPS

ORC
GARDEN GROVE

A

D92845A

37192026

Print Date: 4/30/2015 3:36 PM

LABEL INSTRUCTIONS:

Do not copy or reprint this label for additional shipments - each package must have a unique barcode.

Use the "Print Label" button on this page to print the shipping label on a laser or inkjet printer. Securely attach this label to your package, do not cover the barcode.

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WORK ORDER NUMBER: 15-05- 0012

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Pacific EcoRisk

DATE: 05 / 01 / 2015

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC2 (CF:-0.3°C); Temperature (w/o CF): 2.3 °C (w/ CF): 2.0 °C; ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter Checked by: 836

CUSTODY SEAL:

Cooler	☑ Present and Intact	☐ Present but Not Intact	☐ Not Present	☐ N/A	Checked by: 836
Sample(s)	☐ Present and Intact	☐ Present but Not Intact	☑ Not Present	☐ N/A	Checked by: 965

SAMPLE CONDITION:

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑ 5/1/15	☑	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☑	☐	☐
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: **(Trip Blank Lot Number: _____)**

Aqueous: ☐ VOA ☐ VOA**h** ☐ VOA**na$_2$** ☐ 100PJ ☐ 100PJ**na$_2$** ☐ 125AGB ☐ 125AGBh ☐ 125AGB**p** ☐ 125PB ☐ 125PB**znna** ☐ 250AGB ☐ 250CGB ☐ 250CGB**s** ☐ 250PB ☐ 250PB**n** ☐ 500AGB ☐ 500AGJ ☐ 500AGJ**s** ☐ 500PB ☑ 1AGB ☐ 1AGB**na$_2$** ☐ 1AGB**s** ☐ 1PB ☐ 1PB**na** ☐ _____ ☐ _____ ☐ _____ ☐ _____

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (_____) ☐ EnCores® (_____) ☐ TerraCores® (_____) ☐ _____

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na$_2$** = $Na_2S_2O_3$, **p** = H_3PO_4, **s** = H_2SO_4, **u** = ultra-pure, **znna** = $Zn(CH_3CO_2)_2$ + NaOH

Labeled/Checked by: 965

Reviewed by: 778

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Appendix E

DI WET Analytical Chemistry Laboratory Data Report Submitted by Eurofins Calscience

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WORK ORDER NUMBER: 15-05-0018

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Pacific Ecorisk

Client Project Name: Port of Redwood City / 23613

Attention: Jeff Cotsifas
2250 Cordelia Road
Fairfield, CA 94534-1912

Approved for release on 05/19/2015 by:
Danielle Gonsman
Project Manager

ResultLink

Email your PM

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Work Order Number: 15-05-0018

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Work Order Narrative

Work Order: 15-05-0018 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 05/01/15. They were assigned to Work Order 15-05-0018.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Sample Summary

Client:	Pacific Ecorisk 2250 Cordelia Road Fairfield, CA 94534-1912	Work Order:	15-05-0018
		Project Name:	Port of Redwood City / 23613
		PO Number:	
		Date/Time Received:	05/01/15 09:45
		Number of Containers:	2
Attn:	Jeff Cotsifas		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
PRC-DU1-Comp	15-05-0018-1	02/04/15 12:30	1	Sediment
PRC-DU2-Comp	15-05-0018-2	02/04/15 08:30	1	Sediment

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5.AII DI
		Method:	EPA 1640
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-05-0018-1-A**	**02/04/15 12:30**	**Sediment**	**ICP/MS 05**	**05/04/15**	**05/11/15 15:18**	**150511L01F**

Comment(s): - This sample was prepared with deionized water as the extractant.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- The analysis was performed on a STLC extract of the sample.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	35.7	0.300	0.122	10.0	
Cadmium	0.0158	0.0300	0.00567	1.00	J
Chromium	0.772	0.500	0.164	1.00	
Copper	0.445	0.0300	0.00898	1.00	
Lead	0.0998	0.0300	0.0135	1.00	
Nickel	0.822	0.0500	0.00607	1.00	
Selenium	0.150	0.0500	0.0121	1.00	
Silver	0.0226	0.0500	0.00822	1.00	B,J
Zinc	1.03	0.500	0.0736	1.00	B

PRC-DU2-Comp	**15-05-0018-2-A**	**02/04/15 08:30**	**Sediment**	**ICP/MS 05**	**05/04/15**	**05/11/15 15:26**	**150511L01F**

Comment(s): - This sample was prepared with deionized water as the extractant.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- The analysis was performed on a STLC extract of the sample.

Parameter	Result	RL	MDL	DF	Qualifiers
Cadmium	0.0161	0.0300	0.00567	1.00	J
Chromium	1.87	0.500	0.164	1.00	
Copper	0.633	0.0300	0.00898	1.00	
Lead	0.229	0.0300	0.0135	1.00	
Nickel	1.16	0.0500	0.00607	1.00	
Silver	0.123	0.0500	0.00822	1.00	B
Zinc	2.29	0.500	0.0736	1.00	B

PRC-DU2-Comp	**15-05-0018-2-A**	**02/04/15 08:30**	**Sediment**	**ICP/MS 05**	**05/04/15**	**05/13/15 18:49**	**150511L01F**

Comment(s): - This sample was prepared with deionized water as the extractant.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- The analysis was performed on a STLC extract of the sample.

Parameter	Result	RL	MDL	DF	Qualifiers
Selenium	0.100	0.0500	0.0121	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5.AII DI
		Method:	EPA 1640
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-Comp	**15-05-0018-2-A**	**02/04/15 08:30**	**Sediment**	**ICP/MS 05**	**05/04/15**	**05/14/15 17:55**	**150511L01F**

Comment(s): - This sample was prepared with deionized water as the extractant.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- The analysis was performed on a STLC extract of the sample.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	27.6	0.300	0.122	10.0	

Method Blank	**099-15-823-148**	**N/A**	**Aqueous**	**ICP/MS 05**	**05/04/15**	**05/11/15 13:11**	**150511L01F**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Arsenic	ND	0.0300	0.0122	1.00	
Cadmium	ND	0.0300	0.00567	1.00	
Chromium	ND	0.500	0.164	1.00	
Copper	ND	0.0300	0.00898	1.00	
Lead	ND	0.0300	0.0135	1.00	
Nickel	ND	0.0500	0.00607	1.00	
Selenium	ND	0.0500	0.0121	1.00	
Silver	0.0154	0.0500	0.00822	1.00	J
Zinc	0.0877	0.500	0.0736	1.00	J

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5.AII DI
		Method:	EPA 7470A
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-05-0018-1-A**	**02/04/15 12:30**	**Sediment**	**Mercury 04**	**05/04/15**	**05/07/15 17:08**	**150507L04**

Comment(s): - This sample was prepared with deionized water as the extractant.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- The analysis was performed on a STLC extract of the sample.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.250	0.161	1.00	

PRC-DU2-Comp	**15-05-0018-2-A**	**02/04/15 08:30**	**Sediment**	**Mercury 04**	**05/04/15**	**05/07/15 17:19**	**150507L04**

Comment(s): - This sample was prepared with deionized water as the extractant.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- The analysis was performed on a STLC extract of the sample.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.250	0.161	1.00	

Method Blank	**099-12-510-631**	**N/A**	**Aqueous**	**Mercury 04**	**05/04/15**	**05/07/15 16:52**	**150507L04**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Mercury	ND	0.250	0.161	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5.AII DI
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 1 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-05-0018-1-A**	**02/04/15 12:30**	**Sediment**	**GC/MS AAA**	**05/04/15**	**05/07/15 20:36**	**150506L09B**

Comment(s): - This sample was prepared with deionized water as the extractant.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- The analysis was performed on a STLC extract of the sample.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibenzothiophene	ND	0.20	0.054	1.00	
Naphthalene	0.30	0.20	0.023	1.00	
2-Methylnaphthalene	ND	0.20	0.026	1.00	
1-Methylnaphthalene	0.035	0.20	0.028	1.00	J
Acenaphthylene	ND	0.20	0.018	1.00	
Acenaphthene	0.13	0.20	0.021	1.00	J
Fluorene	0.051	0.20	0.024	1.00	J
Phenanthrene	0.074	0.20	0.031	1.00	J
Anthracene	ND	0.20	0.034	1.00	
Fluoranthene	0.069	0.20	0.027	1.00	J
Pyrene	0.077	0.20	0.025	1.00	J
Benzo (a) Anthracene	ND	0.20	0.024	1.00	
Chrysene	ND	0.20	0.019	1.00	
Benzo (k) Fluoranthene	ND	0.20	0.023	1.00	
Benzo (b) Fluoranthene	ND	0.20	0.025	1.00	
Benzo (a) Pyrene	ND	0.20	0.036	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	0.20	0.022	1.00	
Dibenz (a,h) Anthracene	ND	0.20	0.027	1.00	
Benzo (g,h,i) Perylene	0.025	0.20	0.022	1.00	J
Benzo (e) Pyrene	ND	0.20	0.010	1.00	
Perylene	ND	0.20	0.017	1.00	
Biphenyl	ND	0.20	0.014	1.00	
1-Methylphenanthrene	ND	0.20	0.026	1.00	
2,6-Dimethylnaphthalene	ND	0.20	0.022	1.00	
1,6,7-Trimethylnaphthalene	ND	0.20	0.11	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	76	28-139	
2-Fluorobiphenyl	87	33-144	
p-Terphenyl-d14	77	23-160	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5.AII DI
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 2 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-Comp	**15-05-0018-2-A**	**02/04/15 08:30**	**Sediment**	**GC/MS AAA**	**05/04/15**	**05/07/15 20:56**	**150506L09B**

Comment(s): - This sample was prepared with deionized water as the extractant.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- The analysis was performed on a STLC extract of the sample.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibenzothiophene	ND	0.20	0.054	1.00	
Naphthalene	0.055	0.20	0.023	1.00	J
2-Methylnaphthalene	ND	0.20	0.026	1.00	
1-Methylnaphthalene	ND	0.20	0.028	1.00	
Acenaphthylene	ND	0.20	0.018	1.00	
Acenaphthene	0.11	0.20	0.021	1.00	J
Fluorene	0.030	0.20	0.024	1.00	J
Phenanthrene	0.055	0.20	0.031	1.00	J
Anthracene	ND	0.20	0.034	1.00	
Fluoranthene	0.20	0.20	0.027	1.00	J
Pyrene	0.19	0.20	0.025	1.00	J
Benzo (a) Anthracene	0.049	0.20	0.024	1.00	J
Chrysene	0.045	0.20	0.019	1.00	J
Benzo (k) Fluoranthene	0.039	0.20	0.023	1.00	J
Benzo (b) Fluoranthene	0.063	0.20	0.025	1.00	J
Benzo (a) Pyrene	0.050	0.20	0.036	1.00	J
Indeno (1,2,3-c,d) Pyrene	ND	0.20	0.022	1.00	
Dibenz (a,h) Anthracene	ND	0.20	0.027	1.00	
Benzo (g,h,i) Perylene	0.038	0.20	0.022	1.00	J
Benzo (e) Pyrene	0.044	0.20	0.010	1.00	J
Perylene	ND	0.20	0.017	1.00	
Biphenyl	ND	0.20	0.014	1.00	
1-Methylphenanthrene	ND	0.20	0.026	1.00	
2,6-Dimethylnaphthalene	0.025	0.20	0.022	1.00	J
1,6,7-Trimethylnaphthalene	ND	0.20	0.11	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	75	28-139	
2-Fluorobiphenyl	85	33-144	
p-Terphenyl-d14	75	23-160	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5.AII DI
		Method:	EPA 8270C SIM PAHs
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 3 of 3

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-280-106**	**N/A**	**Aqueous**	**GC/MS AAA**	**05/06/15**	**05/07/15 18:37**	**150506L09B**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Dibenzothiophene	ND	0.20	0.054	1.00	
Naphthalene	ND	0.20	0.023	1.00	
2-Methylnaphthalene	ND	0.20	0.026	1.00	
1-Methylnaphthalene	ND	0.20	0.028	1.00	
Acenaphthylene	ND	0.20	0.018	1.00	
Acenaphthene	ND	0.20	0.021	1.00	
Fluorene	ND	0.20	0.024	1.00	
Phenanthrene	ND	0.20	0.031	1.00	
Anthracene	ND	0.20	0.034	1.00	
Fluoranthene	ND	0.20	0.027	1.00	
Pyrene	ND	0.20	0.025	1.00	
Benzo (a) Anthracene	ND	0.20	0.024	1.00	
Chrysene	ND	0.20	0.019	1.00	
Benzo (k) Fluoranthene	ND	0.20	0.023	1.00	
Benzo (b) Fluoranthene	ND	0.20	0.025	1.00	
Benzo (a) Pyrene	ND	0.20	0.036	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	0.20	0.022	1.00	
Dibenz (a,h) Anthracene	ND	0.20	0.027	1.00	
Benzo (g,h,i) Perylene	ND	0.20	0.022	1.00	
Benzo (e) Pyrene	ND	0.20	0.010	1.00	
Perylene	ND	0.20	0.017	1.00	
Biphenyl	ND	0.20	0.014	1.00	
1-Methylphenanthrene	ND	0.20	0.026	1.00	
2,6-Dimethylnaphthalene	ND	0.20	0.022	1.00	
1,6,7-Trimethylnaphthalene	ND	0.20	0.11	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
Nitrobenzene-d5	72	28-139	
2-Fluorobiphenyl	81	33-144	
p-Terphenyl-d14	71	23-160	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5. AII
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 1 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Comp	**15-05-0018-1-A**	**02/04/15 12:30**	**Sediment**	**GC/MS HHH**	**05/04/15**	**05/07/15 17:41**	**150506L15**

Comment(s): - This sample was prepared with deionized water as the extractant.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.
- The analysis was performed on a STLC extract of the sample.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB005/008	ND	0.0040	0.00072	1.00	
PCB018	ND	0.0020	0.00042	1.00	
PCB028	ND	0.0020	0.00066	1.00	
PCB031	ND	0.0020	0.00041	1.00	
PCB033	ND	0.0020	0.00059	1.00	
PCB044	ND	0.0020	0.00078	1.00	
PCB049	ND	0.0020	0.00078	1.00	
PCB052	ND	0.0020	0.00051	1.00	
PCB056	ND	0.0020	0.00076	1.00	
PCB060	ND	0.0020	0.00099	1.00	
PCB066	ND	0.0020	0.00057	1.00	
PCB070	ND	0.0020	0.00038	1.00	
PCB074	ND	0.0020	0.00043	1.00	
PCB087	ND	0.0020	0.00050	1.00	
PCB095	ND	0.0020	0.00082	1.00	
PCB097	ND	0.0020	0.00069	1.00	
PCB099	ND	0.0020	0.00060	1.00	
PCB101	ND	0.0020	0.00058	1.00	
PCB105	ND	0.0020	0.00038	1.00	
PCB110	ND	0.0020	0.00050	1.00	
PCB118	ND	0.0020	0.00049	1.00	
PCB128	ND	0.0020	0.00070	1.00	
PCB132/153	ND	0.0040	0.0012	1.00	
PCB138/158	ND	0.0040	0.0011	1.00	
PCB141	ND	0.0020	0.00078	1.00	
PCB149	ND	0.0020	0.00050	1.00	
PCB151	ND	0.0020	0.00061	1.00	
PCB156	ND	0.0020	0.00051	1.00	
PCB170	ND	0.0020	0.00056	1.00	
PCB174	ND	0.0020	0.00055	1.00	
PCB177	ND	0.0020	0.00057	1.00	
PCB180	ND	0.0020	0.00072	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5. AII
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 2 of 4

Parameter	Result	RL	MDL	DF	Qualifiers
PCB183	ND	0.0020	0.00053	1.00	
PCB187	ND	0.0020	0.00056	1.00	
PCB194	ND	0.0020	0.00042	1.00	
PCB195	ND	0.0020	0.00035	1.00	
PCB201	ND	0.0020	0.00072	1.00	
PCB203	ND	0.0020	0.00039	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	67	50-150	
p-Terphenyl-d14	70	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5. AII
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 3 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-16-414-37**	**N/A**	**Aqueous**	**GC/MS HHH**	**05/06/15**	**05/07/15 16:49**	**150506L15**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB005/008	ND	0.0040	0.00072	1.00	
PCB018	ND	0.0020	0.00042	1.00	
PCB028	ND	0.0020	0.00066	1.00	
PCB031	ND	0.0020	0.00041	1.00	
PCB033	ND	0.0020	0.00059	1.00	
PCB044	ND	0.0020	0.00078	1.00	
PCB049	ND	0.0020	0.00078	1.00	
PCB052	ND	0.0020	0.00051	1.00	
PCB056	ND	0.0020	0.00076	1.00	
PCB060	ND	0.0020	0.00099	1.00	
PCB066	ND	0.0020	0.00057	1.00	
PCB070	ND	0.0020	0.00038	1.00	
PCB074	ND	0.0020	0.00043	1.00	
PCB087	ND	0.0020	0.00050	1.00	
PCB095	ND	0.0020	0.00082	1.00	
PCB097	ND	0.0020	0.00069	1.00	
PCB099	ND	0.0020	0.00060	1.00	
PCB101	ND	0.0020	0.00058	1.00	
PCB105	ND	0.0020	0.00038	1.00	
PCB110	ND	0.0020	0.00050	1.00	
PCB118	ND	0.0020	0.00049	1.00	
PCB128	ND	0.0020	0.00070	1.00	
PCB132/153	ND	0.0040	0.0012	1.00	
PCB138/158	ND	0.0040	0.0011	1.00	
PCB141	ND	0.0020	0.00078	1.00	
PCB149	ND	0.0020	0.00050	1.00	
PCB151	ND	0.0020	0.00061	1.00	
PCB156	ND	0.0020	0.00051	1.00	
PCB170	ND	0.0020	0.00056	1.00	
PCB174	ND	0.0020	0.00055	1.00	
PCB177	ND	0.0020	0.00057	1.00	
PCB180	ND	0.0020	0.00072	1.00	
PCB183	ND	0.0020	0.00053	1.00	
PCB187	ND	0.0020	0.00056	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5. AII
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/L
Project: Port of Redwood City / 23613			Page 4 of 4

Parameter	Result	RL	MDL	DF	Qualifiers
PCB194	ND	0.0020	0.00042	1.00	
PCB195	ND	0.0020	0.00035	1.00	
PCB201	ND	0.0020	0.00072	1.00	
PCB203	ND	0.0020	0.00039	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	59	50-150	
p-Terphenyl-d14	72	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5.AII DI
		Method:	EPA 1640
Project: Port of Redwood City / 23613			Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Comp	**Sample**	**Sediment**	**ICP/MS 05**	**05/04/15**	**05/11/15 15:18**	**150511S01**
PRC-DU1-Comp	**Matrix Spike**	**Sediment**	**ICP/MS 05**	**05/04/15**	**05/11/15 13:43**	**150511S01**
PRC-DU1-Comp	**Matrix Spike Duplicate**	**Sediment**	**ICP/MS 05**	**05/04/15**	**05/11/15 13:51**	**150511S01**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Arsenic	35.67	0.5000	27.85	4X	27.79	4X	50-150	4X	0-20	Q
Cadmium	ND	0.5000	0.1776	36	0.1686	34	50-150	5	0-20	3
Chromium	0.7719	5.000	5.538	95	5.788	100	50-150	4	0-20	
Copper	0.4453	0.5000	0.6961	50	0.7248	56	50-150	4	0-20	
Lead	0.09981	0.5000	0.3220	44	0.3040	41	50-150	6	0-20	3
Nickel	0.8224	0.5000	1.165	69	1.192	74	50-150	2	0-20	
Selenium	0.1496	0.5000	0.7206	114	0.6922	109	50-150	4	0-20	
Silver	ND	0.2500	0.1254	50	0.1260	50	50-150	1	0-20	
Zinc	1.029	5.000	2.703	33	2.702	33	50-150	0	0-20	3

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5.AII DI
		Method:	EPA 7470A
Project: Port of Redwood City / 23613			Page 2 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Comp	**Sample**	**Sediment**	**Mercury 04**	**05/04/15**	**05/07/15 17:08**	**150507S04**
PRC-DU1-Comp	**Matrix Spike**	**Sediment**	**Mercury 04**	**05/04/15**	**05/07/15 17:11**	**150507S04**
PRC-DU1-Comp	**Matrix Spike Duplicate**	**Sediment**	**Mercury 04**	**05/04/15**	**05/07/15 17:17**	**150507S04**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Mercury	ND	50.00	50.54	101	47.21	94	66-126	7	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5.AII DI
		Method:	EPA 1640
Project: Port of Redwood City / 23613			Page 1 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-15-823-148	**LCS**	**Aqueous**	**ICP/MS 05**	**05/04/15**	**05/11/15 13:27**	**150511L01F**
099-15-823-148	**LCSD**	**Aqueous**	**ICP/MS 05**	**05/04/15**	**05/11/15 13:35**	**150511L01F**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Arsenic	0.5000	0.3633	73	0.4055	81	70-130	11	0-20	
Cadmium	0.5000	0.5326	107	0.5384	108	70-130	1	0-20	
Chromium	5.000	5.383	108	5.428	109	70-130	1	0-20	
Copper	0.5000	0.5337	107	0.5272	105	70-130	1	0-20	
Lead	0.5000	0.4925	98	0.5254	105	70-130	6	0-20	
Nickel	0.5000	0.5318	106	0.5358	107	70-130	1	0-20	
Selenium	0.5000	0.4371	87	0.4492	90	70-130	3	0-20	
Silver	0.2500	0.2686	107	0.2753	110	70-130	2	0-20	
Zinc	5.000	5.014	100	5.104	102	70-130	2	0-20	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5.AII DI
		Method:	EPA 7470A
Project: Port of Redwood City / 23613			Page 2 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS Batch Number
099-12-510-631	**LCS**	**Aqueous**	**Mercury 04**	**05/04/15**	**05/07/15 16:57**	**150507L04**

Parameter	Spike Added	Conc. Recovered	LCS %Rec.	%Rec. CL	Qualifiers
Mercury	50.00	49.99	100	85-121	

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5.AII DI
		Method:	EPA 8270C SIM PAHs
Project: Port of Redwood City / 23613			Page 3 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-280-106	**LCS**	**Aqueous**	**GC/MS AAA**	**05/06/15**	**05/07/15 17:57**	**150506L09B**
099-14-280-106	**LCSD**	**Aqueous**	**GC/MS AAA**	**05/06/15**	**05/11/15 16:15**	**150506L09B**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	ME CL	RPD	RPD CL	Qualifiers
Naphthalene	2.000	1.555	78	1.345	67	21-133	2-152	15	0-25	
2-Methylnaphthalene	2.000	1.785	89	1.509	75	21-140	1-160	17	0-25	
1-Methylnaphthalene	2.000	1.596	80	1.374	69	20-140	0-160	15	0-25	
Acenaphthylene	2.000	1.746	87	1.501	75	33-145	14-164	15	0-25	
Acenaphthene	2.000	1.855	93	1.601	80	55-121	44-132	15	0-25	
Fluorene	2.000	1.930	96	1.664	83	59-121	49-131	15	0-25	
Phenanthrene	2.000	1.671	84	1.463	73	54-120	43-131	13	0-25	
Anthracene	2.000	1.606	80	1.370	68	27-133	9-151	16	0-25	
Fluoranthene	2.000	1.670	84	1.441	72	26-137	8-156	15	0-25	
Pyrene	2.000	1.610	80	1.412	71	45-129	31-143	13	0-25	
Benzo (a) Anthracene	2.000	1.601	80	1.367	68	33-143	15-161	16	0-25	
Chrysene	2.000	1.812	91	1.600	80	17-168	0-193	12	0-25	
Benzo (k) Fluoranthene	2.000	1.895	95	1.641	82	24-159	2-182	14	0-25	
Benzo (b) Fluoranthene	2.000	1.442	72	1.162	58	24-159	2-182	21	0-25	
Benzo (a) Pyrene	2.000	1.460	73	1.265	63	17-163	0-187	14	0-25	
Indeno (1,2,3-c,d) Pyrene	2.000	1.403	70	1.259	63	25-175	0-200	11	0-25	
Dibenz (a,h) Anthracene	2.000	1.405	70	1.280	64	25-175	0-200	9	0-25	
Benzo (g,h,i) Perylene	2.000	1.512	76	1.370	69	25-157	3-179	10	0-25	

Total number of LCS compounds: 18
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0018
Fairfield, CA 94534-1912		Preparation:	T22.11.5. All
		Method:	EPA 8270C SIM PCB Congeners
Project: Port of Redwood City / 23613			Page 4 of 4

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-16-414-37	**LCS**	**Aqueous**	**GC/MS HHH**	**05/06/15**	**05/07/15 15:58**	**150506L15**
099-16-414-37	**LCSD**	**Aqueous**	**GC/MS HHH**	**05/06/15**	**05/07/15 16:23**	**150506L15**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	ME CL	RPD	RPD CL	Qualifiers
PCB018	0.5000	0.3282	66	0.3244	65	50-150	33-167	1	0-25	
PCB028	0.5000	0.3701	74	0.3660	73	50-150	33-167	1	0-25	
PCB044	0.5000	0.3590	72	0.3522	70	50-150	33-167	2	0-25	
PCB052	0.5000	0.3653	73	0.3618	72	50-150	33-167	1	0-25	
PCB066	0.5000	0.4052	81	0.4028	81	50-150	33-167	1	0-25	
PCB101	0.5000	0.3774	75	0.3720	74	50-150	33-167	1	0-25	
PCB105	0.5000	0.4034	81	0.4019	80	50-150	33-167	0	0-25	
PCB118	0.5000	0.4163	83	0.4118	82	50-150	33-167	1	0-25	
PCB128	0.5000	0.3868	77	0.3838	77	50-150	33-167	1	0-25	
PCB170	0.5000	0.3724	74	0.3689	74	50-150	33-167	1	0-25	
PCB180	0.5000	0.4074	81	0.3975	79	50-150	33-167	2	0-25	
PCB187	0.5000	0.3917	78	0.3784	76	50-150	33-167	3	0-25	
PCB195	0.5000	0.4322	86	0.4245	85	50-150	33-167	2	0-25	

Total number of LCS compounds: 13
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Glossary of Terms and Qualifiers

Work Order: 15-05-0018

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CHAIN-OF-CUSTODY RECORD
15-05-0018

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	Drew Gantner
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas / Drew Gantner
Project Name:	Port of Redwood City
PO Number:	23613

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	DI-WET PAH (8270C)	DI-WET Metals	DI-WET Dioxins (PCDD PCDF/8290 TCDD TEQ)	DI-WET PCBs							
1	PRC-DU1-Comp	2/4/15	12:30	Sed	1	Glass jar	X	X	X	X							
2	PRC-DU2-Comp	2/4/15	08:30	Sed	1	Glass jar	X	X	X								
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	

Correct Containers:	Yes	No	
Sample Temperature:	Ambient	Cold	Warm
Sample Preservative:	Yes	No	
Turnaround Time:	STD	Specify:	

Comments:

Samples were Frozen on 2/10/15

RELIQUINSHED BY

Signature:	[signature]	Signature:	Tom O'Malley TO 650
Print:	Andrew Gantner	Print:	Tom O'Malley
Organization: PER		Organization: ECI	
DATE: 4/30/15	TIME: 1324	DATE: 4/30/15	TIME: 1730

RECEIVED BY

Signature:	Tom O'Malley	Signature:	[signature]
Print:	Tom O'Malley	Print:	GREGORY SORIANO
Organization: ECI		Organization: ECI	
DATE: 4/30/15	TIME: 1324	DATE: ~~4/1~~ 5/01/15	TIME: 0947

*MATRIX CODES: (SED = Sediment); (FW = Freshwater); (WW = Wastewater); (STRMW = Stormwater)

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ANALYTE LIST

Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

0018

Project Proponent: Pacific EcoRisk
Project #: Port of Redwood City - 23613
Site #: PRC-DU1-Comp DI-WET

ANALYTE	METHOD	TARGETED MRL	ANALYSIS REQUESTED
Arsenic	6020	2 mg/kg	X
Cadmium	6020	0.3 mg/kg	X
Chromium	6020	5 mg/kg	X
Copper	6020	5 mg/kg	X
Lead	6020	5 mg/kg	X
Nickel	6020	5 mg/kg	X
Silver	6020	0.2 mg/kg	X
Zinc	6020	1 mg/kg	X
Mercury	7471A	0.02 mg/kg	X
Selenium	7742	0.1 mg/kg	X
PCB 008	8082 ECD or 8270C	0.5 µg/kg	X
PCB 018	8082 ECD or 8270C	0.5 µg/kg	X
PCB 028	8082 ECD or 8270C	0.5 µg/kg	X
PCB 031	8082 ECD or 8270C	0.5 µg/kg	X
PCB 033	8082 ECD or 8270C	0.5 µg/kg	X
PCB 044	8082 ECD or 8270C	0.5 µg/kg	X
PCB 049	8082 ECD or 8270C	0.5 µg/kg	X
PCB 052	8082 ECD or 8270C	0.5 µg/kg	X
PCB 056	8082 ECD or 8270C	0.5 µg/kg	X
PCB 060	8082 ECD or 8270C	0.5 µg/kg	X
PCB 066	8082 ECD or 8270C	0.5 µg/kg	X
PCB 070	8082 ECD or 8270C	0.5 µg/kg	X
PCB 074	8082 ECD or 8270C	0.5 µg/kg	X
PCB 087	8082 ECD or 8270C	0.5 µg/kg	X
PCB 095	8082 ECD or 8270C	0.5 µg/kg	X
PCB 097	8082 ECD or 8270C	0.5 µg/kg	X
PCB 099	8082 ECD or 8270C	0.5 µg/kg	X
PCB 101	8082 ECD or 8270C	0.5 µg/kg	X
PCB 105	8082 ECD or 8270C	0.5 µg/kg	X
PCB 110	8082 ECD or 8270C	0.5 µg/kg	X
PCB 118	8082 ECD or 8270C	0.5 µg/kg	X
PCB 128	8082 ECD or 8270C	0.5 µg/kg	X
PCB 132	8082 ECD or 8270C	0.5 µg/kg	X
PCB 138	8082 ECD or 8270C	0.5 µg/kg	X
PCB 141	8082 ECD or 8270C	0.5 µg/kg	X
PCB 149	8082 ECD or 8270C	0.5 µg/kg	X
PCB 151	8082 ECD or 8270C	0.5 µg/kg	X
PCB 153	8082 ECD or 8270C	0.5 µg/kg	X
PCB 156	8082 ECD or 8270C	0.5 µg/kg	X
PCB 158	8082 ECD or 8270C	0.5 µg/kg	X
PCB 170	8082 ECD or 8270C	0.5 µg/kg	X
PCB 174	8082 ECD or 8270C	0.5 µg/kg	X
PCB 177	8082 ECD or 8270C	0.5 µg/kg	X
PCB 180	8082 ECD or 8270C	0.5 µg/kg	X
PCB 183	8082 ECD or 8270C	0.5 µg/kg	X
PCB 187	8082 ECD or 8270C	0.5 µg/kg	X
PCB 194	8082 ECD or 8270C	0.5 µg/kg	X
PCB 195	8082 ECD or 8270C	0.5 µg/kg	X
PCB 201	8082 ECD or 8270C	0.5 µg/kg	X
PCB 203	8082 ECD or 8270C	0.5 µg/kg	X
Acenaphthene	8270C	20 µg/kg	X
Acenaphthylene	8270C	20 µg/kg	X
Anthracene	8270C	20 µg/kg	X
Benz(a)anthracene	8270C	20 µg/kg	X
Benzo(a)pyrene	8270C	20 µg/kg	X
Benzo(e)pyrene	8270C	20 µg/kg	X
Benzo(b)fluoranthene	8270C	20 µg/kg	X
Benzo(g,h,i)perylene	8270C	20 µg/kg	X
Benzo(k)fluoranthene	8270C	20 µg/kg	X
Biphenyl	8270C	20 µg/kg	X
Chrysene	8270C	20 µg/kg	X
Dibenz(a,h)anthracene	8270C	20 µg/kg	X
Dibenzothiophene	8270C	20 µg/kg	X
Dimethylnapthalene 2, 6-	8270C	20 µg/kg	X
Fluoranthene	8270C	20 µg/kg	X
Fluorene	8270C	20 µg/kg	X
Indeno(1,2,3-cd)pyrene	8270C	20 µg/kg	X
Methylnapthalene, 1-	8270C	20 µg/kg	X
Methylnapthalene, 2-	8270C	20 µg/kg	X
Methylphenanthrene, 1-	8270C	20 µg/kg	X
Naphthalene	8270C	20 µg/kg	X
Perylene	8270C	20 µg/kg	X
Phenanthrene	8270C	20 µg/kg	X
Pyrene	8270C	20 µg/kg	X
Trimethylnapthalene, 2, 3, 5-	8270C	20 µg/kg	X
Di-butyltin	Krone 1989	10 µg/kg	X
Mono-Butyltin	Krone 1989	10 µg/kg	X
Tetra-butyltin	Krone 1989	10 µg/kg	X
Tri-butyltin	Krone 1989	10 µg/kg	X
Dioxins (total TCDD TEQ)	EPA 8290	1 ng/kg	X
QA/QC			X

If you have any questions regarding this request as checked, please call Jeff Cotsifas at (707)207-7760

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ANALYTE LIST

Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

0018

Project Proponent:	Pacific EcoRisk
Project #:	Port of Redwood City - 23613
Site #:	PRC-DU2-Comp DI-WET

ANALYTE	METHOD	TARGETED MRL	ANALYSIS REQUESTED
Arsenic	6020	2 mg/kg	X
Cadmium	6020	0.3 mg/kg	X
Chromium	6020	5 mg/kg	X
Copper	6020	5 mg/kg	X
Lead	6020	5 mg/kg	X
Nickel	6020	5 mg/kg	X
Silver	6020	0.2 mg/kg	X
Zinc	6020	1 mg/kg	X
Mercury	7471A	0.02 mg/kg	X
Selenium	7742	0.1 mg/kg	X
Acenaphthene	8270C	20 µg/kg	X
Acenaphthylene	8270C	20 µg/kg	X
Anthracene	8270C	20 µg/kg	X
Benz(a)anthracene	8270C	20 µg/kg	X
Benzo(a)pyrene	8270C	20 µg/kg	X
Benzo(e)pyrene	8270C	20 µg/kg	X
Benzo(b)fluoranthene	8270C	20 µg/kg	X
Benzo(g,h,i)perylene	8270C	20 µg/kg	X
Benzo(k)fluoranthene	8270C	20 µg/kg	X
Biphenyl	8270C	20 µg/kg	X
Chrysene	8270C	20 µg/kg	X
Dibenz(a,h)anthracene	8270C	20 µg/kg	X
Dibenzothiophene	8270C	20 µg/kg	X
Dimethylnapthalene 2, 6-	8270C	20 µg/kg	X
Fluoranthene	8270C	20 µg/kg	X
Fluorene	8270C	20 µg/kg	X
Indeno(1,2,3-cd)pyrene	8270C	20 µg/kg	X
Methylnapthalene, 1-	8270C	20 µg/kg	X
Methylnapthalene, 2-	8270C	20 µg/kg	X
Methylphenanthrene, 1-	8270C	20 µg/kg	X
Naphthalene	8270C	20 µg/kg	X
Perylene	8270C	20 µg/kg	X
Phenanthrene	8270C	20 µg/kg	X
Pyrene	8270C	20 µg/kg	X
Trimethylnapthalene, 2, 3, 5-	8270C	20 µg/kg	X
Di-butyltin	Krone 1989	10 µg/kg	X
Mono-Butyltin	Krone 1989	10 µg/kg	X
Tetra-butyltin	Krone 1989	10 µg/kg	X
Tri-butyltin	Krone 1989	10 µg/kg	X
Dioxins (total TCDD TEQ)	EPA 8290	1 ng/kg	X
QA/QC			X

If you have any questions regarding this request as checked, please call Jeff Cotsifas at (707)207-7760

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GSO

800-322-5555 www.gso.com

0019

Ship From
CAL SCIENCE- CONCORD
ALAN KEMP
5063 COMMERCIAL CIRCLE
#H
CONCORD, CA 94520

Tracking #: 527772820

NPS

Ship To
CEL
SAMPLE RECEIVING
7440 LINCOLN WAY
GARDEN GROVE, CA 92841

ORC A
GARDEN GROVE

COD: $0.00
Weight: 0 lb(s)
Reference:
PACIFIC ECORISK
Delivery Instructions:

Signature Type: REQUIRED

D92845A

37191547

Print Date: 4/30/2015 3:31 PM

LABEL INSTRUCTIONS:

Do not copy or reprint this label for additional shipments - each package must have a unique barcode.

Use the "Print Label" button on this page to print the shipping label on a laser or inkjet printer. Securely attach this label to your package, do not cover the barcode.

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WORK ORDER NUMBER: 15-05- 0018

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Pacific Eco risk

DATE: 05 / 01 / 2015

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC2 (CF:-0.3°C); Temperature (w/o CF): -2.6 °C (w/ CF): -2.9 °C; ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter Checked by: 836

CUSTODY SEAL:

Cooler	☑ Present and Intact	☐ Present but Not Intact	☐ Not Present	☐ N/A	Checked by: 836
Sample(s)	☐ Present and Intact	☐ Present but Not Intact	☑ Not Present	☐ N/A	Checked by: 300

SAMPLE CONDITION:

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☐	☐	☑
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: ☐ VOA ☐ VOA**h** ☐ VOA**na$_2$** ☐ 100PJ ☐ 100PJ**na$_2$** ☐ 125AGB ☐ 125AGB**h** ☐ 125AGB**p** ☐ 125PB

☐ 125PB**znna** ☐ 250AGB ☐ 250CGB ☐ 250CGB**s** ☐ 250PB ☐ 250PB**n** ☐ 500AGB ☐ 500AGJ ☐ 500AGJ**s**

☐ 500PB ☐ 1AGB ☐ 1AGB**na$_2$** ☐ 1AGB**s** ☐ 1PB ☐ 1PB**na** ☐ _____ ☐ _____ ☐ _____ ☐ _____

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☑ 16ozCGJ ☐ Sleeve (_____) ☐ EnCores® (_____) ☐ TerraCores® (_____) ☐ _____

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na$_2$** = $Na_2S_2O_3$, **p** = H_3PO_4, Labeled/Checked by: 300

s = H_2SO_4, **u** = ultra-pure, **znna** = $Zn(CH_3CO_2)_2$ + NaOH Reviewed by: 836

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15-05-0018

Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CHAIN-OF-CUSTODY RECORD

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	Drew Gantner
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas / Drew Gantner
Project Name:	Port of Redwood City
PO Number:	23613

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	DI-WET PAH (8270C)	DI-WET Metals	~~DI-WET Dioxins (PCDD PCDF/8290 TCDD TEQ)~~	DI-WET PCBs							
1	PRC-DU1-Comp	2/4/15	12:30	Sed	1	Glass jar	X	X	~~X~~	X							
2	PRC-DU2-Comp	2/4/15	08:30	Sed	1	Glass jar	X	X	~~X~~								
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	

Correct Containers:	Yes	No	
Sample Temperature:	Ambient	Cold	Warm
Sample Preservative:	Yes	No	
Turnaround Time:	STD	Specify:	

Comments:

Samples were Frozen on 2/10/15

RELIQUINSHED BY

Signature:	[signature]	Signature:	
Print:	Andrew Gantner	Print:	
Organization: PER		Organization:	
DATE: 4/30/15	TIME: 1324	DATE:	TIME:

RECEIVED BY

Signature:	Tom O'Malley	Signature:	
Print:	Tom O'Malley	Print:	
Organization: EC		Organization:	
DATE: 4/30/15	TIME: 1324	DATE:	TIME:

*MATRIX CODES: (SED = Sediment); (FW = Freshwater); (WW = Wastewater); (STRMW = Stormwater)

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Appendix F

Results of the Z-Layer Sediment Analyses: Data Reports Submitted by Eurofins Calscience

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WORK ORDER NUMBER: 15-03-1625

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Pacific Ecorisk

Client Project Name: Port of Redwood City

Attention: Jeff Cotsifas
2250 Cordelia Road
Fairfield, CA 94534-1912

Approved for release on 04/06/2015 by:
Danielle Gonsman
Project Manager

ResultLink

Email your PM

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Work Order Number: 15-03-1625

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Work Order Narrative

Work Order: 15-03-1625 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 03/20/15. They were assigned to Work Order 15-03-1625.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Sample Summary

Client:	Pacific Ecorisk 2250 Cordelia Road Fairfield, CA 94534-1912	Work Order:	15-03-1625
		Project Name:	Port of Redwood City
		PO Number:	
		Date/Time Received:	03/20/15 09:40
		Number of Containers:	2
Attn:	Jeff Cotsifas		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
PRC-DU1-Z-Comp	15-03-1625-1	02/04/15 12:30	1	Sediment
PRC-DU2-Z-Comp	15-03-1625-2	02/04/15 08:30	1	Sediment

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Analytical Report

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	SM 2540 B (M)
		Units:	%
Project: Port of Redwood City			Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Z-Comp	**15-03-1625-1-AA**	**02/04/15 12:30**	**Sediment**	**N/A**	**03/30/15**	**03/30/15 18:00**	**F0330TSB4**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	45.3	0.100	0.100	1.00	

PRC-DU2-Z-Comp	**15-03-1625-2-AA**	**02/04/15 08:30**	**Sediment**	**N/A**	**03/30/15**	**03/30/15 18:00**	**F0330TSB4**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	43.1	0.100	0.100	1.00	

Method Blank	**099-05-019-2866**	**N/A**	**Solid**	**N/A**	**03/30/15**	**03/30/15 18:00**	**F0330TSB4**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	ND	0.100	0.100	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City			Page 1 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Z-Comp	**15-03-1625-1-AA**	**02/04/15 12:30**	**Sediment**	**GC/MS AAA**	**03/23/15**	**03/26/15 18:13**	**150323L11**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	37	22	4.0	1.00	
Acenaphthylene	27	22	3.3	1.00	
Anthracene	71	22	1.8	1.00	
Benzo (a) Anthracene	210	22	3.4	1.00	
Benzo (a) Pyrene	400	22	2.2	1.00	
Benzo (b) Fluoranthene	350	22	2.2	1.00	
Benzo (e) Pyrene	250	22	3.3	1.00	
Benzo (g,h,i) Perylene	330	22	2.1	1.00	
Benzo (k) Fluoranthene	270	22	3.1	1.00	
Biphenyl	11	22	3.1	1.00	J
Chrysene	330	22	2.6	1.00	
Dibenz (a,h) Anthracene	61	22	2.3	1.00	
2,6-Dimethylnaphthalene	17	22	3.7	1.00	J
Fluoranthene	500	22	2.2	1.00	
Fluorene	53	22	3.2	1.00	
Indeno (1,2,3-c,d) Pyrene	240	22	2.3	1.00	
2-Methylnaphthalene	9.9	22	4.0	1.00	J
1-Methylnaphthalene	7.5	22	4.4	1.00	J
1-Methylphenanthrene	ND	22	3.6	1.00	
Naphthalene	31	22	6.6	1.00	
Perylene	160	22	3.8	1.00	
Phenanthrene	100	22	2.2	1.00	
Pyrene	630	22	2.2	1.00	
1,6,7-Trimethylnaphthalene	8.3	22	3.1	1.00	J
Dibenzothiophene	12	22	3.0	1.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	125	14-146	
Nitrobenzene-d5	86	18-162	
p-Terphenyl-d14	106	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City			Page 2 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-Z-Comp	**15-03-1625-2-AA**	**02/04/15 08:30**	**Sediment**	**GC/MS AAA**	**03/23/15**	**03/26/15 18:33**	**150323L11**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	150	23	4.2	1.00	
Acenaphthylene	74	23	3.5	1.00	
Anthracene	200	23	1.9	1.00	
Benzo (a) Anthracene	500	23	3.6	1.00	
Benzo (a) Pyrene	800	23	2.3	1.00	
Benzo (b) Fluoranthene	850	23	2.3	1.00	
Benzo (e) Pyrene	510	23	3.5	1.00	
Benzo (g,h,i) Perylene	500	23	2.2	1.00	
Benzo (k) Fluoranthene	600	23	3.2	1.00	
Biphenyl	17	23	3.2	1.00	J
Chrysene	840	23	2.7	1.00	
Dibenz (a,h) Anthracene	120	23	2.4	1.00	
2,6-Dimethylnaphthalene	32	23	3.8	1.00	
Fluorene	110	23	3.4	1.00	
Indeno (1,2,3-c,d) Pyrene	370	23	2.5	1.00	
2-Methylnaphthalene	14	23	4.2	1.00	J
1-Methylnaphthalene	11	23	4.6	1.00	J
1-Methylphenanthrene	ND	23	3.7	1.00	
Naphthalene	46	23	6.9	1.00	
Perylene	250	23	4.0	1.00	
Phenanthrene	360	23	2.3	1.00	
1,6,7-Trimethylnaphthalene	12	23	3.2	1.00	J
Dibenzothiophene	41	23	3.1	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	96	14-146	
Nitrobenzene-d5	93	18-162	
p-Terphenyl-d14	107	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City			Page 3 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-Z-Comp	**15-03-1625-2-AA**	**02/04/15 08:30**	**Sediment**	**GC/MS AAA**	**03/23/15**	**03/31/15 19:03**	**150323L11**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Fluoranthene	1400	120	11	5.00	
Pyrene	1400	120	11	5.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	82	14-146	
Nitrobenzene-d5	73	18-162	
p-Terphenyl-d14	74	34-148	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City			Page 4 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-437-129**	**N/A**	**Solid**	**GC/MS AAA**	**03/23/15**	**03/25/15 16:04**	**150323L11**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	ND	10	1.8	1.00	
Acenaphthylene	ND	10	1.5	1.00	
Anthracene	ND	10	0.81	1.00	
Benzo (a) Anthracene	ND	10	1.6	1.00	
Benzo (a) Pyrene	ND	10	1.0	1.00	
Benzo (b) Fluoranthene	ND	10	1.0	1.00	
Benzo (e) Pyrene	ND	10	1.5	1.00	
Benzo (g,h,i) Perylene	ND	10	0.94	1.00	
Benzo (k) Fluoranthene	ND	10	1.4	1.00	
Biphenyl	ND	10	1.4	1.00	
Chrysene	ND	10	1.2	1.00	
Dibenz (a,h) Anthracene	ND	10	1.0	1.00	
2,6-Dimethylnaphthalene	ND	10	1.7	1.00	
Fluoranthene	ND	10	0.98	1.00	
Fluorene	ND	10	1.5	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	10	1.1	1.00	
2-Methylnaphthalene	ND	10	1.8	1.00	
1-Methylnaphthalene	ND	10	2.0	1.00	
1-Methylphenanthrene	ND	10	1.6	1.00	
Naphthalene	ND	10	3.0	1.00	
Perylene	ND	10	1.7	1.00	
Phenanthrene	ND	10	1.0	1.00	
Pyrene	ND	10	0.99	1.00	
1,6,7-Trimethylnaphthalene	ND	10	1.4	1.00	
Dibenzothiophene	ND	10	1.3	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	76	14-146	
Nitrobenzene-d5	83	18-162	
p-Terphenyl-d14	71	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 1 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Z-Comp	**15-03-1625-1-AA**	**02/04/15 12:30**	**Sediment**	**GC/MS HHH**	**03/23/15**	**04/06/15 14:45**	**150323L12**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB005/008	ND	0.88	0.34	1.00	
PCB018	ND	0.44	0.16	1.00	
PCB028	0.21	0.44	0.13	1.00	J
PCB031	0.35	0.44	0.19	1.00	J
PCB033	ND	0.44	0.27	1.00	
PCB044	ND	0.44	0.19	1.00	
PCB049	0.32	0.44	0.25	1.00	J
PCB052	0.70	0.44	0.14	1.00	
PCB056	ND	0.44	0.28	1.00	
PCB060	ND	0.44	0.32	1.00	
PCB066	0.32	0.44	0.23	1.00	J
PCB070	0.35	0.44	0.13	1.00	J
PCB074	ND	0.44	0.19	1.00	
PCB087	ND	0.44	0.24	1.00	
PCB095	ND	0.44	0.32	1.00	
PCB097	ND	0.44	0.30	1.00	
PCB099	0.64	0.44	0.13	1.00	
PCB101	0.97	0.44	0.22	1.00	
PCB105	ND	0.44	0.12	1.00	
PCB110	ND	0.44	0.10	1.00	
PCB118	ND	0.44	0.19	1.00	
PCB128	ND	0.44	0.23	1.00	
PCB132/153	1.5	0.88	0.38	1.00	
PCB138/158	1.3	0.88	0.22	1.00	
PCB141	ND	0.44	0.25	1.00	
PCB149	0.99	0.44	0.22	1.00	
PCB151	0.33	0.44	0.15	1.00	J
PCB156	ND	0.44	0.13	1.00	
PCB170	0.67	0.44	0.15	1.00	
PCB174	0.37	0.44	0.32	1.00	J
PCB177	0.41	0.44	0.19	1.00	J
PCB180	1.0	0.44	0.11	1.00	
PCB183	0.31	0.44	0.24	1.00	J

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 2 of 4

Parameter	Result	RL	MDL	DF	Qualifiers
PCB187	0.85	0.44	0.19	1.00	
PCB194	ND	0.44	0.25	1.00	
PCB195	ND	0.44	0.26	1.00	
PCB201	ND	0.44	0.21	1.00	
PCB203	ND	0.44	0.26	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	61	50-150	
p-Terphenyl-d14	55	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 3 of 4

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-16-418-58**	**N/A**	**Solid**	**GC/MS HHH**	**03/23/15**	**03/26/15 14:26**	**150323L12**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
PCB005/008	ND	0.40	0.15	1.00	
PCB018	ND	0.20	0.071	1.00	
PCB028	ND	0.20	0.058	1.00	
PCB031	ND	0.20	0.087	1.00	
PCB033	ND	0.20	0.12	1.00	
PCB044	ND	0.20	0.087	1.00	
PCB049	ND	0.20	0.11	1.00	
PCB052	ND	0.20	0.063	1.00	
PCB056	ND	0.20	0.13	1.00	
PCB060	ND	0.20	0.14	1.00	
PCB066	ND	0.20	0.10	1.00	
PCB070	ND	0.20	0.060	1.00	
PCB074	ND	0.20	0.087	1.00	
PCB087	ND	0.20	0.11	1.00	
PCB095	ND	0.20	0.15	1.00	
PCB097	ND	0.20	0.14	1.00	
PCB099	ND	0.20	0.061	1.00	
PCB101	ND	0.20	0.098	1.00	
PCB105	ND	0.20	0.055	1.00	
PCB110	ND	0.20	0.046	1.00	
PCB118	ND	0.20	0.084	1.00	
PCB128	ND	0.20	0.10	1.00	
PCB132/153	ND	0.40	0.17	1.00	
PCB138/158	ND	0.40	0.10	1.00	
PCB141	ND	0.20	0.11	1.00	
PCB149	ND	0.20	0.098	1.00	
PCB151	ND	0.20	0.067	1.00	
PCB156	ND	0.20	0.058	1.00	
PCB170	ND	0.20	0.068	1.00	
PCB174	ND	0.20	0.15	1.00	
PCB177	ND	0.20	0.087	1.00	
PCB180	ND	0.20	0.048	1.00	
PCB183	ND	0.20	0.11	1.00	
PCB187	ND	0.20	0.084	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
		Units:	ug/kg
Project: Port of Redwood City			Page 4 of 4

Parameter	Result	RL	MDL	DF	Qualifiers
PCB194	ND	0.20	0.11	1.00	
PCB195	ND	0.20	0.12	1.00	
PCB201	ND	0.20	0.097	1.00	
PCB203	ND	0.20	0.12	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	80	50-150	
p-Terphenyl-d14	84	50-150	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
Project: Port of Redwood City			Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Z-Comp	**Sample**	**Sediment**	**GC/MS AAA**	**03/23/15**	**03/26/15 18:13**	**150323S11A**
PRC-DU1-Z-Comp	**Matrix Spike**	**Sediment**	**GC/MS AAA**	**03/23/15**	**03/26/15 17:32**	**150323S11A**
PRC-DU1-Z-Comp	**Matrix Spike Duplicate**	**Sediment**	**GC/MS AAA**	**03/23/15**	**03/26/15 17:52**	**150323S11A**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acenaphthene	16.79	100.0	117.6	101	106.8	90	40-160	10	0-20	
Acenaphthylene	12.32	100.0	111.5	99	100.8	88	40-160	10	0-20	
Anthracene	32.01	100.0	131.8	100	136.3	104	40-160	3	0-20	
Benzo (a) Anthracene	96.59	100.0	185.8	89	197.5	101	40-160	6	0-20	
Benzo (a) Pyrene	181.1	100.0	291.2	110	288.9	108	40-160	1	0-20	
Benzo (b) Fluoranthene	158.0	100.0	253.0	95	257.7	100	40-160	2	0-20	
Benzo (g,h,i) Perylene	148.3	100.0	249.0	101	391.6	243	40-160	45	0-20	3,4
Benzo (k) Fluoranthene	121.0	100.0	189.4	68	214.2	93	40-160	12	0-20	
Chrysene	148.2	100.0	253.3	105	255.1	107	40-160	1	0-20	
Dibenz (a,h) Anthracene	27.51	100.0	116.5	89	168.1	141	40-160	36	0-20	4
Fluoranthene	225.8	100.0	288.8	63	305.2	79	40-160	6	0-20	
Fluorene	24.11	100.0	115.1	91	126.6	103	40-160	10	0-20	
Indeno (1,2,3-c,d) Pyrene	109.0	100.0	206.8	98	294.6	186	40-160	35	0-20	3,4
2-Methylnaphthalene	ND	100.0	91.86	92	96.21	96	40-160	5	0-20	
1-Methylnaphthalene	ND	100.0	93.14	93	110.6	111	40-160	17	0-20	
Naphthalene	14.01	100.0	102.5	88	107.0	93	40-160	4	0-20	
Phenanthrene	46.66	100.0	141.9	95	147.6	101	40-160	4	0-20	
Pyrene	283.3	100.0	258.0	0	401.8	118	40-160	44	0-46	3

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
Project: Port of Redwood City			Page 2 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Z-Comp	**Sample**	**Sediment**	**GC/MS HHH**	**03/23/15**	**04/06/15 14:45**	**150323S12A**
PRC-DU1-Z-Comp	**Matrix Spike**	**Sediment**	**GC/MS HHH**	**03/23/15**	**03/25/15 20:42**	**150323S12A**
PRC-DU1-Z-Comp	**Matrix Spike Duplicate**	**Sediment**	**GC/MS HHH**	**03/27/15**	**03/30/15 14:11**	**150323S12A**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
PCB018	ND	50.00	47.82	96	54.41	109	50-150	13	0-25	
PCB028	ND	50.00	54.26	109	62.94	126	50-150	15	0-25	
PCB044	ND	50.00	51.50	103	60.07	120	50-150	15	0-25	
PCB052	0.3183	50.00	54.22	108	63.04	125	50-150	15	0-25	
PCB066	ND	50.00	60.88	122	56.73	113	50-150	7	0-25	
PCB101	0.4398	50.00	58.11	115	66.40	132	50-150	13	0-25	
PCB105	ND	50.00	68.15	136	68.88	138	50-150	1	0-25	
PCB118	ND	50.00	69.53	139	71.46	143	50-150	3	0-25	
PCB128	ND	50.00	67.61	135	63.73	127	50-150	6	0-25	
PCB170	0.3055	50.00	57.02	113	64.60	129	50-150	12	0-25	
PCB180	0.4712	50.00	77.63	154	77.36	154	50-150	0	0-25	3
PCB187	0.3859	50.00	67.60	134	71.51	142	50-150	6	0-25	
PCB195	ND	50.00	66.66	133	76.93	154	50-150	14	0-25	3

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Sample Duplicate

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	SM 2540 B (M)
Project: Port of Redwood City			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
PRC-DU1-Z-Comp	**Sample**	**Sediment**	**N/A**	**03/30/15 00:00**	**03/30/15 18:00**	**F0330TSD4**
PRC-DU1-Z-Comp	**Sample Duplicate**	**Sediment**	**N/A**	**03/30/15 00:00**	**03/30/15 18:00**	**F0330TSD4**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Total	45.30	45.20	0	0-10	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
Project: Port of Redwood City			Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-437-129	**LCS**	**Solid**	**GC/MS AAA**	**03/23/15**	**03/25/15 14:44**	**150323L11**
099-14-437-129	**LCSD**	**Solid**	**GC/MS AAA**	**03/23/15**	**03/25/15 15:04**	**150323L11**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	ME CL	RPD	RPD CL	Qualifiers
Acenaphthene	100.0	81.37	81	84.47	84	48-108	38-118	4	0-11	
Acenaphthylene	100.0	80.34	80	82.97	83	40-160	20-180	3	0-20	
Anthracene	100.0	78.34	78	80.31	80	40-160	20-180	2	0-20	
Benzo (a) Anthracene	100.0	70.80	71	71.20	71	40-160	20-180	1	0-20	
Benzo (a) Pyrene	100.0	76.13	76	75.72	76	40-160	20-180	1	0-20	
Benzo (b) Fluoranthene	100.0	76.84	77	76.12	76	40-160	20-180	1	0-20	
Benzo (g,h,i) Perylene	100.0	64.30	64	65.68	66	40-160	20-180	2	0-20	
Benzo (k) Fluoranthene	100.0	70.37	70	70.83	71	40-160	20-180	1	0-20	
Chrysene	100.0	74.40	74	75.71	76	40-160	20-180	2	0-20	
Dibenz (a,h) Anthracene	100.0	70.46	70	71.86	72	40-160	20-180	2	0-20	
Fluoranthene	100.0	74.69	75	75.75	76	40-160	20-180	1	0-20	
Fluorene	100.0	79.54	80	81.97	82	40-160	20-180	3	0-20	
Indeno (1,2,3-c,d) Pyrene	100.0	67.64	68	69.67	70	40-160	20-180	3	0-20	
2-Methylnaphthalene	100.0	75.52	76	78.12	78	40-160	20-180	3	0-20	
1-Methylnaphthalene	100.0	72.28	72	74.69	75	40-160	20-180	3	0-20	
Naphthalene	100.0	72.00	72	74.18	74	40-160	20-180	3	0-20	
Phenanthrene	100.0	70.48	70	72.19	72	40-160	20-180	2	0-20	
Pyrene	100.0	70.15	70	70.93	71	40-160	20-180	1	0-16	

Total number of LCS compounds: 18
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	03/20/15
2250 Cordelia Road		Work Order:	15-03-1625
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PCB Congeners
Project: Port of Redwood City			Page 2 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-16-418-58	**LCS**	**Solid**	**GC/MS HHH**	**03/23/15**	**03/26/15 14:53**	**150323L12**
099-16-418-58	**LCSD**	**Solid**	**GC/MS HHH**	**03/23/15**	**03/26/15 15:19**	**150323L12**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	ME CL	RPD	RPD CL	Qualifiers
PCB018	50.00	40.01	80	40.85	82	50-150	33-167	2	0-25	
PCB028	50.00	43.76	88	44.82	90	50-150	33-167	2	0-25	
PCB044	50.00	41.87	84	42.79	86	50-150	33-167	2	0-25	
PCB052	50.00	42.69	85	44.14	88	50-150	33-167	3	0-25	
PCB066	50.00	46.23	92	47.78	96	50-150	33-167	3	0-25	
PCB101	50.00	42.29	85	43.68	87	50-150	33-167	3	0-25	
PCB105	50.00	44.26	89	45.54	91	50-150	33-167	3	0-25	
PCB118	50.00	46.47	93	47.53	95	50-150	33-167	2	0-25	
PCB128	50.00	41.99	84	43.06	86	50-150	33-167	3	0-25	
PCB170	50.00	39.28	79	40.49	81	50-150	33-167	3	0-25	
PCB180	50.00	43.92	88	45.63	91	50-150	33-167	4	0-25	
PCB187	50.00	42.58	85	44.04	88	50-150	33-167	3	0-25	
PCB195	50.00	46.05	92	46.97	94	50-150	33-167	2	0-25	

Total number of LCS compounds: 13
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Glossary of Terms and Qualifiers

Work Order: 15-03-1625 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
	Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.
	A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CHAIN-OF-CUSTODY RECORD

15-03-1625

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	Drew Gantner
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas / Drew Gantner
Project Name:	Port of Redwood City
PO Number:	23613

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	PCBs (See Attached List)	PAHs (See Attached List)									
1	PRC-DU1-Z-Comp	2/4/15	12:30	Sed	1	Glass jar	X	X									
2	PRC-DU2-Z-Comp	2/4/15	08:30	Sed	1	Glass jar		X									
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	

Correct Containers:	Yes	No	
Sample Temperature:	Ambient	Cold	Warm
Sample Preservative:	Yes	No	
Turnaround Time:	STD	Specify:	

Comments:

Samples were frozen on 2/10/15

RELIQUINSHED BY

Signature:	[signature]	**Signature:**	
Print:	A. Gantner	**Print:**	
Organization:	PER	**Organization:**	
DATE: 3/19/15	**TIME:** 1530	**DATE:**	**TIME:**

RECEIVED BY

Signature:	[signature]	**Signature:**	
Print:	PRECY SORIANO	**Print:**	
Organization:	[illegible]	**Organization:**	
DATE: 3/20/15	**TIME:** 0940	**DATE:**	**TIME:**

***MATRIX CODES:** (SED = Sediment); (FW = Freshwater); (WW = Wastewater); (STRMW = Stormwater)

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ANALYTE LIST

Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

Project Proponent: Pacific EcoRisk
Project #: Port of Redwood City - 23613
Site #: PRC-DU1-Z-Comp

ANALYTE	METHOD	TARGETED MRL	ANALYSIS REQUESTED
PCB 008	8082 ECD or 8270C	0.5 µg/kg	X
PCB 018	8082 ECD or 8270C	0.5 µg/kg	X
PCB 028	8082 ECD or 8270C	0.5 µg/kg	X
PCB 031	8082 ECD or 8270C	0.5 µg/kg	X
PCB 033	8082 ECD or 8270C	0.5 µg/kg	X
PCB 044	8082 ECD or 8270C	0.5 µg/kg	X
PCB 049	8082 ECD or 8270C	0.5 µg/kg	X
PCB 052	8082 ECD or 8270C	0.5 µg/kg	X
PCB 056	8082 ECD or 8270C	0.5 µg/kg	X
PCB 060	8082 ECD or 8270C	0.5 µg/kg	X
PCB 066	8082 ECD or 8270C	0.5 µg/kg	X
PCB 070	8082 ECD or 8270C	0.5 µg/kg	X
PCB 074	8082 ECD or 8270C	0.5 µg/kg	X
PCB 087	8082 ECD or 8270C	0.5 µg/kg	X
PCB 095	8082 ECD or 8270C	0.5 µg/kg	X
PCB 097	8082 ECD or 8270C	0.5 µg/kg	X
PCB 099	8082 ECD or 8270C	0.5 µg/kg	X
PCB 101	8082 ECD or 8270C	0.5 µg/kg	X
PCB 105	8082 ECD or 8270C	0.5 µg/kg	X
PCB 110	8082 ECD or 8270C	0.5 µg/kg	X
PCB 118	8082 ECD or 8270C	0.5 µg/kg	X
PCB 128	8082 ECD or 8270C	0.5 µg/kg	X
PCB 132	8082 ECD or 8270C	0.5 µg/kg	X
PCB 138	8082 ECD or 8270C	0.5 µg/kg	X
PCB 141	8082 ECD or 8270C	0.5 µg/kg	X
PCB 149	8082 ECD or 8270C	0.5 µg/kg	X
PCB 151	8082 ECD or 8270C	0.5 µg/kg	X
PCB 153	8082 ECD or 8270C	0.5 µg/kg	X
PCB 156	8082 ECD or 8270C	0.5 µg/kg	X
PCB 158	8082 ECD or 8270C	0.5 µg/kg	X
PCB 170	8082 ECD or 8270C	0.5 µg/kg	X
PCB 174	8082 ECD or 8270C	0.5 µg/kg	X
PCB 177	8082 ECD or 8270C	0.5 µg/kg	X
PCB 180	8082 ECD or 8270C	0.5 µg/kg	X
PCB 183	8082 ECD or 8270C	0.5 µg/kg	X
PCB 187	8082 ECD or 8270C	0.5 µg/kg	X
PCB 194	8082 ECD or 8270C	0.5 µg/kg	X
PCB 195	8082 ECD or 8270C	0.5 µg/kg	X
PCB 201	8082 ECD or 8270C	0.5 µg/kg	X
PCB 203	8082 ECD or 8270C	0.5 µg/kg	X
Acenaphthene	8270C	20 µg/kg	X
Acenaphthylene	8270C	20 µg/kg	X
Anthracene	8270C	20 µg/kg	X
Benz(a)anthracene	8270C	20 µg/kg	X
Benzo(a)pyrene	8270C	20 µg/kg	X
Benzo(e)pyrene	8270C	20 µg/kg	X
Benzo(b)fluoranthene	8270C	20 µg/kg	X
Benzo(g,h,i)perylene	8270C	20 µg/kg	X
Benzo(k)fluoranthene	8270C	20 µg/kg	X
Biphenyl	8270C	20 µg/kg	X
Chrysene	8270C	20 µg/kg	X
Dibenz(a,h)anthracene	8270C	20 µg/kg	X
Dibenzothiophene	8270C	20 µg/kg	X
Dimethylnapthalene 2, 6-	8270C	20 µg/kg	X
Fluoranthene	8270C	20 µg/kg	X
Fluorene	8270C	20 µg/kg	X
Indeno(1,2,3-cd)pyrene	8270C	20 µg/kg	X
Methylnapthalene, 1-	8270C	20 µg/kg	X
Methylnapthalene, 2-	8270C	20 µg/kg	X
Methylphenanthrene, 1-	8270C	20 µg/kg	X
Naphthalene	8270C	20 µg/kg	X
Perylene	8270C	20 µg/kg	X
Phenanthrene	8270C	20 µg/kg	X
Pyrene	8270C	20 µg/kg	X
Trimethylnapthalene, 2, 3, 5-	8270C	20 µg/kg	X

If you have any questions regarding this request as checked,
please call Jeff Cotsifas at (707)207-7760

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ANALYTE LIST

Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

1625

Project Proponent: **Pacific EcoRisk**
Project #: Port of Redwood City - 23613
Site #: **PRC-DU2-Z-Comp**

ANALYTE	METHOD	TARGETED MRL	ANALYSIS REQUESTED
Acenaphthene	8270C	20 µg/kg	X
Acenaphthylene	8270C	20 µg/kg	X
Anthracene	8270C	20 µg/kg	X
Benz(a)anthracene	8270C	20 µg/kg	X
Benzo(a)pyrene	8270C	20 µg/kg	X
Benzo(e)pyrene	8270C	20 µg/kg	X
Benzo(b)fluoranthene	8270C	20 µg/kg	X
Benzo(g,h,i)perylene	8270C	20 µg/kg	X
Benzo(k)fluoranthene	8270C	20 µg/kg	X
Biphenyl	8270C	20 µg/kg	X
Chrysene	8270C	20 µg/kg	X
Dibenz(a,h)anthracene	8270C	20 µg/kg	X
Dibenzothiophene	8270C	20 µg/kg	X
Dimethylnapthalene 2, 6-	8270C	20 µg/kg	X
Fluoranthene	8270C	20 µg/kg	X
Fluorene	8270C	20 µg/kg	X
Indeno(1,2,3-cd)pyrene	8270C	20 µg/kg	X
Methylnapthalene, 1-	8270C	20 µg/kg	X
Methylnapthalene, 2-	8270C	20 µg/kg	X
Methylphenanthrene, 1-	8270C	20 µg/kg	X
Naphthalene	8270C	20 µg/kg	X
Perylene	8270C	20 µg/kg	X
Phenanthrene	8270C	20 µg/kg	X
Pyrene	8270C	20 µg/kg	X
Trimethylnapthalene, 2, 3, 5-	8270C	20 µg/kg	X

If you have any questions regarding this request as checked, please call Jeff Cotsifas at (707)207-7760

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From: (707) 207-7765
CYNTHIA GARCIA
PACIFIC ECORISK
2250 CORDELIA ROAD

FAIRFIELD, CA 94534

Origin ID: CCRA

FedEx Express

J151215022303uv

Ship Date: 19MAR15
ActWgt: 30.0 LB
CAD: 2549479/INET3610

Delivery Address Bar Code

SHIP TO: (714) 895-5494 BILL SENDER

Danielle Gonsman
Eurofins Calscience Env Labs
7440 Lincoln Way

Garden Grove, CA 92841

Ref # Port of Redwood City 23613
Invoice #
PO #
Dept #

FRI - 20 MAR 10:30A
PRIORITY OVERNIGHT

TRK# 7731 7240 8145
0201

92 APVA

92841
CA-US
SNA

537J1/879A/EE4B

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WORK ORDER NUMBER: 15-03- 1625

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Pacific Ecorisk

DATE: 03 / 20 / 2015

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC4 (CF: +0.2°C) Temperature (w/o CF): 2.1 °C (w/ CF): 2.3 °C ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter Checked by: 15

CUSTODY SEAL:

Cooler	☐ Present and Intact	☐ Not Intact	☑ Not Present	☐ N/A	Checked by: 15
Sample(s)	☐ Present and Intact	☐ Not Intact	☑ Not Present	☐ N/A	Checked by: 965

SAMPLE CONDITION:

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	~~☑~~ 03-20-15	☐	☑
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: ☐VOA ☐VOAh ☐VOAna_2 ☐100PJ ☐100PJna_2 ☐125AGB ☐125AGBh ☐125AGBp ☐125PB ☐125PBznna ☐250AGB ☐250CGB ☐250CGBs ☐250PB ☐250PBn ☐500AGB ☐500AGJ ☐500AGJs ☐500PB ☐1AGB ☐1AGBna_2 ☐1AGBs ☐1PB ☐1PBna ☐ _____ ☐ _____ ☐ _____ ☐ _____

Solid: ☐4ozCGJ ☐8ozCGJ ☑16ozCGJ ☐Sleeve (_____) ☐EnCores® ☐TerraCores® ☐ _____ ☐ _____

Air: ☐Tedlar® ☐Canister ☐Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____

Container: **A**=Amber, **B**=Bottle, **C**=Clear, **E**=Envelope, **G**=Glass, **J**=Jar, **P**=Plastic, and **Z**= Ziploc/Resealable Bag

Preservative: **f**=filtered, **h**=HCl, **n**=HNO_3, **na**=NaOH, **na_2**=$Na_2S_2O_3$, **p**=H_3PO_4, **s** = H_2SO_4, **u** = ultra-pure, **znna** = $Zn(CH_3CO_2)_2$ + NaOH

Labeled/Checked by: 965

Reviewed by: 778

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Supplemental Report 1

WORK ORDER NUMBER: 15-05-0017

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Pacific Ecorisk

Client Project Name: Port of Redwood City / 23613

Attention: Jeff Cotsifas
2250 Cordelia Road
Fairfield, CA 94534-1912

Approved for release on 05/21/2015 by:
Danielle Gonsman
Project Manager

ResultLink

Email your PM

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Work Order Number: 15-05-0017

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Work Order Narrative

Work Order: 15-05-0017 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 05/01/15. They were assigned to Work Order 15-05-0017.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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CASE NARRATIVE
Project ID: Port of Redwood City

Holding times

All samples were analyzed outside the EPA Method recommended holding time (in solid samples). However, the sediment samples were frozen after collection and Eurofins Calscience follows standard SWAMP guidelines and the Puget Sound Protocol (USEPA/PSWQAT, 1997, Table 2) for holding times in sediment samples, which states holding times may be extended up to one year if stored frozen at -18°C after collection. Therefore, the sample results have not been flagged as exceeding the EPA Method recommended holding times.

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Sample Summary

Client:	Pacific Ecorisk 2250 Cordelia Road Fairfield, CA 94534-1912	Work Order:	15-05-0017
		Project Name:	Port of Redwood City / 23613
		PO Number:	
		Date/Time Received:	05/01/15 09:45
		Number of Containers:	7
Attn:	Jeff Cotsifas		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
PRC-DU1-Z-Comp	15-05-0017-1	02/04/15 12:30	1	Sediment
PRC-DU2-Z-Comp	15-05-0017-2	02/04/15 08:30	1	Sediment
PRC-DU2-01-Z	15-05-0017-3	02/04/15 08:30	1	Sediment
PRC-DU2-02-Z	15-05-0017-4	02/04/15 09:20	1	Sediment
PRC-DU2-03-Z	15-05-0017-5	02/04/15 09:45	1	Sediment
PRC-DU2-04-Z	15-05-0017-6	02/04/15 10:30	1	Sediment
PRC-DU2-05-Z	15-05-0017-7	02/04/15 11:20	1	Sediment

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	EPA 9060A
		Units:	%
Project: Port of Redwood City / 23613			Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Z-Comp	**15-05-0017-1-A**	**02/04/15 12:30**	**Sediment**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	1.6	0.11	0.027	1.00	

PRC-DU2-Z-Comp	**15-05-0017-2-A**	**02/04/15 08:30**	**Sediment**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	1.9	0.13	0.033	1.00	

PRC-DU2-01-Z	**15-05-0017-3-A**	**02/04/15 08:30**	**Sediment**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	1.9	0.11	0.028	1.00	

PRC-DU2-02-Z	**15-05-0017-4-A**	**02/04/15 09:20**	**Sediment**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	1.9	0.12	0.029	1.00	

PRC-DU2-03-Z	**15-05-0017-5-A**	**02/04/15 09:45**	**Sediment**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	1.9	0.12	0.028	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	EPA 9060A
		Units:	%
Project: Port of Redwood City / 23613			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-04-Z	**15-05-0017-6-A**	**02/04/15 10:30**	**Sediment**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	1.8	0.11	0.028	1.00	

PRC-DU2-05-Z	**15-05-0017-7-A**	**02/04/15 11:20**	**Sediment**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCL1**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	1.9	0.11	0.028	1.00	

Method Blank	**099-06-013-1237**	**N/A**	**Solid**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCL1**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Carbon, Total Organic	ND	0.050	0.012	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	SM 2540 B (M)
		Units:	%
Project: Port of Redwood City / 23613			Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU1-Z-Comp	**15-05-0017-1-AA**	**02/04/15 12:30**	**Sediment**	**N/A**	**05/06/15**	**05/06/15 21:00**	**F0506TSB2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	45.3	0.100	0.100	1.00	

PRC-DU2-Z-Comp	**15-05-0017-2-AA**	**02/04/15 08:30**	**Sediment**	**N/A**	**05/06/15**	**05/06/15 21:00**	**F0506TSB2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	37.2	0.100	0.100	1.00	

PRC-DU2-01-Z	**15-05-0017-3-AA**	**02/04/15 08:30**	**Sediment**	**N/A**	**05/06/15**	**05/06/15 21:00**	**F0506TSB2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	44.0	0.100	0.100	1.00	

PRC-DU2-02-Z	**15-05-0017-4-AA**	**02/04/15 09:20**	**Sediment**	**N/A**	**05/06/15**	**05/06/15 21:00**	**F0506TSB2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	41.1	0.100	0.100	1.00	

PRC-DU2-03-Z	**15-05-0017-5-AA**	**02/04/15 09:45**	**Sediment**	**N/A**	**05/06/15**	**05/06/15 21:00**	**F0506TSB2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	43.4	0.100	0.100	1.00	

PRC-DU2-04-Z	**15-05-0017-6-AA**	**02/04/15 10:30**	**Sediment**	**N/A**	**05/06/15**	**05/06/15 21:00**	**F0506TSB2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	44.0	0.100	0.100	1.00	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	SM 2540 B (M)
		Units:	%
Project: Port of Redwood City / 23613			Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-05-Z	**15-05-0017-7-AA**	**02/04/15 11:20**	**Sediment**	**N/A**	**05/06/15**	**05/06/15 21:00**	**F0506TSB2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	43.8	0.100	0.100	1.00	

Method Blank	**099-05-019-2909**	**N/A**	**Solid**	**N/A**	**05/06/15**	**05/06/15 21:00**	**F0506TSB2**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Solids, Total	ND	0.100	0.100	1.00	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City / 23613			Page 1 of 7

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-01-Z	**15-05-0017-3-AA**	**02/04/15 08:30**	**Sediment**	**GC/MS EEE**	**05/09/15**	**05/11/15 14:50**	**150509L08A**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	640	110	27	5.00	
Acenaphthylene	110	110	20	5.00	
Anthracene	880	110	40	5.00	
Benzo (a) Anthracene	1400	110	24	5.00	
Benzo (a) Pyrene	1200	110	21	5.00	
Benzo (b) Fluoranthene	1400	110	31	5.00	
Benzo (e) Pyrene	730	110	22	5.00	
Benzo (g,h,i) Perylene	650	110	18	5.00	
Benzo (k) Fluoranthene	930	110	32	5.00	
Biphenyl	23	110	21	5.00	J
Chrysene	1900	110	25	5.00	
Dibenz (a,h) Anthracene	190	110	22	5.00	
2,6-Dimethylnaphthalene	80	110	19	5.00	J
Fluoranthene	4600	110	21	5.00	
Fluorene	310	110	36	5.00	
Indeno (1,2,3-c,d) Pyrene	530	110	18	5.00	
2-Methylnaphthalene	ND	110	26	5.00	
1-Methylnaphthalene	ND	110	26	5.00	
1-Methylphenanthrene	ND	110	28	5.00	
Naphthalene	98	110	39	5.00	J
Perylene	440	110	27	5.00	
Phenanthrene	1500	110	25	5.00	
Pyrene	4200	110	26	5.00	
1,6,7-Trimethylnaphthalene	ND	110	22	5.00	
Dibenzothiophene	190	110	15	5.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	92	14-146	
Nitrobenzene-d5	87	18-162	
p-Terphenyl-d14	85	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City / 23613			Page 2 of 7

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-02-Z	**15-05-0017-4-AA**	**02/04/15 09:20**	**Sediment**	**GC/MS EEE**	**05/09/15**	**05/11/15 15:52**	**150509L08A**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	12	25	5.8	1.00	J
Acenaphthylene	40	25	4.4	1.00	
Anthracene	75	25	8.6	1.00	
Benzo (a) Anthracene	210	25	5.3	1.00	
Benzo (a) Pyrene	510	25	4.5	1.00	
Benzo (b) Fluoranthene	500	25	6.7	1.00	
Benzo (e) Pyrene	320	25	4.8	1.00	
Benzo (g,h,i) Perylene	330	25	3.8	1.00	
Benzo (k) Fluoranthene	360	25	6.8	1.00	
Biphenyl	13	25	4.6	1.00	J
Chrysene	330	25	5.5	1.00	
Dibenz (a,h) Anthracene	73	25	4.8	1.00	
2,6-Dimethylnaphthalene	50	25	4.2	1.00	
Fluoranthene	300	25	4.5	1.00	
Fluorene	24	25	7.7	1.00	J
Indeno (1,2,3-c,d) Pyrene	280	25	3.9	1.00	
2-Methylnaphthalene	15	25	5.7	1.00	J
1-Methylnaphthalene	7.4	25	5.7	1.00	J
1-Methylphenanthrene	ND	25	6.1	1.00	
Naphthalene	43	25	8.5	1.00	
Perylene	210	25	5.9	1.00	
Phenanthrene	120	25	5.5	1.00	
Pyrene	740	25	5.5	1.00	
1,6,7-Trimethylnaphthalene	ND	25	4.8	1.00	
Dibenzothiophene	11	25	3.3	1.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	99	14-146	
Nitrobenzene-d5	86	18-162	
p-Terphenyl-d14	86	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City / 23613			Page 3 of 7

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-03-Z	**15-05-0017-5-AA**	**02/04/15 09:45**	**Sediment**	**GC/MS EEE**	**05/09/15**	**05/11/15 16:12**	**150509L08A**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	59	120	27	5.00	J
Acenaphthylene	100	120	21	5.00	J
Anthracene	250	120	40	5.00	
Benzo (a) Anthracene	920	120	25	5.00	
Benzo (a) Pyrene	1000	120	21	5.00	
Benzo (b) Fluoranthene	1100	120	31	5.00	
Benzo (e) Pyrene	640	120	23	5.00	
Benzo (g,h,i) Perylene	510	120	18	5.00	
Benzo (k) Fluoranthene	870	120	32	5.00	
Biphenyl	ND	120	21	5.00	
Chrysene	1500	120	26	5.00	
Dibenz (a,h) Anthracene	140	120	22	5.00	
2,6-Dimethylnaphthalene	50	120	20	5.00	J
Fluoranthene	3100	120	21	5.00	
Fluorene	72	120	36	5.00	J
Indeno (1,2,3-c,d) Pyrene	440	120	18	5.00	
2-Methylnaphthalene	ND	120	27	5.00	
1-Methylnaphthalene	ND	120	27	5.00	
1-Methylphenanthrene	ND	120	29	5.00	
Naphthalene	62	120	40	5.00	J
Perylene	380	120	27	5.00	
Phenanthrene	380	120	26	5.00	
Pyrene	2600	120	26	5.00	
1,6,7-Trimethylnaphthalene	ND	120	22	5.00	
Dibenzothiophene	52	120	16	5.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	94	14-146	
Nitrobenzene-d5	80	18-162	
p-Terphenyl-d14	81	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City / 23613			Page 4 of 7

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-04-Z	**15-05-0017-6-AA**	**02/04/15 10:30**	**Sediment**	**GC/MS EEE**	**05/09/15**	**05/11/15 16:33**	**150509L08A**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	140	110	27	5.00	
Acenaphthylene	270	110	20	5.00	
Anthracene	530	110	39	5.00	
Benzo (a) Anthracene	2600	110	24	5.00	
Benzo (a) Pyrene	1800	110	21	5.00	
Benzo (b) Fluoranthene	3700	110	31	5.00	
Benzo (e) Pyrene	1700	110	22	5.00	
Benzo (g,h,i) Perylene	790	110	17	5.00	
Benzo (k) Fluoranthene	2400	110	31	5.00	
Biphenyl	21	110	21	5.00	J
Dibenz (a,h) Anthracene	310	110	22	5.00	
2,6-Dimethylnaphthalene	60	110	19	5.00	J
Fluorene	96	110	35	5.00	J
Indeno (1,2,3-c,d) Pyrene	830	110	18	5.00	
2-Methylnaphthalene	28	110	26	5.00	J
1-Methylnaphthalene	ND	110	26	5.00	
1-Methylphenanthrene	270	110	28	5.00	
Naphthalene	41	110	39	5.00	J
Perylene	510	110	27	5.00	
Phenanthrene	740	110	25	5.00	
1,6,7-Trimethylnaphthalene	ND	110	22	5.00	
Dibenzothiophene	100	110	15	5.00	J

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	86	14-146	
Nitrobenzene-d5	80	18-162	
p-Terphenyl-d14	86	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City / 23613			Page 5 of 7

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-04-Z	**15-05-0017-6-AA**	**02/04/15 10:30**	**Sediment**	**GC/MS EEE**	**05/09/15**	**05/11/15 20:18**	**150509L08A**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Chrysene	6300	450	100	20.0	
Fluoranthene	17000	450	82	20.0	
Pyrene	14000	450	100	20.0	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	71	14-146	
Nitrobenzene-d5	79	18-162	
p-Terphenyl-d14	86	34-148	

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RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City / 23613			Page 6 of 7

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
PRC-DU2-05-Z	**15-05-0017-7-AA**	**02/04/15 11:20**	**Sediment**	**GC/MS EEE**	**05/09/15**	**05/11/15 16:53**	**150509L08A**

Comment(s): - Results are reported on a dry weight basis.
- Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	ND	110	27	5.00	
Acenaphthylene	50	110	20	5.00	J
Anthracene	130	110	40	5.00	
Benzo (a) Anthracene	330	110	25	5.00	
Benzo (a) Pyrene	860	110	21	5.00	
Benzo (b) Fluoranthene	1000	110	31	5.00	
Benzo (e) Pyrene	550	110	22	5.00	
Benzo (g,h,i) Perylene	430	110	18	5.00	
Benzo (k) Fluoranthene	660	110	32	5.00	
Biphenyl	ND	110	21	5.00	
Chrysene	670	110	25	5.00	
Dibenz (a,h) Anthracene	120	110	22	5.00	
2,6-Dimethylnaphthalene	41	110	20	5.00	J
Fluoranthene	600	110	21	5.00	
Fluorene	ND	110	36	5.00	
Indeno (1,2,3-c,d) Pyrene	380	110	18	5.00	
2-Methylnaphthalene	ND	110	27	5.00	
1-Methylnaphthalene	ND	110	27	5.00	
1-Methylphenanthrene	ND	110	28	5.00	
Naphthalene	ND	110	40	5.00	
Perylene	320	110	27	5.00	
Phenanthrene	170	110	25	5.00	
Pyrene	1400	110	26	5.00	
1,6,7-Trimethylnaphthalene	ND	110	22	5.00	
Dibenzothiophene	ND	110	15	5.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	89	14-146	
Nitrobenzene-d5	88	18-162	
p-Terphenyl-d14	77	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Analytical Report

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
		Units:	ug/kg
Project: Port of Redwood City / 23613			Page 7 of 7

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-14-437-134**	**N/A**	**Solid**	**GC/MS EEE**	**05/09/15**	**05/11/15 12:27**	**150509L08A**

Comment(s): - Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag.

Parameter	Result	RL	MDL	DF	Qualifiers
Acenaphthene	ND	10	2.4	1.00	
Acenaphthylene	ND	10	1.8	1.00	
Anthracene	ND	10	3.5	1.00	
Benzo (a) Anthracene	ND	10	2.2	1.00	
Benzo (a) Pyrene	ND	10	1.8	1.00	
Benzo (b) Fluoranthene	ND	10	2.7	1.00	
Benzo (e) Pyrene	ND	10	2.0	1.00	
Benzo (g,h,i) Perylene	ND	10	1.5	1.00	
Benzo (k) Fluoranthene	ND	10	2.8	1.00	
Biphenyl	ND	10	1.9	1.00	
Chrysene	ND	10	2.2	1.00	
Dibenz (a,h) Anthracene	ND	10	2.0	1.00	
2,6-Dimethylnaphthalene	ND	10	1.7	1.00	
Fluoranthene	ND	10	1.8	1.00	
Fluorene	ND	10	3.1	1.00	
Indeno (1,2,3-c,d) Pyrene	ND	10	1.6	1.00	
2-Methylnaphthalene	ND	10	2.3	1.00	
1-Methylnaphthalene	ND	10	2.3	1.00	
1-Methylphenanthrene	ND	10	2.5	1.00	
Naphthalene	ND	10	3.5	1.00	
Perylene	ND	10	2.4	1.00	
Phenanthrene	ND	10	2.2	1.00	
Pyrene	ND	10	2.2	1.00	
1,6,7-Trimethylnaphthalene	ND	10	1.9	1.00	
Dibenzothiophene	ND	10	1.3	1.00	

Surrogate	Rec. (%)	Control Limits	Qualifiers
2-Fluorobiphenyl	95	14-146	
Nitrobenzene-d5	67	18-162	
p-Terphenyl-d14	78	34-148	

RL: Reporting Limit. DF: Dilution Factor. MDL: Method Detection Limit.

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	EPA 9060A
Project: Port of Redwood City / 23613			Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU1-Z-Comp	**Sample**	**Sediment**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCS1**
PRC-DU1-Z-Comp	**Matrix Spike**	**Sediment**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCS1**
PRC-DU1-Z-Comp	**Matrix Spike Duplicate**	**Sediment**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCS1**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Carbon, Total Organic	0.7400	3.000	2.810	69	3.210	82	75-125	13	0-25	3

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Spike/Spike Duplicate

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
Project: Port of Redwood City / 23613			Page 2 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
PRC-DU2-01-Z	**Sample**	**Sediment**	**GC/MS EEE**	**05/09/15**	**05/11/15 14:50**	**150509S08**
PRC-DU2-01-Z	**Matrix Spike**	**Sediment**	**GC/MS EEE**	**05/15/15**	**05/11/15 15:10**	**150509S08**
PRC-DU2-01-Z	**Matrix Spike Duplicate**	**Sediment**	**GC/MS EEE**	**05/15/15**	**05/11/15 15:31**	**150509S08**

Parameter	Sample Conc.	Spike Added	MS Conc.	MS %Rec.	MSD Conc.	MSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Acenaphthene	280.6	100.0	309.7	29	316.6	36	40-160	2	0-20	3
Acenaphthylene	50.25	100.0	116.5	66	121.1	71	40-160	4	0-20	
Anthracene	385.5	100.0	350.7	0	353.7	0	40-160	1	0-20	3
Benzo (a) Anthracene	624.4	100.0	578.8	0	589.7	0	40-160	2	0-20	3
Benzo (a) Pyrene	517.8	100.0	495.3	0	504.2	0	40-160	2	0-20	3
Benzo (b) Fluoranthene	602.6	100.0	571.5	0	557.7	0	40-160	2	0-20	3
Benzo (g,h,i) Perylene	284.8	100.0	290.3	6	284.1	0	40-160	2	0-20	3
Benzo (k) Fluoranthene	408.5	100.0	388.4	0	415.8	7	40-160	7	0-20	3
Chrysene	847.3	100.0	746.8	0	749.5	0	40-160	0	0-20	3
Dibenz (a,h) Anthracene	81.45	100.0	125.2	44	133.9	52	40-160	7	0-20	
Fluoranthene	2023	100.0	1726	0	1714	0	40-160	1	0-20	3
Fluorene	137.9	100.0	191.6	54	198.6	61	40-160	4	0-20	
Indeno (1,2,3-c,d) Pyrene	233.6	100.0	256.6	23	256.4	23	40-160	0	0-20	3
2-Methylnaphthalene	ND	100.0	70.15	70	72.82	73	40-160	4	0-20	
1-Methylnaphthalene	ND	100.0	63.33	63	61.39	61	40-160	3	0-20	
Naphthalene	ND	100.0	98.41	98	103.4	103	40-160	5	0-20	
Phenanthrene	661.9	100.0	602.5	0	612.5	0	40-160	2	0-20	3
Pyrene	1844	100.0	1572	0	1583	0	40-160	1	0-46	3

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RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - Sample Duplicate

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	SM 2540 B (M)
Project: Port of Redwood City / 23613			Page 1 of 1

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	Duplicate Batch Number
PRC-DU1-Z-Comp	**Sample**	**Sediment**	**N/A**	**05/06/15 00:00**	**05/06/15 21:00**	**F0506TSD2**
PRC-DU1-Z-Comp	**Sample Duplicate**	**Sediment**	**N/A**	**05/06/15 00:00**	**05/06/15 21:00**	**F0506TSD2**

Parameter	Sample Conc.	DUP Conc.	RPD	RPD CL	Qualifiers
Solids, Total	45.30	44.90	1	0-10	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	N/A
		Method:	EPA 9060A
Project: Port of Redwood City / 23613			Page 1 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-06-013-1237	**LCS**	**Solid**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCL1**
099-06-013-1237	**LCSD**	**Solid**	**TOC 5**	**05/12/15**	**05/12/15 20:10**	**F0512TOCL1**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	RPD	RPD CL	Qualifiers
Carbon, Total Organic	0.6000	0.5485	91	0.5438	91	80-120	1	0-20	

RPD: Relative Percent Difference. CL: Control Limits

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Quality Control - LCS/LCSD

Pacific Ecorisk		Date Received:	05/01/15
2250 Cordelia Road		Work Order:	15-05-0017
Fairfield, CA 94534-1912		Preparation:	EPA 3541
		Method:	EPA 8270C SIM PAHs
Project: Port of Redwood City / 23613			Page 2 of 2

Quality Control Sample ID	Type	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-14-437-134	**LCS**	**Solid**	**GC/MS EEE**	**05/09/15**	**05/11/15 11:46**	**150509L08A**
099-14-437-134	**LCSD**	**Solid**	**GC/MS EEE**	**05/09/15**	**05/11/15 12:06**	**150509L08A**

Parameter	Spike Added	LCS Conc.	LCS %Rec.	LCSD Conc.	LCSD %Rec.	%Rec. CL	ME CL	RPD	RPD CL	Qualifiers
Acenaphthene	100.0	86.33	86	90.19	90	48-108	38-118	4	0-11	
Acenaphthylene	100.0	84.03	84	89.56	90	40-160	20-180	6	0-20	
Anthracene	100.0	79.66	80	85.00	85	40-160	20-180	6	0-20	
Benzo (a) Anthracene	100.0	77.19	77	81.64	82	40-160	20-180	6	0-20	
Benzo (a) Pyrene	100.0	79.26	79	82.42	82	40-160	20-180	4	0-20	
Benzo (b) Fluoranthene	100.0	89.38	89	90.58	91	40-160	20-180	1	0-20	
Benzo (g,h,i) Perylene	100.0	78.12	78	80.74	81	40-160	20-180	3	0-20	
Benzo (k) Fluoranthene	100.0	72.60	73	78.02	78	40-160	20-180	7	0-20	
Chrysene	100.0	79.44	79	83.84	84	40-160	20-180	5	0-20	
Dibenz (a,h) Anthracene	100.0	75.80	76	78.12	78	40-160	20-180	3	0-20	
Fluoranthene	100.0	77.57	78	82.60	83	40-160	20-180	6	0-20	
Fluorene	100.0	86.00	86	89.80	90	40-160	20-180	4	0-20	
Indeno (1,2,3-c,d) Pyrene	100.0	75.06	75	79.01	79	40-160	20-180	5	0-20	
2-Methylnaphthalene	100.0	81.10	81	85.48	85	40-160	20-180	5	0-20	
1-Methylnaphthalene	100.0	68.57	69	72.95	73	40-160	20-180	6	0-20	
Naphthalene	100.0	74.95	75	79.34	79	40-160	20-180	6	0-20	
Phenanthrene	100.0	83.21	83	88.62	89	40-160	20-180	6	0-20	
Pyrene	100.0	79.75	80	86.50	86	40-160	20-180	8	0-16	

Total number of LCS compounds: 18
Total number of ME compounds: 0
Total number of ME compounds allowed: 1
LCS ME CL validation result: Pass

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RPD: Relative Percent Difference. CL: Control Limits

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Glossary of Terms and Qualifiers

Work Order: 15-05-0017 Page 1 of 1

Qualifiers	Definition
*	See applicable analysis comment.
<	Less than the indicated value.
>	Greater than the indicated value.
1	Surrogate compound recovery was out of control due to a required sample dilution. Therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to suspected matrix interference. The associated LCS recovery was in control.
4	The MS/MSD RPD was out of control due to suspected matrix interference.
5	The PDS/PDSD or PES/PESD associated with this batch of samples was out of control due to suspected matrix interference.
6	Surrogate recovery below the acceptance limit.
7	Surrogate recovery above the acceptance limit.
B	Analyte was present in the associated method blank.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
CI	See case narrative.
E	Concentration exceeds the calibration range.
ET	Sample was extracted past end of recommended max. holding time.
HD	The chromatographic pattern was inconsistent with the profile of the reference fuel standard.
HDH	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but heavier hydrocarbons were also present (or detected).
HDL	The sample chromatographic pattern for TPH matches the chromatographic pattern of the specified standard but lighter hydrocarbons were also present (or detected).
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
JA	Analyte positively identified but quantitation is an estimate.
ME	LCS Recovery Percentage is within Marginal Exceedance (ME) Control Limit range (+/- 4 SD from the mean).
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
SG	The sample extract was subjected to Silica Gel treatment prior to analysis.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

A calculated total result (Example: Total Pesticides) is the summation of each component concentration and/or, if "J" flags are reported, estimated concentration. Component concentrations showing not detected (ND) are summed into the calculated total result as zero concentrations.

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Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CHAIN-OF-CUSTODY RECORD
15-05-0017

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	Drew Gantner
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas / Drew Gantner
Project Name:	Port of Redwood City
PO Number:	23613

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	Dioxins (PCDD PCDF/8290 TCDD TEQ)	PAH (8270C)	TOC	Total Solids							
1	PRC-DU1-Z-Comp	2/4/15	12:30	Sed	1	Glass jar	X		X	X							
2	PRC-DU2-Z-Comp	2/4/15	08:30	Sed	1	Glass jar	X		X	X							
3	PRC-DU2-01-Z	2/4/15	08:30	Sed	1	Glass jar		X	X	X							
4	PRC-DU2-02-Z	2/4/15	09:20	Sed	1	Glass jar		X	X	X							
5	PRC-DU2-03-Z	2/4/15	09:45	Sed	1	Glass jar		X	X	X							
6	PRC-DU2-04-Z	2/4/15	10:30	Sed	1	Glass jar		X	X	X							
7	PRC-DU2-05-Z	2/4/15	11:20	Sed	1	Glass jar		X	X	X							
8																	
9																	
10																	
11																	
12																	
13																	
14																	

Correct Containers:	**Yes**	**No**	
Sample Temperature:	**Ambient**	**Cold**	**Warm**
Sample Preservative:	**Yes**	**No**	
Turnaround Time:	**STD**	**Specify:**	

Comments:

Samples were Frozen on 2/10/15

RELIQUINSHED BY

Signature:	[signature]	**Signature:**	Tom O'Malley to ECI
Print:	Andrew Gantner	**Print:**	Tom O'Malley
Organization:	PER	**Organization:**	ECI
DATE:	4/30/15	**TIME:**	1324
		DATE:	4/30/15
		TIME:	1730

RECEIVED BY

Signature:	Tom O'Malley	**Signature:**	[signature]
Print:	Tom O'Malley	**Print:**	PRECY SORIANO
Organization:	ECI	**Organization:**	ECI
DATE:	4/30/15	**TIME:**	1324
		DATE:	5/01/15
		TIME:	0945

***MATRIX CODES**: (**SED** = Sediment); (**FW** = Freshwater); (**WW** = Wastewater); (**STRMW** = Stormwater)

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ANALYTE LIST

Pacific EcoRisk
2250 Cordelia Rd.
Fairfield, CA 94534

0017

Project Proponent:	Pacific EcoRisk		
Project #:	Port of Redwood City - 23613		
Site #:	PRC-DU2-01-Z	PRC-DU2-02-Z	PRC-DU2-03-Z
	PRC-DU2-04-Z	PRC-DU2-05-Z	

ANALYTE	METHOD	TARGETED MRL	ANALYSIS REQUESTED
Total Organic Carbon	EPA 415.1	0.10%	X
Arsenic	6020	2 mg/kg	X
Cadmium	6020	0.3 mg/kg	X
Chromium	6020	5 mg/kg	X
Copper	6020	5 mg/kg	X
Lead	6020	5 mg/kg	X
Nickel	6020	5 mg/kg	X
Silver	6020	0.2 mg/kg	X
Zinc	6020	1 mg/kg	X
Mercury	7471A	0.02 mg/kg	X
Selenium	7742	0.1 mg/kg	X
Acenaphthene	8270C	20 µg/kg	X
Acenaphthylene	8270C	20 µg/kg	X
Anthracene	8270C	20 µg/kg	X
Benz(a)anthracene	8270C	20 µg/kg	X
Benzo(a)pyrene	8270C	20 µg/kg	X
Benzo(e)pyrene	8270C	20 µg/kg	X
Benzo(b)fluoranthene	8270C	20 µg/kg	X
Benzo(g,h,i)perylene	8270C	20 µg/kg	X
Benzo(k)fluoranthene	8270C	20 µg/kg	X
Biphenyl	8270C	20 µg/kg	X
Chrysene	8270C	20 µg/kg	X
Dibenz(a,h)anthracene	8270C	20 µg/kg	X
Dibenzothiophene	8270C	20 µg/kg	X
Dimethylnapthalene 2, 6-	8270C	20 µg/kg	X
Fluoranthene	8270C	20 µg/kg	X
Fluorene	8270C	20 µg/kg	X
Indeno(1,2,3-cd)pyrene	8270C	20 µg/kg	X
Methylnapthalene, 1-	8270C	20 µg/kg	X
Methylnapthalene, 2-	8270C	20 µg/kg	X
Methylphenanthrene, 1-	8270C	20 µg/kg	X
Naphthalene	8270C	20 µg/kg	X
Perylene	8270C	20 µg/kg	X
Phenanthrene	8270C	20 µg/kg	X
Pyrene	8270C	20 µg/kg	X
Trimethylnapthalene, 2, 3, 5-	8270C	20 µg/kg	X
QA/QC			X

If you have any questions regarding this request as checked, please call Jeff Cotsifas at (707)207-7760

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GSO

800-322-5555 www.gso.com

0017

Ship From
CAL SCIENCE- CONCORD
ALAN KEMP
5063 COMMERCIAL CIRCLE
#H
CONCORD, CA 94520

Ship To
CEL
SAMPLE RECEIVING
7440 LINCOLN WAY
GARDEN GROVE, CA 92841

COD: $0.00
Weight: 0 lb(s)
Reference:
PACIFIC ECORISK
Delivery Instructions:

Signature Type: REQUIRED

Tracking #: 527772820

NPS

ORC **A**
GARDEN GROVE

D92845A

37191547

Print Date: 4/30/2015 3:31 PM

LABEL INSTRUCTIONS:

Do not copy or reprint this label for additional shipments - each package must have a unique barcode.

Use the "Print Label" button on this page to print the shipping label on a laser or inkjet printer. Securely attach this label to your package, do not cover the barcode.

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WORK ORDER NUMBER: 15-05- 0017

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Pacific Eco risk

DATE: 05 / 01 / 2015

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC2 (CF:-0.3°C); Temperature (w/o CF): -2.6 °C (w/ CF): -2.9 °C; ☑ Blank ☐ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter

Checked by: 836

CUSTODY SEAL:

Cooler	☑ Present and Intact	☐ Present but Not Intact	☐ Not Present	☐ N/A	Checked by: 836
Sample(s)	☐ Present and Intact	☐ Present but Not Intact	☑ Not Present	☐ N/A	Checked by: 300

SAMPLE CONDITION:

	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☐	☐	☑
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: ☐ VOA ☐ VOAh ☐ VOAna_2 ☐ 100PJ ☐ 100PJna_2 ☐ 125AGB ☐ 125AGBh ☐ 125AGBp ☐ 125PB

☐ 125PBznna ☐ 250AGB ☐ 250CGB ☐ 250CGBs ☐ 250PB ☐ 250PBn ☐ 500AGB ☐ 500AGJ ☐ 500AGJs

☐ 500PB ☐ 1AGB ☐ 1AGBna_2 ☐ 1AGBs ☐ 1PB ☐ 1PBna ☐ _____ ☐ _____ ☐ _____ ☐ _____

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☑ 16ozCGJ ☐ Sleeve (_____) ☐ EnCores® (_____) ☐ TerraCores® (_____) ☐ _____

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na_2** = $Na_2S_2O_3$, **p** = H_3PO_4, **s** = H_2SO_4, **u** = ultra-pure, **znna** = $Zn(CH_3CO_2)_2$ + NaOH

Labeled/Checked by: 300

Reviewed by: 836

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Subcontractor Analysis Report

Work Order: 15-05-0017 Page 1 of 1

One or more samples in this work order have tests that were subcontracted. The subcontract report(s) follows.

For subcontracted tests, please reference the laboratory information noted below.

1. Eurofins Lancaster Laboratories - Lancaster,PA NELAP 10276CA
   EPA 8290A Dioxins/Furans

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2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

May 19, 2015

Project: 15-05-0017

Submittal Date: 05/07/2015
Group Number: 1559459
PO Number: 15-05-0017
State of Sample Origin: NA

Client Sample Description	Lancaster Labs (LL) #
PRC-DU1-Z-Comp Composite Sediment	7878157
PRC-DU2-Z-Comp Composite Sediment	7878158

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

ELECTRONIC COPY TO Eurofins Calscience, Inc. Attn: Danielle Gonsman

Respectfully Submitted,

Nicole L. Maljovec
Manager

(717) 556-7259

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Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU1-Z-Comp Composite Sediment

LL Sample # SW 7878157
LL Group # 1559459
Account # 19744

Project Name: 15-05-0017

Collected: 02/04/2015 12:30

Submitted: 05/07/2015 09:20
Reported: 05/19/2015 13:58

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1--

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
Wet Chemistry		**SM 2540 G-1997**	%	%	
00111	Moisture	n.a.	56.3	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

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Lancaster Laboratories Environmental
2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

Sample Description: PRC-DU1-Z-Comp Composite Sediment

LL Sample # SW 7878157
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Project Name: 15-05-0017

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Submitted: 05/07/2015 09:20
Reported: 05/19/2015 13:58

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1--

CAT No.	Analysis Name	CAS Number	Dry Result		Dry EDL	Dilution Factor
Dioxins/Furans	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**		**ng/kg**	
12937	2378-TCDD	1746-01-6	0.307	JBQ	0.0788	1
12937	12378-PeCDD	40321-76-4	2.04	JBQ	0.115	1
12937	123478-HxCDD	39227-28-6	2.21	JB	0.0881	1
12937	123678-HxCDD	57653-85-7	8.30	JB	0.0889	1
12937	123789-HxCDD	19408-74-3	4.63	JB	0.0888	1
12937	1234678-HpCDD	35822-46-9	191	B	0.169	1
12937	OCDD	3268-87-9	1,410	B	0.0639	1
13233	2378-TCDF-Conf	51207-31-9	2.11	JC	0.155	1
12937	12378-PeCDF	57117-41-6	1.77	JB	0.0411	1
12937	23478-PeCDF	57117-31-4	3.98	JB	0.0377	1
12937	123478-HxCDF	70648-26-9	2.03	JB	0.0511	1
12937	123678-HxCDF	57117-44-9	1.84	JB	0.0483	1
12937	123789-HxCDF	72918-21-9	0.817	JB	0.0555	1
12937	234678-HxCDF	60851-34-5	2.86	JB	0.0498	1
12937	1234678-HpCDF	67562-39-4	21.2	B	0.0387	1
12937	1234789-HpCDF	55673-89-7	1.42	JB	0.0488	1
12937	OCDF	39001-02-0	43.0	B	0.0310	1
D/F Toxic Equivalents	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**		**ng/kg**	
12937	TEQ WHO 2005 - EDLx0.0+EMPC	n.a.	9.01			1
12937	TEQ WHO 2005 - EDLx1.0+EMPC	n.a.	9.01			1

Labeled Compounds	**%Rec**	**Windows**
13C12-2378-TCDF-Conf	64	40 - 135
13C12-2378-TCDD	90	40 - 135
13C12-12378-PeCDD	90	40 - 135
13C12-123478-HxCDD	92	40 - 135
13C12-123678-HxCDD	92	40 - 135
13C12-123789-HxCDD	92	40 - 135
13C12-1234678-HpCDD	102	40 - 135
13C12-OCDD	105	40 - 135
13C12-12378-PeCDF	96	40 - 135
13C12-23478-PeCDF	95	40 - 135
13C12-123478-HxCDF	101	40 - 135
13C12-123678-HxCDF	102	40 - 135
13C12-234678-HxCDF	101	40 - 135
13C12-123789-HxCDF	104	40 - 135
13C12-1234678-HpCDF	112	40 - 135
13C12-1234789-HpCDF	99	40 - 135
13C12-OCDF	98	40 - 135

Dioxins/Furans Data Qualifiers:

B *Detected in Method Blank*
U *Undetected*
J *Estimated concentration between Estimated Detection Limit and Minimum Level*
E *Exceeds calibration range*

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Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU1-Z-Comp Composite Sediment

LL Sample # SW 7878157
LL Group # 1559459
Account # 19744

Project Name: 15-05-0017

Collected: 02/04/2015 12:30

Submitted: 05/07/2015 09:20
Reported: 05/19/2015 13:58

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1--

CAT No.	Analysis Name	CAS Number	Dry Result	Dry EDL	Dilution Factor

C *Confirmed quantitation on secondary GC column*
Q *EMPC - Estimated Maximum Possible Concentration*
F *Interference is present*
S *Saturation of detection signal*

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Lancaster Laboratories Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU1-Z-Comp Composite Sediment

LL Sample # SW 7878157
LL Group # 1559459
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Project Name: 15-05-0017

Collected: 02/04/2015 12:30

Submitted: 05/07/2015 09:20
Reported: 05/19/2015 13:58

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1--

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
12937	Dioxins/Furans in Solids-8290	SW-846 8290A Feb 2007 Rev 1	1	15133001	05/14/2015 21:21	Michael A Ziegler	1
13233	D/F in Solids 8290-Conf	SW-846 8290A Feb 2007 Rev 1	1	15133001	05/18/2015 21:38	Michael A Ziegler	1
11030	Dioxins/Furans in Solids - Sox	SW-846 8290A Feb 2007 Rev 1	1	15133001	05/13/2015 13:25	Ginelle L McQuaid	1
00111	Moisture	SM 2540 G-1997	1	15135820007A	05/15/2015 22:11	Scott W Freisher	1

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Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-Z-Comp Composite Sediment

LL Sample # SW 7878158
LL Group # 1559459
Account # 19744

Project Name: 15-05-0017

Collected: 02/04/2015 08:30

Submitted: 05/07/2015 09:20
Reported: 05/19/2015 13:58

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2--

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
Wet Chemistry		**SM 2540 G-1997**	%	%	
00111	Moisture	n.a.	58.8	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

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Lancaster Laboratories Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-Z-Comp Composite Sediment

LL Sample # SW 7878158
LL Group # 1559459
Account # 19744

Project Name: 15-05-0017

Collected: 02/04/2015 08:30

Submitted: 05/07/2015 09:20
Reported: 05/19/2015 13:58

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2--

CAT No.	Analysis Name	CAS Number	Dry Result		Dry EDL	Dilution Factor
Dioxins/Furans	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**		**ng/kg**	
12937	2378-TCDD	1746-01-6	0.332	JBQ	0.0794	1
12937	12378-PeCDD	40321-76-4	1.75	JBQ	0.123	1
12937	123478-HxCDD	39227-28-6	2.48	JB	0.158	1
12937	123678-HxCDD	57653-85-7	8.20	JB	0.154	1
12937	123789-HxCDD	19408-74-3	4.14	JB	0.150	1
12937	1234678-HpCDD	35822-46-9	411	B	0.264	1
12937	OCDD	3268-87-9	3,100	B	0.0885	1
13233	2378-TCDF-Conf	51207-31-9	1.74	JC	0.135	1
12937	12378-PeCDF	57117-41-6	1.43	JB	0.0438	1
12937	23478-PeCDF	57117-31-4	3.35	JB	0.0423	1
12937	123478-HxCDF	70648-26-9	1.98	JB	0.0601	1
12937	123678-HxCDF	57117-44-9	1.76	JB	0.0561	1
12937	123789-HxCDF	72918-21-9	0.589	JB	0.0627	1
12937	234678-HxCDF	60851-34-5	2.54	JB	0.0558	1
12937	1234678-HpCDF	67562-39-4	23.7	B	0.0483	1
12937	1234789-HpCDF	55673-89-7	1.96	JBQ	0.0651	1
12937	OCDF	39001-02-0	84.0	B	0.0451	1
D/F Toxic Equivalents	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**		**ng/kg**	
12937	TEQ WHO 2005 - EDLx0.0+EMPC	n.a.	11.1			1
12937	TEQ WHO 2005 - EDLx1.0+EMPC	n.a.	11.1			1

Labeled Compounds	**%Rec**	**Windows**
13C12-2378-TCDF-Conf	60	40 - 135
13C12-2378-TCDD	92	40 - 135
13C12-12378-PeCDD	87	40 - 135
13C12-123478-HxCDD	93	40 - 135
13C12-123678-HxCDD	93	40 - 135
13C12-123789-HxCDD	94	40 - 135
13C12-1234678-HpCDD	95	40 - 135
13C12-OCDD	104	40 - 135
13C12-12378-PeCDF	97	40 - 135
13C12-23478-PeCDF	95	40 - 135
13C12-123478-HxCDF	100	40 - 135
13C12-123678-HxCDF	103	40 - 135
13C12-234678-HxCDF	100	40 - 135
13C12-123789-HxCDF	99	40 - 135
13C12-1234678-HpCDF	110	40 - 135
13C12-1234789-HpCDF	92	40 - 135
13C12-OCDF	87	40 - 135

Dioxins/Furans Data Qualifiers:

B *Detected in Method Blank*
U *Undetected*
J *Estimated concentration between Estimated Detection Limit and Minimum Level*
E *Exceeds calibration range*

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Analysis Report

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Sample Description: PRC-DU2-Z-Comp Composite Sediment

LL Sample # SW 7878158
LL Group # 1559459
Account # 19744

Project Name: 15-05-0017

Collected: 02/04/2015 08:30

Submitted: 05/07/2015 09:20
Reported: 05/19/2015 13:58

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2--

CAT No.	Analysis Name	CAS Number	Dry Result	Dry EDL	Dilution Factor

C	*Confirmed quantitation on secondary GC column*
Q	*EMPC - Estimated Maximum Possible Concentration*
F	*Interference is present*
S	*Saturation of detection signal*

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Analysis Report

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Sample Description: PRC-DU2-Z-Comp Composite Sediment

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Submitted: 05/07/2015 09:20
Reported: 05/19/2015 13:58

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2--

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
12937	Dioxins/Furans in Solids-8290	SW-846 8290A Feb 2007 Rev 1	1	15133001	05/14/2015 22:17	Michael A Ziegler	1
13233	D/F in Solids 8290-Conf	SW-846 8290A Feb 2007 Rev 1	1	15133001	05/18/2015 22:33	Michael A Ziegler	1
11030	Dioxins/Furans in Solids - Sox	SW-846 8290A Feb 2007 Rev 1	1	15133001	05/13/2015 13:25	Ginelle L McQuaid	1
00111	Moisture	SM 2540 G-1997	1	15135820007A	05/15/2015 22:11	Scott W Freisher	1

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Analysis Report

Quality Control Summary

Client Name: Eurofins Calscience, Inc. Group Number: 1559459
Reported: 05/19/2015 13:58

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 15135820007A	Sample number(s): 7878157-7878158							
Moisture				100		99-101		

Analysis Name	Blank Result	Blank EDL	Report Units	OPR %REC	OPRD %REC	OPR/OPRD Limits	RPD	RPD Max
Batch number: 15133001	Sample number(s): 7878157-7878158							
2378-TCDD	0.0656 J	0.0251	ng/kg	108		67-158		
12378-PeCDD	0.0706 J	0.0210	ng/kg	110		70-142		
123478-HxCDD	0.0613 J	0.0120	ng/kg	113		70-164		
123678-HxCDD	0.0590 J	0.0121	ng/kg	113		76-134		
123789-HxCDD	0.0720 J	0.0119	ng/kg	115		64-162		
1234678-HpCDD	0.101 J	0.0111	ng/kg	112		70-140		
OCDD	0.214 J	0.0165	ng/kg	107		78-144		
2378-TCDF-Conf	N.D.	0.138	ng/kg	116		40-135		
12378-PeCDF	0.0998 J	0.00818	ng/kg	112		80-134		
23478-PeCDF	0.0696 J	0.00821	ng/kg	115		68-160		
123478-HxCDF	0.0661 J	0.00982	ng/kg	108		72-134		
123678-HxCDF	0.0537 J	0.00924	ng/kg	106		84-130		
123789-HxCDF	0.0699 J	0.0106	ng/kg	101		78-130		
234678-HxCDF	0.0557 J	0.00926	ng/kg	105		70-156		
1234678-HpCDF	0.0602 J	0.00528	ng/kg	106		82-122		
1234789-HpCDF	0.0773 J	0.00789	ng/kg	105		78-138		
OCDF	0.157 J	0.0146	ng/kg	100		63-170		
TEQ WHO 2005 - EDLx0.0+EMPC	0.210		ng/kg					
TEQ WHO 2005 - EDLx1.0+EMPC	0.210		ng/kg					

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 15135820007A	Sample number(s): 7878157-7878158					BKG: P878274			
Moisture						14.9	15.5	4	5

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ / MRL.
(2) The unspiked result was more than four times the spike added.

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Analysis Report

Quality Control Summary

Client Name: Eurofins Calscience, Inc. Group Number: 1559459
Reported: 05/19/2015 13:58

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: Dioxins/Furans in Solids-8290
Batch number: 15133001

	13C12-2378-TCDD	13C12-12378-PeCDD	13C12-123478-HxCDD	13C12-123678-HxCDD	13C12-123789-HxCDD	13C12-1234678-HpCDD
7878157	90	90	92	92	92	102
7878158	92	87	93	93	94	95
Blank	77	82	93	95	94	97
OPR	73	73	86	88	87	87
Limits:	40-135	40-135	40-135	40-135	40-135	40-135

	13C12-OCDD	13C12-12378-PeCDF	13C12-23478-PeCDF	13C12-123478-HxCDF	13C12-123678-HxCDF	13C12-234678-HxCDF
7878157	105	96	95	101	102	101
7878158	104	97	95	100	103	100
Blank	102	84	84	94	100	96
OPR	93	80	78	93	99	95
Limits:	40-135	40-135	40-135	40-135	40-135	40-135

	13C12-123789-HxCDF	13C12-1234678-HpCDF	13C12-1234789-HpCDF	13C12-OCDF	13C12-2378-TCDF-Conf
7878157	104	112	99	98	64
7878158	99	110	92	87	60
Blank	94	117	90	93	62
OPR	94	105	88	89	74
Limits:	40-135	40-135	40-135	40-135	40-135

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*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ / MRL.
(2) The unspiked result was more than four times the spike added.

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7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1427
TEL: (714) 895-5494 . FAX: (714) 894-7501

TO: EUROFINS LANCASTER

A-19744
G-1559459
S-7878157-58

CHAIN OF CUSTODY RECORD

DATE: 05/06/15
PAGE: 1 OF 1

LABORATORY CLIENT: Eurofins Calscience, Inc.
ADDRESS: 7440 Lincoln Way
CITY: Garden Grove, CA 92841-1427
TEL: (714) 895-5494
E-MAIL: DanielleGonsman@EurofinsUS.com

CLIENT PROJECT NAME / NUMBER: 15-05-0017
P.O. NO.: 15-05-0017
PROJECT CONTACT: Danielle Gonsman
TEMP BLANK:
SAMPLER(S): (PRINT)
LAB USE ONLY

TURNAROUND TIME
____SAME DAY ____24 HR ____48HR ____72 HR __5 DAYS x STANDARD

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS
All analytes are to be reported on a dry weight basis.
EDD needed

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Dioxins (PCDD PCDF/ 8290 TCDD TEQ)
	PRC-DU1-Z-Comp	02/04/15	1230	Sed	1 4oz jar	X
	PRC-DU2-Z-Comp	02/04/15	0830	Sed	1 4oz jar	X

Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
(Eurofins Calscience)	Fedex # 773544323360	5/6/15	1530
Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by / Affiliation: (Signature) ELLE	Date: 5-7-15	Time: 920

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Sample Administration Receipt Documentation Log

Doc Log ID: 68580

Group Number(s): 1559459

Client: Eurofins Calscience

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	05/07/2015 9:20
Number of Packages:	1	Number of Projects:	1

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Samples Chilled:	Yes	Total Trip Blank Qty:	0
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Timothy Cubberley (6520) at 15:38 on 05/07/2015

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	8013596-IR	1.4	IR	Wet	Y	Loose	N

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Lancaster, PA 17605-2425
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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

< less than

> greater than

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and the < Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference…

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, ISO17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

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Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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Appendix G

Ammonia and Sulfide Analyses Performed in Support of Bioassay Testing

Table G-1. Sediment Porewater Initial Water Quality Characteristics for *Leptocheirus plumulosus* Toxicity Tests.

Sample ID	pH	Salinity (ppt)	Total Ammonia (mg/L N)	Total Sulfide (mg/L)
Lab Control	7.49	18.2	3.68	0.023
SF-11	7.73	21.4	1.08	0.057
PRC-DU1-Comp	7.45	22.8	<1.00	0.025
PRC-DU2-Comp	7.39	24.3	2.19	0.052

Table G-2. Sediment Porewater Final Water Quality Characteristics for *Leptocheirus plumulosus* Toxicity Tests.

Sample ID	pH	Salinity (ppt)	Total Ammonia (mg/L N)	Total Sulfide (mg/L)
Lab Control	7.33	18.9	<1.00	0.048
SF-11	7.53	21.3	<1.00	0.017
PRC-DU1-Comp	7.34	21.5	<1.00	0.018
PRC-DU2-Comp	7.15	21.6	<1.00	0.040

Table G-3. Sediment Overlying Water Total Ammonia Levels for *Leptocheirus plumulosus* Tests.

Sample ID	Total Ammonia (mg/L N)	
	Test Initiation	Test Termination
Lab Control	<1.00	<1.00
SF-11	<1.00	<1.00
PRC-DU1-Comp	<1.00	<1.00
PRC-DU2-Comp	<1.00	<1.00

Table G-4. Sediment Porewater Initial Water Quality Characteristics for *Neanthes arenacoedentata* Tests.

Sample ID	pH	Salinity (ppt)	Total Ammonia (mg/L N)	Total Sulfide (mg/L)
Lab Control	7.52	23.6	2.83	0.014
SF-11	7.61	28.7	1.34	0.174
PRC-DU1-Comp	7.45	29.9	4.57	0.083
PRC-DU2-Comp	7.46	29.7	2.87	0.030

Table G-5. Sediment Porewater Final Water Quality Characteristics for *Neanthes arenacoedentata* Tests.

Sample ID	pH	Salinity (ppt)	Total Ammonia (mg/L N)	Total Sulfide (mg/L)
Lab Control	7.29	27.6	1.61	0.030
SF-11	7.52	28.0	2.31	0.234
PRC-DU1-Comp	7.35	30.4	1.51	0.045
PRC-DU2-Comp	7.17	31.4	<1.00	0.037

Table G-6. Sediment Overlying Water Total Ammonia Levels for *Neanthes arenacoedentata* Tests.

Sample ID	Total Ammonia (mg/L N)	
	Test Initiation	Test Termination
Lab Control	<1.00	<1.00
SF-11	<1.00	<1.00
PRC-DU1-Comp	<1.00	<1.00
PRC-DU2-Comp	<1.00	<1.00

Table G-7. Sediment Overlying Water Total Ammonia Levels for *Macoma nasuta* Bioaccumulation Tests.

Sample ID	Total Ammonia (mg/L N)				
	Day 0	Day 7	Day 14	Day 21	Day 28
Lab Control	<1.00	<1.00	1.43	<1.00	<1.00
PRC-DU1-Comp	3.19	4.61	4.60	1.08	<1.00
PRC-DU2-Comp	3.05	4.19	2.02	<1.00	<1.00

Table G-8. Sediment Overlying Water Total Ammonia Levels for *Nereis virens* Bioaccumulation Tests.

Sample ID	Total Ammonia (mg/L N)				
	Day 0	Day 7	Day 14	Day 21	Day 28
Lab Control	<1.00	<1.00	<1.00	<1.00	<1.00
PRC-DU1-Comp	4.86	3.43	<1.00	<1.00	<1.00
PRC-DU2-Comp	5.92	3.35	<1.00	<1.00	<1.00

Table G-9. Total Ammonia Levels for Standard Elutriate Test (SET) and Modified Elutriate Test (MET) Samples.

Sample ID	Total Ammonia (mg/L N)	Total Ammonia (mg/L N)
	SET	MET
PRC-DU1-Comp	9.02	5.25
PRC-DU2-Comp	10.8	17.1

Appendix H

Test Data and Summary of Statistics for the Evaluation of the Toxicity of the Port of Redwood City's Berths 1-4 Sediments to the Amphipod *Leptocheirus plumulosus*

CETIS Summary Report

Test Code: PRC_0315LP_C1 | 04-1072-7612

10 Day Marine/Estuarine Sediment Test — **Pacific EcoRisk**

Batch ID:	21-3481-6981	**Test Type:**	Survival	**Analyst:**	Charlene Derheim
Start Date:	15 Mar-15 14:15	**Protocol:**	ASTM E1367-99 (Amphipod)	**Diluent:**	Not Applicable
Ending Date:	25 Mar-15 17:00	**Species:**	Leptocheirus plumulosus	**Brine:**	Not Applicable
Duration:	10d 3h	**Source:**	Chesapeake Cultures, Inc.	**Age:**	N/A

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control Sed	10-4016-3748	15 Mar-15 14:15	15 Mar-15 14:15	NA (25.4 °C)	Moffat and Nichol	23613
SF-11	03-9512-9793	25 Feb-15 11:13	25 Feb-15	18d 3h		
PRC-DU1-COMP	03-6554-2139	04 Feb-15 12:30	05 Feb-15 09:40	39d 2h (4.6 °C)		
PRC-DU2-COMP	20-2816-9331	04 Feb-15 08:30	05 Feb-15 09:40	39d 6h (4.6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control Sed	Sediment	Port of Redwood City	LABQA		
SF-11	Elutriate	Port of Redwood City	SF-11		
PRC-DU1-COMP	Elutriate	Port of Redwood City	PRC-DU1-COMP		
PRC-DU2-COMP	Elutriate	Port of Redwood City	PRC-DU2-COMP		

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control Sed	5	0.98	0.946	1	0.95	1	0.0122	0.0274	2.79%	0.0%
SF-11	5	0.98	0.946	1	0.95	1	0.0122	0.0274	2.79%	0.0%
PRC-DU1-COMP	5	0.98	0.946	1	0.95	1	0.0122	0.0274	2.79%	0.0%
PRC-DU2-COMP	5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	0.0%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control Sed	1	0.95	0.95	1	1
SF-11	1	0.95	0.95	1	1
PRC-DU1-COMP	1	1	0.95	0.95	1
PRC-DU2-COMP	1	1	0.9	1	1

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control Sed	20/20	19/20	19/20	20/20	20/20
SF-11	20/20	19/20	19/20	20/20	20/20
PRC-DU1-COMP	20/20	20/20	19/20	19/20	20/20
PRC-DU2-COMP	20/20	20/20	18/20	20/20	20/20

CETIS Analytical Report

Report Date: 04 Jun-15 09:55 (p 1 of 3)
Test Code: PRC_0315LP_C1 | 04-1072-7612

10 Day Marine/Estuarine Sediment Test — **Pacific EcoRisk**

Analysis ID:	19-6040-6133	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Jun-15 9:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	3.29%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control Sed		SF-11	27.5	NA	2	8	0.7381	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0309042	0.003863025	8			
Total	0.0309042		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.64	0.741	0.0002	Non-normal Distribution

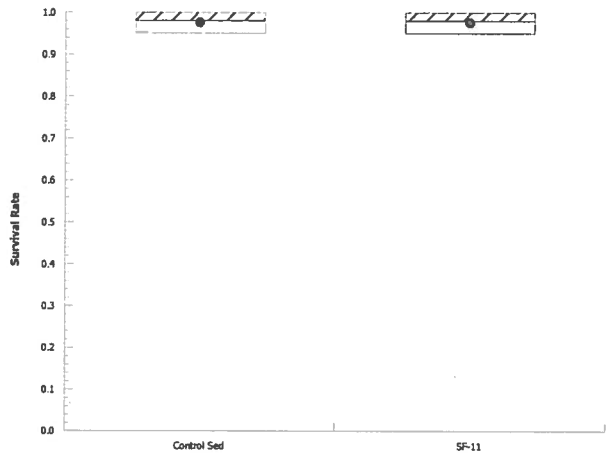
Survival Rate Summary

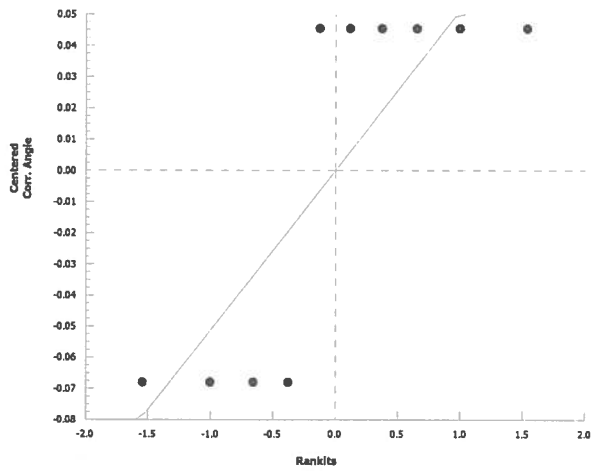
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	5	0.98	0.946	1	1	0.95	1	0.0122	2.79%	0.0%
SF-11	5	0.98	0.946	1	1	0.95	1	0.0122	2.79%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.4%	0.0%
SF-11	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.4%	0.0%

Graphics





10-Day Estuarine/Marine Sediment Toxicity Test Data

Client: PORT OF REDWOOD CITY Test ID#: - Date (Day 0): 3/15/15

Species: *Leptocheirus plumulosus* Project #: 23613 Organism Supplier: Chesapeake

Organism Log # : 8843

Day of Test	Test Replicate	Sample ID: Lab Control					Sign-Off
		Temp (°C)	pH	D.O. (mg/L)	Salinity (ppt)	# Alive	
Day 0	Rep A	25.4	7.90	~~8.1~~ 7.1 RB 3/15/15	20.0	20	Date: 3/15/15
	Rep B	25.4	7.92	7.3	19.8	20	Time: 1415
	Rep C	25.4	7.92	7.4	19.9	20	WQ: FOWB
	Rep D	25.4	7.92	7.4	19.7	20	Scientist Initiation:
	Rep E	25.4	7.92	7.4	19.9	20	Scientist Confirmation: MF
Day 1	Rep A	25.1	7.93	7.7	20.2		Date: 3/16/15 Time: 0945 WQ: NB
Day 2	Rep B	25.8	~~7.82~~ 7.82 NB 03/16/2015	~~7.4~~ 7.5 NB 03/16/2015	~~20.9~~ 19.7 NB 03/16/2015		Date: 3/17/15 Time: 1015 WQ: RG
Day 3	Rep C	25.5	~~7.86~~ 7.88 NB 03/16/2015	~~7.4~~ 7.1 NB 03/16/2015	~~21.2~~ 20.8 NB 03/16/2015		Date: 3/18/15 Time: 0842 WQ: RG
Day 4	Rep D	25.4	7.85	7.1	21.2		Date: 3-19-15 Time: 1415 WQ: YU
Day 5	Rep E	25.2	7.84	7.7	21.6		Date: 3-20-15 Time: 1230 WQ: YU
Day 6	Rep A	24.9	7.95	7.4	20.1		Date: 3/21/15 Time: 1120 WQ: RG
Day 7	Rep B	25.5	7.79	7.7	20.8		Date: 3-22-15 Time: 1130 WQ: CS
Day 8	Rep C	25.3	7.72	7.2	20.7		Date: 3-23-15 Time: 1200 WQ: YU
Day 9	Rep D	25.3	7.80	~~8.2~~ 8.1	~~22.0~~ 22.0		Date: 3-24-15 Time: 1515 WQ: RG
Day 10	Rep A	25.6	7.77	7.3 RG 3/24/15	20.1	20	Date: 3/25/15
	Rep B	25.6	7.85	7.3	20.3	19	Time: 1700
	Rep C	25.6	7.82	7.2	20.5	19	WQ: FOWB
	Rep D	25.6	7.86	7.3	21.8	20	Scientist Counts:
	Rep E	25.6	7.88	7.4	20.0	20	

Day of Test	Matrix	pH	D.O. (mg/L)	Salinity (ppt)	Total Sulfide (mg/L)	Total Ammonia (mg/L)	Sign-Off
Day 0	Porewater	7.49	7.0	18.2	0.023	3.68	Date: 3/15/15 Time: 1015 WQ: FOWB
	Overlying Water					<1.00	Date: 3/15/15 Time: 1015 WQ: FOWB
	Meter ID	PH21	RD11	EC11	DR4000	DR3900	
Day 10	Porewater	7.33	7.0	18.9	0.048	<1.00	Date: 3/25/15 Time: 1000 WQ: FOWB
	Overlying Water					<1.00	Date: 3/25/15 Time: 0930 WQ: FOWB
	Meter ID	PH22	RD11	EC10	DR4000	DR3900	

10-Day Estuarine/Marine Sediment Toxicity Test Data

Client: PORT OF REDWOOD CITY Test ID#: 61437 Date (Day 0): 3/15/15

Species: *Leptocheirus plumulosus* Project #: 23613 Organism Supplier: Chesapeake

Organism Log # : 5843

Day of Test	Test Replicate	Sample ID: SF-11					Sign-Off
		Temp (°C)	pH	D.O. (mg/L)	Salinity (ppt)	# Alive	
Day 0	Rep A	25.4	7.81	7.4	20.6	20	Date: 3/15/15
	Rep B	25.4	7.81	7.4	20.4	20	Time: 1415
	Rep C	25.4	7.79	7.4	20.1	20	WQ: FOVB
	Rep D	25.4	7.77	7.4	20.3	20	Scientist Initiation: DC
	Rep E	25.4	7.80	7.3	20.5	20	Scientist Confirmation: MF
Day 1	Rep A	25.1	7.86	7.4	21.2		Date: 3/16/15 Time: 0945 WQ: NB
Day 2	Rep B	25.8	7.74	6.9	21.2		Date: 3/17/15 Time: 1015 WQ: RG
Day 3	Rep C	25.5	7.69	5.9	21.0		Date: 3/18/15 Time: 0842 WQ: RG
Day 4	Rep D	25.4	7.91	7.1	21.1		Date: 3-19-15 Time: 1415 WQ: YM
Day 5	Rep E	25.2	7.96	7.5	21.0		Date: 3-20-15 Time: 1230 WQ: YM
Day 6	Rep A	24.9	7.89	7.6	21.1		Date: 3/21/15 Time: 1120 WQ: RG
Day 7	Rep B	25.5	7.88	7.3	20.9		Date: 3-22-15 Time: 1130 WQ: CS
Day 8	Rep C	25.3	7.67	7.1	21.3		Date: 3-23-15 Time: 1200 WQ: YM
Day 9	Rep D	25.3	7.59	~~6.9~~ 6.9	20.9		Date: 3/24/15 Time: 1515 WQ: RG
Day 10	Rep A	25.6	7.85	7.4 3/24/15	21.4	20	Date: 3/25/15
	Rep B	25.6	7.79	7.3	21.3	19	Time: 1700
	Rep C	25.6	7.63	6.0	21.5	19	WQ: FOVB
	Rep D	25.6	7.85	7.0	21.7	20	Scientist Counts: DC
	Rep E	25.6	7.89	7.3	21.8	20	

Day of Test	Matrix	pH	D.O. (mg/L)	Salinity (ppt)	Total Sulfide (mg/L)	Total Ammonia (mg/L)	Sign-Off
Day 0	Porewater	7.73	7.9	21.4	0.057	1.08	Date: 3/15/15 Time: 1015 WQ: FOVB
	Overlying Water					<1.00	Date: 3/15/15 Time: 1015 WQ: FOVB
	Meter ID	PH21	RD11	EC11	DR4000	DR3800	
Day 10	Porewater	7.53	7.3	21.3	0.017	<1.00	Date: 3/25/15 Time: 1000 WQ: FOVB
	Overlying Water					<1.00	Date: 3/25/15 Time: 0930 WQ: FOVB
	Meter ID	PH22	RD11	EC10	DR4000	DR3800	

10 Day Marine/Estuarine Sediment Test — **Pacific EcoRisk**

Analysis ID:	11-6428-0301	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Jun-15 9:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	3.29%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control Sed		PRC-DU1-COMP	27.5	NA	2	8	0.7381	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0309042	0.003863025	8			
Total	0.0309042		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.64	0.741	0.0002	Non-normal Distribution

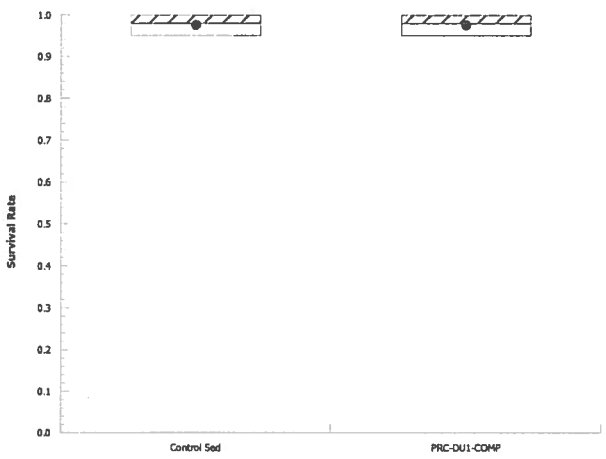
Survival Rate Summary

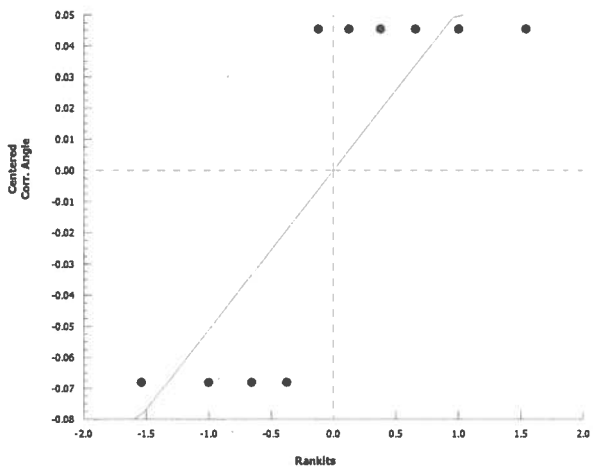
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	5	0.98	0.946	1	1	0.95	1	0.0122	2.79%	0.0%
PRC-DU1-COMP	5	0.98	0.946	1	1	0.95	1	0.0122	2.79%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.4%	0.0%
PRC-DU1-COMP	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.4%	0.0%

Graphics





10-Day Estuarine/Marine Sediment Toxicity Test Data

Client: Port of Redwood City | Test ID#: 61452 | Date (Day 0): 3/15/15

Species: *Leptocheirus plumulosus* | Project #: 23613 | Organism Supplier: Chesapeake

Organism Log # : 8843

Day of Test	Test Replicate	Sample ID: PRC-DU1 Temp (°C)	pH	D.O. (mg/L)	Salinity (ppt)	# Alive	Sign-Off
Day 0	Rep A	25.4	7.84	7.3	20.1	20	Date: 3/15/15
	Rep B	25.4	7.84	7.2	20.3	20	Time: 1415
	Rep C	25.4	7.85	7.2	20.6	20	WQ: FOVB
	Rep D	25.4	7.85	7.3	20.4	20	Scientist Initiation: DC
	Rep E	25.4	7.85	7.4	20.9	20	Scientist Confirmation: MF
Day 1	Rep A	25.1	7.87	7.3	20.7		Date: 3/16/15 Time: 0745 WQ: MB
Day 2	Rep B	25.8	7.81	7.2	21.9		Date: 3/17/15 Time: 1015 WQ: RG
Day 3	Rep C	25.5	7.99	7.6	19.8		Date: 3/18/15 Time: 0842 WQ: RG
Day 4	Rep D	25.4	7.99	7.0	20.7		Date: 3-19-15 Time: 1415 WQ: YU
Day 5	Rep E	25.2	8.11	7.6	21.2		Date: 3-20-15 Time: 1230 WQ: YU
Day 6	Rep A	24.9	8.12	7.5	21.0		Date: 3/21/15 Time: 1120 WQ: MG
Day 7	Rep B	25.5	7.94	7.1	20.4		Date: 3-22-15 Time: 1130 WQ: LS
Day 8	Rep C	25.3	7.96	7.1	21.1		Date: 3/23/15 Time: 1200 WQ: YU
Day 9	Rep D	25.3	7.94	7.0	20.8		Date: 3/24/15 Time: 1515 WQ: MG
Day 10	Rep A	25.6	7.97	7.4	21.4	20	Date: 3/25/15
	Rep B	25.6	7.87	7.3	21.9	20	Time: 1700
	Rep C	25.6	8.00	7.3	19.6	19	WQ: FOVB
	Rep D	25.6	7.95	7.3	20.3	19	Scientist Counts: DC
	Rep E	25.6	8.00	7.3	20.8	20	

Day of Test	Matrix	pH	D.O. (mg/L)	Salinity (ppt)	Total Sulfide (mg/L)	Total Ammonia (mg/L)	Sign-Off
Day 0	Porewater	7.45	6.6	22.8	0.025	FOVB 3/15/15 ~~2.40~~ <1.00	Date: 3/15/15 Time: 1015 WQ: FOVB
	Overlying Water					<1.00	Date: 3/15/15 Time: 1015 WQ: FOVB
	Meter ID	PH21	RD11	EC11	DR4000	DR3800	
Day 10	Porewater	7.34	7.2	21.5	0.018 ~~0.040~~ FVB 3/25/15	<1.00	Date: 3/25/15 Time: 1000 WQ: FOVB
	Overlying Water					<1.00	Date: 3/25/15 Time: 0930 WQ: FOVB
	Meter ID	PH22	RD11	EC10	DR4000	DR3800	

10 Day Marine/Estuarine Sediment Test — **Pacific EcoRisk**

Analysis ID:	17-5163-3652	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Jun-15 9:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.25%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control Sed		PRC-DU2-COMP	29	NA	1	8	0.6389	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.971698E-05	2.971698E-05	1	0.0047	0.9471	Non-Significant Effect
Error	0.0506357	0.006329463	8			
Total	0.05066542		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.28	23.2	0.4451	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.668	0.741	0.0004	Non-normal Distribution

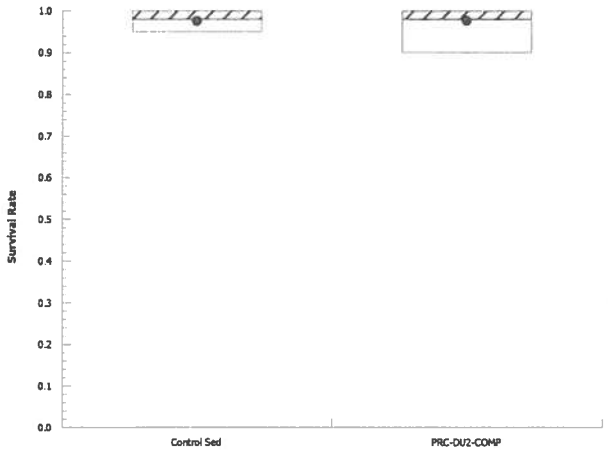
Survival Rate Summary

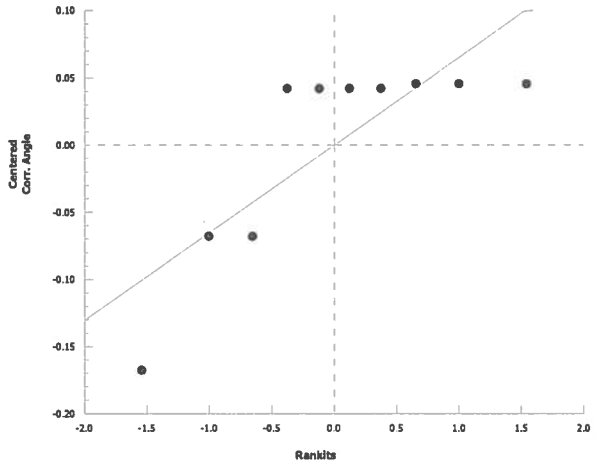
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	5	0.98	0.946	1	1	0.95	1	0.0122	2.79%	0.0%
PRC-DU2-COMP	5	0.98	0.924	1	1	0.9	1	0.02	4.56%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sed	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.4%	0.0%
PRC-DU2-COMP	5	1.42	1.3	1.53	1.46	1.25	1.46	0.0419	6.62%	-0.24%

Graphics





10-Day Estuarine/Marine Sediment Toxicity Test Data

Client: Port of Redwood City Test ID#: 61453 Date (Day 0): 3/15/15

Species: *Leptocheirus plumulosus* Project #: 23613 Organism Supplier: Chesapeake

Organism Log # : 5843

Day of Test	Test Replicate	Sample ID: PRC-DU2 Temp (°C)	pH	D.O. (mg/L)	Salinity (ppt)	# Alive	Sign-Off
Day 0	Rep A	25.4	7.89	7.4	20.2	20	Date: 3/15/15
	Rep B	25.4	7.86	7.4	20.3	20	Time: 1415
	Rep C	25.4	7.86	7.4	20.5	20	WQ: FOR
	Rep D	25.4	7.86	7.4	20.4	20	Scientist Initiation: DC
	Rep E	25.4	7.86	7.4	20.7	20	Scientist Confirmation: MF
Day 1	Rep A	25.1	7.92	7.3	21.1		Date: 3/16/15 Time: 0945 WQ: MB
Day 2	Rep B	25.8	7.87	7.1	21.6		Date: 3/17/15 Time: 1015 WQ: RG
Day 3	Rep C	25.5	8.06	7.4	21.1		Date: 3/18/15 Time: 0842 WQ: RG
Day 4	Rep D	25.4	8.11	7.0	21.6		Date: 3-19-15 Time: 1415 WQ: [illegible]
Day 5	Rep E	25.2	8.19	7.5	21.7		Date: 3-20-15 Time: 1230 WQ: [illegible]
Day 6	Rep A	24.9	8.23	7.5	22.0		Date: 3/21/15 Time: 1120 WQ: RG
Day 7	Rep B	25.5	8.05	7.3	21.9		Date: 3.22.15 Time: 1130 WQ: LS
Day 8	Rep C	25.3	8.10	7.2	21.1		Date: 3-23-15 Time: 1200 WQ: [illegible]
Day 9	Rep D	25.3	8.16	6.9	21.9		Date: 3/24/15 Time: 1515 WQ: RG
Day 10	Rep A	25.6	8.02	7.3	21.6	20	Date: 3/25/15
	Rep B	25.6	8.05	7.2	21.7	20	Time: 1700
	Rep C	25.6	8.10	7.2	21.0	18	WQ: FOR
	Rep D	25.6	8.10	7.2	21.5	20	Scientist Counts: DC
	Rep E	25.6	8.11	7.1	22.0	20	

Day of Test	Matrix	pH	D.O. (mg/L)	Salinity (ppt)	Total Sulfide (mg/L)	Total Ammonia (mg/L)	Sign-Off
Day 0	Porewater	7.39	6.8	24.3	0.052	2.19	Date: 3/15/15 Time: 1015 WQ: FOR
	Overlying Water					~~2.04~~ <1.00 FOR 3/15/15	Date: 3/15/15 Time: 1015 WQ: FOR
	Meter ID	PH21	RD11	EC11	DR4000	DR3800	
Day 10	Porewater	7.15	7.0	21.6	0.040	<1.00	Date: 3/25/15 Time: 1000 WQ: FOR
	Overlying Water					<1.00	Date: 3/25/15 Time: 0930 WQ: FOR
	Meter ID	PH22	RD11	EC10	DR4000	DR3800	

Appendix I

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the Amphipod *Leptocheirus plumulosus*

CETIS Summary Report

Report Date: 30 Mar-15 14:44 (p 1 of 1)
Test Code: 61561a | 14-8851-8249

Acute Amphipod Survival Test — **Pacific EcoRisk**

Batch ID:	09-3223-7432	**Test Type:**	Survival (96h)	**Analyst:**	Drew Gantner
Start Date:	15 Mar-15 15:30	**Protocol:**	EPA/600/R-01/020 (2001)	**Diluent:**	Diluted Seawater
Ending Date:	19 Mar-15 15:05	**Species:**	Leptocheirus plumulosus	**Brine:**	Not Applicable
Duration:	96h	**Source:**	Chesapeake Cultures, Inc.	**Age:**	Juv

Sample ID:	19-7784-0406	**Code:**	KCl	**Client:**	Reference Toxicant
Sample Date:	15 Mar-15 15:30	**Material:**	Potassium chloride	**Project:**	23651
Receive Date:	15 Mar-15 15:30	**Source:**	Reference Toxicant		
Sample Age:	NA (25.4 °C)	**Station:**	In House		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
04-8636-0723	96h Survival Rate	0.25	0.5	0.3536	20.4%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
04-4086-7169	96h Survival Rate	EC5	0.279	0.0841	0.424		Linear Regression (MLE)
		EC10	0.336	0.122	0.484		
		EC15	0.38	0.156	0.53		
		EC20	0.419	0.19	0.571		
		EC25	0.456	0.224	0.61		
		EC40	0.565	0.335	0.729		
		EC50	0.642	0.421	0.824		

96h Survival Rate Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	2	0.9	0.9	0.9	0.9	0.9	0	0	0.0%	0.0%
0.25		2	0.85	0.215	1	0.8	0.9	0.05	0.0707	8.32%	5.56%
0.5		2	0.6	0.6	0.6	0.6	0.6	0	0	0.0%	33.3%
1		2	0.2	0	1	0.1	0.3	0.1	0.141	70.7%	77.8%
2		2	0	0	0	0	0	0	0		100.0%
4		2	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

C-g/L	Control Type	Rep 1	Rep 2
0	Lab Water Contr	0.9	0.9
0.25		0.9	0.8
0.5		0.6	0.6
1		0.1	0.3
2		0	0
4		0	0

96h Survival Rate Binomials

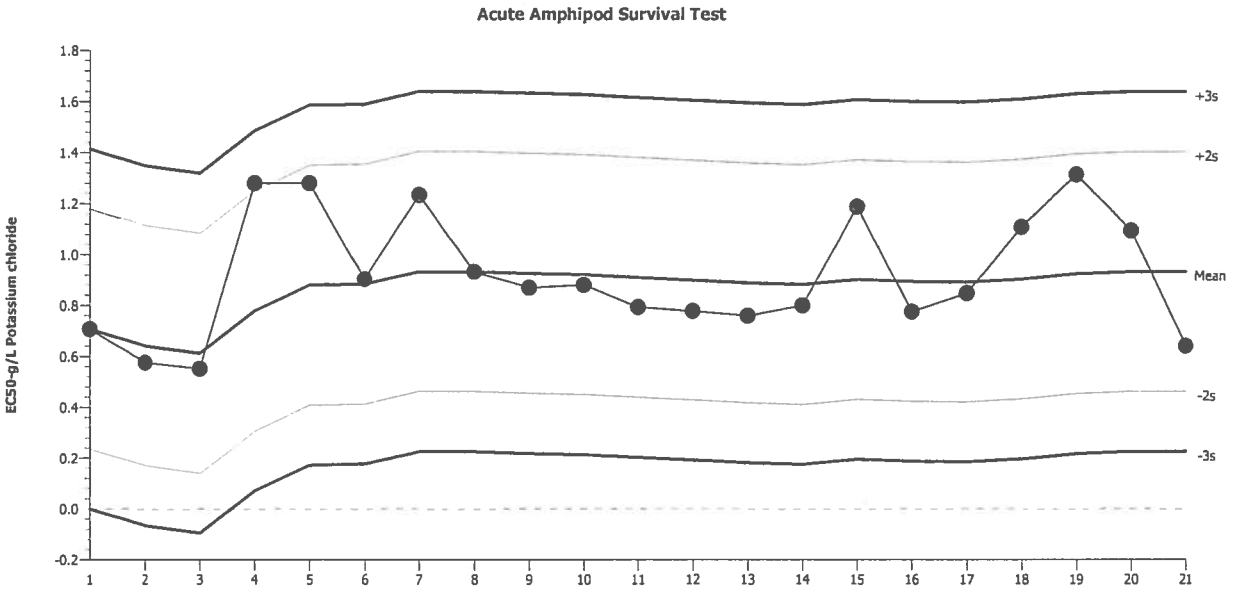
C-g/L	Control Type	Rep 1	Rep 2
0	Lab Water Contr	9/10	9/10
0.25		9/10	8/10
0.5		6/10	6/10
1		1/10	3/10
2		0/10	0/10
4		0/10	0/10

CETIS QC Plot

Report Date: 30 Mar-15 14:49 (1 of 1)

Acute Amphipod Survival Test — **Pacific EcoRisk**

Test Type:	Survival (96h)	**Organism:**	Leptocheirus plumulosus (Amphipod	**Material:**	Potassium chloride
Protocol:	EPA/600/R-01/020 (2001)	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF



Mean:	0.9337	**Count:**	20	**-2s Warning Limit:**	0.4623	**-3s Action Limit:**	0.2266
Sigma:	0.2357	**CV:**	25.20%	**+2s Warning Limit:**	1.405	**+3s Action Limit:**	1.641

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2012	Oct	16	14:10	0.7071	-0.2266	-0.9614			16-6876-0413	04-3701-7977
2	2013	Jan	11	16:45	0.5757	-0.358	-1.519			21-0784-6820	13-8438-5664
3			16	14:50	0.5521	-0.3816	-1.619			14-0307-6049	19-2821-6790
4			16	16:20	1.28	0.3459	1.467			04-3904-8840	04-6222-0082
5			18	16:20	1.28	0.3459	1.467			20-1396-8241	13-1077-3128
6			29	11:30	0.9031	-0.03061	-0.1299			03-0172-6782	09-6972-6940
7		Feb	2	14:15	1.234	0.3	1.273			08-2258-5024	08-5164-9627
8			17	14:00	0.933	-0.00067	-0.00283			16-9692-3720	12-3469-4741
9			17	16:05	0.8694	-0.06431	-0.2729			09-3905-6572	16-9094-2155
10			22	17:00	0.8801	-0.05357	-0.2273			18-6590-8647	17-4845-9267
11		Mar	1	16:30	0.7934	-0.1403	-0.5953			10-1195-2648	05-4285-0065
12		May	6	17:00	0.7772	-0.1565	-0.6639			17-0750-2985	02-8705-3724
13			16	14:00	0.7589	-0.1748	-0.7418			14-2801-8601	06-1800-0132
14		Jul	16	15:30	0.7993	-0.1344	-0.5703			15-7301-6581	04-0044-6324
15		Dec	9	18:45	1.189	0.2555	1.084			14-7670-4920	16-9354-6472
16	2014	Mar	14	16:15	0.7756	-0.1581	-0.6709			01-1605-5438	07-1517-7016
17		Apr	1	14:30	0.8474	-0.08629	-0.3661			00-1756-6897	13-6125-7634
18		Dec	9	16:45	1.11	0.1759	0.7462			13-8011-7441	12-6158-2428
19	2015	Feb	3	16:15	1.315	0.381	1.616			10-4072-2330	11-2571-6423
20		Mar	7	16:30	1.095	0.1618	0.6864			17-4102-7221	15-4619-4597
21			15	15:30	0.6417	-0.292	-1.239			14-8851-8249	04-4086-7169

96 Hour Marine Reference Toxicant Test Data

Client: Reference Toxicant
Organism Log #: 8843
Test Material: Potassium Chloride
Organism Supplier: Chesapeake Cultures
Test ID#: 61561 ~~36355~~ Project # ~~36354~~ 23651
Species: *Leptocheirus plumulosus*
Test Date: 3/15/15
Randomization: 2.6.1
Control/Diluent: 20 ppt Seawater

Treatment (g KCl /L)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms A	# Live Organisms B	SIGN-OFF
Control	25.4	7.74		8.5		19.2		10	10	Date: 3.15.15
0.25	25.4	7.73		8.3		20.4		10	10	Test Solution Prep:
0.5	25.4	7.69		8.5		19.9		10	10	New WQ: MJM
1	25.4	7.68		8.7		20.5		10	10	Initiation Time: 1530
2	25.4	7.65		8.8		21.6		10	10	Initiation Signoff:
4	25.4	7.73		8.6		21.5		10	10	Ref Tox Stock Batch # 12813
Meter ID:	43A	PH19		RD10		EC10				
Control	25.2		7.59		7.3		20.0	10	10	Date: 3-16-15
0.25	25.2		7.57		6.7		21.5	10	9	Count Time: 1155
0.5	25.2		7.55		6.1		20.5	10	10	Count Signoff:
1	25.2		7.54		6.0		21.0	10	10	Old WQ: FOVB
2	25.2		7.52		6.1		22.0	0	0	
4	25.2		7.55		5.7		24.7	0	0	
Meter ID:	43A		PH22		RD11		EC09			
Control	25.7		7.48		6.9		19.5	10	10	Date: 3/17/15
0.25	25.7		7.56		7.2		21.1	10	9	Count Time: 1110
0.5	25.7		7.57		7.1		20.4	9	10	Count Signoff:
1	25.7		7.54		7.2		20.8	8	8	Old WQ: CA
2	25.7		—		—		—	—	—	
4	25.7		—		—		—	—	—	
Meter ID:	43A		pH15		RD09		EC11			
Control	25.3		7.42		~~7.2~~ ~~8.5~~		19.9	10	9	Date: 3-18-15
0.25	25.3		7.55		~~7.8~~ ~~8.3~~		21.3	9	9	Count Time: 1015
0.5	25.3		7.61		~~7.1~~ ~~8.2~~		20.5	9	10	Count Signoff:
1	25.3		7.63		~~7.7~~ ~~8.5~~		21.0	1	4	Old WQ: FOVS
2	—		—		—		—	—	—	
4	—		—		—		—	—	—	
Meter ID:	43A		PH19		RD11		EC11			
Control	25.4		7.53		7.5		19.8	9	9	Date: 3-19-15
0.25	25.4		7.62		7.5		21.2	9	8	Termination Time: 1505
0.5	25.4		7.65		7.4		20.6	6	6	Termination Signoff:
1	25.4		7.66		7.5		21.2	1	3	Old WQ: SD
2	—		—		—		—	—	—	
4	—		—		—		—	—	—	
Meter ID:	43A		PH15		RD10		EC10			

Appendix J

Test Data and Summary of Statistics for the Evaluation of the Toxicity of the Port of Redwood City's Berths 1-4 Sediments to the Polychaete *Neanthes arenaceodentata*

CETIS Summary Report

Test Code: PRC_0314NA_CTL1 | 04-6096-9625

10 Day Marine/Estuarine Sediment Test — **Pacific EcoRisk**

Batch ID:	19-3961-6149	**Test Type:**	Survival	**Analyst:**	Charlene Derheim
Start Date:	14 Mar-15 10:00	**Protocol:**	ASTM E1611-00 (2007)	**Diluent:**	Not Applicable
Ending Date:	24 Mar-15 09:30	**Species:**	Neanthes arenaceodentata	**Brine:**	Not Applicable
Duration:	10d	**Source:**	Aquatic Tox. Sup.	**Age:**	N/A

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control Sedimen	20-3239-7596	14 Mar-15 10:00	14 Mar-15 10:00	NA (19.9 °C)	Moffat and Nichol	23613
SF-11	20-7250-5740	25 Feb-15 11:13	25 Feb-15	16d 23h	Port of Redwood City	
PRC-DU1-COMP	03-6554-2139	04 Feb-15 12:30	05 Feb-15 09:40	37d 21h (4.6 °	Moffat and Nichol	
PRC-DU2-COMP	20-2816-9331	04 Feb-15 08:30	05 Feb-15 09:40	38d 2h (4.6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control Sedimen	Sediment	Port of Redwood City	LABQA		
SF-11	Elutriate	Port of Redwood City	SF-11		
PRC-DU1-COMP	Elutriate	Port of Redwood City	PRC-DU1-COMP		
PRC-DU2-COMP	Elutriate	Port of Redwood City	PRC-DU2-COMP		

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control Sedimen	5	1	1	1	1	1	0	0	0.0%	0.0%
SF-11	5	1	1	1	1	1	0	0	0.0%	0.0%
PRC-DU1-COMP	5	0.96	0.849	1	0.8	1	0.04	0.0894	9.32%	4.0%
PRC-DU2-COMP	5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	2.0%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control Sedimen	1	1	1	1	1
SF-11	1	1	1	1	1
PRC-DU1-COMP	1	0.8	1	1	1
PRC-DU2-COMP	1	0.9	1	1	1

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control Sedimen	10/10	10/10	10/10	10/10	10/10
SF-11	10/10	10/10	10/10	10/10	10/10
PRC-DU1-COMP	10/10	8/10	10/10	10/10	10/10
PRC-DU2-COMP	10/10	9/10	10/10	10/10	10/10

CETIS Analytical Report

Report Date: 04 Jun-15 10:38 (p 1 of 3)
Test Code: PRC_0314NA_CTL1 | 04-6096-9625

10 Day Marine/Estuarine Sediment Test — **Pacific EcoRisk**

Analysis ID:	05-6927-8782	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Jun-15 10:38	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Angular (Corrected)	NA	C > T	NA	NA	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control Sedimen		SF-11	27.5	NA	1	8	1.0000	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	65500	<0.0001	Significant Effect
Error	0	0	8			
Total	0		9			

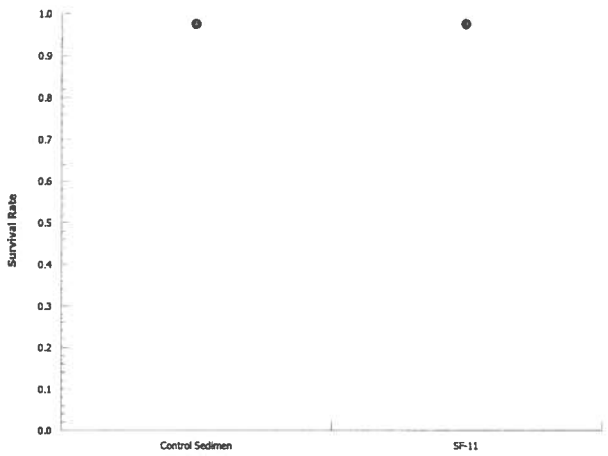
Survival Rate Summary

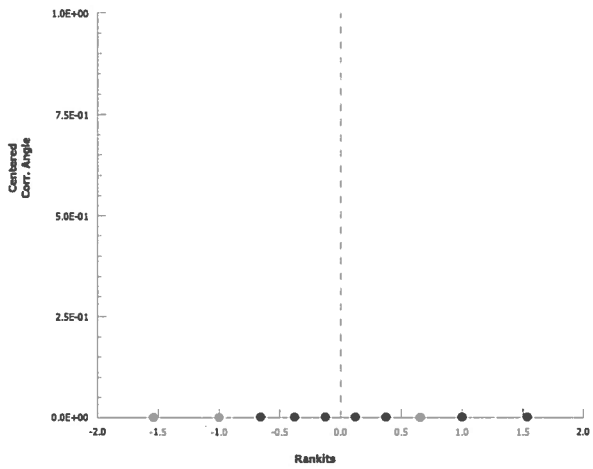
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sedimen	5	1	1	1	1	1	1	0	0.0%	0.0%
SF-11	5	1	1	1	1	1	1	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sedimen	5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
SF-11	5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%

Graphics





10-Day Estuarine/Marine Sediment Toxicity Test Data

Client: PORT OF REDWOOD CITY Test ID #: – Date (Day 0): 3/14/15

Species: *Neanthes arenaceodentata* Project #: 23613 Organism Supplier: ATS

Organism Log # : 8824

Day of Test	Test Replicate	Sample ID: Control Sediment (Paradise Cove)					Sign-Off
		Temp (°C)	pH	D.O. (mg/L)	Salinity (ppt)	# Alive	
Day 0	Rep A	19.9	7.71	7.5	28.6	10	Date: 3.14.15
	Rep B	19.9	7.70	7.6	28.4	10	Time: 1000
	Rep C	19.9	7.73	7.5	28.4	10	WQ: CS
	Rep D	19.9	7.74	7.5	28.5	10	Scientist Initiation:
	Rep E	19.9	7.74	7.6	28.4	10	Scientist Confirmation:
Day 1	Rep A	19.6	7.81	~~7.6~~ 7.3 DM	28.9		Date: 3/15/15 Time: 1440 WQ: DM
Day 2	Rep B	19.7	7.92	7.6	28.7		Date: 3/16/15 Time: 0920 WQ: NB
Day 3	Rep C	19.7	7.91	7.6	29.5		Date: 3/17/15 Time: 0950 WQ: RG
Day 4	Rep D	19.6	7.93	7.5	28.0		Date: 3/18/15 Time: 0925 WQ: RG
Day 5	Rep E	19.8	7.90	7.6	28.0		Date: 3-19-15 Time: 1415 WQ: MC
Day 6	Rep A	20.1	7.91	7.6	30.1		Date: 3-20-15 Time: 1230 WQ: MC
Day 7	Rep B	19.7	7.97	7.7	30.7		Date: 3/21/15 Time: 1048 WQ: RG
Day 8	Rep C	20.2	7.77	7.6	~~27.6~~ 28.1 CS		Date: 3.22.15 Time: 1136 WQ: CS
Day 9	Rep D	20.2	7.75	7.8	29.9		Date: 3-23-15 Time: 1200 WQ: MC
Day 10	Rep A	20.3	7.99	7.6	29.3	10	Date: 3.24.15
	Rep B	20.3	8.02	7.6	28.6	10	Time: 0930
	Rep C	20.3	7.97	7.6	28.4	10	WQ: KR
	Rep D	20.3	7.98	7.6	29.3	10	Scientist:
	Rep E	20.3	8.02	7.7	28.0	10	

Day of Test	Matrix	pH	D.O. (mg/L)	Salinity (ppt)	Total Sulfide (mg/L)	Total Ammonia (mg/L)	Sign-Off
Day 0	Porewater	7.52	8.3	23.6	0.014	2.83	Date: 3.14.15 Time: 1000 WQ: CS
	Overlying Water					<1.00	Date: 3.14.15 Time: 1000 WQ: CS
	Meter ID	DH22	RD10	EC08	DR4000U	DR3800	
Day 10	Porewater	7.29	6.5	27.6	0.030	1.61	Date: 3.24.15 Time: 1351 WQ: KR
	Overlying Water					<1.00	Date: 3.24.15 Time: 1330 WQ: KR
	Meter ID	pH22	RD10	EC09	DR4000U	DR3800	

10-Day Estuarine/Marine Sediment Toxicity Test Data

Client: PORT OF REDWOOD CITY Test ID #: – Date (Day 0): 3/14/15

Species: *Neanthes arenaceodentata* Project #: 23613 Organism Supplier: ATS

Organism Log # : 8824

Day of Test	Test Replicate	Sample ID: SF11					Sign-Off
		Temp (°C)	pH	D.O. (mg/L)	Salinity (ppt)	# Alive	
Day 0	Rep A	19.9	7.65	7.6	29.6	10	Date: 3.14.15
	Rep B	19.9	7.66	7.6	29.3	10	Time: 1000
	Rep C	19.9	7.66	7.6	29.2	10	WQ: CS
	Rep D	19.9	7.66	7.7	29.1	10	Scientist Initiation:
	Rep E	19.9	7.66	7.7	29.3	10	Scientist Confirmation:
Day 1	Rep A	19.6	7.75	7.5	30.5		Date: 3/15/15 Time: 1445 WQ: DM
Day 2	Rep B	19.7	7.89	7.6	30.0		Date: 3/16/15 Time: 0920 WQ: [illegible]
Day 3	Rep C	19.7	7.97	7.7	28.8		Date: 3/17/15 Time: 0950 WQ: RG
Day 4	Rep D	19.6	7.97	7.6	30.2		Date: 3/18/15 Time: 0925 WQ: RG
Day 5	Rep E	19.8	7.84	7.6	30.3		Date: 3-19-15 Time: 1415 WQ: [illegible]
Day 6	Rep A	20.1	7.88	7.6	30.3		Date: 3/20/15 Time: 1230 WQ: [illegible]
Day 7	Rep B	19.7	7.88	7.6	30.0		Date: 3/21/15 Time: 1048 WQ: RG
Day 8	Rep C	20.2	7.74	7.7	29.9		Date: 3.22.15 Time: 1136 WQ: CS
Day 9	Rep D	20.2	7.74	7.7	30.4		Date: 3/23/15 Time: 1200 WQ: [illegible]
Day 10	Rep A	20.3	7.92	7.7	31.4	10	Date: 3.24.15
	Rep B	20.3	7.97	7.7	30.4	10	Time: 10:05
	Rep C	20.3	7.98	7.8	30.0	10	WQ: KM
	Rep D	20.3	7.97	7.7	30.8	10	Scientist:
	Rep E	20.3	7.91	7.7	30.4	10	

Day of Test	Matrix	pH	D.O. (mg/L)	Salinity (ppt)	Total Sulfide (mg/L)	Total Ammonia (mg/L)	Sign-Off
Day 0	Porewater	7.61	8.8	28.7	0.174	1.34	Date: 3.14.15 Time: 1000 WQ: CS
	Overlying Water					<1.00	Date: 3.14.15 Time: 0000 WQ: CS
	Meter ID	PH42	RD10	EC08	DR4000U	DR3800	
Day 10	Porewater	7.52	7.0	28.0	0.234	2.31	Date: 3.24.15 Time: 1354 WQ: KM
	Overlying Water					<1.00	Date: 3.24.15 Time: 1330 WQ: KM
	Meter ID	PH22	RD10	EC09	DR4000U	DR3800	

10 Day Marine/Estuarine Sediment Test — **Pacific EcoRisk**

Analysis ID:	07-3244-1137	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Jun-15 10:38	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	7.23%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control Sedimen		PRC-DU1-COMP	25	NA	1	8	0.5000	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.009294413	0.009294413	1	1	0.3466	Non-Significant Effect
Error	0.0743553	0.009294413	8			
Total	0.08364972		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	13.7	0.3559	Equal Variances
Variances	Levene Equality of Variance	7.11	11.3	0.0285	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.625	0.741	0.0001	Non-normal Distribution

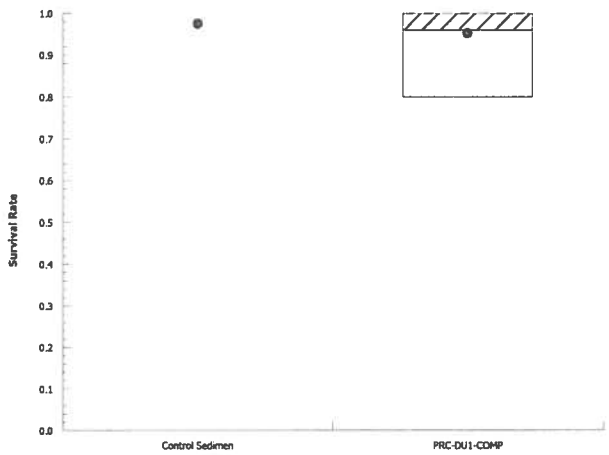
Survival Rate Summary

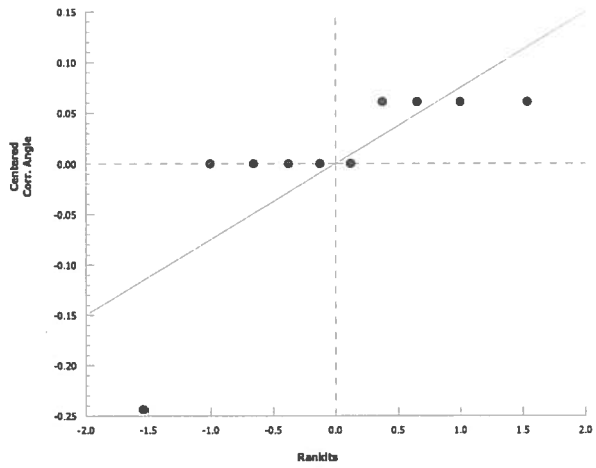
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sedimen	5	1	1	1	1	1	1	0	0.0%	0.0%
PRC-DU1-COMP	5	0.96	0.849	1	1	0.8	1	0.04	9.32%	4.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sedimen	5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
PRC-DU1-COMP	5	1.35	1.18	1.52	1.41	1.11	1.41	0.061	10.1%	4.32%

Graphics





10-Day Estuarine/Marine Sediment Toxicity Test Data

Client: Port of Redwood City | Test ID #: 61454 | Date (Day 0): 3/14/15

Species: *Neanthes arenaceodentata* | Project #: 23608 | Organism Supplier: ATS

Organism Log # : 8824

Day of Test	Test Replicate	Sample ID: PRC-DU1 Temp (°C)	pH	D.O. (mg/L)	Salinity (ppt)	# Alive	Sign-Off
Day 0	Rep A	19.9	7.68	7.6	29.4	10	Date: 3.14.15
	Rep B	19.9	7.71	7.5	29.2	10	Time: 1000
	Rep C	19.9	7.71	7.4	29.1	10	WQ: LS
	Rep D	19.9	7.70	7.5	29.1	10	Scientist Initiation:
	Rep E	19.9	7.70	7.6	29.2	10	Scientist Confirmation:
Day 1	Rep A	19.9	7.82	7.3	29.9		Date: 3/15/15 Time: 1445 WQ: DM
Day 2	Rep B	19.7	7.93	7.6	29.9		Date: 3/16/15 Time: 0920 WQ: AJB
Day 3	Rep C	19.7	7.92	7.6	30.1		Date: 3/17/15 Time: 0950 WQ: RG
Day 4	Rep D	19.6	8.04	7.7	30.2		Date: 3/18/15 Time: 0925 WQ: RG
Day 5	Rep E	19.8	7.97	7.6	30.5		Date: 3-19-15 Time: 1415 WQ: KR
Day 6	Rep A	20.1	7.96	7.5	30.8		Date: 3-20-15 Time: 1230 WQ: KR
Day 7	Rep B	19.7	RG 3/21/15 8.13	7.7	30.3		Date: 3/21/15 Time: 1048 WQ: RG
Day 8	Rep C	20.2	7.94	7.7	29.8		Date: 3.22.15 Time: 1136 WQ: LS
Day 9	Rep D	20.2	7.94	7.6	29.9		Date: 3-23-15 Time: 1200 WQ: KR
Day 10	Rep A	20.3	7.98	7.4	31.6	10	Date: 3.24.15
	Rep B	20.3	8.09	7.6	31.1	8	Time: 930 ~~1020~~ 6/4/15
	Rep C	20.3	8.07	7.5	29.9	10	WQ: KR
	Rep D	20.3	8.14	7.7	30.4	10	Scientist:
	Rep E	20.3	8.10	7.6	31.2	10	

Day of Test	Matrix	pH	D.O. (mg/L)	Salinity (ppt)	Total Sulfide (mg/L)	Total Ammonia (mg/L)	Sign-Off
Day 0	Porewater	7.45	8.4	29.9	0.083	4.57	Date: 3.14.15 Time: 1000 WQ: LS
	Overlying Water					<1.00	Date: 3.14.15 Time: 1000 WQ: LS
	Meter ID	PH22	RD10	EC09	DR4000U	DR3800	
Day 10	Porewater	7.35	6.6	30.4	0.045	1.51	Date: 3.24.15 Time: 1357 WQ: KR
	Overlying Water					<1.00	Date: 3.24.15 Time: 1031 WQ: KR
	Meter ID	PH22	RD10	EC09	DR4000U	DR3800	

10 Day Marine/Estuarine Sediment Test — **Pacific EcoRisk**

Analysis ID:	03-0502-1810	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Jun-15 10:38	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.74%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control Sedimen		PRC-DU2-COMP	25	NA	1	8	0.5000	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002655933	0.002655933	1	1	0.3466	Non-Significant Effect
Error	0.02124747	0.002655933	8			
Total	0.0239034		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	13.7	0.3559	Equal Variances
Variances	Levene Equality of Variance	7.11	11.3	0.0285	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.625	0.741	0.0001	Non-normal Distribution

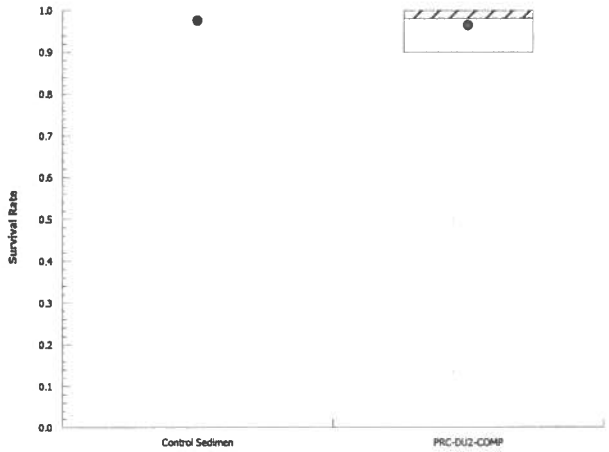
Survival Rate Summary

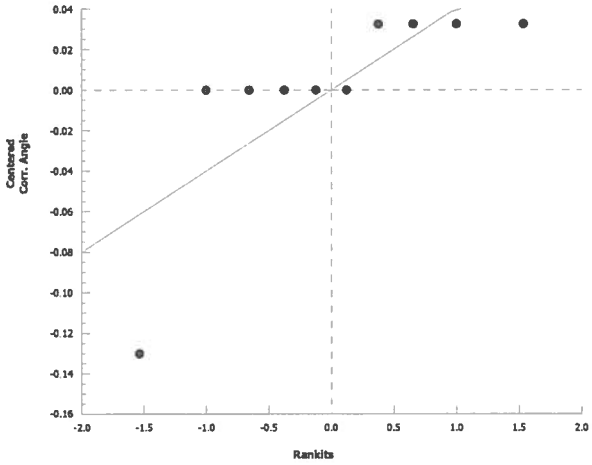
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sedimen	5	1	1	1	1	1	1	0	0.0%	0.0%
PRC-DU2-COMP	5	0.98	0.924	1	1	0.9	1	0.02	4.56%	2.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control Sedimen	5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
PRC-DU2-COMP	5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	2.31%

Graphics





10-Day Estuarine/Marine Sediment Toxicity Test Data

Client: Port of Redwood City | Test ID #: 61455 | Date (Day 0): 3/14/15

Species: *Neanthes arenaceodentata* | Project #: 23608 | Organism Supplier: ATS

Organism Log # : 8824

Day of Test	Test Replicate	Sample ID: PRC-DU2 Temp (°C)	pH	D.O. (mg/L)	Salinity (ppt)	# Alive	Sign-Off
Day 0	Rep A	19.9	7.66	7.6	29.4	10	Date: 3.14.15
	Rep B	19.9	7.69	7.6	29.2	10	Time: 10 00
	Rep C	19.9	7.69	7.6	29.1	10	WQ: CS
	Rep D	19.9	7.71	7.6	29.0	10	Scientist Initiation:
	Rep E	19.9	7.71	7.5	29.0	10	Scientist Confirmation:
Day 1	Rep A	19.7	7.84	7.5	30.1		Date: 3/15/15 Time: 1445 WQ: DM
Day 2	Rep B	19.7	7.96	7.6	30.0		Date: 3/16/15 Time: 0920 WQ: NB
Day 3	Rep C	19.7	8.01	7.7	30.1		Date: 3/17/15 Time: 0950 WQ: RG
Day 4	Rep D	19.6	8.05	7.6	30.0		Date: 3/18/15 Time: 0925 WQ: RG
Day 5	Rep E	19.8	8.05	7.6	30.3		Date: 3-19-15 Time: 1415 WQ: [illegible]
Day 6	Rep A	20.1	8.01	7.4	30.9		Date: 3-20-15 Time: 1230 WQ: [illegible]
Day 7	Rep B	19.7	8.16	7.7	29.0		Date: 3/21/15 Time: 1048 WQ: RG
Day 8	Rep C	20.2	8.02	7.7	31.2		Date: 3.22.15 Time: 1136 WQ: LS
Day 9	Rep D	20.2	8.03	7.8	30.8		Date: 3-23-15 Time: 1200 WQ: [illegible]
Day 10	Rep A	20.3	8.07	7.3	31.1	10	Date: 3.24.15
	Rep B	20.3	8.13	7.6	30.8	9	Time: 6/14/15 ~~0925~~ 930
	Rep C	20.3	8.12	7.6	31.0	10	WQ: KR
	Rep D	20.3	8.16	7.6	31.0	10	Scientist:
	Rep E	20.3	8.14	7.6	30.0	~~DEG~~ 3/24/15 10	

Day of Test	Matrix	pH	D.O. (mg/L)	Salinity (ppt)	Total Sulfide (mg/L)	Total Ammonia (mg/L)	Sign-Off
Day 0	Porewater	7.46	8.5	29.7	0.030	2.87	Date: 3.14.15 Time: 1000 WQ: CS
	Overlying Water					<1.00	Date: 3.14.15 Time: 1000 WQ: CS
	Meter ID	PH22	RD10	EC08	DR4000U	DR3800	
Day 10	Porewater	7.17	6.3	31.4	0.037	<1.00	Date: 3.24.15 Time: 1401 WQ: KR
	Overlying Water					<1.00	Date: 3.24.15 Time: 1031 WQ: KR
	Meter ID	PH22	RD10	EC09	DR4000U	DR3800	

Appendix K

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the Polychaete *Neanthes arenaceodentata*

CETIS Summary Report

Report Date: 20 Apr-15 15:58 (p 1 of 1)
Test Code: 61566 | 04-4644-1940

Acute Polychaete Survival Test — **Pacific EcoRisk**

Batch ID:	20-3389-6405	**Test Type:**	Survival	**Analyst:**	Drew Gantner
Start Date:	14 Mar-15 16:40	**Protocol:**	ASTM E1611-00 (2007)	**Diluent:**	Diluted Seawater
Ending Date:	18 Mar-15 15:40	**Species:**	Neanthes arenaceodentata	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Tox. Sup.	**Age:**	Juv

Sample ID:	00-5574-8573	**Code:**	KCl	**Client:**	Reference Toxicant
Sample Date:	14 Mar-15 16:40	**Material:**	Potassium chloride	**Project:**	23656
Receive Date:	14 Mar-15 16:40	**Source:**	Reference Toxicant		
Sample Age:	NA (19.9 °C)	**Station:**	In House		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
14-8654-7139	Survival Rate	2	4	2.828	51.7%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
05-5241-6006	Survival Rate	EC50	2.07	1.6	2.68		Spearman-Kärber

Survival Rate Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	2	0.9	0	1	0.8	1	0.1	0.141	15.7%	0.0%
0.25		2	1	1	1	1	1	0	0	0.0%	-11.1%
0.5		2	1	1	1	1	1	0	0	0.0%	-11.1%
1		2	0.8	0	1	0.6	1	0.2	0.283	35.4%	11.1%
2		2	0.7	0	1	0.6	0.8	0.1	0.141	20.2%	22.2%
4		2	0	0	0	0	0	0	0		100.0%

Survival Rate Detail

C-g/L	Control Type	Rep 1	Rep 2
0	Lab Water Contr	1	0.8
0.25		1	1
0.5		1	1
1		1	0.6
2		0.6	0.8
4		0	0

Survival Rate Binomials

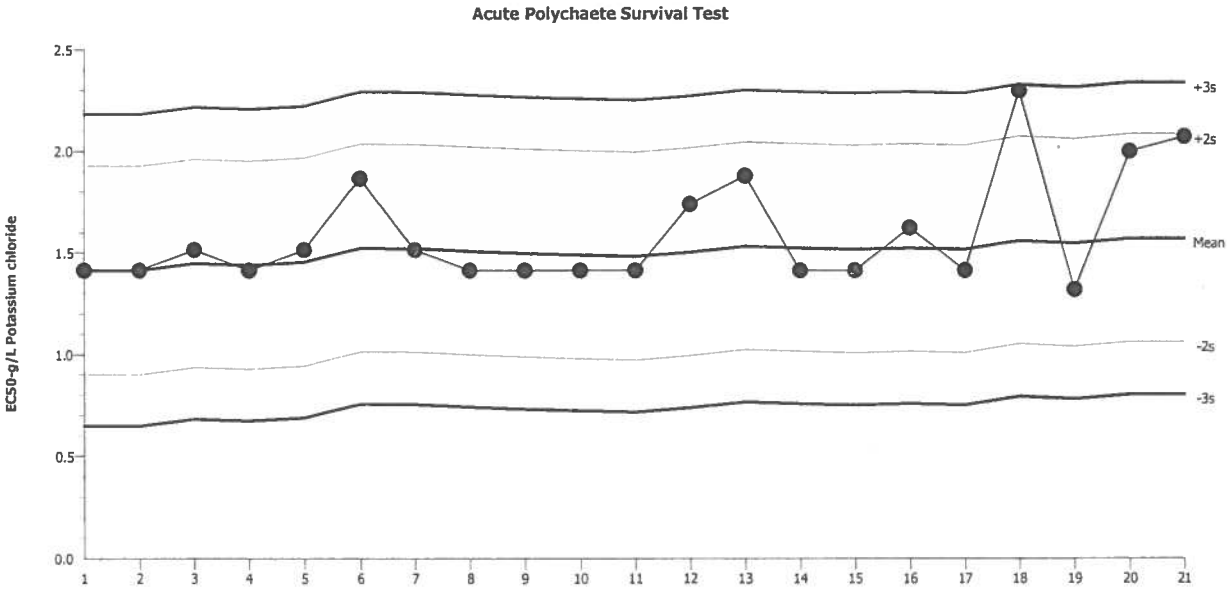
C-g/L	Control Type	Rep 1	Rep 2
0	Lab Water Contr	5/5	4/5
0.25		5/5	5/5
0.5		5/5	5/5
1		5/5	3/5
2		3/5	4/5
4		0/5	0/5

CETIS QC Plot

Report Date: 30 Mar-15 14:28 (1 of 1)

Acute Polychaete Survival Test — **Pacific EcoRisk**

Test Type:	Survival	**Organism:**	Neanthes arenaceodentata (Polycha	**Material:**	Potassium chloride
Protocol:	ASTM E1611-00 (2007)	**Endpoint:**	Survival Rate	**Source:**	Reference Toxicant-REF



Mean:	1.571	**Count:**	20	**-2s Warning Limit:**	1.059	**-3s Action Limit:**	0.8032
Sigma:	0.2559	**CV:**	16.30%	**+2s Warning Limit:**	2.083	**+3s Action Limit:**	2.339

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Dec	13	14:50	1.414	-0.1568	-0.6127			11-1826-3152	00-6282-5946
2	2014	Jan	5	14:50	1.414	-0.1568	-0.6127			11-7494-1072	03-6736-6879
3			20	12:50	1.516	-0.05528	-0.216			06-0102-9488	01-7835-0010
4		Feb	5	16:25	1.414	-0.1568	-0.6127			20-9439-3373	00-2300-7193
5		Mar	23	14:50	1.516	-0.05528	-0.216			08-0205-8742	15-7400-5055
6		Apr	6	15:50	1.866	0.2951	1.153			03-8568-6696	18-8231-8811
7			20	16:20	1.516	-0.05528	-0.216			09-7639-6868	14-5068-2446
8		May	13	16:30	1.414	-0.1568	-0.6127			12-2042-7256	20-8051-1136
9			20	15:40	1.414	-0.1568	-0.6127			20-8128-0427	06-1401-0156
10		Jun	8	15:00	1.414	-0.1568	-0.6127			04-7828-8631	10-9984-6101
11			22	15:35	1.414	-0.1568	-0.6127			19-4767-6030	06-1388-7106
12		Aug	10	13:45	1.741	0.1701	0.6647			16-9730-8709	02-6217-3865
13			29	16:45	1.879	0.3084	1.205			05-7382-6503	06-9550-5915
14		Oct	4	15:00	1.414	-0.1568	-0.6127			19-9656-1288	02-3614-8987
15			24	14:35	1.414	-0.1568	-0.6127			10-1184-0671	14-8173-1504
16			28	17:00	1.625	0.05351	0.2091			16-7583-3759	15-1388-1107
17		Nov	20	15:40	1.414	-0.1568	-0.6127			06-3148-6920	13-9072-2785
18		Dec	9	15:10	2.297	0.7264	2.839	(+)		07-5960-2007	05-7493-7285
19	2015	Jan	13	14:45	1.32	-0.2515	-0.9828			13-2783-7637	15-6385-9105
20		Mar	7	15:25	2	0.429	1.676			10-2699-0081	06-6102-3690
21			14	16:40	2.073	0.502	1.962			04-4644-1940	05-5241-6006

96 Hour Marine Reference Toxicant Test Data

Client: **Reference Toxicant**
Test Material: Potassium Chloride
Test ID#: 61566 ~~60561~~ Project # 23656 ~~35352~~
Test Date: 3/14/15 Randomization: 26.2

Organism Log #: 8824
Organism Supplier: Aquatic Toxicology Support
Species: *Neanthes arenaceodentata*
Control/Diluent: 30 ppt Seawater

Treatment (g KCl /L)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms A	# Live Organisms B	SIGN-OFF
Control	19.9	7.87		7.6		29.4		5	5	Date: 3/14/15
0.25	19.9	7.88		7.7		30.0		5	5	Test Solution Prep: MM
0.5	19.9	7.87		7.9		29.8		5	5	New WQ: DM
1	19.9	7.86		7.9		30.7		5	5	Initiation Time: 1640
2	19.9	7.84		8.2		31.6		5	5	Initiation Signoff: MM
4	19.9	7.79		8.5		33.7		5	5	Ref Tox Stock Batch # 44
Meter ID:	38A	pH19		RD09		EC11				
Control	19.8		7.77		7.0		28.9	~~4~~ 5	~~4~~ 5 3/15/15	Date: 3/15/15
0.25	19.8		7.78		7.1		30.3	5	5	Count Time: 0930
0.5	19.8		7.78		7.1		30.6	5	5	Count Signoff: DE
1	19.8		7.77		7.2		31.1	5	3	Old WQ: DM
2	19.8		7.77		7.2		32.1	3	5	
4	19.8		7.76		7.1		34.3	4	0	
Meter ID:	38A		pH21		RD11		EC11			
Control	19.7		7.73		7.2		29.6	5	4	Date: 3/16/15
0.25	19.7		7.78		7.2		30.2	5	5	Count Time: 1050
0.5	19.7		7.78		7.3		30.5	5	5	Count Signoff: COD
1	19.7		7.78		7.4		31.1	5	3	Old WQ: FOUR
2	19.7		7.77		7.4		32.0	3	5	
4	19.7		7.78		7.4		34.5	1	–	
Meter ID:	38A		pH22		RD11		EC09			
Control	19.8		7.64		6.9		29.7	5	4	Date: 3/17/15
0.25	19.8		7.71		7.0		30.5	5	5	Count Time: 1055
0.5	19.8		7.74		7.2		30.7	5	5	Count Signoff: MM
1	19.8		7.73		7.2		31.2	5	3	Old WQ: KUP
2	19.8		7.73		7.1		32.3	3	5	
4	19.8		7.73		6.9		34.7	0	–	
Meter ID:	38A		pH15		RD09		EC11			
Control	19.8		7.70		7.2		30.0	5	4	Date: 3/18/15
0.25	19.8		7.71		7.2		30.5	5	5	Termination Time: 1540
0.5	19.8		7.77		7.4		30.9	5	5	Termination Signoff: MM
1	19.8		7.73		7.1		31.5	5	3	Old WQ: ARF
2	19.8		7.75		7.2		32.4	3	4	
4	–		–		–		–	–	–	
Meter ID:	38A		pH22		RD12		EC08			

Appendix L

Elutriate Suitability Calculation

Table L-1. Calculation of the Elutriate Suitability Concentration (ESC)

Site: **PRC-DU2-Comp**
Species: ***Mytilus sp.***
Disposal Site: **SF-11/SF-DODS**

Mixing Zone Estimation	**PRC-DU2-Comp**
Depth of disposal site (m)=	15
Pi=	3.14159
Width of vessel (m)=	10
Length of vessel(m)=	25
Speed of vessel (m/sec)=	0.5
Time of discharge (sec)=	30
Depth of vessel (m)=	4
Mixing Zone Volume(cu.m)=	627239

Volume of Liquid Phase	
Bulk density (constant) =	1.3
Particle density (constant) =	2.6
Density of liquid phase (constant) =	1
Vol of disposal vessel (cu.m)=	3000
Liquid phase volume (cu.m)=	2438

Concentration of suspended phase	
Percent Silt=	67.5
Percent Clay=	30.1
Volume of Suspended Phase (cu.m)=	549

Projected Concentration (percent SP) =	0.0875
Lowest LC_{50} or EC_{50} from bioassay=	64.4
Factor LC_{50} or EC_{50} X 0.01=	0.644

The factored LC50 or EC50 is higher than the projected concentration; therefore the Elutriate Suitability Concentration is not exceeded for dredged material from this site for the disposal site specified (SF-11 or SF-DODS). This assumes that sediment will be disposed of by barge at the disposal site, using a barge meeting the listed parameters.

Appendix M

Test Data and Summary of Statistics for the Evaluation of the Toxicity of the Port of Redwood City's Berths 1-4 Sediment Elutriates to Bivalve (*Mytilus galloprovincialis*) Embryos

CETIS Summary Report

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Batch ID:	14-3368-4535	**Test Type:**	Development-Survival	**Analyst:**	Mike McElroy
Start Date:	18 Feb-15 16:30	**Protocol:**	ASTM E724-98 (2004)	**Diluent:**	Diluted Seawater
Ending Date:	20 Feb-15 15:48	**Species:**	Mytilus galloprovincialis	**Brine:**	Crystal Sea
Duration:	47h	**Source:**	Gutoff	**Age:**	NA

Sample ID:	11-3339-4302	**Code:**	DMMO	**Client:**	Moffat and Nichol
Sample Date:	04 Feb-15 12:30	**Material:**	Elutriate	**Project:**	23613
Receive Date:	05 Feb-15 09:40	**Source:**	Port of Redwood City		
Sample Age:	14d 4h (4.6 °C)	**Station:**	PRC-DU1-SET		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
05-2209-4859	Development Rate	0	>0		1.09%		Equal Variance t Two-Sample Test
16-2918-4909	Development Rate	0	>0		1.35%		Equal Variance t Two-Sample Test
14-5507-0023	Development Rate	50	100	70.71	1.46%	2	Dunnett Multiple Comparison Test
05-3595-1529	Survival Rate	0	>0		4.84%		Equal Variance t Two-Sample Test
11-9178-8070	Survival Rate	0	>0		5.5%		Equal Variance t Two-Sample Test
21-0623-2259	Survival Rate	50	100	70.71	4.56%	2	Steel Many-One Rank Sum Test

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	5	0.979	0.969	0.99	0.966	0.987	0.00389	0.0087	0.89%	0.0%
0	Salt Control	5	0.988	0.978	0.999	0.977	1	0.00382	0.00855	0.87%	-0.92%
0	Site Water	5	0.987	0.978	0.995	0.978	0.995	0.00312	0.00697	0.71%	-0.74%
1		5	0.977	0.965	0.99	0.965	0.992	0.0044	0.00983	1.01%	0.2%
10		5	0.986	0.979	0.992	0.981	0.991	0.00223	0.00498	0.51%	-0.63%
25		5	0.979	0.97	0.987	0.969	0.986	0.00302	0.00676	0.69%	0.05%
50		5	0.984	0.975	0.992	0.973	0.99	0.00298	0.00666	0.68%	-0.43%
100		5	0.686	0.636	0.737	0.632	0.741	0.0182	0.0407	5.94%	29.9%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	5	0.982	0.939	1	0.92	1	0.0156	0.0349	3.55%	0.0%
0	Salt Control	5	0.958	0.877	1	0.85	1	0.029	0.0649	6.77%	2.49%
0	Site Water	5	0.942	0.844	1	0.817	1	0.0353	0.0789	8.38%	4.11%
1		5	0.956	0.882	1	0.859	1	0.0266	0.0595	6.23%	2.68%
10		5	0.994	0.979	1	0.972	1	0.00563	0.0126	1.27%	-1.24%
25		5	0.98	0.946	1	0.944	1	0.0123	0.0275	2.8%	0.19%
50		5	0.992	0.968	1	0.958	1	0.00845	0.0189	1.91%	-0.96%
100		5	0.692	0.574	0.81	0.54	0.779	0.0425	0.0951	13.7%	29.5%

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	0.986	0.982	0.966	0.977	0.987
0	Salt Control	0.984	1	0.99	0.991	0.977
0	Site Water	0.978	0.99	0.989	0.995	0.981
1		0.977	0.965	0.973	0.992	0.98
10		0.982	0.983	0.991	0.981	0.991
25		0.977	0.986	0.969	0.977	0.985
50		0.973	0.987	0.99	0.986	0.982
100		0.706	0.67	0.683	0.632	0.741

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	1	1	0.92	0.991	1
0	Salt Control	1	0.85	0.944	1	0.995
0	Site Water	1	0.911	0.817	1	0.981
1		0.981	1	0.859	1	0.939
10		1	1	1	0.972	1
25		1	0.958	1	1	0.944
50		1	1	0.958	1	1
100		0.756	0.667	0.718	0.54	0.779

Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	213/216	213/217	196/203	211/216	223/226
0	Salt Control	248/252	181/181	201/203	214/216	212/217
0	Site Water	223/228	194/196	174/176	218/219	209/213
1		209/214	219/227	183/188	236/238	200/204
10		217/221	228/232	219/221	207/211	218/220
25		213/218	204/207	221/228	215/220	201/204
50		216/222	221/224	204/206	214/217	213/217
100		161/228	142/212	153/224	115/182	166/224

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	213/213	213/213	196/213	211/213	213/213
0	Salt Control	213/213	181/213	201/213	213/213	212/213
0	Site Water	213/213	194/213	174/213	213/213	209/213
1		209/213	213/213	183/213	213/213	200/213
10		213/213	213/213	213/213	207/213	213/213
25		213/213	204/213	213/213	213/213	201/213
50		213/213	213/213	204/213	213/213	213/213
100		161/213	142/213	153/213	115/213	166/213

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	21-0623-2259	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 10:47	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	4.56%	50	100	70.71	2

Steel Many-One Rank Sum Test

Control vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control	1	24	16	1	8	0.5394	Asymp	Non-Significant Effect
	10	30	16	1	8	0.9446	Asymp	Non-Significant Effect
	25	27.5	16	1	8	0.8333	Asymp	Non-Significant Effect
	50	30	16	1	8	0.9446	Asymp	Non-Significant Effect
	100*	15	16	0	8	0.0191	Asymp	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.012974	0.2025948	5	18.6	<0.0001	Significant Effect
Error	0.2609569	0.0108732	24			
Total	1.273931		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.41	15.1	0.6373	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.885	0.903	0.0037	Non-normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	5	0.982	0.939	1	1	0.92	1	0.0156	3.55%	0.0%
1		5	0.956	0.882	1	0.981	0.859	1	0.0266	6.23%	2.68%
10		5	0.994	0.979	1	1	0.972	1	0.00563	1.27%	-1.24%
25		5	0.98	0.946	1	1	0.944	1	0.0123	2.8%	0.19%
50		5	0.992	0.968	1	1	0.958	1	0.00845	1.91%	-0.96%
100		5	0.692	0.574	0.81	0.718	0.54	0.779	0.0425	13.7%	29.5%

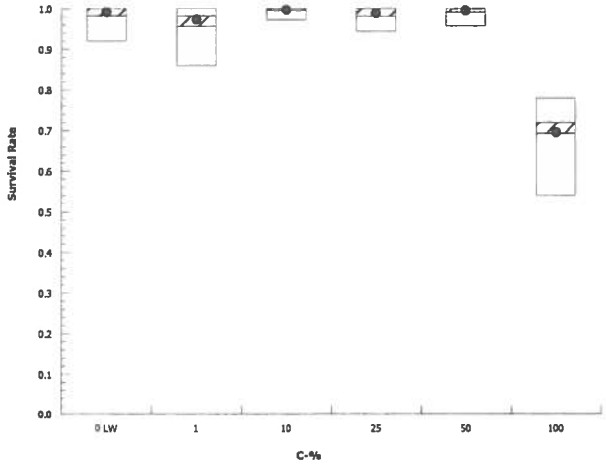
Angular (Corrected) Transformed Summary

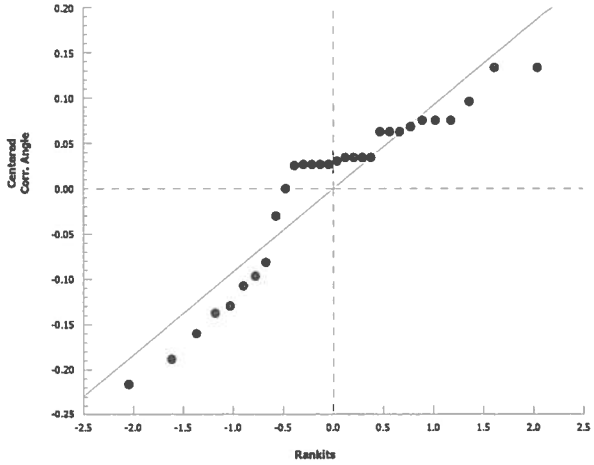
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Cont	5	1.47	1.34	1.61	1.54	1.28	1.54	0.0488	7.41%	0.0%
1		5	1.4	1.22	1.59	1.43	1.19	1.54	0.0672	10.7%	4.81%
10		5	1.51	1.44	1.58	1.54	1.4	1.54	0.0269	3.98%	-2.45%
25		5	1.46	1.33	1.59	1.54	1.33	1.54	0.0466	7.13%	0.86%
50		5	1.5	1.41	1.6	1.54	1.36	1.54	0.0346	5.14%	-1.93%
100		5	0.986	0.86	1.11	1.01	0.825	1.08	0.0454	10.3%	33.1%

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	21-0623-2259	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 10:47	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	14-5507-0023	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 10:46	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	1.46%	50	100	70.71	2

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		1	0.297	2.36	0.046	8	0.7310	CDF	Non-Significant Effect
		10	-1.16	2.36	0.046	8	0.9895	CDF	Non-Significant Effect
		25	0.127	2.36	0.046	8	0.7931	CDF	Non-Significant Effect
		50	-0.771	2.36	0.046	8	0.9691	CDF	Non-Significant Effect
		100*	23.1	2.36	0.046	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.8763842	0.1752768	5	183	<0.0001	Significant Effect
Error	0.02299595	0.0009581646	24			
Total	0.8993801		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	2.83	15.1	0.7260	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.973	0.903	0.6297	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	5	0.979	0.969	0.99	0.982	0.966	0.987	0.00389	0.89%	0.0%
1		5	0.977	0.965	0.99	0.977	0.965	0.992	0.0044	1.01%	0.2%
10		5	0.986	0.979	0.992	0.983	0.981	0.991	0.00223	0.51%	-0.63%
25		5	0.979	0.97	0.987	0.977	0.969	0.986	0.00302	0.69%	0.05%
50		5	0.984	0.975	0.992	0.986	0.973	0.99	0.00298	0.68%	-0.43%
100		5	0.686	0.636	0.737	0.683	0.632	0.741	0.0182	5.94%	29.9%

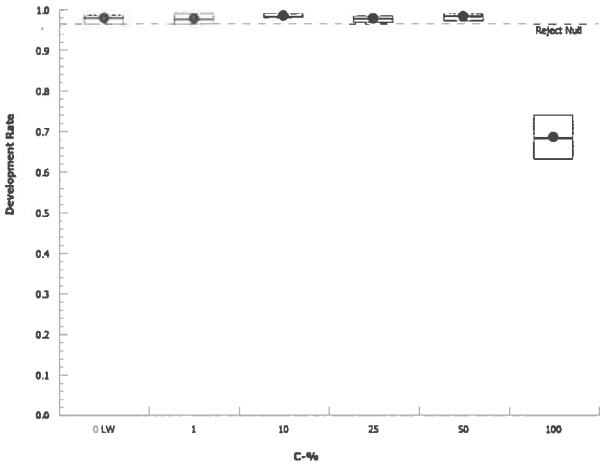
Angular (Corrected) Transformed Summary

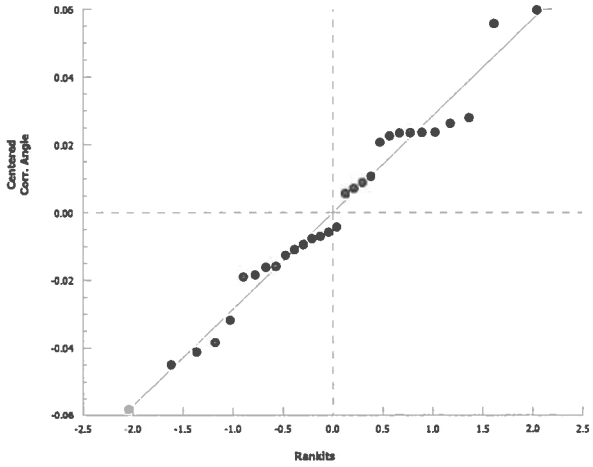
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Cont	5	1.43	1.39	1.47	1.43	1.38	1.46	0.0131	2.05%	0.0%
1		5	1.42	1.38	1.47	1.42	1.38	1.48	0.0161	2.52%	0.41%
10		5	1.45	1.42	1.48	1.44	1.43	1.48	0.00974	1.5%	-1.59%
25		5	1.43	1.4	1.46	1.42	1.39	1.45	0.0105	1.64%	0.17%
50		5	1.44	1.41	1.48	1.45	1.41	1.47	0.0113	1.75%	-1.06%
100		5	0.977	0.922	1.03	0.973	0.919	1.04	0.0197	4.51%	31.6%

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	14-5507-0023	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 10:46	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Mytilus sp. Development Toxicity Test Water Chemistry Data

Client: Port of Redwood City
Test Material: PRC-DU1-SET
Test ID #: 61456
Project #: 23613
Sample Salinity adjusted with: Crystal Sea Salts

Test Start Date: 2/18/15
Test End Date: 2/20/15
Enumeration Date: 2/22/15
Investigator: CA
Inoculation Count: 213

Concentration	Replicate	Number of Normal Larvae	Number of Abnormal Larvae	Total Number Larvae	Percent Normal Development	Percent Survival
Control	A	213	3	216	98.6	100.0
	B	213	4	217	98.2	100.0
	C	196	7	203	96.6	92.0
	D	211	5	216	97.7	99.1
	E	223	3	226	98.7	100.0
1.0%	A	209	5	214	97.7	98.1
	B	219	8	227	96.5	100.0
	C	183	5	188	97.3	85.9
	D	236	2	238	99.2	100.0
	E	200	4	204	98.0	93.9
10%	A	217	4	221	98.2	100.0
	B	228	4	232	98.3	100.0
	C	219	2	221	99.1	100.0
	D	207	4	211	98.1	97.2
	E	218	2	220	99.1	100.0
25%	A	213	5	218	97.7	100.0
	B	204	3	207	98.6	95.8
	C	221	7	228	96.9	100.0
	D	215	5	220	97.7	100.0
	E	201	3	204	98.5	94.4
50%	A	216	6	222	97.3	100.0
	B	221	3	224	98.7	100.0
	C	204	2	206	99.0	95.8
	D	214	3	217	98.6	100.0
	E	213	4	217	98.2	100.0
100%	A	161	67	228	70.6	75.6
	B	142	70	212	67.0 ~~70.6~~ 6/4/15	66.7
	C	153	71	224	68.3	71.8
	D	115	67	182	63.2	54.0
	E	166	58	224	74.1	77.9

Mytilus sp. Development Toxicity Test Water Chemistry Data

Client: Port of Redwood City
Test Material: PRC-DU1-SET
Test ID#: 61456 Project #: 23613
Test Date: 2/18/15 Randomization: —
Sample Salinity adjusted with : Crystal Sea Salts

Organism Log#: 8751 Age: N/A
Organism Supplier: Grotoff
Control/Diluent: 30ppt FSW

Day 0

Treatment	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	NH_3	Signoff
Control	15.6	7.92	8.6	30.3		Test Solution Prep: CJD
1%	15.6	7.95	8.1	30.7		New WQ: RG
10%	15.6	7.93	8.2	30.7		Inoculation Date: 2/18/15
25%	15.6	7.94	8.1	30.7		Inoculation Time: 1630
50%	15.6	7.95	8.0	30.5		Inoculation Signoff: Le
100%	15.6	7.91	8.0	30.3	9.02	
Meter ID	35A	PH21	RD12	EC10	DR3800	

Day 1

Treatment	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	Signoff
Control	15.3				Date: 2/19/15
1%	15.3				Signoff: Le
10%	15.3				
25%	15.3				
50%	15.3				
100%	15.3				
Meter ID	35A				

Day 2

Treatment	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	Signoff
Control	15.5	7.78	7.7	29.9	Termination Signoff: Le
1%	15.5	7.81	7.8	30.5	Termination Date: 2/20/15
10%	15.5	7.86	7.8	30.4	Termination Time: 1548
25%	15.5	7.93	7.9	30.4	Old WQ: RG
50%	15.5	8.03	7.9	30.4	
100%	15.5	8.16	8.0	30.2	
Meter ID	35A	PH15	RD09	EC09	

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	11-9178-8070	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 10:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	5.5%	Passes survival rate

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		Site Water	0.994	1.86	0.174	8	0.1748	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02164157	0.02164157	1	0.987	0.3495	Non-Significant Effect
Error	0.1753722	0.02192153	8			
Total	0.1970138		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.68	23.2	0.3632	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.883	0.741	0.1396	Normal Distribution

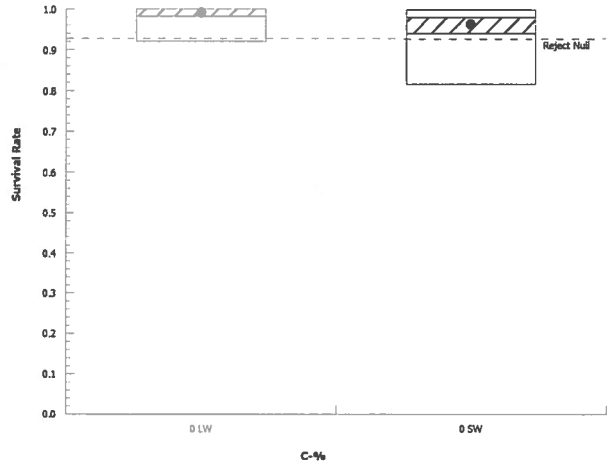
Survival Rate Summary

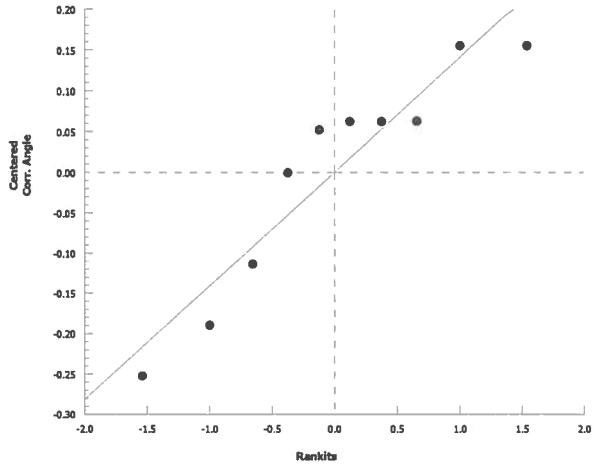
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Site Water	5	0.942	0.844	1	0.981	0.817	1	0.0353	8.38%	0.0%
0	Lab Water Contr	5	0.982	0.939	1	1	0.92	1	0.0156	3.55%	-4.29%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Site Water	5	1.38	1.16	1.6	1.43	1.13	1.54	0.0799	12.9%	0.0%
0	Lab Water Cont	5	1.47	1.34	1.61	1.54	1.28	1.54	0.0488	7.41%	-6.74%

Graphics





Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	05-3595-1529	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 10:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.84%	Passes survival rate

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		Salt Control	0.665	1.86	0.161	8	0.2623	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.008324097	0.008324097	1	0.442	0.5247	Non-Significant Effect
Error	0.1505327	0.01881659	8			
Total	0.1588568		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.16	23.2	0.4749	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.837	0.741	0.0409	Normal Distribution

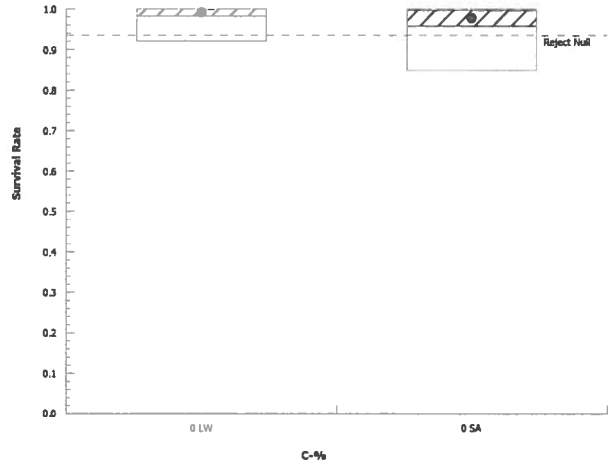
Survival Rate Summary

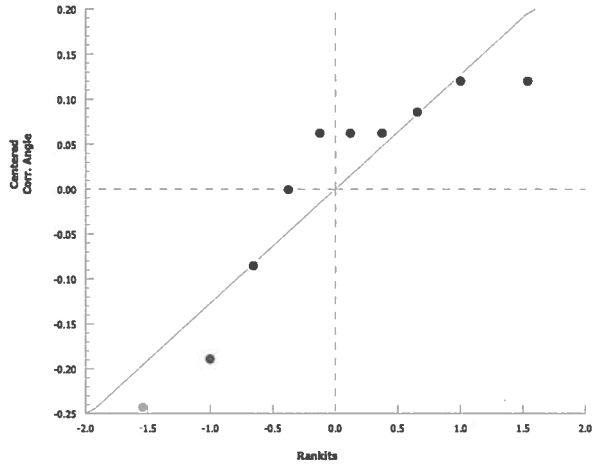
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Salt Control	5	0.958	0.877	1	0.995	0.85	1	0.029	6.77%	0.0%
0	Lab Water Contr	5	0.982	0.939	1	1	0.92	1	0.0156	3.55%	-2.55%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Salt Control	5	1.42	1.22	1.61	1.5	1.17	1.54	0.0717	11.3%	0.0%
0	Lab Water Cont	5	1.47	1.34	1.61	1.54	1.28	1.54	0.0488	7.41%	-4.08%

Graphics





Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	05-2209-4859	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 10:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	1.09%	Passes development rate

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		Site Water	-1.52	1.86	0.036	8	0.9166	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002178075	0.002178075	1	2.31	0.1667	Non-Significant Effect
Error	0.007531175	0.0009413969	8			
Total	0.00970925		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.2	23.2	0.8659	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.965	0.741	0.8363	Normal Distribution

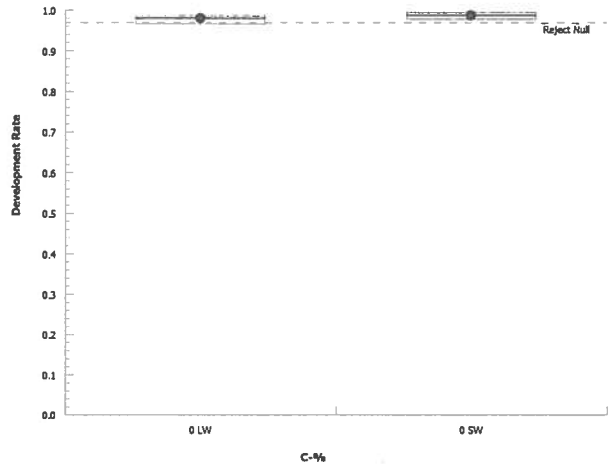
Development Rate Summary

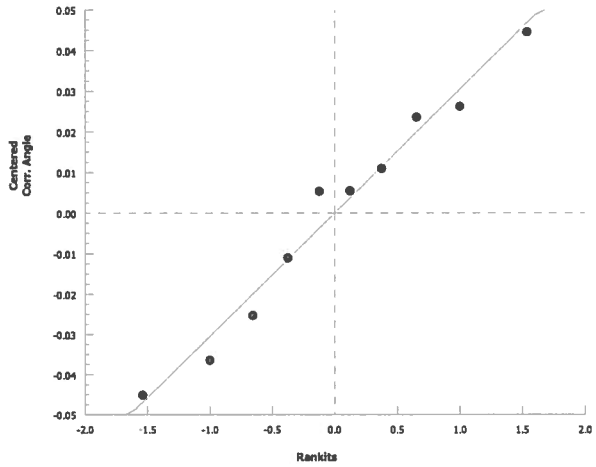
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Site Water	5	0.987	0.978	0.995	0.989	0.978	0.995	0.00312	0.71%	0.0%
0	Lab Water Contr	5	0.979	0.969	0.99	0.982	0.966	0.987	0.00389	0.89%	0.74%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Site Water	5	1.46	1.42	1.5	1.46	1.42	1.5	0.0143	2.2%	0.0%
0	Lab Water Cont	5	1.43	1.39	1.47	1.43	1.38	1.46	0.0131	2.05%	2.02%

Graphics





Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	16-2918-4909	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 10:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	1.35%	Passes development rate

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		Salt Control	-1.7	1.86	0.043	8	0.9363	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003905646	0.003905646	1	2.89	0.1274	Non-Significant Effect
Error	0.01079832	0.00134979	8			
Total	0.01470397		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.15	23.2	0.4767	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.963	0.741	0.8173	Normal Distribution

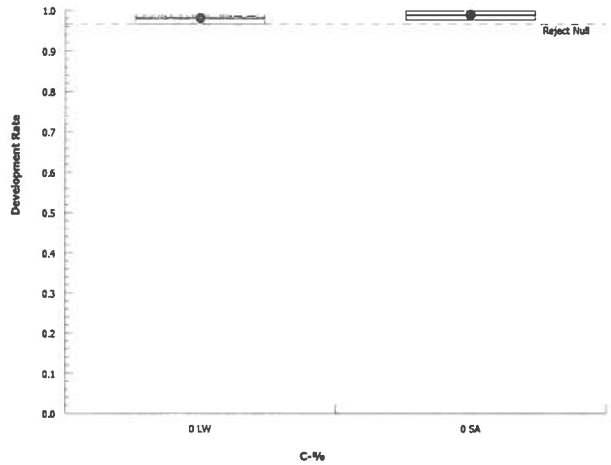
Development Rate Summary

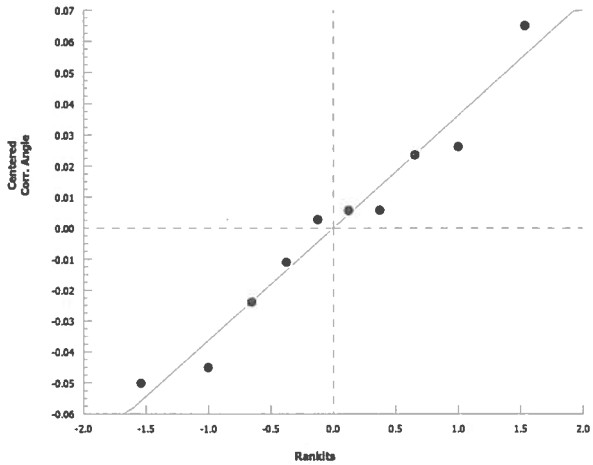
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Salt Control	5	0.988	0.978	0.999	0.99	0.977	1	0.00382	0.87%	0.0%
0	Lab Water Contr	5	0.979	0.969	0.99	0.982	0.966	0.987	0.00389	0.89%	0.92%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Salt Control	5	1.47	1.42	1.52	1.47	1.42	1.53	0.0192	2.92%	0.0%
0	Lab Water Cont	5	1.43	1.39	1.47	1.43	1.38	1.46	0.0131	2.05%	2.69%

Graphics





Mytilus sp. Development Toxicity Test Count Data

Client: Port of Redwood City
Test Material: Salt Control/Site Waters
Test ID #: 61456-7
Project #: 23613
Sample Salinity adjusted with: Crystal Sea

Test Start Date: 2/18/15
Test End Date: 2/20/15
Enumeration Date: 2/22/15
Investigator: LA
Innoculation Counts: 213

Concentration	Replicate	Number of Normal Larvae	Number of Abnormal Larvae	Total Number Larvae	Percent Normal Development	Percent Survival
Control (30 ppt)	A	213	3	216	98.6	100.0
	B	213	4	217	98.2	100.0
	C	196	7	203	96.6	92.0
	D	211	5	216	97.7	99.1
	E	223	3	226	98.7	100.0
Site Water	A	223	5	228	97.8	100.0
	B	194	2	196	99.0 ~~BH~~ T 6/4/15	91.1
	C	174	2	176	98.9	81.7
	D	218	1	219	99.5	100.0
	E	209	4	213	98.1	98.1
Salt Control	A	248	4	252	98.4	100.0
	B	191	0	191	100.0	85.0
	C	201	2	203	99.0	94.4
	D	214	2	216	99.1	100.0
	E	212	5	217	97.7	99.5

Mytilus sp. Development Toxicity Test Water Chemistry Data

Client: Port of Redwood City
Test Material: Salt Control/Site Water
Test ID#: 61456-7 Project #: 23613
Test Date: 2/18/15 Randomization: —
Sample Salinity adjusted with: Crystal Sea Salts

Organism Log#: 8751 Age: N/A
Organism Supplier: Grotoff
Control/Diluent: 30 ppt FSW

Day 0					
Treatment	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	Signoff
Control (30ppt)	15.6	7.92	8.6	30.3	Date & Inoculation Time: 2/18/15 1630
Site Water	15.6	7.97	8.3	29.5	Test Solution Prep: CJD
Salt Control	15.6	8.04	8.3	30.4	Inoculation Signoff: Le
					New WQ: RG
Meter ID	35A	PH21	RD12	EC10	

Day 1					
Treatment	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	Signoff
Control (30ppt)	15.3				Date: 2/19/15
Site Water	15.3				Old WQ: Le
Salt Control	15.3				
Meter ID	35A				

Day 2					
Treatment	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	Signoff
Control (30ppt)	15.5	7.78	7.7	29.9	Date: 2/20/15
Site Water	15.5	7.89	7.6	29.2	Tremination Time: ~~2/20~~ 1548
Salt Control	15.5	7.81	7.7	29.8	Termination Signoff: Le
Meter ID	35A	PH15	RD09	EC09	

CETIS Summary Report

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Batch ID:	01-5397-5940	**Test Type:**	Development-Survival	**Analyst:**	Mike McElroy
Start Date:	18 Feb-15 16:17	**Protocol:**	ASTM E724-98 (2004)	**Diluent:**	Diluted Seawater
Ending Date:	20 Feb-15 15:50	**Species:**	Mytilus galloprovincialis	**Brine:**	Crystal Sea
Duration:	48h	**Source:**	Gutoff	**Age:**	NA

Sample ID:	04-9416-5549	**Code:**	DMMO	**Client:**	Moffat and Nichol
Sample Date:	04 Feb-15 08:30	**Material:**	Elutriate	**Project:**	23613
Receive Date:	05 Feb-15 09:40	**Source:**	Port of Redwood City		
Sample Age:	14d 8h (4.6 °C)	**Station:**	PRC-DU2-SET		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
14-1766-5992	Development Rate	25	50	35.36	1.11%	4	Dunnett Multiple Comparison Test
05-9780-3455	Survival Rate	50	100	70.71	9.75%	2	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
09-5276-2003	Development Rate	EC50	69.1	68.3	69.8	1.448	Trimmed Spearman-Kärber
17-5149-0558	Survival Rate	EC50	64.4	63.2	65.6	1.553	Spearman-Kärber

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	5	0.987	0.981	0.993	0.979	0.991	0.00207	0.00462	0.47%	0.0%
1		5	0.984	0.973	0.996	0.969	0.991	0.00407	0.0091	0.92%	0.25%
10		5	0.982	0.974	0.991	0.975	0.99	0.00312	0.00697	0.71%	0.45%
25		5	0.985	0.978	0.993	0.975	0.99	0.00265	0.00592	0.6%	0.18%
50		5	0.954	0.936	0.972	0.944	0.979	0.00644	0.0144	1.51%	3.35%
100		5	0	0	0	0	0	0	0		100.0%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	5	0.924	0.839	1	0.831	1	0.0307	0.0686	7.42%	0.0%
1		5	0.991	0.965	1	0.953	1	0.00939	0.021	2.12%	-7.22%
10		5	0.943	0.897	0.988	0.906	1	0.0163	0.0364	3.86%	-2.03%
25		5	0.935	0.886	0.985	0.892	1	0.0178	0.0398	4.25%	-1.22%
50		5	0.887	0.798	0.976	0.798	0.962	0.032	0.0717	8.08%	3.96%
100		5	0	0	0	0	0	0	0		100.0%

Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	0.986	0.979	0.99	0.989	0.991
1		0.986	0.986	0.99	0.991	0.969
10		0.975	0.99	0.985	0.975	0.987
25		0.986	0.975	0.985	0.99	0.99
50		0.979	0.952	0.949	0.944	0.945
100		0	0	0	0	0

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	0.981	0.892	0.915	0.831	1
1		1	1	0.953	1	1
10		0.906	0.953	0.92	0.934	1
25		1	0.93	0.92	0.934	0.892
50		0.873	0.845	0.958	0.798	0.962
100		0	0	0	0	0

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	209/212	190/194	195/197	177/179	216/218
1		215/218	218/221	203/205	214/216	216/223
10		193/198	203/205	196/199	199/204	226/229
25		214/217	198/203	196/199	199/201	190/192
50		186/190	180/189	204/215	170/180	205/217
100		0/178	0/207	0/200	0/166	0/180

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water Contr	209/213	190/213	195/213	177/213	213/213
1		213/213	213/213	203/213	213/213	213/213
10		193/213	203/213	196/213	199/213	213/213
25		213/213	198/213	196/213	199/213	190/213
50		186/213	180/213	204/213	170/213	205/213
100		0/213	0/213	0/213	0/213	0/213

CETIS Analytical Report

Report Date: 04 Jun-15 15:36 (p 1 of 1)
Test Code: 61457 | 16-5655-0254

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	05-9780-3455	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Jun-15 15:34	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	9.75%	50	100	70.71	2

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		1	-2.29	2.3	0.175	8	0.9995	CDF	Non-Significant Effect
		10	-0.304	2.3	0.175	8	0.8837	CDF	Non-Significant Effect
		25	-0.11	2.3	0.175	8	0.8339	CDF	Non-Significant Effect
		50	1.09	2.3	0.175	8	0.3454	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1729992	0.0432498	4	3.01	0.0428	Significant Effect
Error	0.2874969	0.01437484	20			
Total	0.4604961		24			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.5	13.3	0.8271	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.947	0.888	0.2128	Normal Distribution

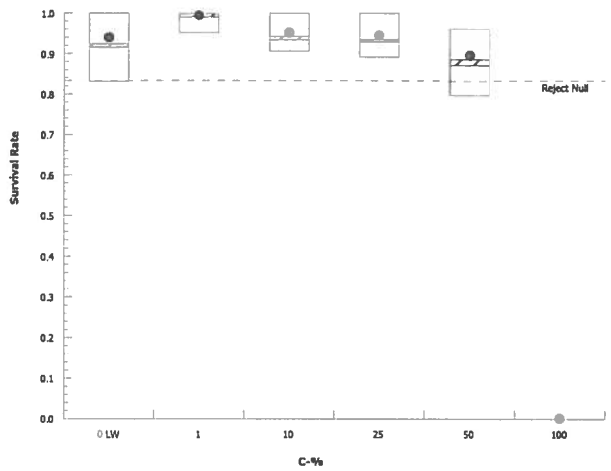
Survival Rate Summary

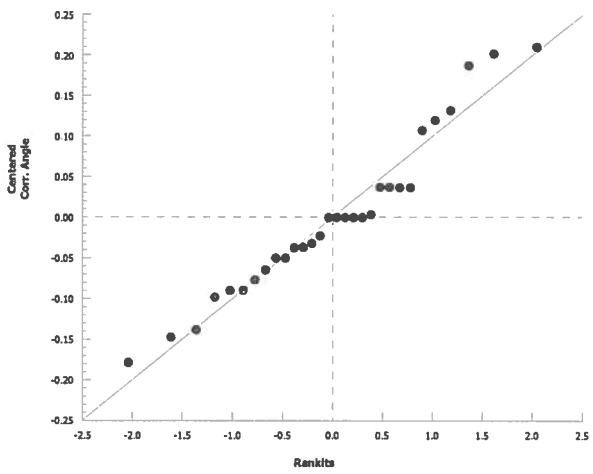
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	5	0.924	0.839	1	0.915	0.831	1	0.0307	7.42%	0.0%
1		5	0.991	0.965	1	1	0.953	1	0.00939	2.12%	-7.22%
10		5	0.943	0.897	0.988	0.934	0.906	1	0.0163	3.86%	-2.03%
25		5	0.935	0.886	0.985	0.93	0.892	1	0.0178	4.25%	-1.22%
50		5	0.887	0.798	0.976	0.873	0.798	0.962	0.032	8.08%	3.96%
100		5	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Cont	5	1.33	1.13	1.52	1.28	1.15	1.54	0.0702	11.8%	0.0%
1		5	1.5	1.4	1.6	1.54	1.35	1.54	0.0368	5.49%	-13.1%
10		5	1.35	1.21	1.49	1.31	1.26	1.54	0.0494	8.19%	-1.74%
25		5	1.33	1.19	1.48	1.3	1.24	1.54	0.0523	8.76%	-0.63%
50		5	1.24	1.09	1.39	1.21	1.1	1.38	0.0541	9.73%	6.21%
100		5	0.0343	0.0343	0.0343	0.0343	0.0343	0.0343	0	0.0%	97.4%

Graphics





Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	17-5149-0558	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 10:57	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

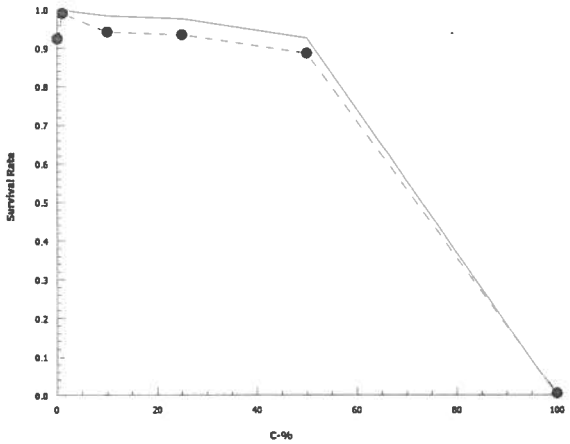
Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.0761	0.00%	1.81	0.0039	64.4	63.2	65.6

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Water Contr	5	0.924	0.831	1	0.0307	0.0686	7.42%	0.0%	984	1065
1		5	0.991	0.953	1	0.00939	0.021	2.12%	-7.22%	1055	1065
10		5	0.943	0.906	1	0.0163	0.0364	3.86%	-2.03%	1004	1065
25		5	0.935	0.892	1	0.0178	0.0398	4.25%	-1.22%	996	1065
50		5	0.887	0.798	0.962	0.032	0.0717	8.08%	3.96%	945	1065
100		5	0	0	0	0	0		100.0%	0	1065

Graphics



CETIS Analytical Report

Report Date: 03 Jun-15 10:59 (p 1 of 3)
Test Code: 61457 | 16-5655-0254

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	14-1766-5992	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 10:59	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	1.11%	25	50	35.36	4

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Control		1	0.453	2.3	0.042	8	0.6242	CDF	Non-Significant Effect
		10	0.951	2.3	0.042	8	0.4018	CDF	Non-Significant Effect
		25	0.376	2.3	0.042	8	0.6574	CDF	Non-Significant Effect
		50*	5.47	2.3	0.042	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.03493634	0.008734086	4	10.3	0.0001	Significant Effect
Error	0.01691506	0.0008457529	20			
Total	0.0518514		24			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	2.2	13.3	0.6998	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.972	0.888	0.7022	Normal Distribution

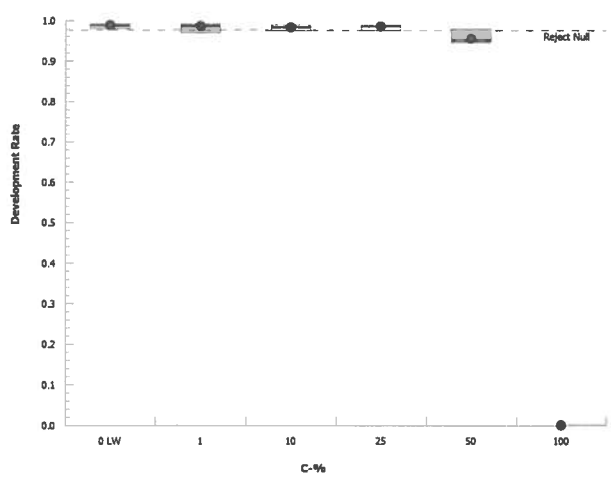
Development Rate Summary

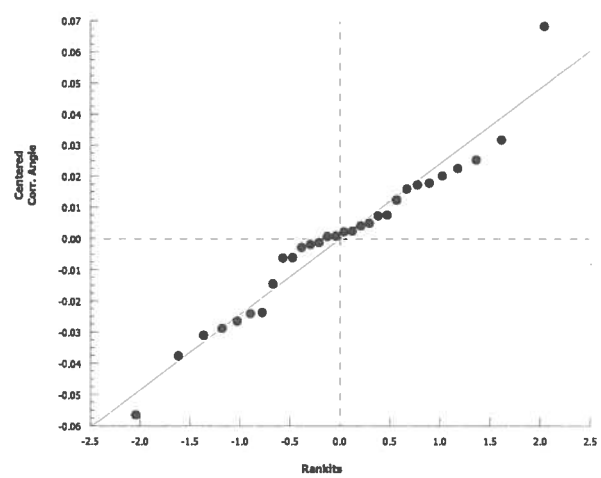
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Contr	5	0.987	0.981	0.993	0.989	0.979	0.991	0.00207	0.47%	0.0%
1		5	0.984	0.973	0.996	0.986	0.969	0.991	0.00407	0.92%	0.25%
10		5	0.982	0.974	0.991	0.985	0.975	0.99	0.00312	0.71%	0.45%
25		5	0.985	0.978	0.993	0.986	0.975	0.99	0.00265	0.6%	0.18%
50		5	0.954	0.936	0.972	0.949	0.944	0.979	0.00644	1.51%	3.35%
100		5	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water Cont	5	1.46	1.43	1.48	1.46	1.43	1.47	0.00864	1.33%	0.0%
1		5	1.45	1.41	1.49	1.45	1.39	1.47	0.0148	2.28%	0.57%
10		5	1.44	1.41	1.47	1.45	1.41	1.47	0.012	1.86%	1.2%
25		5	1.45	1.42	1.48	1.45	1.41	1.47	0.0104	1.6%	0.48%
50		5	1.36	1.31	1.41	1.34	1.33	1.43	0.0174	2.86%	6.9%
100		5	0.0367	0.0347	0.0388	0.0373	0.0348	0.0388	0.000741	4.51%	97.5%

Graphics





CETIS Analytical Report

Report Date: 03 Jun-15 10:59 (p 1 of 2)
Test Code: 61457 | 16-5655-0254

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Analysis ID:	09-5276-2003	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 10:59	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

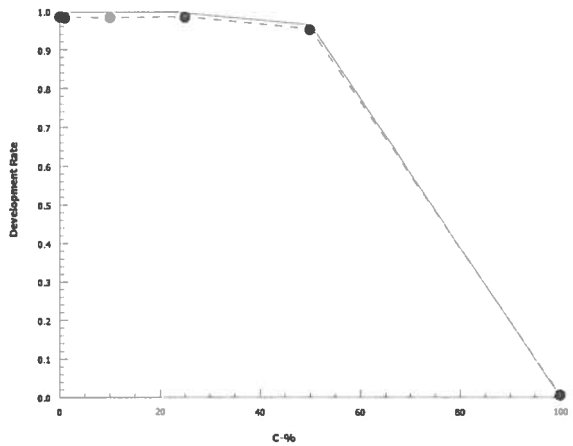
Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.013	0.27%	1.84	0.00235	69.1	68.3	69.8

Development Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Water Contr	5	0.987	0.979	0.991	0.00207	0.00462	0.47%	0.0%	987	1000
1		5	0.984	0.969	0.991	0.00407	0.0091	0.92%	0.25%	1066	1083
10		5	0.982	0.975	0.99	0.00312	0.00697	0.71%	0.45%	1017	1035
25		5	0.985	0.975	0.99	0.00265	0.00592	0.6%	0.18%	997	1012
50		5	0.954	0.944	0.979	0.00644	0.0144	1.51%	3.35%	945	991
100		5	0	0	0	0	0		100.0%	0	931

Graphics



Mytilus sp. Development Toxicity Test Water Chemistry Data

Client: Port of Redwood City
Test Material: PRC-DU2-SET
Test ID #: 61457
Project #: 23613
Sample Salinity adjusted with: Crystal Sea Salts

Test Start Date: 2/18/15
Test End Date: 2/20/15
Enumeration Date: 2/24/15
Investigator: CA
Inoculation Count: 213

Concentration	Replicate	Number of Normal Larvae	Number of Abnormal Larvae	Total Number Larvae	Percent Normal Development	Percent Survival
Control	A	209	3	212	98.6	98.1
	B	190	4	194	97.9	89.2
	C	195	2	197	99.0	91.5
	D	177	2	179	98.9	83.1
	E	216	2	218	99.1	100.0
1.0%	A	215	3	218	98.6	100.0
	B	218	3	221	98.6	100.0
	C	203	2	205	99.0	95.3
	D	214	2	216	99.1	100.0
	E	216	7	223	96.9	100.0
10%	A	193	5	198	97.5	90.6
	B	203	2	205	99.0	95.3
	C	196	3	199	98.5	92.0
	D	199	5	204	97.5	93.4
	E	226	3	229	98.7	100.0
25%	A	214	3	217	98.6	100.0
	B	198	5	203	97.5	93.0
	C	196	3	199	98.5	92.0
	D	199	2	201	99.0	93.4
	E	190	2	192	99.0	89.2
50%	A	186	4	190	97.9	87.3
	B	180	9	189	95.2	84.5
	C	204	11	215	94.9	95.8
	D	170	10	180	94.4	79.8
	E	205	12	217	94.5	96.2
100%	A	0	178	178	0.0	0.0
	B	0	207	207	0.0	0.0
	C	0	200	200	0.0	0.0
	D	0	166	166	0.0	0.0
	E	0	190	190	0.0	0.0

Mytilus sp. Development Toxicity Test Water Chemistry Data

Client: Port of Redwood City
Test Material: PRC-DU2-SET
Test ID#: 61457 Project #: 23613
Test Date: 2/18/15 Randomization: —
Sample Salinity adjusted with : Crystal Sea Salts

Organism Log#: 8751 Age: N/A
Organism Supplier: Grotto
Control/Diluent: 30ppt FSW

Day 0

Treatment	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	NH_3	Signoff
Control	15.6	7.95	8.8	29.9		Test Solution Prep: CJD
1%	15.6	7.93	8.7	30.7		New WQ: RG
10%	15.6	7.94	8.6	30.6		Inoculation Date: 2/18/15
25%	15.6	7.96	8.2	30.0		Inoculation Time: 1617
50%	15.6	8.00	8.1	30.4		Inoculation Signoff: Le
100%	15.6	8.03	7.2	30.1	4.91	
Meter ID	35A	pH21	RD12	EC10	DR3800	

Day 1

Treatment	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	Signoff
Control	15.3				Date: 2/19/15
1%	15.3				Signoff: Le
10%	15.3				
25%	15.3				
50%	15.3				
100%	15.3				
Meter ID	35A				

Day 2

Treatment	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	Signoff
Control	15.5	7.84	7.9	29.8	Termination Signoff: Le
1%	15.5	7.84	7.9	30.7	Termination Date: 2/20/15
10%	15.5	7.90	7.9	30.6	Termination Time: 1550
25%	15.5	7.99	7.9	30.5	Old WQ: RG
50%	15.5	8.10	7.9	30.8	
100%	15.5	8.24	8.0	30.6	
Meter ID	35A	pH15	RD09	EC09	

Appendix N

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the Bivalve (*Mytilus galloprovincialis*) Embryos

CETIS Summary Report

Test Code: 60954 | 01-7067-0973

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Batch ID:	13-1036-8601	**Test Type:**	Development-Survival	**Analyst:**	Padrick Anderson
Start Date:	18 Feb-15 16:35	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Diluted Seawater
Ending Date:	20 Feb-15 15:46	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	47h	**Source:**	Gutoff	**Age:**	n/a

Sample ID:	06-8755-4468	**Code:**	KCl	**Client:**	Reference Toxicant
Sample Date:	18 Feb-15 16:35	**Material:**	Potassium chloride	**Project:**	23451
Receive Date:	18 Feb-15 16:35	**Source:**	Reference Toxicant		
Sample Age:	NA (17.1 °C)	**Station:**	In House		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
00-2798-7291	Development Rate	1	2	1.414	1.0%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
01-6538-9170	Development Rate	EC50	2.26	2.23	2.3		Trimmed Spearman-Kärber

Development Rate Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	4	0.994	0.981	1	0.982	1	0.00432	0.00864	0.87%	0.0%
0.5		4	0.988	0.978	0.998	0.98	0.995	0.00315	0.0063	0.64%	0.61%
1		4	0.995	0.989	1	0.99	1	0.00197	0.00395	0.4%	-0.09%
2		4	0.851	0.812	0.891	0.822	0.874	0.0124	0.0248	2.91%	14.4%
3		4	0	0	0	0	0	0	0		100.0%
4		4	0	0	0	0	0	0	0		100.0%

Development Rate Detail

C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	1	0.995	0.982	1
0.5		0.995	0.989	0.989	0.98
1		1	0.995	0.995	0.99
2		0.84	0.822	0.869	0.874
3		0	0	0	0
4		0	0	0	0

Development Rate Binomials

C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	190/190	211/212	215/219	230/230
0.5		195/196	186/188	180/182	193/197
1		206/206	197/198	213/214	205/207
2		178/212	152/185	173/199	166/190
3		0/165	0/180	0/169	0/159
4		0/1	0/1	0/1	0/1

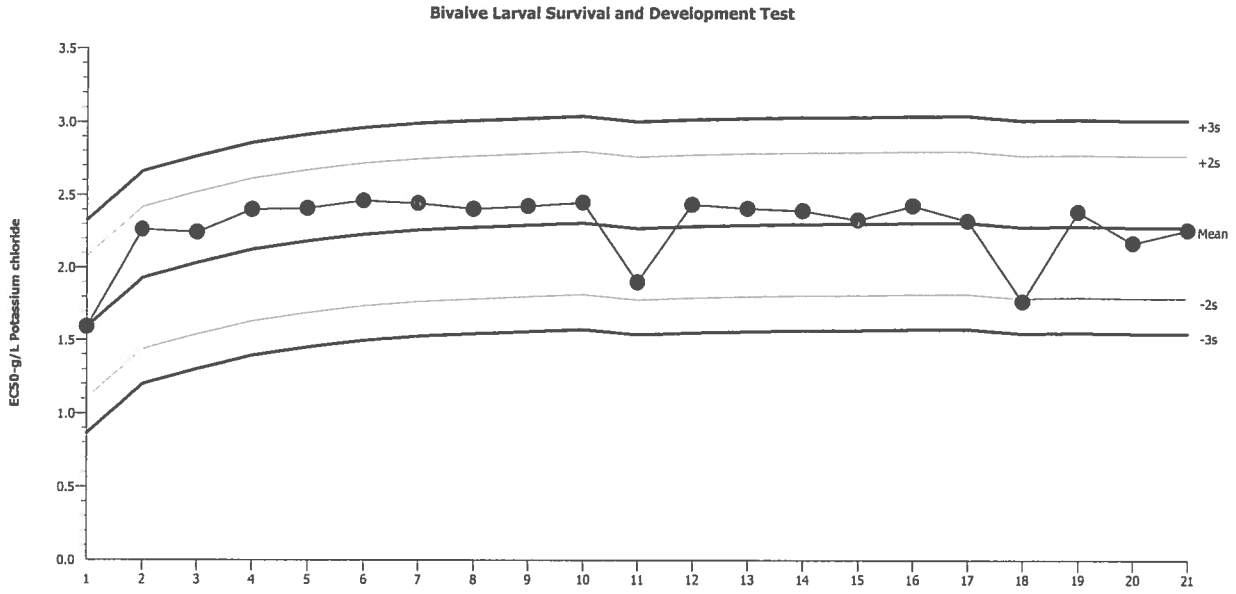
Analyst: [signature] QA: BJ

CETIS QC Plot

Report Date: 12 Mar-15 18:36 (1 of 1)

Bivalve Larval Survival and Development Test — **Pacific EcoRisk**

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Potassium chloride
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Development Rate	**Source:**	Reference Toxicant-REF



Mean:	2.284	**Count:**	20	**-2s Warning Limit:**	1.796	**-3s Action Limit:**	1.552
Sigma:	0.2439	**CV:**	10.70%	**+2s Warning Limit:**	2.771	**+3s Action Limit:**	3.015

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2014	Oct	17	15:22	1.594	-0.6897	-2.828	(-)		17-6129-7493	12-6422-6787
2			22	16:01	2.264	-0.01993	-0.0817			12-3609-5272	00-4902-9186
3			30	15:50	2.244	-0.03951	-0.162			11-4309-6671	08-5806-2432
4		Nov	4	15:50	2.401	0.1174	0.4815			16-9678-3811	02-0994-0813
5			6	15:07	2.409	0.1254	0.5141			06-0872-8892	10-6740-8126
6			12	15:01	2.461	0.1771	0.7259			13-1307-7397	00-5580-9854
7			13	17:02	2.443	0.1594	0.6535			16-8268-7140	17-2496-0400
8			20	14:06	2.406	0.1216	0.4986			08-8162-3199	01-6640-0526
9			26	13:35	2.425	0.1411	0.5784			11-8404-4355	16-4390-2683
10		Dec	3	16:47	2.449	0.1655	0.6785			00-9746-6783	02-0763-2614
11			11	18:17	1.905	-0.3791	-1.554			09-3295-2434	20-3337-5080
12			17	14:36	2.436	0.1522	0.6239			19-8789-1885	01-6260-1164
13			27	13:05	2.41	0.126	0.5168			08-1009-9386	09-6511-4368
14			30	15:42	2.396	0.1116	0.4575			05-1309-4894	14-4041-9208
15	2015	Jan	8	15:00	2.332	0.0484	0.1984			02-6349-2338	16-1519-5774
16			14	14:28	2.431	0.1471	0.6033			14-7771-9631	13-5840-4347
17			22	16:15	2.326	0.0418	0.1714			05-3895-4316	01-0755-5829
18			28	14:28	1.773	-0.5105	-2.093	(-)		03-2064-7048	19-3409-9938
19		Feb	4	14:36	2.39	0.1056	0.4329			00-4611-9857	13-5394-3256
20			12	14:29	2.175	-0.1093	-0.4481			01-7724-8944	00-6054-3963
21			18	16:35	2.264	-0.01952	-0.08005			01-7067-0973	01-6538-9170

Analyst: _____ QA: BJ

Mytilus sp. Development Toxicity Test Count Data

Client: **Reference Toxicant**
Test Material: Potassium Chloride
Test ID #: 60954
Project #: 23451

Test Start Date: 2/18/15
Test End Date: 2/20/15
Enumeration Date: 3/3/15
Investigator: IA

Treatment (g/L)	Replicate	Number of Normal Larvae	Number of Abnormal Larvae	Total Number Larvae	Percent Normal Development
Control	A	190	0	190	100.0
	B	211	1	212	99.5
	C	215	4	219	98.2
	D	230	0	230	100.0
0.5	A	195	1	196	99.5
	B	186	2	188	98.9
	C	180	2	182	98.9
	D	193	4	197	98.0
1	A	206	0	206	100.0
	B	197	1	198	99.5
	C	213	1	214	99.5
	D	205	2	207	99.0
2	A	178	34	212	~~84~~ 84.0
	B	152	33	185	82.2
	C	173	26	199	86.9
	D	166	24	190	87.4
3	A	0	165	165	0.0
	B	0	180	180	0.0
	C	0	169	169	0.0
	D	0	159	159	0.0
4	A	0	0	0	0.0
	B	0	0	0	0.0
	C	0	0	0	0.0
	D	0	0	0	0.0

Mytilus sp. Development Toxicity Test Water Chemistry Data

Client: **Reference Toxicant**
Test Material: Potassium Chloride
Test ID#: 60954 Project #: 23451
Test Date: 2/18/15

Organism Log#: 8751 Age: N/A
Control/Diluent: FSW @ 30ppt

Day 0					
Treatment (g/L)	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	Signoff
Control	17.1	7.93	8.6	30.2	Ref Tox Stock # —
0.5	17.1	7.93	8.6	31.1	Test Solution Prep: Le
1	17.1	7.93	8.5	31.6	New WQ: RG
2	17.1	7.92	8.5	32.5	Innoculation Date: 2/18/15
3	17.1	7.90	8.3	33.6	Innoculation Time: 1635
4	17.1	7.89	8.3	34.6	Innoculation Signoff: Le
Meter ID	69A	PH21	RD12	EC10	

Day 1					
Treatment	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	Signoff
Control	17.0				Date: 2/19/15
0.5	17.0				WQ: Le
1	17.0				
2	17.0				
3	17.0				
4	17.0				
Meter ID	69A				

Day 2					
Treatment	Temperature (°C)	pH	D.O. (mg/L)	Salinity (ppt)	Signoff
Control	17.6	7.90	7.5	29.6	Termination Date: 2/20/15
0.5	17.6	7.95	7.7	31.1	Termination Time: 1546
1	17.6	7.97	7.7	31.9	Termination Signoff: Le
2	17.6	7.98	7.8	32.9	Old WQ: RG
3	17.6	7.98	7.8	34.1	
4	17.6	7.98	7.8	34.6	
Meter ID	69A	PH15	RD09	EC09	

Appendix O

Test Data and Summary of Statistics for the Evaluation of the Toxicity of the Port of Redwood City's Berths 1-4 Sediment Elutriates to the Mysid *Americamysis bahia*

CETIS Summary Report

Report Date: 03 Jun-15 11:05 (p 1 of 1)
Test Code: 61458 | 05-2156-0903

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	01-1895-8254	**Test Type:**	Survival (96h)	**Analyst:**	Mike McElroy
Start Date:	19 Feb-15 16:30	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	23 Feb-15 14:45	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Indicators, FL	**Age:**	5

Sample ID:	16-8067-0605	**Code:**	DMMO	**Client:**	Moffat and Nichol
Sample Date:	04 Feb-15 12:30	**Material:**	Elutriate	**Project:**	23613
Receive Date:	05 Feb-15 09:40	**Source:**	Port of Redwood City		
Sample Age:	15d 4h (4.6 °C)	**Station:**	PRC-DU1-SET		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
07-0273-3941	96h Survival Rate	0	>0		10.4%		Equal Variance t Two-Sample Test
13-1694-3884	96h Survival Rate	100	>100	NA	7.17%	1	Steel Many-One Rank Sum Test

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water	5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	0.0%
0	Site Water	5	0.92	0.758	1	0.7	1	0.0583	0.13	14.2%	6.12%
1		5	0.94	0.829	1	0.8	1	0.04	0.0894	9.52%	4.08%
10		5	1	1	1	1	1	0	0	0.0%	-2.04%
25		5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	0.0%
50		5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	0.0%
100		5	1	1	1	1	1	0	0	0.0%	-2.04%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1	1	1	0.9	1
0	Site Water	1	0.9	0.7	1	1
1		0.8	1	1	0.9	1
10		1	1	1	1	1
25		1	1	1	0.9	1
50		0.9	1	1	1	1
100		1	1	1	1	1

96h Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	10/10	10/10	10/10	9/10	10/10
0	Site Water	10/10	9/10	7/10	10/10	10/10
1		8/10	10/10	10/10	9/10	10/10
10		10/10	10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	9/10	10/10
50		9/10	10/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10	10/10

CETIS Analytical Report

Report Date: 03 Jun-15 11:05 (p 1 of 3)
Test Code: 61458 | 05-2156-0903

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	13-1694-3884	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 11:05	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	7.17%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water		1	24.5	16	2	8	0.5880	Asymp	Non-Significant Effect
		10	30	16	1	8	0.9446	Asymp	Non-Significant Effect
		25	27.5	16	2	8	0.8333	Asymp	Non-Significant Effect
		50	27.5	16	2	8	0.8333	Asymp	Non-Significant Effect
		100	30	16	1	8	0.9446	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02919776	0.005839551	5	1	0.4362	Non-Significant Effect
Error	0.1394714	0.005811309	24			
Total	0.1686692		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1.05	4.25	0.4169	Equal Variances
Variances	Levene Equality of Variance	5.88	3.9	0.0011	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.788	0.903	<0.0001	Non-normal Distribution

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water	5	0.98	0.924	1	1	0.9	1	0.02	4.56%	0.0%
1		5	0.94	0.829	1	1	0.8	1	0.04	9.52%	4.08%
10		5	1	1	1	1	1	1	0	0.0%	-2.04%
25		5	0.98	0.924	1	1	0.9	1	0.02	4.56%	0.0%
50		5	0.98	0.924	1	1	0.9	1	0.02	4.56%	0.0%
100		5	1	1	1	1	1	1	0	0.0%	-2.04%

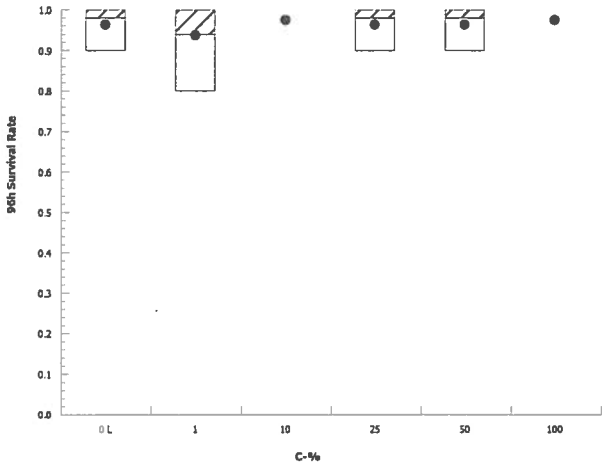
Angular (Corrected) Transformed Summary

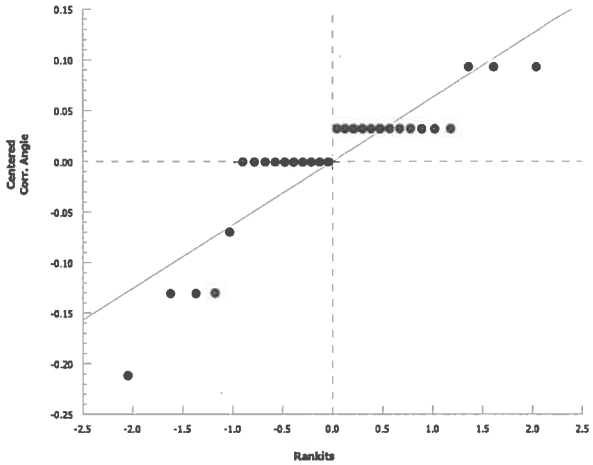
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water	5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	0.0%
1		5	1.32	1.15	1.49	1.41	1.11	1.41	0.0615	10.4%	4.42%
10		5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	-2.36%
25		5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	0.0%
50		5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	0.0%
100		5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	-2.36%

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	13-1694-3884	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 11:05	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: Port of Redwood City
Test Material: PRC-DU1-SET
Test ID#: 61458 Project # 23613
Test Date: 2/19/15 Randomization: 5.7.2

Organism Log #: 8795 Age: 5 days
Organism Supplier: Aquatic Indicators
Control/Diluent: 25 ppt Seawater
Control Water Batch: NA

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. old	Salinity (ppt) new	Salinity old	NH_3 (mg/L) new	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.7	7.92		9.0		24.9			10	10	10	10	10	Test Solution Prep: HA
1	20.7	7.92		9.2		25.3			10	10	10	10	10	New WQ: SVV
10	20.7	7.89		9.0		25.2			10	10	10	10	10	Initiation Date: 2/19/15
25	20.7	7.90		8.9		25.1			10	10	10	10	10	Initiation Time: 1630
50	20.7	7.90		8.9		25.1			10	10	10	10	10	Initiation Signoff: CP
100	20.7	7.92		8.7		25.0		5.98	10	10	10	10	10	a.m. Feeding Signoff: ARF
Meter ID	38A	pH19		RD11		EC08		DR3800						p.m. Feeding Signoff: CP
Control	20.6		7.15		7.5		~~25.8~~ ~~25.50~~		10	10	10	10	10	Count Date: 2/20/15
1	20.6		7.23		7.6		25.3		10	10	10	10	10	Count Time: 1100
10	20.6		7.24		7.6		25.4		10	10	10	10	10	Count Signoff: CD
25	20.6		7.44		7.6		25.5		10	10	10	10	10	Old WQ: CD
50	20.6		7.69		7.5		25.5		10	10	10	10	10	a.m. Feeding Signoff: SVV
100	20.6		7.92		7.4		25.8		10	10	10	10	10	p.m. Feeding Signoff: ARF
Meter ID	38A		pH22		RD11		EC08							
Control	20.6		~~7.88~~ 7.89		~~7.2~~ 7.1		~~25.5~~ ~~25.46~~		10	10	10	10	10	Count Date: 2-21-15
1	20.6		7.60		7.2		~~25.3~~ 25.5		10	10	10	10	10	Count Time: 1050
10	20.6		7.75		7.3		25.6		10	10	10	10	10	Count Signoff: ARF
25	20.6		7.75		7.3		25.7		10	10	10	10	10	Old WQ: NB
50	20.6		7.91		7.3		25.7		10	10	10	10	10	a.m. Feeding Signoff:
100	20.6		8.11		7.3		25.9		10	10	10	10	10	p.m. Feeding Signoff:
Meter ID	38A		pH21		RD11		EC08							
Control	20.5		7.70		7.4		25.9		10	10	10	10	10	Count Date: 2-22-15
1	20.5		7.68		7.4		26.0		8	10	10	10	10	Count Time: 1010
10	20.5		7.74		7.4		26.4		10	10	10	10	10	Count Signoff:
25	20.5		7.83		7.4		26.3		10	10	10	9	10	Old WQ: DM
50	20.5		7.95		7.4		26.4		9	10	10	10	10	a.m. Feeding Signoff:
100	20.5		8.07		7.3		26.7		10	10	10	10	10	p.m. Feeding Signoff: CSD
Meter ID	~~38A~~		pH19		RD12		EC10							
Control	20.3		7.62		6.7		27.9		10	10	10	9	10	Termination Date: 2-23-15
1	20.3		7.64		6.7		27.6		8	10	10	9	10	Termination Time: 1445
10	20.3		7.69		6.8		27.6		10	10	10	10	10	Termination Signoff:
25	20.3		7.76		6.7		27.7		10	10	10	9	10	Old WQ: KRR
50	20.3		7.89		6.7		27.4		9	10	10	10	10	a.m. Feeding Signoff:
100	20.3		8.06		6.3		28.9	5.02	10	10	10	10	10	
Meter ID	38A		pH21		RD11		EC11	DR3800						

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	07-0273-3941	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 11:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	10.4%	Passes 96h survival rate

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water		Site Water	0.951	1.86	0.165	8	0.1848	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01771227	0.01771227	1	0.904	0.3696	Non-Significant Effect
Error	0.1567581	0.01959476	8			
Total	0.1744704		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	6.38	23.2	0.1003	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.816	0.741	0.0228	Normal Distribution

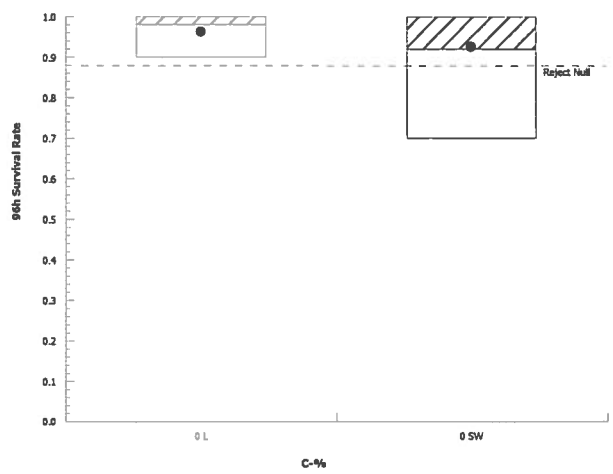
96h Survival Rate Summary

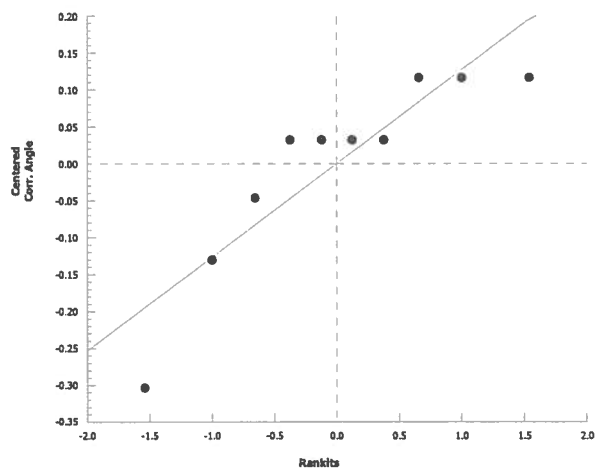
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Site Water	5	0.92	0.758	1	1	0.7	1	0.0583	14.2%	0.0%
0	Lab Water	5	0.98	0.924	1	1	0.9	1	0.02	4.56%	-6.52%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Site Water	5	1.3	1.07	1.52	1.41	0.991	1.41	0.0823	14.2%	0.0%
0	Lab Water	5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	-6.5%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: Port of Redwood City
Test Material: Site Water
Test ID#: 61458 Project # 23613
Test Date: 2/19/15 Randomization: 5.7.2

Organism Log #: 8795 Age: 5 days
Organism Supplier: Aquatic Indicators
Control/Diluent: 25 ppt Seawater
Control Water Batch: NA

Treatment	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.7	7.92		9.0		24.9		10	10	10	10	10	Test Solution Prep: DA
Site Water	20.7	7.89		10.3		24.5		10	10	10	10	10	New WQ: SVV
													Initiation Date: 2/19/15
													Initiation Time: 1630
													Initiation Signoff: CP
													a.m. Feeding Signoff: ARF
Meter ID	38A	pH19		RD11		EC08							p.m. Feeding Signoff: CP
Control	20.6		7.15		7.5		25.0	10	10	10	10	10	Count Date: 2/20/15
Site Water	20.6		7.51		7.6		25.2	10	10	8	10	10	Count Time: 1100
													Count Signoff: CD
													Old WQ: CD
													a.m. Feeding Signoff: SVV
													p.m. Feeding Signoff: ARF
Meter ID	38A		pH22		RD11		EC08						
Control	20.6		7.59		7.1		25.5	10	10	10	10	10	Count Date: 2-21-15
Site Water	20.6		7.69		7.1		25.5	10	10	7	10	10	Count Time: 1050
													Count Signoff: ARF
													Old WQ: NB
													a.m. Feeding Signoff: LC
Meter ID	38A		pH21		RD11		EC08						p.m. Feeding Signoff: LC
Control	20.5		7.70		7.4		25.9	10	10	10	10	10	Count Date: 2-22-15
Site Water	20.5		7.76 DM ~~pH19~~		7.3 DM ~~RD12~~		DM 26.3 ~~EC10~~	10	10	7	10	10	Count Time: 1010
													Count Signoff: [illegible]
													Old WQ: DM
													a.m. Feeding Signoff: [illegible]
Meter ID	38A		pH19		RD12		EC10						p.m. Feeding Signoff: CSD
Control	20.3		7.62		6.7		27.9	10	10	10	9	10	Termination Date: 2-23-15
Site Water	20.3		7.59		6.6		28.1	10	9	7	10	10	Termination Time: 1445
													Termination Signoff: [illegible]
													Old WQ: KAR
Meter ID	38A		pH21		RD11		EC11						a.m. Feeding Signoff: [illegible]

CETIS Summary Report

Report Date: 03 Jun-15 11:10 (p 1 of 1)
Test Code: 61459 | 07-9749-6376

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	05-9489-4556	**Test Type:**	Survival (96h)	**Analyst:**	Mike McElroy
Start Date:	19 Feb-15 16:45	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	23 Feb-15 15:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Indicators, FL	**Age:**	5

Sample ID:	10-5307-0971	**Code:**	DMMO	**Client:**	Moffat and Nichol
Sample Date:	04 Feb-15 08:30	**Material:**	Elutriate	**Project:**	23613
Receive Date:	05 Feb-15 09:40	**Source:**	Port of Redwood City		
Sample Age:	15d 8h (4.6 °C)	**Station:**	PRC-DU2-SET		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
20-4738-1094	96h Survival Rate	100	>100	NA	4.07%	1	Steel Many-One Rank Sum Test

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water	5	1	1	1	1	1	0	0	0.0%	0.0%
1		5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	1	1	1	1	1	0	0	0.0%	0.0%
25		5	1	1	1	1	1	0	0	0.0%	0.0%
50		5	1	1	1	1	1	0	0	0.0%	0.0%
100		5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	2.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1	1	1	1	1
1		1	1	1	1	1
10		1	1	1	1	1
25		1	1	1	1	1
50		1	1	1	1	1
100		1	0.9	1	1	1

96h Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	10/10	10/10	10/10	10/10	10/10
1		10/10	10/10	10/10	10/10	10/10
10		10/10	10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	10/10	10/10
50		10/10	10/10	10/10	10/10	10/10
100		10/10	9/10	10/10	10/10	10/10

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	20-4738-1094	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 11:10	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	4.07%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water		1	27.5	16	1	8	0.8333	Asymp	Non-Significant Effect
		10	27.5	16	1	8	0.8333	Asymp	Non-Significant Effect
		25	27.5	16	1	8	0.8333	Asymp	Non-Significant Effect
		50	27.5	16	1	8	0.8333	Asymp	Non-Significant Effect
		100	25	16	1	8	0.6353	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004426555	0.000885311	5	1	0.4389	Non-Significant Effect
Error	0.02124747	0.000885311	24			
Total	0.02567402		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	4.25	0.4457	Equal Variances
Variances	Levene Equality of Variance	7.11	3.9	0.0003	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.406	0.903	<0.0001	Non-normal Distribution

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water	5	1	1	1	1	1	1	0	0.0%	0.0%
1		5	1	1	1	1	1	1	0	0.0%	0.0%
10		5	1	1	1	1	1	1	0	0.0%	0.0%
25		5	1	1	1	1	1	1	0	0.0%	0.0%
50		5	1	1	1	1	1	1	0	0.0%	0.0%
100		5	0.98	0.924	1	1	0.9	1	0.02	4.56%	2.0%

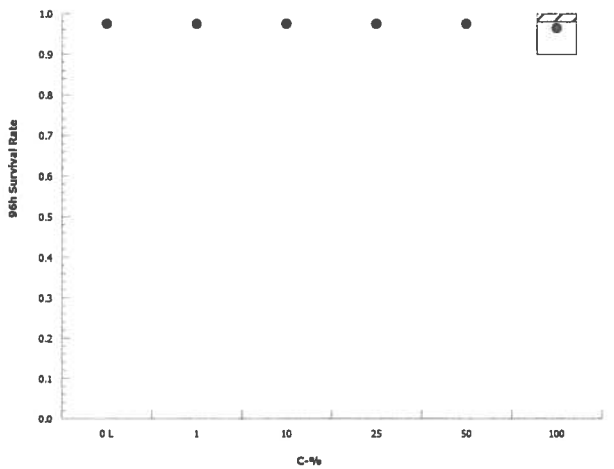
Angular (Corrected) Transformed Summary

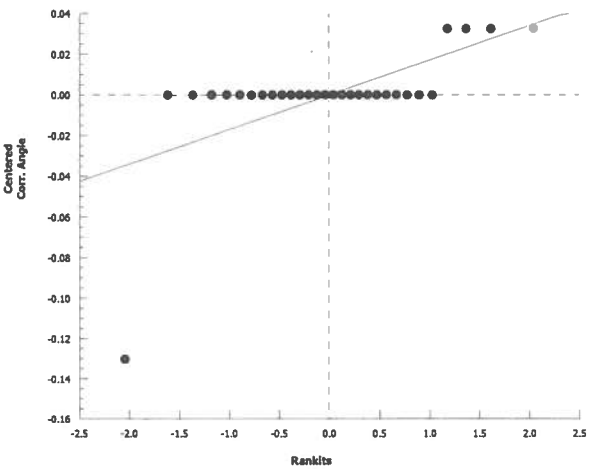
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water	5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
1		5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
10		5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
25		5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
50		5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
100		5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	2.31%

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	20-4738-1094	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 11:10	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: Port of Redwood City
Test Material: PRC-DU2-SET
Test ID#: 61459 Project # 23613
Test Date: 2/19/15 Randomization: 5.6.3

Organism Log #: 8795 Age: 5 day
Organism Supplier: Aquatic Indicators
Control/Diluent: 25 ppt Seawater
Control Water Batch: NA

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. old	Salinity (ppt) new	Salinity old	NH_3 (mg/L) new	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.6	7.82		9.4		24.8			10	10	10	10	10	Test Solution Prep:
1	20.6	7.88		9.4		25.1			10	10	10	10	10	New WQ: KR
10	20.6	7.90		9.2		25.2			10	10	10	10	10	Initiation Date: 2/19/15
25	20.6	7.93		9.3		25.2			10	10	10	10	10	Initiation Time: 1645
50	20.6	7.97		9.1		25.3			10	10	10	10	10	Initiation Signoff: TC
100	20.6	8.01		8.4		25.3		10.8	10	10	10	10	10	a.m. Feeding Signoff: AAF
Meter ID	38A	PH21		RD09		EC09		DR3800						p.m. Feeding Signoff: TM
Control	20.6		7.78		6.5		25.5		10	10	10	10	10	Count Date: 2/20/15
1	20.6		7.93		7.2		25.7		10	10	10	10	10	Count Time: 0930
10	20.6		7.98		7.2		25.7		9	10	10	10	10	Count Signoff: CD
25	20.6		7.98		5.9		25.7		10	10	10	10	10	Old WQ: NB
50	20.6		8.16		5.9		25.8		10	10	10	10	10	a.m. Feeding Signoff: RV
100	20.6		8.33		6.3		25.9		10	10	10	10	10	p.m. Feeding Signoff: AAF
Meter ID	38A		PH15		RD09		EC09							
Control	20.6		7.54		7.4		25.7		10	10	10	10	10	Count Date: 2-21-15
1	20.6		7.60		7.4		26.2		10	10	10	10	10	Count Time: 1156
10	20.6		7.68		7.3		25.8		9	10	10	10	10	Count Signoff: AAF
25	20.6		7.82		7.4		26.1		10	10	10	10	10	Old WQ: DM
50	20.6		7.97		7.4		26.1		10	10	10	10	10	a.m. Feeding Signoff: [illegible]
100	20.6		8.16		7.4		26.1		10	10	10	10	10	p.m. Feeding Signoff: [illegible]
Meter ID	38A		PH21		RD11		EC08							
Control	20.5		7.78		7.5		26.3		10	10	10	10	10	Count Date: 2-22-15
1	20.5		7.78		7.6		26.3		10	10	10	10	10	Count Time: 905
10	20.5		7.90		7.6		26.7		9	10	10	10	10	Count Signoff: PA
25	20.5		7.99		7.5		26.7		10	10	10	10	10	Old WQ: KRR
50	20.5		8.08		7.5		26.8		10	10	10	10	10	a.m. Feeding Signoff: [illegible]
100	20.5		8.22		7.5		26.9		10	9	10	10	10	p.m. Feeding Signoff: SJD
Meter ID	38A		PH22		RD11		EC09							
Control	20.3		7.77		7.2		27.2		10	10	10	10	10	Termination Date: 2-23-15
1	20.3		7.62		6.8		27.5		10	10	10	10	10	Termination Time: 1515
10	20.3		7.72		6.9		27.5		10	10	10	10	10	Termination Signoff: [illegible]
25	20.3		7.81		6.9		27.4		10	10	10	10	10	Old WQ: MA
50	20.3		7.94		6.8		28.1		10	10	10	10	10	a.m. Feeding Signoff: [illegible]
100	20.3		8.14		7.0		28.0	6.98	10	9	10	10	10	
Meter ID	38A		PH19		RD12		EC08	DR3800						

Appendix P

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Americamysis bahia*

CETIS Summary Report

Report Date: 12 Mar-15 18:39 (p 1 of 1)
Test Code: 61563 | 03-6420-8860

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	16-7545-9819	**Test Type:**	Survival (96h)	**Analyst:**	Padrick Anderson
Start Date:	19 Feb-15 17:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Feb-15 15:20	**Species:**	Americamysis bahia	**Brine:**	Crystal Sea
Duration:	94h	**Source:**	Aquatic Indicators, FL	**Age:**	5

Sample ID:	18-7502-5046	**Code:**	KCl	**Client:**	Reference Toxicant
Sample Date:	19 Feb-15 17:00	**Material:**	Potassium chloride	**Project:**	23653
Receive Date:	19 Feb-15 17:00	**Source:**	Reference Toxicant		
Sample Age:	NA (20.7 °C)	**Station:**	In House		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
21-1831-6483	96h Survival Rate	0.5	1	0.7071	8.84%		Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
02-5408-8248	96h Survival Rate	EC50	0.707	0.5	1		Binomial/Graphical

96h Survival Rate Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	4	0.95	0.791	1	0.8	1	0.05	0.1	10.5%	0.0%
0.125		4	1	1	1	1	1	0	0	0.0%	-5.26%
0.25		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	-2.63%
0.5		4	1	1	1	1	1	0	0	0.0%	-5.26%
1		4	0	0	0	0	0	0	0		100.0%
2		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	1	0.8	1	1
0.125		1	1	1	1
0.25		1	0.9	1	1
0.5		1	1	1	1
1		0	0	0	0
2		0	0	0	0

96h Survival Rate Binomials

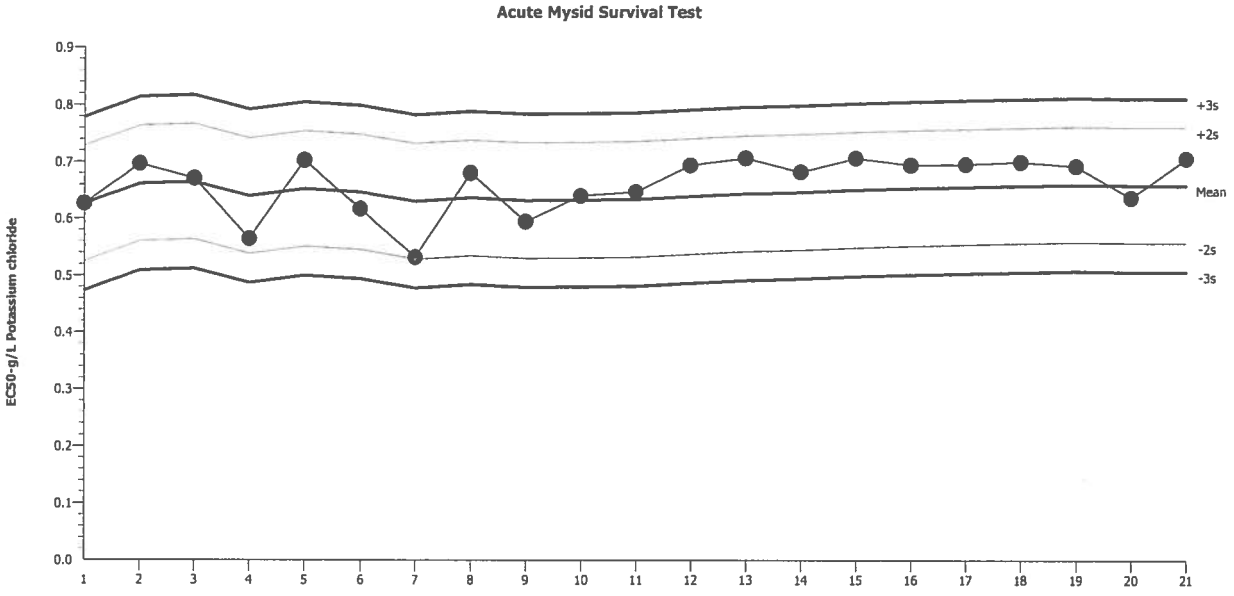
C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	10/10	8/10	10/10	10/10
0.125		10/10	10/10	10/10	10/10
0.25		10/10	9/10	10/10	10/10
0.5		10/10	10/10	10/10	10/10
1		0/10	0/10	0/10	0/10
2		0/10	0/10	0/10	0/10

CETIS QC Plot

Report Date: 12 Mar-15 18:39 (1 of 1)

Acute Mysid Survival Test — **Pacific EcoRisk**

Test Type:	Survival (96h)	**Organism:**	Americamysis bahia (Mysid)	**Material:**	Potassium chloride
Protocol:	EPA-821-R-02-012 (2002)	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF



Mean:	0.6594	**Count:**	20	**-2s Warning Limit:**	0.5577	**-3s Action Limit:**	0.5068
Sigma:	0.05085	**CV:**	7.71%	**+2s Warning Limit:**	0.7611	**+3s Action Limit:**	0.8119

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Aug	30	16:15	0.6263	-0.03307	-0.6503			08-8455-3169	08-4678-4634
2	2014	Jan	8	16:05	0.6965	0.03713	0.7302			01-6925-9981	19-6909-5150
3			16	18:00	0.6708	0.01144	0.2251			10-7712-2942	05-2344-0230
4		Mar	20	16:45	0.5645	-0.09492	-1.867			08-6371-6024	07-3313-9788
5		Apr	2	17:30	0.703	0.04357	0.8567			03-8950-7977	11-5175-0492
6			10	16:15	0.6169	-0.04254	-0.8366			10-2133-0736	12-8523-8395
7		May	1	17:05	0.5318	-0.1276	-2.509	(-)		03-8012-9334	13-7152-9760
8			6	17:50	0.6808	0.02135	0.4199			03-8048-8596	09-0340-4886
9			9	16:00	0.5946	-0.0648	-1.274			17-0331-8675	13-3542-8898
10			15	16:30	0.6403	-0.01905	-0.3747			13-1497-3628	00-5174-3866
11			21	16:55	0.6473	-0.01213	-0.2386			06-3402-6022	03-4115-6104
12		Jun	18	17:10	0.6944	0.03504	0.6892			06-1188-4258	00-0241-1521
13			26	16:50	0.7071	0.04771	0.9382			04-8193-2775	12-6407-0947
14		Oct	2	14:30	0.683	0.02362	0.4645			11-2549-1156	20-3834-3332
15			8	14:20	0.7071	0.04771	0.9382			07-2900-0354	08-7535-0039
16			23	17:05	0.695	0.03556	0.6993			16-6872-9777	14-5911-2070
17			30	14:15	0.6965	0.03708	0.7291			18-2385-7585	14-5709-8201
18		Nov	20	17:05	0.7009	0.04145	0.8152			07-5290-9164	14-2725-8866
19	2015	Jan	2	15:20	0.6936	0.03422	0.673			10-4730-5330	15-5225-1160
20			22	17:00	0.6373	-0.02212	-0.435			10-7968-8254	11-0502-7928
21		Feb	19	17:00	0.7071	0.04771	0.9382			03-6420-8860	02-5408-8248

96 Hour Acute *Americamysis bahia* Reference Toxicant Test

Client: Reference Toxicant
Test Material: Potassium chloride
Test ID#: 61563 Project # 23653
Test Date: 2/19/15 Randomization: 4.6.3

Organism Log #: 8795 Age: 5 days
Organism Supplier: Aquatic Indicators
Control/Diluent: DI + Crystal Sea @ 25 ppt
Control Water Batch: 1047

Treatment (g/L KCl)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	SIGN-OFF
Control	20.7	8.03		8.0		24.8		10	10	10	10	Test Solution Prep: CP
0.125	20.7	8.08		8.0		24.7		10	10	10	10	New WQ: KRR
0.25	20.7	8.06		8.1		24.7		10	10	10	10	Initiation Date: 2/19/15
0.5	20.7	8.06		8.1		24.9		10	10	10	10	Initiation Time: 1700
1	20.7	8.07		8.4		25.5		10	10	10	10	Initiation Signoff: CJD
2	20.7	8.08		9.2		26.3		10	10	10	10	RT Batch #: 130
Meter ID	38A	pH22		RD12		EC10						a.m. Feeding Signoff:
												p.m. Feeding Signoff: CJD
Control	20.6		7.15		5.9		24.7	10	10	10	10	Count Date: 2/20/15
0.125	20.6		7.19		6.1		25.0	10	10	10	10	Count Time: 1020
0.25	20.6		7.16		6.3		25.1	10	10	10	10	Count Signoff: CD
0.5	20.6		7.23		6.3		25.2	10	10	10	10	Old WQ: CD
1	20.6		7.85		6.3		25.7	0	0	0	0	a.m. Feeding Signoff: SVV
2	20.6		7.87		6.7		26.7	0	0	0	0	p.m. Feeding Signoff:
Meter ID	38A		pH22		RD11		EC08					
Control	20.6	8.04	7.47	8.0	5.7	24.5	25.1	10	10	10	10	Test Solution Prep: CD
0.125	20.6	8.05	7.49	8.0	5.9	24.6	25.5	10	10	10	10	New WQ: DM
0.25	20.6	8.06	7.63	8.0	6.3	24.8	25.4	10	9	10	10	Renewal Date: 2/21/15
0.5	20.6	8.06	7.60	8.1	6.4	25.0	25.7	10	10	10	10	Renewal Time: 1620
1	—	—	—	—	—	—	—	—	—	—	—	Renewal Signoff:
2	—	—	—	—	—	—	—	—	—	—	—	Old WQ: DM
Meter ID	38A	pH 19	pH 21	RD12	RD11	EC10	EC08					a.m. Feeding Signoff:
												p.m. Feeding Signoff:
												RT Batch #: 130
Control	20.5		7.85		7.0		24.6	10	8	10	10	Count Date: 2/22/15 ~~2/23/15~~
0.125	20.5		7.87		7.0		24.5	10	10	10	10	Count Time: 0935
0.25	20.5		7.89		6.8		25.1	10	9	10	10	Count Signoff: PJ
0.5	20.5		7.95		7.1		25.3	10	10 SVV	10	10	Old WQ: KRR
1	—		—		—		—	—	—	—	—	a.m. Feeding Signoff:
2	—		—		—		—	—	—	—	—	p.m. Feeding Signoff: CJD
Meter ID	38A		pH22		RD11		EC09					
Control	20.2		7.66		6.1		25.2	10	8	10	10	Termination Date: 2/23/15
0.125	20.2		7.66		6.2		25.2	10	10	10	10	Termination Time: 1520
0.25	20.2		7.68		6.5		25.3	10	9	10	10	Termination Signoff: SVV
0.5	20.2		7.70		6.6		25.5	10	10	10	10	Old WQ: MA
1	—		—		—		—	—	—	—	—	a.m. Feeding Signoff:
2	—		—		—		—	—	—	—	—	
Meter ID	38A		pH19		RD12		EC08					

Appendix Q

Test Data and Summary of Statistics for the Evaluation of the Toxicity of the Port of Redwood City's Berths 1-4 Sediment Elutriates to the Estuarine Fish *Menidia beryllina*

CETIS Summary Report

Report Date: 03 Jun-15 11:18 (p 1 of 1)
Test Code: 61460 | 21-2980-8304

Acute Fish Survival Test — **Pacific EcoRisk**

Batch ID:	02-4800-9973	**Test Type:**	Survival (96h)	**Analyst:**	Mike McElroy
Start Date:	19 Feb-15 16:35	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	23 Feb-15 15:30	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Indicators, FL	**Age:**	12

Sample ID:	12-1272-4265	**Code:**	DMMO	**Client:**	Moffat and Nichol
Sample Date:	04 Feb-15 12:30	**Material:**	Elutriate	**Project:**	23613
Receive Date:	05 Feb-15 09:40	**Source:**	Port of Redwood City		
Sample Age:	15d 4h (4.6 °C)	**Station:**	PRC-DU1-SET		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
10-0622-3123	96h Survival Rate	0	>0		6.13%		Equal Variance t Two-Sample Test
01-3658-0973	96h Survival Rate	100	>100	NA	10.6%	1	Steel Many-One Rank Sum Test

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water	5	0.96	0.892	1	0.9	1	0.0245	0.0548	5.71%	0.0%
0	Site Water	5	0.92	0.864	0.976	0.9	1	0.02	0.0447	4.86%	4.17%
1		5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	-2.08%
10		5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	-2.08%
25		5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	-2.08%
50		5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	-2.08%
100		5	0.9	0.724	1	0.7	1	0.0632	0.141	15.7%	6.25%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1	0.9	0.9	1	1
0	Site Water	0.9	0.9	1	0.9	0.9
1		1	1	1	1	0.9
10		1	1	0.9	1	1
25		1	0.9	1	1	1
50		1	0.9	1	1	1
100		1	1	1	0.8	0.7

96h Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	10/10	9/10	9/10	10/10	10/10
0	Site Water	9/10	9/10	10/10	9/10	9/10
1		10/10	10/10	10/10	10/10	9/10
10		10/10	10/10	9/10	10/10	10/10
25		10/10	9/10	10/10	10/10	10/10
50		10/10	9/10	10/10	10/10	10/10
100		10/10	10/10	10/10	8/10	7/10

Acute Fish Survival Test — **Pacific EcoRisk**

Analysis ID:	01-3658-0973	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 11:17	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	10.6%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water		1	30	16	2	8	0.9446	Asymp	Non-Significant Effect
		10	30	16	2	8	0.9446	Asymp	Non-Significant Effect
		25	30	16	2	8	0.9446	Asymp	Non-Significant Effect
		50	30	16	2	8	0.9446	Asymp	Non-Significant Effect
		100	25.5	16	1	8	0.6807	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05109487	0.01021898	5	0.871	0.5150	Non-Significant Effect
Error	0.281592	0.011733	24			
Total	0.3326869		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	8.39	15.1	0.1360	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.825	0.903	0.0002	Non-normal Distribution

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water	5	0.96	0.892	1	1	0.9	1	0.0245	5.71%	0.0%
1		5	0.98	0.924	1	1	0.9	1	0.02	4.56%	-2.08%
10		5	0.98	0.924	1	1	0.9	1	0.02	4.56%	-2.08%
25		5	0.98	0.924	1	1	0.9	1	0.02	4.56%	-2.08%
50		5	0.98	0.924	1	1	0.9	1	0.02	4.56%	-2.08%
100		5	0.9	0.724	1	1	0.7	1	0.0632	15.7%	6.25%

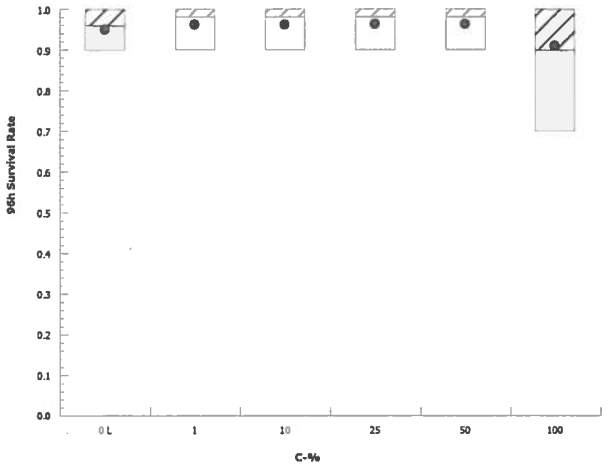
Angular (Corrected) Transformed Summary

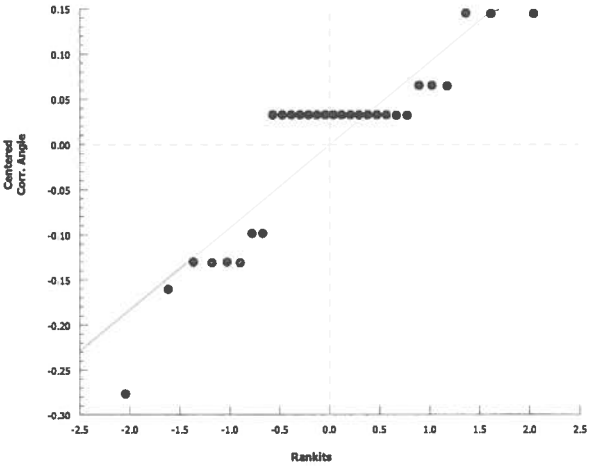
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water	5	1.35	1.24	1.46	1.41	1.25	1.41	0.0399	6.63%	0.0%
1		5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	-2.42%
10		5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	-2.42%
25		5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	-2.42%
50		5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	-2.42%
100		5	1.27	1.01	1.52	1.41	0.991	1.41	0.0908	16.0%	5.94%

Acute Fish Survival Test — **Pacific EcoRisk**

Analysis ID:	01-3658-0973	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 11:17	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





96 Hour Acute Inland Silverside (*M. beryllina*) Toxicity Test

Client: Port of Redwood City
Test Material: PRC-DUI-SET
Test ID#: 61460 Project # 23613
Test Date: 2/19/15 Randomization: 5 7.4
Feeding To Time: 0857 Initials: ARE

Organism Log #: 8794 Age: 12 days
Organism Supplier: Aquatic Indicators
Control/Diluent: 25 ppt Seawater
Control Water Batch: NA

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. old	Salinity (ppt) new	Salinity old	NH_3 new	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.7	7.92		9.0		24.9			10	10	10	10	10	Test Solution Prep:
1	20.7	7.92		9.2		25.3			10	10	10	10	10	New WQ:
10	20.7	7.89		9.0		25.2			10	10	10	10	10	Initiation Date: 2/19/15
25	20.7	7.90		8.9		25.1			10	10	10	10	10	Initiation Time: 1635
50	20.7	7.90		8.9		25.1			10	10	10	10	10	Initiation Signoff:
100	20.7	7.92		8.7		25.0		DR3800	10	10	10	10	10	a.m. Feeding Signoff:
Meter ID	38A	pH19		RD11		EC08		5.98 DR3800						p.m. Feeding Signoff:
Control	20.6		7.36		7.3		25.7		10	10	10	10	10	Count Date: 2/20/15
1	20.6		7.48		7.5		25.8		10	10	10	10	9	Count Time: 1135
10	20.6		7.47		7.2		25.7		10	10	10	10	10	Count Signoff: CD
25	20.6		7.61		7.1		25.6		10	10	10	10	10	Old WQ: MJM
50	20.6		7.76		7.3		25.7		10	9	10	10	10	a.m. Feeding Signoff:
100	20.6		7.89		7.4		25.8		10	10	10	9	9	p.m. Feeding Signoff:
Meter ID	38A		pH19		RD09		EC10							
Control	20.6		7.67		7.2		25.8		10	10	9	10	10	Count Date: 2-21-15
1	20.6		7.69		7.4		25.9		10	10	10	10	9	Count Time: 1120
10	20.6		7.73		7.4		25.8		10	10	10	10	10	Count Signoff: ARE
25	20.6		7.81		7.4		25.9		10	10	10	10	10	Old WQ: DM
50	20.6		7.91		7.3		25.8		10	9	10	10	10	a.m. Feeding Signoff:
100	20.6		8.06		7.1		26.1		10	10	10	8	9	p.m. Feeding Signoff:
Meter ID	38A		pH21		RD11		EC08							
Control	20.5		7.67		7.5		26.4		10	10	9	10	10	Count Date: 2.22.15
1	20.5		7.69		7.5		26.2		10	10	10	10	9	Count Time: 1240
10	20.5		7.75		7.5		26.6		10	10	9	10	10	Count Signoff:
25	20.5		7.85		7.6		26.7		10	9	10	10	10	Old WQ: KRE
50	20.5		7.94		7.6		26.9		10	9	10	10	10	a.m. Feeding Signoff:
100	20.5		8.10		7.6		27.1		10	10	10	8	7	p.m. Feeding Signoff:
Meter ID	38A		pH22		RD11		EC09							
Control	20.2		7.48		6.1		27.0		10	9	9	10	10	Termination Date: 2/23/15
1	20.2		7.63		6.7		27.7		10	10	10	10	9	Termination Time: 1530
10	20.2		7.61		6.6		28.4		10	10	9	10	10	Termination Signoff:
25	20.2		7.66		6.4		27.3		10	9	10	10	10	Old WQ: SD
50	20.2		7.81		6.6		27.9		10	9	10	10	10	a.m. Feeding Signoff:
100	20.2		7.99		6.6		28.7	4.46	10	10	10	8	7	
Meter ID	38A		pH15		RD10		EC09	DR3800						

Acute Fish Survival Test — **Pacific EcoRisk**

Analysis ID:	10-0622-3123	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 11:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.13%	Passes 96h survival rate

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Water		Site Water	1.26	1.86	0.096	8	0.1208	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01062373	0.01062373	1	1.6	0.2415	Non-Significant Effect
Error	0.05311866	0.006639833	8			
Total	0.0637424		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.89	0.741	0.1713	Normal Distribution

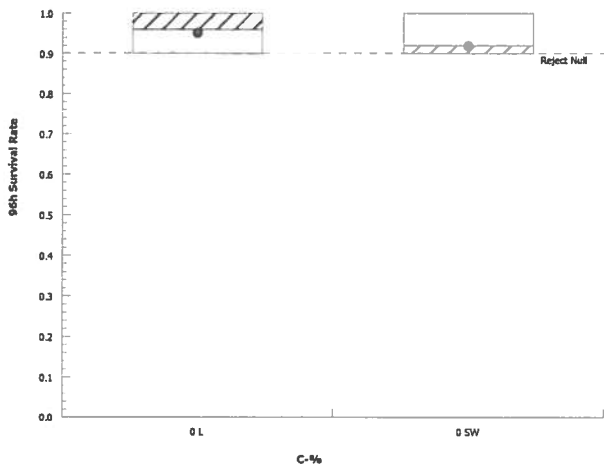
96h Survival Rate Summary

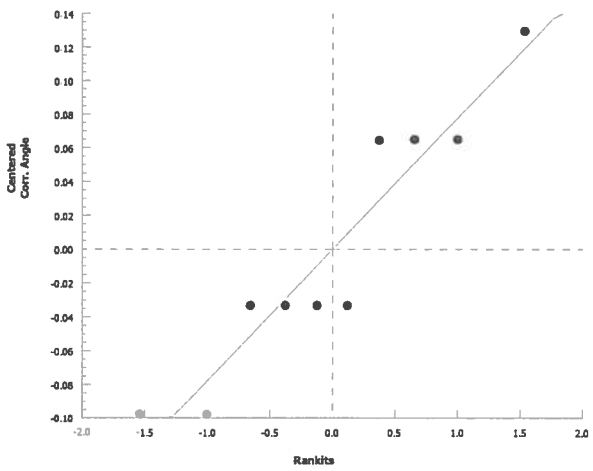
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Site Water	5	0.92	0.864	0.976	0.9	0.9	1	0.02	4.86%	0.0%
0	Lab Water	5	0.96	0.892	1	1	0.9	1	0.0245	5.71%	-4.35%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Site Water	5	1.28	1.19	1.37	1.25	1.25	1.41	0.0326	5.69%	0.0%
0	Lab Water	5	1.35	1.24	1.46	1.41	1.25	1.41	0.0399	6.63%	-5.09%

Graphics





96 Hour Acute Inland Silverside (*M. beryllina*) Toxicity Test

Client: Port of Redwood City
Test Material: Site Water
Test ID#: 61458 Project # 23613
Test Date: 2/19/15 Randomization: 5 7.4

Organism Log #: 8794 Age: 12days
Organism Supplier: Aquatic Indicators
Control/Diluent: 25 ppt Seawater
Control Water Batch: NA

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.7	7.92		9.0		24.9		10	10	10	10	10	Test Solution Prep: PA
Site Water	20.7	7.89		10.3		24.5		10	10	10	10	10	New WQ: SVV
													Initiation Date: 2/19/15
													Initiation Time: 1635
													Initiation Signoff: CO
													a.m. Feeding Signoff: AKF
Meter ID	38A	pH19		RD11		EC08							p.m. Feeding Signoff: CO
Control	20.6		7.36		7.3		25.7 ~~19.7~~ CO	10	10	10	10	10	Count Date: 2/20/15
Site Water	20.6		7.52		7.4		25.6 ~~19.8~~ CO	9	10	10	10	10	Count Time: 1135
													Count Signoff: CO
													Old WQ: MJM
													a.m. Feeding Signoff: SVV
Meter ID	38A		PH19		RD09 ~~RD12~~		EC10						p.m. Feeding Signoff: AKF
Control	20.6		7.63		7.4		26.0	10	10	9	10	10	Count Date: 2-21-15
Site Water	20.6		7.82		7.3		26.3	~~10~~ 9	10	10	10	10	Count Time: 1120
													Count Signoff: AKF
													Old WQ: DM
													a.m. Feeding Signoff: Le
Meter ID	38A		PH21		RD11		EC08						p.m. Feeding Signoff: Le
Control	20.5		7.67		7.5		26.4	10	10	9	10	10	Count Date: 2-22-15
Site Water	20.5		7.80		7.5		25.7	9	9	10	10	10	Count Time: 1040
													Count Signoff: PA
													Old WQ: KRR
													a.m. Feeding Signoff: [illegible]
Meter ID	38A		pH22		RD11		EC09						p.m. Feeding Signoff: CSD
Control	20.2		7.48		6.1		27.0	10	9	9	10	10	Termination Date: 2/23/15
Site Water	20.2		7.72		6.9		28.5	9	9	10	9	9	Termination Time: 1530
													Termination Signoff: KO
													Old WQ: SD
Meter ID	38A		PH15		RD10		EC09						a.m. Feeding Signoff: [illegible]

CETIS Summary Report

Report Date: 03 Jun-15 11:27 (p 1 of 1)
Test Code: 61462 | 02-5742-6491

Acute Fish Survival Test — **Pacific EcoRisk**

Batch ID:	15-9048-8847	**Test Type:**	Survival (96h)	**Analyst:**	Mike McElroy
Start Date:	19 Feb-15 17:00	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Seawater
Ending Date:	23 Feb-15 16:00	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Indicators, FL	**Age:**	12

Sample ID:	19-5663-0614	**Code:**	DMMO	**Client:**	Moffat and Nichol
Sample Date:	04 Feb-15 08:30	**Material:**	Elutriate	**Project:**	23613
Receive Date:	05 Feb-15 09:40	**Source:**	Port of Redwood City		
Sample Age:	15d 9h (4.6 °C)	**Station:**	PRC-DU2-SET		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
15-4779-8786	96h Survival Rate	100	>100	NA	6.11%	1	Steel Many-One Rank Sum Test

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water	5	1	1	1	1	1	0	0	0.0%	0.0%
1		5	1	1	1	1	1	0	0	0.0%	0.0%
10		5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	2.0%
25		5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	2.0%
50		5	1	1	1	1	1	0	0	0.0%	0.0%
100		5	0.9	0.812	0.988	0.8	1	0.0316	0.0707	7.86%	10.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1	1	1	1	1
1		1	1	1	1	1
10		1	1	1	1	0.9
25		1	1	1	1	0.9
50		1	1	1	1	1
100		0.9	1	0.9	0.9	0.8

96h Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	10/10	10/10	10/10	10/10	10/10
1		10/10	10/10	10/10	10/10	10/10
10		10/10	10/10	10/10	10/10	9/10
25		10/10	10/10	10/10	10/10	9/10
50		10/10	10/10	10/10	10/10	10/10
100		9/10	10/10	9/10	9/10	8/10

CETIS Analytical Report

Report Date: 03 Jun-15 11:27 (p 1 of 2)
Test Code: 61462 | 02-5742-6491

Acute Fish Survival Test — **Pacific EcoRisk**

Analysis ID:	15-4779-8786	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 11:27	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	6.11%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water		1	27.5	16	1	8	0.8333	Asymp	Non-Significant Effect
		10	25	16	1	8	0.6353	Asymp	Non-Significant Effect
		25	25	16	1	8	0.6353	Asymp	Non-Significant Effect
		50	27.5	16	1	8	0.8333	Asymp	Non-Significant Effect
		100	17.5	16	1	8	0.0695	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09484821	0.01896964	5	5.11	0.0025	Significant Effect
Error	0.08910022	0.003712509	24			
Total	0.1839484		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1.13	4.25	0.3784	Equal Variances
Variances	Levene Equality of Variance	2.75	3.9	0.0423	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.701	0.903	<0.0001	Non-normal Distribution

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water	5	1	1	1	1	1	1	0	0.0%	0.0%
1		5	1	1	1	1	1	1	0	0.0%	0.0%
10		5	0.98	0.924	1	1	0.9	1	0.02	4.56%	2.0%
25		5	0.98	0.924	1	1	0.9	1	0.02	4.56%	2.0%
50		5	1	1	1	1	1	1	0	0.0%	0.0%
100		5	0.9	0.812	0.988	0.9	0.8	1	0.0316	7.86%	10.0%

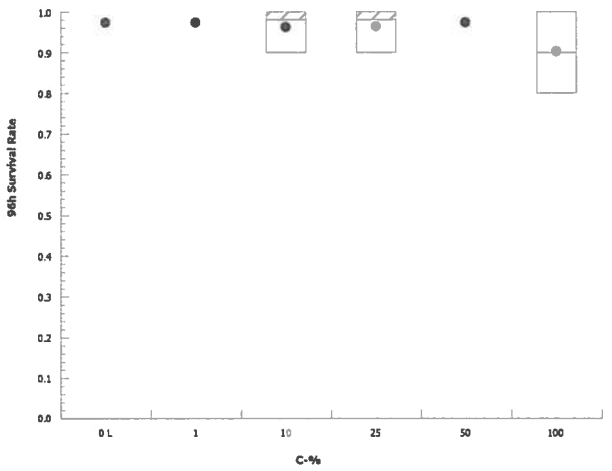
Angular (Corrected) Transformed Summary

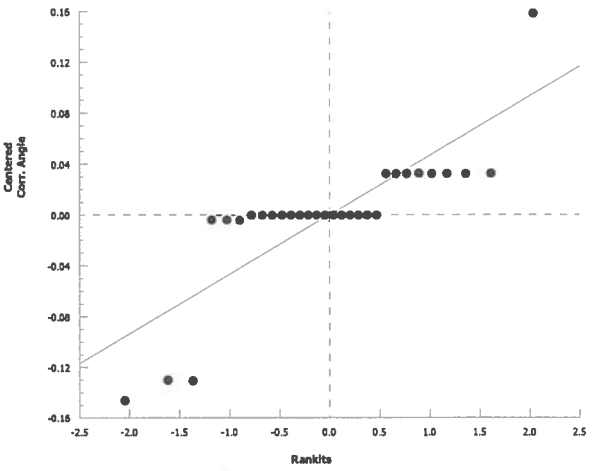
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Water	5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
1		5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
10		5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	2.31%
25		5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	2.31%
50		5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
100		5	1.25	1.12	1.39	1.25	1.11	1.41	0.0483	8.61%	11.2%

Acute Fish Survival Test — **Pacific EcoRisk**

Analysis ID:	15-4779-8786	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-15 11:27	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





96 Hour Acute Inland Silverside (*M. beryllina*) Toxicity Test

Client: Port of Redwood City
Test Material: PRC-DU2-SET
Test ID#: 61462 Project # 23613
Test Date: 2/19/15 Randomization: 56.4 SM
Feeding To Time: 0857 Initials: ~~56.4~~

Organism Log #: 8794 Age: 12 days
Organism Supplier: Aquatic Indicators
Control/Diluent: 25 ppt Seawater
Control Water Batch: NA

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	NH_3 new	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.7	7.82		9.4		24.8			10	10	10	10	10	Test Solution Prep: DO
1	20.7	7.88		9.4		25.1			10	10	10	10	10	New WQ: KL
10	20.7	7.90		9.2		25.2			10	10	10	10	10	Initiation Date: 2/19/15
25	20.7	7.93		9.3		25.2			10	10	10	10	10	Initiation Time: 1700
50	20.7	7.97		9.1		25.3			10	10	10	10	10	Initiation Signoff: SM
100	20.7	8.01		8.4		25.3		10.8	10	10	10	10	10	a.m. Feeding Signoff: AEF
Meter ID	38A	pH21		RD09		EC09		DR3800						p.m. Feeding Signoff: SM
Control	20.6		7.61		6.1		25.0		10	10	10	10	10	Count Date: 2/20/15
1	20.6		7.73		6.0		25.6		10	10	10	10	10	Count Time: 0950
10	20.6		7.82		5.3		25.7		10	10	10	10	10	Count Signoff: CD
25	20.6		7.95		5.2		25.7		10	10	10	10	10	Old WQ: NB
50	20.6		8.12		5.2		25.8		10	10	10	10	10	a.m. Feeding Signoff: SV
100	20.6		8.31		5.1		25.8		10	10	10	10	10	p.m. Feeding Signoff: AEF
Meter ID	38A		pH15		RD09		EC09							
Control	20.6		7.61		7.7		25.8		10	10	10	10	10	Count Date: 2-21-15
1	20.6		7.62		7.5		25.9		10	10	10	10	10	Count Time: 1214
10	20.6		7.70		7.5		25.8		10	10	10	10	10	Count Signoff: AEF
25	20.6		7.78		7.4		26.0		10	10	10	10	9	Old WQ: DM
50	20.6		7.96		7.3		25.9		10	10	10	10	10	a.m. Feeding Signoff: [illegible]
100	20.6		8.12		7.6		26.6		9	10	10	9	8	p.m. Feeding Signoff: [illegible]
Meter ID	38A		pH21		RD11		EC08							
Control	20.5		7.82		7.8		26.5		10	10	10	10	10	Count Date: 2-22-15
1	20.5		7.84		7.8		26.0		10	10	10	10	10	Count Time: 0920
10	20.5		7.89		7.7		27.2		10	10	10	10	9	Count Signoff: PA
25	20.5		8.01		7.7		27.1		10	10	10	10	9	Old WQ: ~~DM~~ KLR
50	20.5		8.13		7.8		27.3		10	10	10	10	10	a.m. Feeding Signoff: [illegible]
100	20.5		8.25		7.7		27.3		9	10	9	9	8	p.m. Feeding Signoff: CJD
Meter ID	38A		pH22		RD11		EC09							
Control	20.2		7.62		6.9		27.3		10	10	10	10	10	Termination Date: 2/23/15
1	20.2		7.68		7.1		27.7		10	10	10	10	10	Termination Time: 1600
10	20.2		7.69		7.3		28.3		10	10	10	10	9	Termination Signoff: [illegible]
25	20.2		7.79		7.1		28.4		10	10	10	10	9	Old WQ: MA
50	20.2		7.89		7.1		28.5		10	10	10	10	10	a.m. Feeding Signoff: [illegible]
100	20.2		8.05		6.8		29.3	5.19	9	10	9	9	8	
Meter ID	38A		pH19		RD12		EC08	DR3800						

Appendix R

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Menidia beryllina*

CETIS Summary Report

Report Date: 12 Mar-15 18:41 (p 1 of 1)
Test Code: 61564 | 21-1739-1529

Acute Fish Survival Test — **Pacific EcoRisk**

Batch ID:	18-2460-4558	**Test Type:**	Survival (96h)	**Analyst:**	Padrick Anderson
Start Date:	19 Feb-15 16:45	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Laboratory Water
Ending Date:	23 Feb-15 15:15	**Species:**	Menidia beryllina	**Brine:**	Crystal Sea
Duration:	94h	**Source:**	Aquatic Indicators, FL	**Age:**	12

Sample ID:	07-0925-8427	**Code:**	KCl	**Client:**	Reference Toxicant
Sample Date:	19 Feb-15 16:45	**Material:**	Potassium chloride	**Project:**	23654
Receive Date:	19 Feb-15 16:45	**Source:**	Reference Toxicant		
Sample Age:	NA (20.7 °C)	**Station:**	In House		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
03-1523-1184	96h Survival Rate	1	2	1.414	44.5%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
00-8444-0029	96h Survival Rate	EC50	1.24	1.1	1.4		Spearman-Kärber

96h Survival Rate Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	2	0.9	0	1	0.8	1	0.1	0.141	15.7%	0.0%
0.125		2	0.95	0.315	1	0.9	1	0.05	0.0707	7.44%	-5.56%
0.25		2	0.9	0.9	0.9	0.9	0.9	0	0	0.0%	0.0%
0.5		2	0.95	0.315	1	0.9	1	0.05	0.0707	7.44%	-5.56%
1		2	0.75	0	1	0.6	0.9	0.15	0.212	28.3%	16.7%
2		2	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

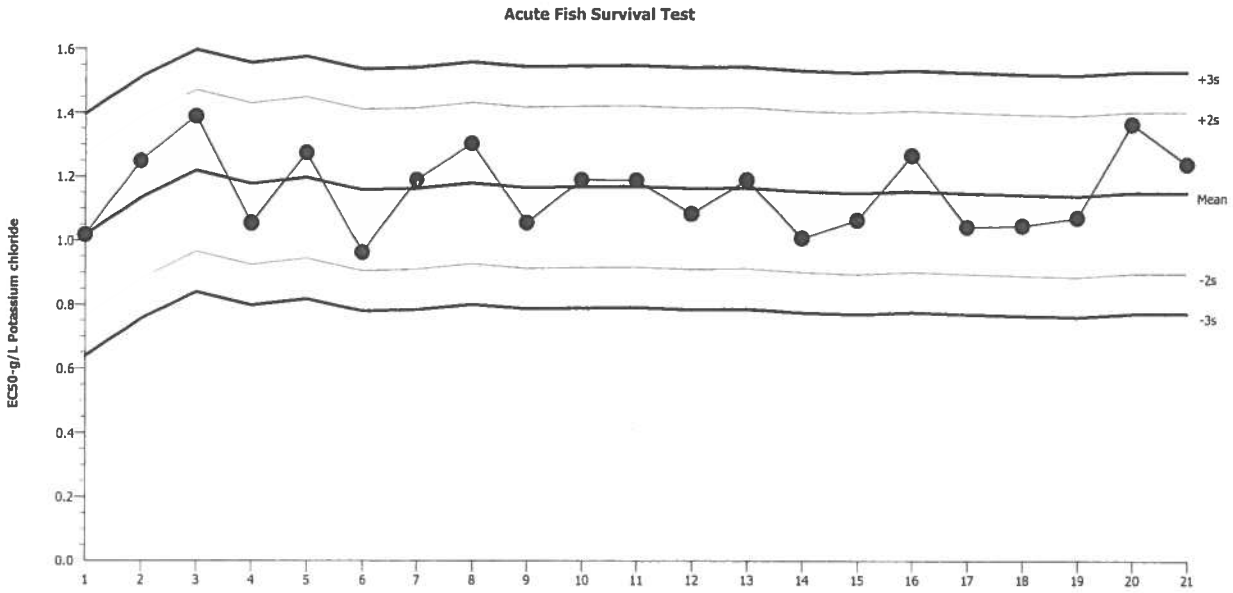
C-g/L	Control Type	Rep 1	Rep 2
0	Lab Water Contr	1	0.8
0.125		0.9	1
0.25		0.9	0.9
0.5		0.9	1
1		0.9	0.6
2		0	0

96h Survival Rate Binomials

C-g/L	Control Type	Rep 1	Rep 2
0	Lab Water Contr	10/10	8/10
0.125		9/10	10/10
0.25		9/10	9/10
0.5		9/10	10/10
1		9/10	6/10
2		0/10	0/10

Acute Fish Survival Test Pacific EcoRisk

Test Type:	Survival (96h)	**Organism:**	Menidia beryllina (Inland Silverside)	**Material:**	Potassium chloride
Protocol:	EPA-821-R-02-012 (2002)	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF



Mean:	1.151	**Count:**	20	**-2s Warning Limit:**	0.8985	**-3s Action Limit:**	0.7723
Sigma:	0.1262	**CV:**	11.00%	**+2s Warning Limit:**	1.403	**+3s Action Limit:**	1.53

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2014	Jan	9	16:30	1.018	-0.1332	-1.056			03-2950-1190	11-1181-5928
2		Feb	5	14:15	1.249	0.09777	0.7748			14-5817-6540	04-4867-5543
3		Mar	13	15:10	1.389	0.2377	1.883			10-7657-5155	07-2686-1541
4			21	18:18	1.054	-0.09671	-0.7663			04-1558-2526	00-3111-6516
5			25	14:00	1.275	0.1236	0.9791			11-7533-2590	12-7771-8966
6		Apr	3	16:00	0.9632	-0.1878	-1.489			03-0346-7967	20-6959-0894
7			23	16:30	1.189	0.03821	0.3027			04-9346-7639	16-0134-1673
8		May	1	17:15	1.303	0.1521	1.205			05-4563-5468	08-7514-0061
9			8	16:10	1.056	-0.09475	-0.7508			18-8861-3025	10-6023-2464
10			21	17:00	1.191	0.03974	0.3149			19-2852-8539	08-0468-4777
11		Jun	19	15:30	1.189	0.03837	0.304			02-5857-6616	13-2554-8348
12			26	16:10	1.083	-0.06774	-0.5367			18-8086-3702	18-6301-8148
13		Aug	6	14:30	1.19	0.03886	0.3079			01-8508-1507	04-1089-3320
14		Sep	16	16:50	1.009	-0.1421	-1.126			19-0616-8980	12-9040-7864
15		Oct	8	15:00	1.065	-0.08642	-0.6848			08-3511-4385	12-3962-9207
16			22	17:00	1.267	0.1161	0.9199			10-3474-4518	18-9215-4558
17		Nov	20	17:40	1.043	-0.1077	-0.8538			13-2285-4626	20-4430-6476
18	2015	Jan	8	14:40	1.047	-0.1035	-0.8204			09-1088-9299	09-4926-0714
19			22	16:30	1.072	-0.07923	-0.6278			09-3038-0119	04-7370-3573
20		Feb	4	17:25	1.366	0.215	1.704			12-6009-3343	20-8000-7802
21			19	16:45	1.24	0.08941	0.7084			21-1739-1529	00-8444-0029

Analyst: QA: BJ

96 Hour Acute Inland Silverside Reference Toxicant Test

Client: Reference Toxicant
Test Material: Potassium Chloride
Test ID#: 61564 Project # 23654
Test Date: 2/19/15 Randomization: 26.1

Organism Log #: 8794 Age: 12 days
Organism Supplier: Aquatic Indicators
Control/Diluent: D1 + Crystal Sea @ 25 ppt
Control Water Batch: 1047

Treatment (g KCl/L)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. old	Salinity (ppt) new	Salinity old	# Live Organisms Rep A	# Live Organisms Rep B	SIGN-OFF
Control	20.7	8.03		8.1		24.5		10	10	Test Solution Prep: CP
0.125	20.7	8.06		8.0		24.8		10	10	New WQ: HRR
0.25	20.7	8.06		8.0		24.9		10	10	Initiation Date: 2/19/15
0.5	20.7	8.06		8.0		25.1		10	10	Initiation Time: 1645
1	20.7	8.06		8.1		25.6		10	10	Initiation Signoff: KP
2	20.7	8.05		8.1		26.5		10	10	RT Batch #: 43
										a.m.Feeding Signoff: ARF
Meter ID:	38A	pH22		RD12		EC10				p.m. Feeding Signoff: KP
Control	20.6		7.87		7.2		24.7	10	8	Count Date: 2/20/15
0.125	20.6		7.90		7.4		24.8	9	10	Count Time: 1035
0.25	20.6		7.90		7.4		25.0	10	10	Count Signoff: CD
0.5	20.6		7.89		7.4		25.1	10	10	Old WQ: CD
1	20.6		7.87		7.5		25.6	9	7	a.m. Feeding Signoff: SVV
2	20.6		7.85		7.3		26.6	0	0	p.m. Feeding Signoff: ARF
Meter ID:	38A		pH22		RD11		EC08			
Control	20.6	8.03	7.57	8.0	6.1	24.9	25.1	10	8	Test Solution Prep: CD
0.125	20.6	8.07	7.60	8.1	6.2	25.3	25.5	9	10	New WQ: NB
0.25	20.6	8.07	7.58	8.1	6.3	25.5	25.7	9	9	Renewal Date: 2/21/15
0.5	20.6	8.07	7.57	8.1	6.2	25.7	25.9	9	10	Renewal Time: 1555
1	20.6	8.07	7.56	8.1	6.3	26.3	26.2	9	6	Renewal Signoff: Le
2	—	—	—	—	—	—	—	—	—	Old WQ: KMP
										RT Batch #: 43
										a.m.Feeding Signoff: Le
Meter ID:	38A	pH15	pH19	RD10	RD10	EC11	EC11			p.m. Feeding Signoff: Le
Control	20.5		7.86		7.1		24.6	10	8	Count Date: 2.22.15
0.125	20.5		7.89		7.3		24.9	9	10	Count Time: 0945
0.25	20.5		7.89		7.4		25.1	9	9	Count Signoff: PA
0.5	20.5		7.89		7.2		25.3	9	10	Old WQ: DM
1	20.5		7.89		7.3		25.8	9	6	a.m. Feeding Signoff: [illegible]
2	—		—		—		—	—	—	p.m. Feeding Signoff: CJD
Meter ID:	38A		pH19		RD12		EC10			
Control	20.2		7.62		5.7		24.5	10	8	Termination Date: 2/23/15
0.125	20.2		7.65		5.6		25.0	9	10	Termination Time: 1515
0.25	20.2		7.64		5.5		25.1	9	9	Termination Signoff: SVV
0.5	20.2		7.67		5.6		25.3	9	10	Old WQ: DS
1	20.2		7.62		5.2		25.8	9	6	a.m. Feeding Signoff: [illegible]
2	—		—		—		—	—	—	
Meter ID:	38A		pH15		RD10		EC09			

Appendix S

Test Data and Summary of Statistics for the Evaluation of the Toxicity of the Port of Redwood City's Berths 1-4 Modified Elutriate Test Sediment Elutriates to Mysids (*Americamysis bahia*)

CETIS Summary Report

Report Date: 04 Jun-15 11:51 (p 1 of 1)
Test Code: 61468-61470 | 07-3657-4113

Acute Mysid Survival Test — **Pacific EcoRisk**

Batch ID:	17-8254-6760	**Test Type:**	Survival (96h)	**Analyst:**	Michelle Fong
Start Date:	19 Feb-15 16:20	**Protocol:**	EPA-821-R-02-012 (2002)	**Diluent:**	Not Applicable
Ending Date:	23 Feb-15 15:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Indicators, FL	**Age:**	5

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Water Contr	09-7534-9426	19 Feb-15 16:20	19 Feb-15 16:20	NA (20.7 °C)	Moffat and Nichol	23613
Site Water	04-1310-8539	04 Feb-15	04 Feb-15	15d 16h		
PRC-DU1-MET	05-3076-2471	04 Feb-15 12:30	05 Feb-15 09:40	15d 4h (4.6 °C)		
PRC-DU2-MET	19-2056-9166	04 Feb-15 08:30	05 Feb-15 09:40	15d 8h (4.6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Water Contr	Elutriate	Port of Redwood City	LABQA		
Site Water	Site Water	Port of Redwood City	Site Water		
PRC-DU1-MET	Elutriate	Port of Redwood City	PRC-DU1-MET		
PRC-DU2-MET	Elutriate	Port of Redwood City	PRC-DU2-MET		

96h Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Water Contr	5	1	1	1	1	1	0	0	0.0%	0.0%
Site Water	5	1	1	1	1	1	0	0	0.0%	0.0%
PRC-DU1-MET	5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	2.0%
PRC-DU2-MET	5	0.98	0.924	1	0.9	1	0.02	0.0447	4.56%	2.0%

96h Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Water Contr	1	1	1	1	1
Site Water	1	1	1	1	1
PRC-DU1-MET	1	1	0.9	1	1
PRC-DU2-MET	1	1	1	0.9	1

96h Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Water Contr	10/10	10/10	10/10	10/10	10/10
Site Water	10/10	10/10	10/10	10/10	10/10
PRC-DU1-MET	10/10	10/10	9/10	10/10	10/10
PRC-DU2-MET	10/10	10/10	10/10	9/10	10/10

CETIS Analytical Report

Report Date: 04 Jun-15 11:50 (p 1 of 3)
Test Code: 61468-61470 | 07-3657-4113

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	00-2489-1072	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Jun-15 11:49	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Angular (Corrected)	NA	C > T	NA	NA	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Contr		Site Water	27.5	NA	1	8	1.0000	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	65500	<0.0001	Significant Effect
Error	0	0	8			
Total	0		9			

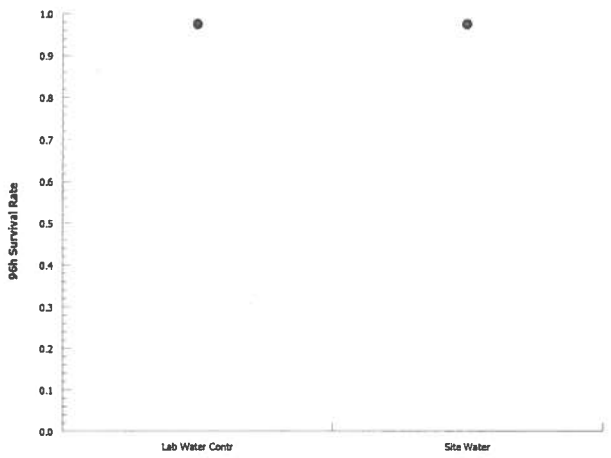
96h Survival Rate Summary

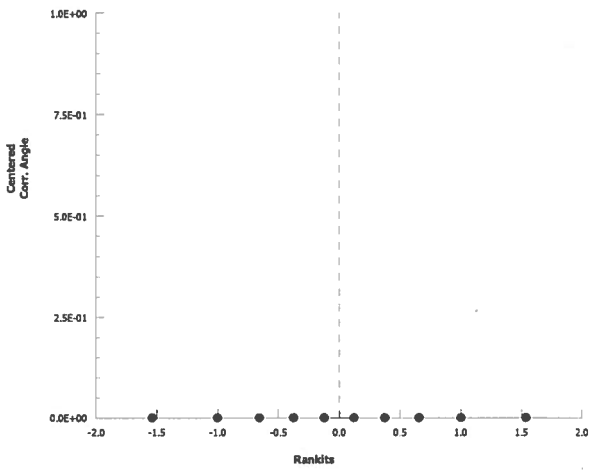
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Water Contr	5	1	1	1	1	1	1	0	0.0%	0.0%
Site Water	5	1	1	1	1	1	1	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Water Contr	5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
Site Water	5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: Port of Redwood City
Test Material: Site Water
Test ID#: 61470 Project # 23613
Test Date: 2-19-15 Randomization: 5.2.1

Organism Log #: 8795 Age: 5 days
Organism Supplier: Aquatic Indicators
Control: 25 ppt Seawater
Control Water Batch: NA

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. old	Salinity (ppt) new	Salinity old	NH3 (mg/L) new	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.7	7.85		9.2		24.6			10	10	10	10	10	Test Solution Prep: DG
100%	20.7	7.89		9.8		24.7		<1.00	10	10	10	10	10	New WQ: RR
														Initiation Date: 2-19-15
														Initiation Time: 1620
														Initiation Signoff: [illegible]
														a.m. Feeding: [illegible]
Meter ID	38A	pH21		RD09		EC09		D23802						p.m. Feeding: [illegible]
Control	20.6		7.60		5.4		25.1		10	10	10	10	10	Count Date: 2/20/15
100%	20.6		7.71		5.5		24.9		10	10	10	10	10	Count Time: 1045
														Count Signoff: CD
														Old WQ: RG
														a.m. Feeding: SNV
Meter ID	38A		PH15		RD09		EC09							p.m. Feeding: [illegible]
Control	20.6		7.74		7.6		25.5		10	10	10	10	10	Count Date: 2-21-15
100%	20.6		7.84		7.3		25.7		10	10	10	10	10	Count Time: 1053
														Count Signoff: [illegible]
														Old WQ: NB
														a.m. Feeding: [illegible]
Meter ID	38A		pH19		RD12		EC10							p.m. Feeding: [illegible]
Control	20.5		7.64		7.0		25.7		10	10	10	10	10	Count Date: 2-22-15
100%	20.5		7.78		7.1		26.3		10	10	10	10	10	Count Time: 1000
														Count Signoff: [illegible]
														Old WQ: SD
														a.m. Feeding: [illegible]
Meter ID	38A		PH22		RD11		EC09							p.m. Feeding: [illegible]
Control	20.5		7.63		6.7		27.6		10	10	10	10	10	Termination Date: 2-23-15
100%	20.5		7.73		6.9		27.6		10	10	10	10	10	Termination Time: 1515
														Termination Signoff: [illegible]
														Old WQ: MA
Meter ID	38A		PH19		RD12		EC08							a.m. Feeding: [illegible]

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	18-8070-4611	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Jun-15 11:49	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.74%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Contr		PRC-DU1-MET	25	NA	1	8	0.5000	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002655933	0.002655933	1	1	0.3466	Non-Significant Effect
Error	0.02124747	0.002655933	8			
Total	0.0239034		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	13.7	0.3559	Equal Variances
Variances	Levene Equality of Variance	7.11	11.3	0.0285	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.625	0.741	0.0001	Non-normal Distribution

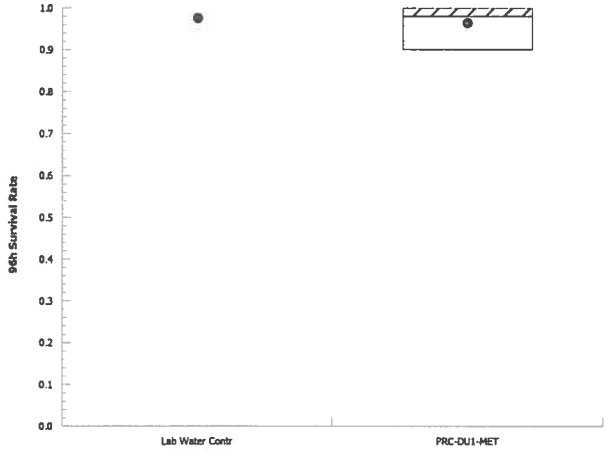
96h Survival Rate Summary

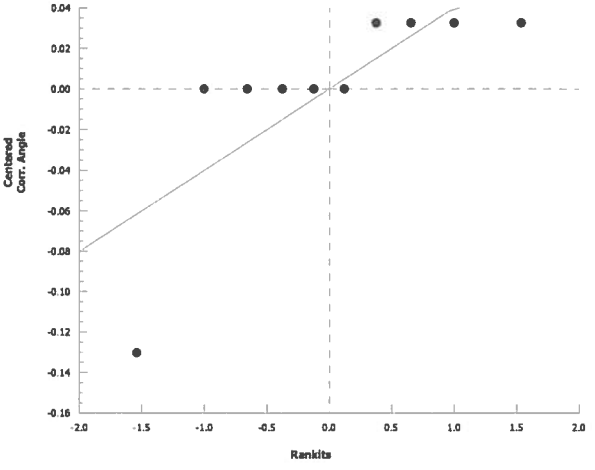
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Water Contr	5	1	1	1	1	1	1	0	0.0%	0.0%
PRC-DU1-MET	5	0.98	0.924	1	1	0.9	1	0.02	4.56%	2.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Water Contr	5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
PRC-DU1-MET	5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	2.31%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: Port of Redwood City
Test Material: PRC-DU1-MET
Test ID#: 61468 Project # 23613
Test Date: 2-19-15 Randomization: 5.2.1

Organism Log #: 8775 Age: 5 days
Organism Supplier: Aquatic Indicators
Control: 25 ppt Seawater
Control Water Batch: NA

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. old	Salinity (ppt) new	Salinity old	NH3 (mg/L) new	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.7	7.85		9.2		24.6			10	10	10	10	10	Test Solution Prep: PB
100%	20.7	7.95		9.8		25.0		5-25	10	10	10	10	10	New WQ: KK
														Initiation Date: 2-19-15
														Initiation Time: 1620
														Initiation Signoff: [illegible]
														a.m. Feeding: [illegible]
Meter ID	38A	DH21		DO09		EC09		DR380						p.m. Feeding: [illegible]
Control	20.6		7.60		5.4		25.1		10	10	10	10	10	Count Date: 2/20/15
100%	20.6		8.10		5.7		25.2		10	10	10	10	10	Count Time: 1045
														Count Signoff: CD
														Old WQ: NG
														a.m. Feeding: [illegible]
Meter ID	38A		PH15		RD09		EC09							p.m. Feeding: [illegible]
Control	20.6		7.74		7.6		25.5		10	10	10	10	10	Count Date: 2-21-15
100%	20.6		8.14		7.4		26.0		10	10	10	10	10	Count Time: 1053
														Count Signoff: ARF
														Old WQ: NB
														a.m. Feeding: [illegible]
Meter ID	38A		pH19		RD12		EC10							p.m. Feeding: [illegible]
Control	~~20.6~~ 20.5		7.64		7.0		25.7		10	10	10	10	10	Count Date: 2-22-15
100%	20.5		8.03		7.2		26.8		10	10	10	10	10	Count Time: 1000
														Count Signoff: [illegible]
														Old WQ: SD
														a.m. Feeding: [illegible]
Meter ID	38A		PH22		RD11		EC09							p.m. Feeding: CJD
Control	20.5		7.63		6.7		27.6		10	10	10	10	10	Termination Date: 2-23-15
100%	20.5		7.99		6.9		27.7		10	10	9	10	10	Termination Time: 1515
														Termination Signoff: [illegible]
														Old WQ: MA
Meter ID	38A		PH19		RD12		EC08							a.m. Feeding: [illegible]

Acute Mysid Survival Test — **Pacific EcoRisk**

Analysis ID:	03-4113-8236	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Jun-15 11:49	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.74%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Water Contr		PRC-DU2-MET	25	NA	1	8	0.5000	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002655933	0.002655933	1	1	0.3466	Non-Significant Effect
Error	0.02124747	0.002655933	8			
Total	0.0239034		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	13.7	0.3559	Equal Variances
Variances	Levene Equality of Variance	7.11	11.3	0.0285	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.625	0.741	0.0001	Non-normal Distribution

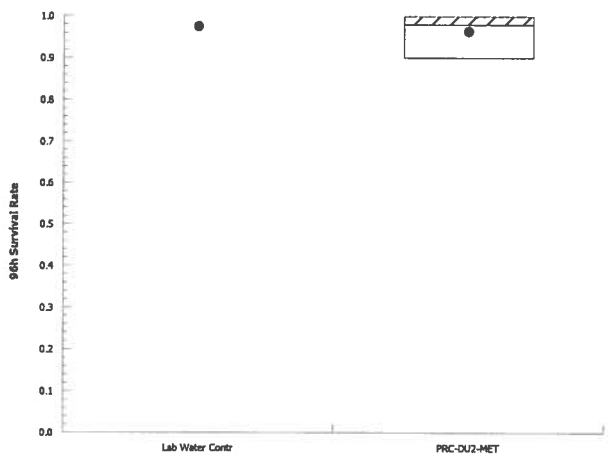
96h Survival Rate Summary

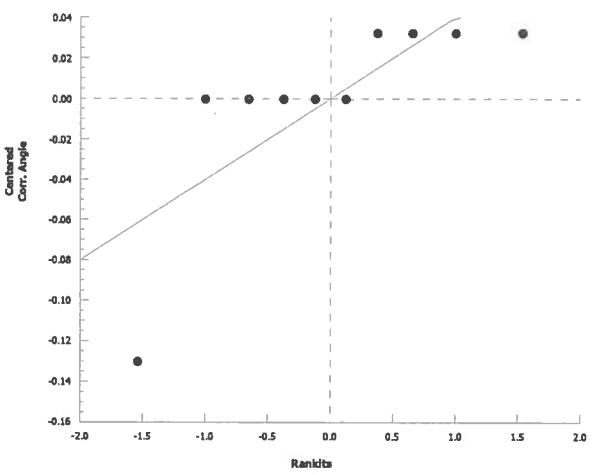
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Water Contr	5	1	1	1	1	1	1	0	0.0%	0.0%
PRC-DU2-MET	5	0.98	0.924	1	1	0.9	1	0.02	4.56%	2.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Water Contr	5	1.41	1.41	1.41	1.41	1.41	1.41	0	0.0%	0.0%
PRC-DU2-MET	5	1.38	1.29	1.47	1.41	1.25	1.41	0.0326	5.28%	2.31%

Graphics





96 Hour Acute *Americamysis bahia* Water Column Toxicity Test

Client: Port of Redwood City
Test Material: PRC-DU2-MET
Test ID#: 61469 Project # 23613
Test Date: 2-19-15 Randomization: 5.2.1

Organism Log #: 8795 Age: 5days
Organism Supplier: Aquatic Indicators
Control: 25 ppt Seawater
Control Water Batch: NA

Treatment (% Elutriate)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	NH3 (mg/L) new	# Live Organisms Rep A	Rep B	Rep C	Rep D	Rep E	SIGN-OFF
Control	20.7	7.85		9.2		24.6			10	10	10	10	10	Test Solution Prep
100%	20.7	7.64		~~4.8~~ 6.5		25.6		17.1	10	10	10	10	10	New WQ: KNL
														Initiation Date 2-19-15
														Initiation Time 1620
														Initiation Signoff
														a.m. Feeding
Meter ID	38A	pH21		RD09		EC09		DR3800						p.m. Feeding
Control	20.6		7.60		5.4		25.1		10	10	10	10	10	Count Date 2/20/15
100%	20.6		8.38		5.7		25.5		10	10	10	10	10	Count Time 1045
														Count Signoff CD
														Old WQ: RG
														a.m. Feeding
Meter ID	38A		PH15		RD09		EC09							p.m. Feeding
Control	20.6		7.74		7.6		25.5		10	10	10	10	10	Count Date 2-21-15
100%	20.6		8.40		7.5		26.8		10	10	10	10	10	Count Time 1053
														Count Signoff ARF
														Old WQ: NB
														a.m. Feeding
Meter ID	38A		pH19		RD12		EC10							p.m. Feeding
Control	20.5		7.64		7.0		25.7		10	10	10	10	10	Count Date 2.22.15
100%	20.5		8.28		7.2		27.1		10	10	10	9	10	Count Time 1000
														Count Signoff PD
														Old WQ: SD
														a.m. Feeding
Meter ID	38A		PH22		RD11		EC09							p.m. Feeding CJD
Control	20.5		7.63		6.7		27.6		10	10	10	10	~~10~~ 10	Termination Date 2.23.15
100%	20.5		8.30		6.5		28.2		10	10	10	9	10	Termination Time 1515
														Termination Signoff PD
														Old WQ: MA
Meter ID	38A		pH19		RD12		EC08							a.m. Feeding

Appendix T

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the Mysid, *Americamysis bahia*

CETIS Summary Report

Report Date: 12 Mar-15 18:39 (p 1 of 1)
Test Code: 61563 | 03-6420-8860

Acute Mysid Survival Test — Pacific EcoRisk

Batch ID:	16-7545-9819	Test Type:	Survival (96h)	Analyst:	Padrick Anderson
Start Date:	19 Feb-15 17:00	Protocol:	EPA-821-R-02-012 (2002)	Diluent:	Laboratory Water
Ending Date:	23 Feb-15 15:20	Species:	Americamysis bahia	Brine:	Crystal Sea
Duration:	94h	Source:	Aquatic Indicators, FL	Age:	5

Sample ID:	18-7502-5046	Code:	KCl	Client:	Reference Toxicant
Sample Date:	19 Feb-15 17:00	Material:	Potassium chloride	Project:	23653
Receive Date:	19 Feb-15 17:00	Source:	Reference Toxicant		
Sample Age:	NA (20.7 °C)	Station:	In House		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
21-1831-6483	96h Survival Rate	0.5	1	0.7071	8.84%		Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	g/L	95% LCL	95% UCL	TU	Method
02-5408-8248	96h Survival Rate	EC50	0.707	0.5	1		Binomial/Graphical

96h Survival Rate Summary

C-g/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Water Contr	4	0.95	0.791	1	0.8	1	0.05	0.1	10.5%	0.0%
0.125		4	1	1	1	1	1	0	0	0.0%	-5.26%
0.25		4	0.975	0.895	1	0.9	1	0.025	0.05	5.13%	-2.63%
0.5		4	1	1	1	1	1	0	0	0.0%	-5.26%
1		4	0	0	0	0	0	0	0		100.0%
2		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

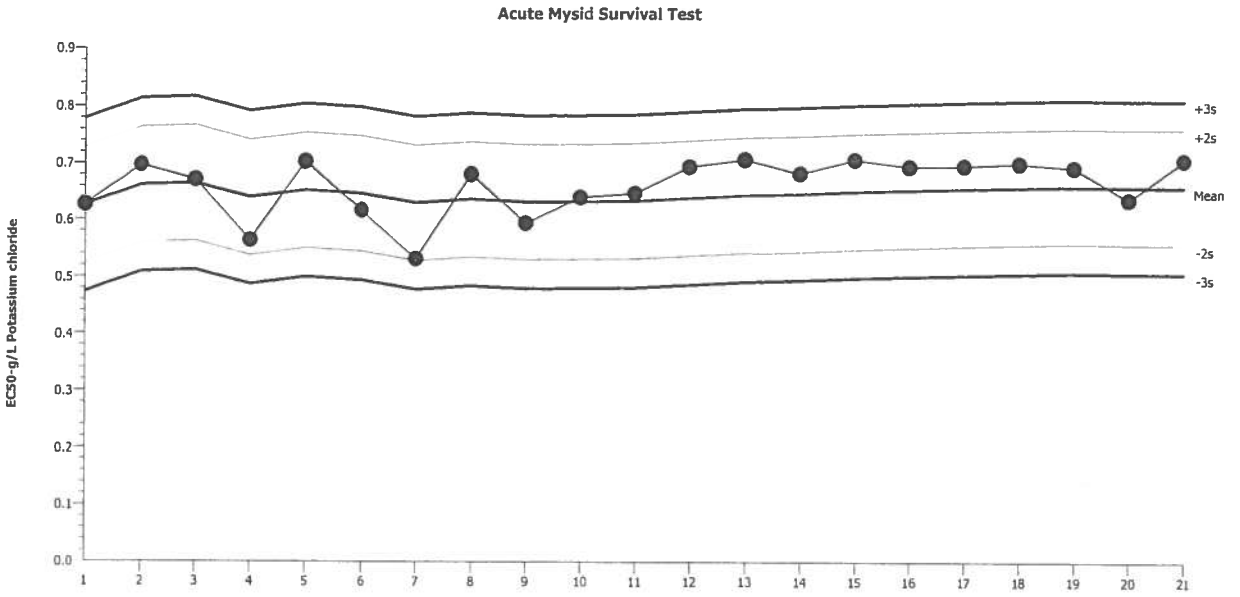
C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	1	0.8	1	1
0.125		1	1	1	1
0.25		1	0.9	1	1
0.5		1	1	1	1
1		0	0	0	0
2		0	0	0	0

96h Survival Rate Binomials

C-g/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Water Contr	10/10	8/10	10/10	10/10
0.125		10/10	10/10	10/10	10/10
0.25		10/10	9/10	10/10	10/10
0.5		10/10	10/10	10/10	10/10
1		0/10	0/10	0/10	0/10
2		0/10	0/10	0/10	0/10

Acute Mysid Survival Test Pacific EcoRisk

Test Type:	Survival (96h)	**Organism:**	Americamysis bahia (Mysid)	**Material:**	Potassium chloride
Protocol:	EPA-821-R-02-012 (2002)	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF



Mean:	0.6594	**Count:**	20	**-2s Warning Limit:**	0.5577	**-3s Action Limit:**	0.5068
Sigma:	0.05085	**CV:**	7.71%	**+2s Warning Limit:**	0.7611	**+3s Action Limit:**	0.8119

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2013	Aug	30	16:15	0.6263	-0.03307	-0.6503			08-8455-3169	08-4678-4634
2	2014	Jan	8	16:05	0.6965	0.03713	0.7302			01-6925-9981	19-6909-5150
3			16	18:00	0.6708	0.01144	0.2251			10-7712-2942	05-2344-0230
4		Mar	20	16:45	0.5645	-0.09492	-1.867			08-6371-6024	07-3313-9788
5		Apr	2	17:30	0.703	0.04357	0.8567			03-8950-7977	11-5175-0492
6			10	16:15	0.6169	-0.04254	-0.8366			10-2133-0736	12-8523-8395
7		May	1	17:05	0.5318	-0.1276	-2.509	(-)		03-8012-9334	13-7152-9760
8			6	17:50	0.6808	0.02135	0.4199			03-8048-8596	09-0340-4886
9			9	16:00	0.5946	-0.0648	-1.274			17-0331-8675	13-3542-8898
10			15	16:30	0.6403	-0.01905	-0.3747			13-1497-3628	00-5174-3866
11			21	16:55	0.6473	-0.01213	-0.2386			06-3402-6022	03-4115-6104
12		Jun	18	17:10	0.6944	0.03504	0.6892			06-1188-4258	00-0241-1521
13			26	16:50	0.7071	0.04771	0.9382			04-8193-2775	12-6407-0947
14		Oct	2	14:30	0.683	0.02362	0.4645			11-2549-1156	20-3834-3332
15			8	14:20	0.7071	0.04771	0.9382			07-2900-0354	08-7535-0039
16			23	17:05	0.695	0.03556	0.6993			16-6872-9777	14-5911-2070
17			30	14:15	0.6965	0.03708	0.7291			18-2385-7585	14-5709-8201
18		Nov	20	17:05	0.7009	0.04145	0.8152			07-5290-9164	14-2725-8866
19	2015	Jan	2	15:20	0.6936	0.03422	0.673			10-4730-5330	15-5225-1160
20			22	17:00	0.6373	-0.02212	-0.435			10-7968-8254	11-0502-7928
21		Feb	19	17:00	0.7071	0.04771	0.9382			03-6420-8860	02-5408-8248

96 Hour Acute *Americamysis bahia* Reference Toxicant Test

Client: Reference Toxicant
Organism Log #: 8795 Age: 5 days
Test Material: Potassium chloride
Organism Supplier: Aquatic Indicators
Test ID#: 61563 Project # 23653
Control/Diluent: DI + Crystal Sea @ 25 ppt
Test Date: 2/19/15 Randomization: 4.6.3
Control Water Batch: 1047

Treatment (g/L KCl)	Temp (°C)	pH new	pH old	D.O. (mg/L) new	D.O. (mg/L) old	Salinity (ppt) new	Salinity (ppt) old	# Live Organisms Rep A	Rep B	Rep C	Rep D	SIGN-OFF
Control	20.7	8.03		8.0		24.8		10	10	10	10	Test Solution Prep: CP
0.125	20.7	8.08		8.0		24.7		10	10	10	10	New WQ: KRR
0.25	20.7	8.06		8.1		24.7		10	10	10	10	Initiation Date: 2/19/15
0.5	20.7	8.06		8.1		24.9		10	10	10	10	Initiation Time: 1700
1	20.7	8.07		8.4		25.5		10	10	10	10	Initiation Signoff: CJD
2	20.7	8.08		9.2		26.3		10	10	10	10	RT Batch #: 130
Meter ID	38A	pH22		RD12		EC10						a.m. Feeding Signoff: [illegible]
												p.m. Feeding Signoff: CJD
Control	20.6		7.15		5.9		24.7	10	10	10	10	Count Date: 2/20/15
0.125	20.6		7.19		6.1		25.0	10	10	10	10	Count Time: 1020
0.25	20.6		7.16		6.3		25.1	10	10	10	10	Count Signoff: CD
0.5	20.6		7.23		6.3		25.2	10	10	10	10	Old WQ: CD
1	20.6		7.85		6.3		25.7	0	0	0	0	a.m. Feeding Signoff: SVV
2	20.6		7.87		6.7		26.7	0	0	0	0	p.m. Feeding Signoff: [illegible]
Meter ID	38A		pH22		RD11		EC08					
Control	20.6	8.04	7.47	8.0	5.7	24.5	25.1	10	10	10	10	Test Solution Prep: CD
0.125	20.6	8.05	7.49	8.0	5.9	24.6	25.5	10	10	10	10	New WQ: DM
0.25	20.6	8.06	7.63	8.0	6.3	24.8	25.4	10	9	10	10	Renewal Date: 2/21/15
0.5	20.6	8.06	7.60	8.1	6.4	25.0	25.7	10	10	10	10	Renewal Time: 1620
1	—	—	—	—	—	—	—	—	—	—	—	Renewal Signoff: [illegible]
2	—	—	—	—	—	—	—	—	—	—	—	Old WQ: DM
Meter ID	38A	pH 19	pH 21	RD12	RD11	EC10	EC08					a.m. Feeding Signoff: [illegible]
												p.m. Feeding Signoff: [illegible]
												RT Batch #: 130
Control	20.5		7.85		7.0		24.6	10	8	10	10	Count Date: 2/22/15 ~~2/23/15~~
0.125	20.5		7.87		7.0		24.5	10	10	10	10	Count Time: 0935
0.25	20.5		7.89		6.8		25.1	10	9	10	10	Count Signoff: PF
0.5	20.5		7.95		7.1		25.3	10	10 SVV	10	10	Old WQ: KRR
1	—		—		—		—	—	—	—	—	a.m. Feeding Signoff: [illegible]
2	—		—		—		—	—	—	—	—	p.m. Feeding Signoff: CJD
Meter ID	38A		pH22		RD11		EC09					
Control	20.2		7.66		6.1		25.2	10	8	10	10	Termination Date: 2/23/15
0.125	20.2		7.66		6.2		25.2	10	10	10	10	Termination Time: 1520
0.25	20.2		7.68		6.5		25.3	10	9	10	10	Termination Signoff: SVV
0.5	20.2		7.70		6.6		25.5	10	10	10	10	Old WQ: MA
1	—		—		—		—	—	—	—	—	a.m. Feeding Signoff: [illegible]
2	—		—		—		—	—	—	—	—	
Meter ID	38A		pH19		RD12		EC08					

Appendix U

Test Data for the Sediment Bioaccumulation Tests with the Bivalve *Macoma nasuta*

28-day *Macoma* Sediment Bioaccumulation Initial Water Quality Data

Client: PRC **Project:** Port of Redwood City **Project #:** 23613 **Date (Day 0):** 2/17/15

Treatment	Replicate	Temp. (°C)	pH	DO (mg/L)	Salinity (ppt)	Date	Time	Initials
Control Sediment (Paradise Cove)	A	14.7	7.95	8.1	32.1	2/17/15	0940	RG
	B	14.7	7.97	8.2	32.4			
	C	14.7	7.98	8.2	32.3			
	D	14.7	7.98	8.2	32.3			
	E	14.7	7.97	8.3	32.2			
PRC-DU1	A	14.7	8.11	7.7	32.1	2/17/15	0940	RG
	B	14.7	8.08	7.8	32.5			
	C	14.7	8.10	7.9	32.5			
	D	14.7	8.10	8.1	32.6			
	E	14.7	8.10	8.2	32.6			
PRC-DU2	A	14.7	8.06	7.9	32.4	2/17/15	0940	RG
	B	14.7	8.01	8.0	32.5			
	C	14.7	8.02	7.9	32.5			
	D	14.7	8.01	7.9	32.6			
	E	14.7	8.01	8.0	32.6			

28-day *Macoma* Sediment Bioaccumulation Final Water Quality Data

Client: PRC **Project:** Port of Redwood City **Project #:** 23613 **Date (Day 28):** 3/17/15

Treatment	Replicate	Temp. (°C)	pH	DO (mg/L)	Salinity (ppt)	Date	Time	Initials
Control Sediment (Paradise Cove)	A	15.0	7.58	7.8	33.6	3/17/15	0850	RG
	B	15.0	7.63	8.0	33.8			
	C	15.0	7.65	8.1	34.2			
	D	15.0	7.64	8.2	34.2			
	E	15.0	7.63	8.1	33.9			
PRC-DU1	A	15.0	7.63	8.2	34.3	3/17/15	0850	RG
	B	15.0	7.63	8.2	34.5			
	C	15.0	7.63	8.1	34.6			
	D	15.0	7.59	7.9	34.6			
	E	15.0	7.64	8.0	34.5			
PRC-DU2	A	15.0	7.61	8.0	34.1	3/17/15	0850	RG
	B	15.0	7.66	8.1	34.0			
	C	15.0	7.67	8.1	33.7			
	D	15.0	7.62	8.1	34.1			
	E	15.0	7.63	8.0	34.2			

28-day *Macoma nasuta* Sediment Bioaccumulation Test Data

Client: Port of Redwood City **Sample ID:** Control Sediment **Project #:** 23613 **Test ID:** 61462 **Date (Day 0):** 2/17/15

Day	Date	Water Quality Measurements					Observed Mortality					Sign-Off
		Temp. (°C)	NH_3 (mg/L)	pH	D.O. (mg/L)	Salinity (ppt)	A	B	C	D	E	
0	2/17/15	14.7	<1.00	7.95	8.1	32.1	0	0	0	0	0	RG / KP
1	2/18/15	15.1			8.0	32.1	0	0	0	0	0	RG
2	2/19/15	14.6			~~7.6~~ KRR ~~8.0~~ 8.1	32.2	0	0	0	0	0	KRR
3	2/20/15	15.1			8.0	32.3	0	0	0	0	0	RG
4	2/21/15	14.8			8.0	32.3	0	0	0	0	0	KRR
5	2.22.15	15.1			8.0	32.3	0	0	0	0	0	KRR
6	2/23/15	14.7			7.8	32.9	1	0	0	0	0	KRR
7	2/24/15	~~12.1~~ 15.3 KRR	<1.00	7.72	8.3	33.0	0	~~0~~ 1 KRR	0	0	0	KRR
8	2/25/15	15.2			8.2	32.8	0	~~0~~ 1 KRR	0	0	0	KRR
9	2-26-15	15.3			8.3	33.4	0	0	0	0	0	KRR
10	2/27/15	15.0			7.9	33.2	0	0	0	0	0	RG
11	2/28/15	15.2			8.0	34.0	0	0	0	0	0	RG
12	KRR ~~2/28/15~~ 3/1/15	14.8			7.6	33.9	0	0	0	0	0	KRR
13	3/2/15	15.2			7.8	33.2	0	0	0	1	0	MJM
14	3 3 15	15.1	1.43	7.51	7.9	33.6	0	0	0	0	0	RG
15	3/4/15	15.4			7.6	32.7	0	0	0	0	0	RG
16	3/5/15	15.2			8.5	32.4	0	0	0	0	0	SD
17	3/6/15	15.5			7.9	33.2	0	0	0	0	0	MJM
18	3/7/15	15.1			7.7	33.5	0	0	0	0	0	RG
19	3.8.15	14.8			8.1	34.1	0	0	0	0	0	DM
20	3/9/15	15.2			7.2	33.3	0	0	0	0	0	MJM
21	3.10.15	15.5	<1.00	7.53	7.9	33.5	0	0	0	0	0	KRR
22	3.11.15	15.5			8.1	33.2	0	0	0	0	0	KRR
23	3.12.15	15.1			8.1	33.5	0	0	0	0	0	KRR
24	3/13/15	15.0			8.2	33.6	0	0	0	0	0	RG
25	3/14/15	15.1			8.1	33.9	0	0	0	0	0	MJM
26	3/15/15	15.6			7.7	33.9	0	0	0	0	0	DM
27	3.16.15	14.9	RG 3/17/15 <1.00		7.4	34.1	0	0	0	0	0	KR
28	3/17/15	15.0	~~7.95~~	7.98	8.2	32.3	0	0	0	0	0	RG/KR
					28-d Survival		19	19	20	19	19	

28-day *Macoma nasuta* Sediment Bioaccumulation Test Data

Client: Port of Redwood City **Sample ID:** PRC-DU1 **Project #:** 23613 **Test ID:** 61462 **Date (Day 0):** 2/17/15

Day	Date	Water Quality Measurements					Observed Mortality					Sign-Off
		Temp. (°C)	NH_3 (mg/L)	pH	D.O. (mg/L)	Salinity (ppt)	A	B	C	D	E	
0	2/17/15	14.7	3.19	8.11	7.7	32.1	0	0	0	0	0	RG/CD
1	2/18/15	15.1			7.9	32.3	0	0	0	0	0	RG
2	2/19/15	14.6			~~8.8~~ 8.0 KRR	32.3	0	0	0	0	0	KRR
3	2/20/15	15.1			8.1	32.8	0	0	0	0	0	RG
4	2/21/15	14.8			8.2	32.5	0	0	0	0	0	KMP
5	2.22.15	15.1			8.1	32.5	0	0	0	0	0	KR
6	2/23/15	14.7			7.8	32.8	0	0	0	0	0	KRR
7	2/24/15	~~15.1~~ 15.3 KRR	4.61	7.9	7.8	33.0	0	0	0	0	0	KRR
8	2/25/15	15.2			8.3	32.8	0	0	0	0	0	KRR
9	2-26-15	15.3			8.5	33.9	0	0	0	0	0	KR
10	2/27/15	15.0			7.8	33.3	0	0	0	0	0	RG
11	2/28/15	15.2			8.0	34.6	0	0	0	0	0	RG
12	3/1/15 ~~2/28/15~~ KRR	14.8			8.0	34.2	0	0	0	0	0	KRR
13	3/2/15	15.2			7.9	33.5	0	0	0	0	0	MJM
14	3.3.15	15.1	4.60	7.64	8.1	33.8	0	0	0	0	0	RD
15	3/4/15	15.4			7.8	33.1	0	1	0	0	0	RG
16	3/5/15	15.2			8.3	32.7	0	0	0	0	0	SD
17	3/6/15	15.5			7.9	33.6	0	0	0	0	0	MJM
18	3/7/15	15.1			7.5	33.6	0	0	0	0	0	RG
19	3/8/15	15.4			7.8	33.6	0	0	0	0	0	DM
20	3/9/15	15.2			8.0	33.6	0	0	0	0	0	MJM
21	3.10.15	15.5	1.08	7.52	7.9	33.8	0	0	0	0	0	KRR
22	3.11.15	15.5			7.8	33.5	0	0	0	0	0	KRR
23	3.12.15	15.1			8.0	33.9	0	0	0	0	0	KMP
24	3/13/15	15.0			7.9	33.9	0	0	0	0	0	RG
25	3/14/15	15.1			8.6	34.7	0	0	0	0	0	MJM
26	3/15/15	15.0			7.8	34.5	0	0	0	0	0	DM
27	3.16.15	14.9			7.3	34.1	0	0	0	0	0	KR
28	3/17/15	15.0	~~8.11~~ <100	8.11	7.7	32.1	0	0	1 ~~2~~ 3/17/15	0	0	RG/RG
RG 3/17/15					28-d Survival		20	19	19	20	20	

28-day *Macoma nasuta* Sediment Bioaccumulation Test Data

Client: Port of Redwood City **Sample ID:** PRC-DU2 **Project #:** 23613 **Test ID:** 61463 **Date (Day 0):** 2/17/15

Day	Date	Water Quality Measurements					Observed Mortality					Sign-Off
		Temp. (°C)	NH_3 (mg/L)	pH	D.O. (mg/L)	Salinity (ppt)	A	B	C	D	E	
0	2/17/15	14.7	3.05	8.06	7.9	32.4	0	0	0	0	0	RG/LE
1	2/18/15	15.1			7.6	32.2	0	0	0	0	0	RG
2	2/19/15	14.6			~~9.6~~ 7.6 KRR	32.3	0	0	0	0	0	KRR
3	2/20/15	15.1			8.0	32.2	0	0	0	0	0	RG
4	2/21/15	14.8			8.0	32.8	0	0	0	0	0	KRP
5	2.22.15	15.1			8.1	32.6	0	0	0	0	0	KR
6	KRR ~~2/23/15~~ 2/23/15	14.7			7.8	32.9	0	0	0	0	0	KRR
7	2/24/15	~~12.1~~ 15.1 KRR	4.19	7.81	8.1	32.9	0	0	0	0	0	KRR
8	2/25/15	15.2			8.2	32.8	0	0	0	0	0	KRR
9	2-26-15	15.3			8.5	34.1	0	0	0	0	0	KR
10	2/27/15	15.0			7.6	33.5	0	0	0	0	0	RG
11	2/28/15	15.2			7.8	34.6	0	0	0	0	0	RG
12	3-1-15 ~~2/29/15~~ KRR	14.8			7.8	34.0	0	0	0	0	0	KRR
13	3/2/15	15.2			7.6	33.2	0	0	0	0	0	MJM
14	3.3.15	15.1	2.02	7.60	7.8	33.4	0	0	0	0	0	RG
15	3/4/15	15.4			7.8	33.3	0	0	0	0	0	RG
16	3/5/15	15.2			8.1	32.8	0	0	0	0	0	SD
17	3/6/15	15.5			7.8	33.7	0	0	0	0	0	MJM
18	3/7/15	15.1			7.4	33.5	0	0	0	0	0	RG
19	3/8/15	15.7			7.8	33.9	0	0	0	0	0	DM
20	3/9/15	15.2			7.9	33.4	0	0	0	0	0	MJM
21	3.10.15	15.5	<1.00	7.54	7.9	33.5	0	0	0	0	0	KRR
22	3.11.15	15.5			8.0	32.9	0	0	0	0	0	KRR
23	3.12.15	15.1			8.0	33.6	0	0	0	0	0	KRP
24	3/13/15	15.0			8.0	33.7	0	0	0	0	0	RG
25	3/14/15	15.1			8.5	34.7	0	0	0	0	0	MJM
26	3/15/15	15.2			7.9	34.0	0	0	0	0	0	DM
27	3.16.15	14.9			7.8	34.0	0	0	0	0	0	KR
28	3/17/15	15.0	<1.00	8.06	7.9	32.4	~~0~~ 1 3/17/15	~~0~~ 1 3/17/15	0	1	0	RG/LE
					28-d Survival		19	19	20	19	20	

Appendix V

Test Data for the Sediment Bioaccumulation Tests with the Polychaete *Nereis virens*

28-day *Nereis* Sediment Bioaccumulation Initial Water Quality Data

Client: PRC Project: Port of Redwood City Project #: 23613 Date (Day 0): 2/19/15

Treatment	Replicate	Temp. (°C)	pH	DO (mg/L)	Salinity (ppt)	Date	Time	Initials
Control Sediment (Paradise Cove)	A	14.9	7.92	8.1	31.7	2/19/15	0930	RG
	B	14.9	7.94	8.2	31.9			
	C	14.9	7.94	8.2	31.9			
	D	14.9	7.96	8.3	32.0			
	E	14.9	7.95	8.3	32.1			
PRC-DU1	A	14.9	8.15	8.0	32.2	2/19/15	0930	RG
	B	14.9	8.18	8.3	32.4			
	C	14.9	8.12	8.3	32.3			
	D	14.9	8.08	8.2	32.3			
	E	14.9	8.10	8.1	32.4			
PRC-DU2	A	14.9	8.08	8.2	32.4	2/19/15	0930	RG
	B	14.9	8.11	8.2	32.3			
	C	14.9	8.10	8.2	32.3			
	D	14.9	8.12	8.2	32.4			
	E	14.9	8.18	8.1	32.1			

28-day *Nereis virens* Sediment Bioaccumulation Final Water Quality Data

Client: PRC Project: Port of Redwood City Project #: 23613 Date (Day 28): 3.19.15

Treatment	Replicate	Temp. (°C)	pH	DO (mg/L)	Salinity (ppt)	Date	Time	Initials
Control Sediment (Paradise Cove)	A	14.8	7.68	8.1	33.8	3.19.15	0910	KRR
	B	14.8	7.69	8.1	33.9			
	C	14.8	7.67	8.0	33.7			
	D	14.8	7.66	8.0	34.0			
	E	14.8	7.69	8.0	34.5			
PRC-DU1	A	14.8	7.69	8.0	34.9	3.19.15	0915	KRR
	B	14.8	7.71	8.1	34.7			
	C	14.8	7.70	8.0	34.1			
	D	14.8	7.72	8.0	33.4			
	E	14.8	7.66	7.7	33.9			
PRC-DU2	A	14.8	7.71	7.7	33.7	3.19.15	~~0910~~ 3.19.15 0920	KRR
	B	14.8	7.74	8.0	33.9			
	C	14.8	7.79	8.1	33.9			
	D	14.8	7.78	7.5	33.6			
	E	14.8	7.81	8.1	33.7			

28-day *Nereis virens* Sediment Bioaccumulation Test Data

Client: Port of Redwood City **Sample ID:** Control Sediment **Project #:** 23613 **Test ID:** 61465 **Date (Day 0):** 2/19/15

Day	Date	Water Quality Measurements					Observed Mortality					Sign-Off
		Temp. (°C)	NH_3 (mg/L)	pH	D.O. (mg/L)	Salinity (ppt)	A	B	C	D	E	
0	2/19/15	14.9	<1.00	7.92	8.1	31.7	0	0	0	0	0	KP/RG
1	2/20/15	15.1			7.9	31.9	0	0	0	0	0	RG
2	2.21.15	14.8			7.9	31.6	0	0	0	0	0	KMP
3	2.22.15	15.1			7.9	31.6	0	0	0	0	0	KR
4	2/23/15	14.7			7.8	32.0	0	0	0	0	0	KRR
5	2/24/15	15.3 KRR			7.7	32.08	0	0	0	0	0	KRR
6	2/25/15	15.2			8.0	32.4	0	0	0	0	0	KRR
7	2-26-15	15.3	<1.00	7.98	8.4	33.4	0	0	0	0	0	YM
8	2/27/15	15.0			7.8	33.2	0	0	0	0	0	RG
9	2/28/15	15.2			7.8	34.4	0	0	0	0	0	RG
10	KM 3/1/15	14.8			7.9	33.8	0	0	0	0	0	KRR
11	3/2/15	15.2			7.9	33.5	0	0	0	0	0	MJM
12	3.3.15	15.1			8.1	33.7	0	0	0	0	0	PO
13	3/4/15	15.4			7.8	33.5	0	0	0	0	0	RG
14	3/5/15	15.2	<1.00	7.60	8.4	33.1	0	0	0	0	0	SD
15	3/6/15	15.5			8.0	33.7	0	0	0	0	0	MJM
16	3/7/15	15.1			7.5	33.4	0	0	0	0	0	RG
17	3/8/15	15.1			8.1	34.6	0	0	0	0	0	DM
18	3/9/15	15.2			7.3	33.2	0	0	0	0	0	MJM
19	3.10.15	15.5			7.9	34.3	0	0	0	0	0	KRR
20	3.11.15	15.5			8.0	33.6	0	0	0	0	0	KRR
21	3/12/15	15.1	<1.00	7.65	7.9	33.9	0	0	0	0	0	KMP
22	3/13/15	15.0			8.2	33.9	0	0	0	0	0	RG
23	3/14/15	15.1			8.6	34.6	0	0	0	0	0	MJM
24	3/15/15	16.0			7.8	34.3	0	0	0	0	0	DM
25	3.16.15	14.9			7.7	33.9	0	0	0	0	0	KR
26	3/17/15	14.8			7.4	33.9	0	0	0	0	0	RG
27	3.18.15	14.7			7.9	33.5	0	0	0	0	0	KR
28	3.19.15	14.8	<1.00	7.68	8.1	33.8	0	0	0	1	0	KRR
					28-d Survival		10	10	10	9	10	

28-day *Nereis virens* Sediment Bioaccumulation Test Data

Client: Port of Redwood City **Sample ID:** PRC-DU1 **Project #:** 23613 **Test ID:** 61465 **Date (Day 0):** 2/19/1.

Day	Date	Water Quality Measurements					Observed Mortality					Sign-Off
		Temp. (°C)	NH_3 (mg/L)	pH	D.O. (mg/L)	Salinity (ppt)	A	B	C	D	E	
0	2/19/15	14.9	4.86	8.15	8.0	32.2	10	10	10	10	10	RG/KR
1	2/20/15	15.1			8.0	32.4	0	0	0	0	0	RG
2	2/21/15	14.8			8.1	32.0	0	0	0	0	0	KRP
3	2.22.15	15.1			8.2	32.6	0	0	0	0	0	KR
4	2/23/15	14.7			7.8	32.7	0	0	0	0	0	KRR
5	2/24/15	~~15.0~~ 15.3 KRR			7.9	32.4	0	0	0	0	0	KRR
6	2/25/15	15.2			8.0	32.8	0	0	0	0	0	KRR
7	2-26-15	15.3	~~21.03~~ 3.43 m	7.70	8.4	33.8	0	0	0	0	0	KR
8	2/27/15	15.0			7.6	33.3	0	0	0	0	0	RG
9	2/28/15	15.2			7.7	34.4	0	0	0	0	0	RG
10	KRR 3/1/15 ~~2/30/15~~	14.8			7.7	34.5	0	0	0	0	0	KRR
11	3/2/15	15.2			7.5	34.3	0	0	0	0	0	MJM
12	3.3.15	15.1			7.9	34.4	0	0	0	0	0	RG
13	3/4/15	15.4			7.6	33.7	0	0	0	0	0	RG
14	3/5/15	15.2	<1.00	7.64	8.4	33.2	0	0	0	0	0	SD
15	3/6/15	15.5			7.8	33.6	0	0	0	0	0	MJM
16	3/7/15	15.1			7.4	33.2	0	0	0	0	0	RG
17	3/8/15	15.2			7.3	34.2	0	0	0	0	0	DM
18	3/9/15	15.2			7.7	34.2	0	0	0	0	0	MJM
19	3.10.15	15.5			7.9	33.6	0	0	0	0	0	KRR
20	3.11.15	15.5			8.1	33.5	0	0	0	0	0	KRR
21	3.12.15	15.1	<1.00	7.75	7.8	34.4	0	0	0	0	0	KRP
22	3/13/15	15.0			8.2	34.3	0	0	0	0	0	RG
23	3/14/15	15.1			8.6	34.7	0	0	0	0	0	MJM
24	3/15/15	14.7			8.1	35.5	0	0	0	0	0	DM
25	3.16.15	14.9			7.2	35.1	0	0	0	0	0	KR
26	3/17/15	14.8			7.6	33.7	0	0	0	0	0	RG
27	3.18.15	14.7			8.1	33.9	0	0	0	0	0	KR
28	3.19.15	14.8	<1.00	7.69	8.0	34.9	0	1	0	0	0	KRR
					28-d Survival		10	9	10	11	10	

28-day *Nereis virens* Sediment Bioaccumulation Test Data

Client: Port of Redwood City **Sample ID:** PRC-DU2 **Project #:** 23613 **Test ID:** 61465 **Date (Day 0):** 2/19/15

Day	Date	Water Quality Measurements					Observed Mortality					Sign-Off
		Temp. (°C)	NH_3 (mg/L)	pH	D.O. (mg/L)	Salinity (ppt)	A	B	C	D	E	
0	2/19/15	14.9	5.92	8.08	8.2	32.4	0	0	0	0	0	RG/CD
1	2/20/15	15.1			8.0	32.4	0	0	0	0	0	RG
2	2/21/15	14.8			7.9	32.4	0	0	0	0	0	KMP
3	2.22.15	15.1			7.8	32.3	0	0	0	0	0	KR
4	2/23/15	14.7			7.3	32.6	0	0	0	0	0	KRR
5	2/24/15	~~14.7~~ 15.3 KRR			7.7	32.8	0	0	0	0	0	KRR
6	2/25/15	15.2			8.0	32.8	0	0	0	0	0	KRR
7	2-26-15	15.3	3.35	7.69	8.4	33.7	0	0	0	0	0	KR
8	2/27/15	15.0			7.4	33.5	0	0	0	0	0	RG
9	2/28/15	15.2			7.8	34.7	0	0	0	0	0	RG
10	KRR ~~2/29/15~~ 3/1/15	14.8			7.5	34.4	0	0	0	0	0	KRR
11	3/2/15	15.2			7.6	33.6	0	0	0	0	0	MJM
12	3-3-15	15.1			7.8	33.9	0	0	0	0	0	RD
13	3/4/15	15.4			7.7	33.3	0	0	0	0	0	RG
14	3/5/15	15.2	<1.00	7.60	8.3	33.0	0	0	0	0	0	SD
15	3/6/15	15.5			8.1	33.4	0	0	0	0	0	MJM
16	3/7/15	15.1			7.5	33.6	0	0	0	0	0	RG
17	3/8/15	15.6			7.7	34.2	0	0	0	0	0	DM
18	3/9/15	15.2			7.9	33.5	0	0	0	0	0	MJM
19	3-10-15	15.5			8.1	33.8	0	0	0	0	0	KRR
20	3-11-15	15.5			8.1	33.2	0	0	0	0	0	KRR
21	3-12-15	15.1	<1.00	7.75	7.9	33.9	0	0	KMP 3-12-15 0	0	0	KMP
22	3/13/15	15.0			8.2	34.1	0	0	0	0	0	RG
23	3/14/15	15.1			8.7	34.8	0	0	0	0	0	MJM
24	3/15/15	15.1			8.0	34.8	0	0	0	0	0	DM
25	3.16.15	14.9			7.0	34.1	0	0	0	0	0	KR
26	3/17/15	14.8			7.9	34.5	0	0	0	0	0	RG
27	3.18.15	14.7			8.2	33.5	0	0	0	0	0	KR
28	3.19.15	14.8	<1.00	7.71	7.7	33.7	0	0	1	0	0	KRR
					28-d Survival		10	10	9	10	10	

Appendix W

Bioassay Standard Test Conditions

Summary of Test Conditions and Acceptability Criteria for the Amphipod (*Leptocheirus plumulosus)* 10-Day Sediment Toxicity Test.		
1.	Test type	Static non-renewal
2.	Test duration	10 d
3.	Temperature	20 ± 1°C
4.	Salinity	20 – 35 ppt
5.	Light quality	Ambient Laboratory
6.	Light intensity	50 – 100 ft c.
7.	Photoperiod	Continuous
8.	Test chamber size	1 L
9.	Seawater volume	800 mL
10.	Sediment depth	40 mm
11.	Renewal of seawater	None
12.	Age of test organisms	Wild population, immature juveniles
13.	# of organisms per test chamber	20
14.	# of replicate chambers/concentration	5
15.	# of organisms per sediment type	100
16.	Feeding regime	None
17.	Test chamber cleaning	Lab washing prior to test
18.	Test solution aeration	Low bubble (~100/minute)
19.	Overlying water	0.45 μm-filtered seawater (at test salinity)
20.	Test materials	Test sites and Control
21.	Dilution series	None
22.	Endpoint	% Survival
23.	Sample holding requirements	< 8 weeks
24.	Sample volume required	4 L
25.	Test acceptability criteria	≥ 90% survival in the Control treatment
26.	Reference toxicant results	Within 2 SD of laboratory mean

Summary of Test Conditions and Acceptability Criteria for the Marine Polychaete (*Neanthes arenaceodentata)* 10-Day Sediment Toxicity Test.		
1.	Test type	Static-renewal
2.	Test duration	10 d
3.	Temperature	20 ± 1°C
4.	Salinity	20 – 35 ppt
5.	Light quality	Ambient Laboratory
6.	Light intensity	50 – 100 ft c.
7.	Photoperiod	12L/12D
8.	Test chamber size	1 L glass beakers
9.	Test solution volume	800 L
10.	Sediment depth	25 mm (200 mL)
11.	Renewal of seawater	None.
12.	Age of test organisms	2-3 weeks
13.	# of organisms per test chamber	5
14.	# of replicate chambers/concentration	5
15.	# of organisms per sediment type	25
16.	Feeding regime	None
17.	Test chamber cleaning	Lab washing prior to test
18.	Test solution aeration	Low bubble (~100/minute)
19.	Overlying water	0.45 μm-filtered seawater, at test salinity
20.	Test concentrations	Test site and Control
21.	Dilution series	None
22.	Endpoint	Survival
23.	Sample holding requirements	< 8 weeks
24.	Sample volume required	4 L
25.	Test acceptability criteria	≥ 90% survival in the Control treatment
26.	Reference toxicant results	Within 2 SD of laboratory mean

Summary of Test Conditions and Acceptability Criteria for the Mussel (*Mytilus galloprovinciales*) Water Column Toxicity Test		
1.	Test type	Static non-renewal
2.	Test duration	48 hours
3.	Salinity	28 – 32 ppt
4.	Temperature	16 ± 1°C (mussels)
5.	Light quality	Ambient Laboratory
6.	Light intensity	50 –100 ft c.
7.	Photoperiod	16L/8D
8.	Test chamber size	20 mL vials
9.	Test solution volume	10 mL
10.	Renewal of seawater	None
11.	Age of test organisms	Embryo ≤ 4h old
12.	# of organisms per test chamber	150 – 300
13.	# of replicate chambers/concentration	5
14.	# of organisms per concentration	750 – 1,500
15.	Feeding regime	None
16.	Test chamber cleaning	Lab washing prior to test
17.	Test chamber aeration	None
18.	Elutriate preparation water	Site water
19.	Test concentrations	Test sites, and Lab Control
20.	Dilution series	Four concentrations (1, 10, 50, 100%) and a Lab Control.
21.	Dilution water	Natural seawater
22.	Endpoints	%Survival and %normal development
23.	Sampling holding requirements	< 8 weeks
24.	Sample volume required	2L
25.	Test acceptability criteria	≥70% survival and normal development in the Lab Controls, <10% abnormal in Lab Control

Summary of Test Conditions and Acceptability Criteria for the Mysid (*Americamysis bahia*) Water Column Toxicity Test		
1.	Test type	Static non-renewal
2.	Test duration	96 hours
3.	Salinity	25-30 ppt ± 10 ppt
4.	Temperature	20 ± 1°C
5.	Light quality	Ambient Laboratory
6.	Light intensity	50 –100 ft c.
7.	Photoperiod	16L/8D
8.	Test chamber size	400 mL beaker
9.	Test solution volume	200 mL
10.	Renewal of seawater	None
11.	Age of test organisms	1-5 days; 24 hour range in age
12.	# of organisms per test chamber	10
13.	# of replicate chambers/concentration	5
14.	# of organisms per concentration	50
15.	Feeding regime	daily
16.	Test chamber cleaning	Lab washing prior to test
17.	Test chamber aeration	If needed to maintain >40% saturation
18.	Elutriate preparation water	Site water or Clean sea water
19.	Test concentrations	Test sites, and Lab Control
20.	Dilution series	Four concentrations (1, 10, 50, 100%) and a Lab Control.
21.	Dilution water	Natural seawater/artificial seawater
22.	Endpoints	% Survival
23.	Sampling holding requirements	< 8 weeks
24.	Sample volume required	2L
25.	Test acceptability criteria	≥90% survival in the Lab Controls

Summary of Test Conditions and Acceptability Criteria for the Inland Silverside (*Menidia beryllina*) Water Column Toxicity Test		
1.	Test type	Static non-renewal
2.	Test duration	96 hours
3.	Salinity	5 – 32 ppt ± 10 ppt
4.	Temperature	20 ± 1°C
5.	Light quality	Ambient Laboratory
6.	Light intensity	50 –100 ft c.
7.	Photoperiod	16L/8D
8.	Test chamber size	400 mL beaker
9.	Test solution volume	200 mL
10.	Renewal of seawater	None
11.	Age of test organisms	9-14 days; 24 hr range in age
12.	# of organisms per test chamber	10
13.	# of replicate chambers per concentration	5
14.	# of organisms per concentration	50
15.	Feeding regime	At 48 hrs
16.	Test chamber cleaning	Lab washing prior to test
17.	Test chamber aeration	If needed to maintain >40% saturation
18.	Elutriate preparation water	Site water or Clean sea water
19.	Test concentrations	Test sites, and Lab Control
20.	Dilution series	Four concentrations (1, 10, 50, 100%) and a Lab Control.
21.	Dilution water	Natural seawater/artificial seawater
22.	Endpoints	%Survival
23.	Sampling holding requirements	< 8 weeks
24.	Sample volume required	2L
25.	Test acceptability criteria	≥90% survival in the Lab Controls

Summary of Test Conditions and Acceptability Criteria for the Bioaccumulation Testing Using *Macoma nasuta* and *Nereis virens*	
1. Test type	Static-renewal
2. Test duration	28-days
3. Salinity	>25 ppt
4. Temperature	12-16 ± 1°C
5. Light quality	Ambient Laboratory
6. Light intensity	50 –100 ft c.
7. Photoperiod	16L/8D
8. Test chamber size	12-L tank
9. Test sediment/test solution volume	4-L sediment/8-L water
10. Renewal of seawater	3x per week
11. Age of test organisms	*Macoma* 2-4 years, 28-45 mm shell length; *Nereis* large adults
12. # of organisms per test chamber	20 *Macoma*/10 *Nereis* (or as needed)
13. # of replicate chambers per concentration	5
14. # of organisms per concentration	100 *Macoma*/50 *Nereis* (or as needed)
15. Feeding regime	None
16. Test chamber cleaning	As needed
17. Test chamber aeration	Moderate as needed
18. Elutriate preparation water	Site water or Clean sea water
19. Test concentrations	Test sediment, reference sediment, and a Lab Control sediment
20. Dilution series	N/A
21. Dilution water	Natural seawater/artificial seawater
22. Endpoints	Bioaccumulation
23. Sampling holding requirements	< 8 weeks
24. Sample volume required	≥25-L
25. Test acceptability criteria	Adequate mass of organisms at test completion for detection of target analytes

Appendix X

Results of *Macoma nasuta* and *Nereis virens* Tissue Analyses: Laboratory Data Report Submitted by Eurofins Calscience

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WORK ORDER NUMBER: 15-04-2231

The difference is service

AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Pacific Ecorisk

Client Project Name: Port of Redwood City / 23613

Attention: Jeff Cotsifas
2250 Cordelia Road
Fairfield, CA 94534-1912

Approved for release on 06/10/2015 by:
Danielle Gonsman
Project Manager

ResultLink

Email your PM

Eurofins Calscience, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any defense to any litigation which may arise.

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Work Order Number: 15-04-2231

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Work Order Narrative

Work Order: 15-04-2231 Page 1 of 1

Condition Upon Receipt:

Samples were received under Chain-of-Custody (COC) on 04/30/15. They were assigned to Work Order 15-04-2231.

Unless otherwise noted on the Sample Receiving forms all samples were received in good condition and within the recommended EPA temperature criteria for the methods noted on the COC. The COC and Sample Receiving Documents are integral elements of the analytical report and are presented at the back of the report.

Holding Times:

All samples were analyzed within prescribed holding times (HT) and/or in accordance with the Calscience Sample Acceptance Policy unless otherwise noted in the analytical report and/or comprehensive case narrative, if required.

Any parameter identified in 40CFR Part 136.3 Table II that is designated as "analyze immediately" with a holding time of <= 15 minutes (40CFR-136.3 Table II, footnote 4), is considered a "field" test and the reported results will be qualified as being received outside of the stated holding time unless received at the laboratory within 15 minutes of the collection time.

Quality Control:

All quality control parameters (QC) were within established control limits except where noted in the QC summary forms or described further within this report.

Subcontractor Information:

Unless otherwise noted below (or on the subcontract form), no samples were subcontracted.

Additional Comments:

Air - Sorbent-extracted air methods (EPA TO-4A, EPA TO-10, EPA TO-13A, EPA TO-17): Analytical results are converted from mass/sample basis to mass/volume basis using client-supplied air volumes.

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are always reported on a wet weight basis.

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Sample Summary

Client:	Pacific Ecorisk 2250 Cordelia Road Fairfield, CA 94534-1912	Work Order:	15-04-2231
		Project Name:	Port of Redwood City / 23613
		PO Number:	
		Date/Time Received:	04/30/15 09:35
		Number of Containers:	40
Attn:	Jeff Cotsifas		

Sample Identification	Lab Number	Collection Date and Time	Number of Containers	Matrix
Macoma-TO-A	15-04-2231-1	02/17/15 12:00	1	Tissue
Macoma-TO-B	15-04-2231-2	02/17/15 12:00	1	Tissue
Macoma-TO-C	15-04-2231-3	02/17/15 12:00	1	Tissue
Macoma-TO-D	15-04-2231-4	02/17/15 12:00	1	Tissue
Macoma-TO-E	15-04-2231-5	02/17/15 12:00	1	Tissue
Control-A-Macoma-Day 28	15-04-2231-6	03/17/15 12:01	1	Tissue
Control-B-Macoma-Day 28	15-04-2231-7	03/17/15 12:01	1	Tissue
Control-C-Macoma-Day 28	15-04-2231-8	03/17/15 12:01	1	Tissue
Control-D-Macoma-Day 28	15-04-2231-9	03/17/15 12:01	1	Tissue
Control-E-Macoma-Day 28	15-04-2231-10	03/17/15 12:01	1	Tissue
PRC-DU1-A-Macoma-Day 28	15-04-2231-11	03/17/15 12:02	1	Tissue
PRC-DU1-B-Macoma-Day 28	15-04-2231-12	03/17/15 12:02	1	Tissue
PRC-DU1-C-Macoma-Day 28	15-04-2231-13	03/17/15 12:02	1	Tissue
PRC-DU1-D-Macoma-Day 28	15-04-2231-14	03/17/15 12:02	1	Tissue
PRC-DU1-E-Macoma-Day 28	15-04-2231-15	03/17/15 12:02	1	Tissue
PRC-DU2-A-Macoma-Day 28	15-04-2231-16	03/17/15 12:03	1	Tissue
PRC-DU2-B-Macoma-Day 28	15-04-2231-17	03/17/15 12:03	1	Tissue
PRC-DU2-C-Macoma-Day 28	15-04-2231-18	03/17/15 12:03	1	Tissue
PRC-DU2-D-Macoma-Day 28	15-04-2231-19	03/17/15 12:03	1	Tissue
PRC-DU2-E-Macoma-Day 28	15-04-2231-20	03/17/15 12:03	1	Tissue
Nereis-TO-A	15-04-2231-21	02/19/15 12:00	1	Tissue
Nereis-TO-B	15-04-2231-22	02/19/15 12:00	1	Tissue
Nereis-TO-C	15-04-2231-23	02/19/15 12:00	1	Tissue
Nereis-TO-D	15-04-2231-24	02/19/15 12:00	1	Tissue
Nereis-TO-E	15-04-2231-25	02/19/15 12:00	1	Tissue
Control-A-Nereis-Day 28	15-04-2231-26	03/19/15 12:01	1	Tissue
Control-B-Nereis-Day 28	15-04-2231-27	03/19/15 12:01	1	Tissue
Control-C-Nereis-Day 28	15-04-2231-28	03/19/15 12:01	1	Tissue
Control-D-Nereis-Day 28	15-04-2231-29	03/19/15 12:01	1	Tissue
Control-E-Nereis-Day 28	15-04-2231-30	03/19/15 12:01	1	Tissue
PRC-DU1-A-Nereis-Day 28	15-04-2231-31	03/19/15 12:02	1	Tissue
PRC-DU1-B-Nereis-Day 28	15-04-2231-32	03/19/15 12:02	1	Tissue
PRC-DU1-C-Nereis-Day 28	15-04-2231-33	03/19/15 12:02	1	Tissue
PRC-DU1-D-Nereis-Day 28	15-04-2231-34	03/19/15 12:02	1	Tissue
PRC-DU1-E-Nereis-Day 28	15-04-2231-35	03/19/15 12:02	1	Tissue
PRC-DU2-A-Nereis-Day 28	15-04-2231-36	03/19/15 12:03	1	Tissue
PRC-DU2-B-Nereis-Day 28	15-04-2231-37	03/19/15 12:03	1	Tissue
PRC-DU2-C-Nereis-Day 28	15-04-2231-38	03/19/15 12:03	1	Tissue
PRC-DU2-D-Nereis-Day 28	15-04-2231-39	03/19/15 12:03	1	Tissue
PRC-DU2-E-Nereis-Day 28	15-04-2231-40	03/19/15 12:03	1	Tissue

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Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CalScience CHAIN-OF-CUSTODY RECORD

15-04-2231 1/4

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	PER
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas
Project Name:	Port of Redwood City
PO Number:	23613 (PER)

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	PAHs	% lipids *	PCBs (EPA 8082)	Dioxin							
1	Macoma-T0-A	2/17/15	12:00	Tissue	1	poly bag	X		X	X							
2	Macoma-T0-B	2/17/15	12:00	Tissue	1	poly bag	X		X	X							
3	Macoma-T0-C	2/17/15	12:00	Tissue	1	poly bag	X	X	X	X							
4	Macoma-T0-D	2/17/15	12:00	Tissue	1	poly bag	X		X	X							
5	Macoma-T0-E	2/17/15	12:00	Tissue	1	poly bag	X		X	X							
6	Control-A-Macoma-Day 28	3/17/15	12:01	Tissue	1	poly bag	X		X	X							
7	Control-B-Macoma-Day 28	3/17/15	12:01	Tissue	1	poly bag	X		X	X							
8	Control-C-Macoma-Day 28	3/17/15	12:01	Tissue	1	poly bag	X	X	X	X							
9	Control-D-Macoma-Day 28	3/17/15	12:01	Tissue	1	poly bag	X		X	X							
10	Control-E-Macoma-Day 28	3/17/15	12:01	Tissue	1	poly bag	X		X	X							

Correct Containers:	Yes	No	
Sample Temperature:	Ambient	Cold	Warm
Sample Preservative:	Yes	No	
Turnaround Time:	STD	Specify:	

Comments:
*** Homogenize each replicate for each sample. Take a subsample for each sample replicate and composite. Perform lipd analysis on composite sample.**

Report on a Wet Weight Basis

Sample date is date tests were terminated.

Samples shipped on dry ice.

RELIQUINSHED BY

Signature:	[signature]	**Signature:**	
Print:	A. Gantner	**Print:**	
Organization:	PER	**Organization:**	
DATE: 4/28/15	**TIME:** 1500	**DATE:**	**TIME:**

RECEIVED BY

Signature:	[signature]	**Signature:**	
Print:	PRECY SORIANO	**Print:**	
Organization:	EY	**Organization:**	
DATE: 4/30/15	**TIME:** 0935	**DATE:**	**TIME:**

(Fedex)

***MATRIX CODES:** (**SED** = Sediment); (**FW** = Freshwater); (**WW** = Wastewater); (**STRMW** = Stormwater)

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Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CalScience CHAIN-OF-CUSTODY RECORD

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	PER
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas
Project Name:	Port of Redwood City
PO Number:	23613 (PER)

REQUESTED ANALYSIS (2231) 2/4

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	PAHs	% lipids *	PCBs (EPA 8082)	Dioxin							
1	PRC-DU1-A-Macoma-Day 28	3/17/15	12:02	Tissue	1	poly bag	X		X	X							
2	PRC-DU1-B-Macoma-Day 28	3/17/15	12:02	Tissue	1	poly bag	X		X	X							
3	PRC-DU1-C-Macoma-Day 28	3/17/15	12:02	Tissue	1	poly bag	X	X	X	X							
4	PRC-DU1-D-Macoma-Day 28	3/17/15	12:02	Tissue	1	poly bag	X		X	X							
5	PRC-DU1-E-Macoma-Day 28	3/17/15	12:02	Tissue	1	poly bag	X		X	X							
6	PRC-DU2-A-Macoma-Day 28	3/17/15	12:03	Tissue	1	poly bag	X			X							
7	PRC-DU2-B-Macoma-Day 28	3/17/15	12:03	Tissue	1	poly bag	X			X							
8	PRC-DU2-C-Macoma-Day 28	3/17/15	12:03	Tissue	1	poly bag	X	X		X							
9	PRC-DU2-D-Macoma-Day 28	3/17/15	12:03	Tissue	1	poly bag	X			X							
10	PRC-DU2-E-Macoma-Day 28	3/17/15	12:03	Tissue	1	poly bag	X			X							

Correct Containers:	Yes	No	
Sample Temperature:	Ambient	Cold	Warm
Sample Preservative:	Yes	No	
Turnaround Time:	STD	Specify:	

Comments:
*** Homogenize each replicate for each sample. Take a subsample for each sample replicate and composite. Perform lipd analysis on composite sample.**

Report on a Wet Weight Basis

Sample date is date tests were terminated.

Samples shipped on dry ice.

RELIQUINSHED BY

Signature:	[signature]	**Signature:**	
Print:	A. Gantner	**Print:**	
Organization: PER		**Organization:**	
DATE: 4/28/15	**TIME:** 1500	**DATE:**	**TIME:**

RECEIVED BY

Signature:	[signature]	**Signature:**	
Print:	PRECY SORIANO	**Print:**	
Organization:	EI	**Organization:**	
DATE: 4/30/15	**TIME:** 0935	**DATE:**	**TIME:**

***MATRIX CODES:** (**SED** = Sediment); (**FW** = Freshwater); (**WW** = Wastewater); (**STRMW** = Stormwater)

Return to Contents

Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CalScience CHAIN-OF-CUSTODY RECORD

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	PER
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas
Project Name:	Port of Redwood City
PO Number:	23613 (PER)

REQUESTED ANALYSIS 2231 3/4

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	PAHs	% lipids *	PCBs (EPA 8082)	Dioxin							
1	Nereis-T0-A	2/19/15	12:00	Tissue	1	poly bag	X		X	X							
2	Nereis-T0-B	2/19/15	12:00	Tissue	1	poly bag	X		X	X							
3	Nereis-T0-C	2/19/15	12:00	Tissue	1	poly bag	X	X	X	X							
4	Nereis-T0-D	2/19/15	12:00	Tissue	1	poly bag	X		X	X							
5	Nereis-T0-E	2/19/15	12:00	Tissue	1	poly bag	X		X	X							
6	Control-A-Nereis-Day 28	3/19/15	12:01	Tissue	1	poly bag	X		X	X							
7	Control-B-Nereis-Day 28	3/19/15	12:01	Tissue	1	poly bag	X		X	X							
8	Control-C-Nereis-Day 28	3/19/15	12:01	Tissue	1	poly bag	X	X	X	X							
9	Control-D-Nereis-Day 28	3/19/15	12:01	Tissue	1	poly bag	X		X	X							
10	Control-E-Nereis-Day 28	3/19/15	12:01	Tissue	1	poly bag	X		X	X							

Correct Containers:	**Yes**	**No**	
Sample Temperature:	**Ambient**	**Cold**	**Warm**
Sample Preservative:	**Yes**	**No**	
Turnaround Time:	**STD**	**Specify:**	

Comments:
*** Homogenize each replicate for each sample. Take a subsample for each sample replicate and composite. Perform lipd analysis on composite sample.**

Report on a Wet Weight Basis

Sample date is date tests were terminated.

Samples shipped on dry ice.

RELIQUINSHED BY			
Signature:	[signature]	**Signature:**	
Print:	A. Gantner	**Print:**	
Organization: PER		**Organization:**	
DATE: 4/28/15	**TIME:** 1500	**DATE:**	**TIME:**

RECEIVED BY			
Signature:	[signature]	**Signature:**	
Print:	PRECY SORIANO	**Print:**	
Organization:	EY	**Organization:**	
DATE: 4/30/15	**TIME:** 0935	**DATE:**	**TIME:**

***MATRIX CODES**: (**SED** = Sediment); (**FW** = Freshwater); (**WW** = Wastewater); (**STRMW** = Stormwater)

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Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CalScience CHAIN-OF-CUSTODY RECORD

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	PER
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas
Project Name:	Port of Redwood City
PO Number:	23613 (PER)

REQUESTED ANALYSIS 2231 4/4

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	PAHs	% lipids *	PCBs (EPA 8082)	Dioxin							
1	PRC-DU1-A-Nereis-Day 28	3/19/15	12:02	Tissue	1	poly bag	X		X	X							
2	PRC-DU1-B-Nereis-Day 28	3/19/15	12:02	Tissue	1	poly bag	X		X	X							
3	PRC-DU1-C-Nereis-Day 28	3/19/15	12:02	Tissue	1	poly bag	X	X	X	X							
4	PRC-DU1-D-Nereis-Day 28	3/19/15	12:02	Tissue	1	poly bag	X		X	X							
5	PRC-DU1-E-Nereis-Day 28	3/19/15	12:02	Tissue	1	poly bag	X		X	X							
6	PRC-DU2-A-Nereis-Day 28	3/19/15	12:03	Tissue	1	poly bag	X			X							
7	PRC-DU2-B-Nereis-Day 28	3/19/15	12:03	Tissue	1	poly bag	X			X							
8	PRC-DU2-C-Nereis-Day 28	3/19/15	12:03	Tissue	1	poly bag	X	X		X							
9	PRC-DU2-D-Nereis-Day 28	3/19/15	12:03	Tissue	1	poly bag	X			X							
10	PRC-DU2-E-Nereis-Day 28	3/19/15	12:03	Tissue	1	poly bag	X			X							

Correct Containers:	**Yes**	**No**	
Sample Temperature:	**Ambient**	**Cold**	**Warm**
Sample Preservative:	**Yes**	**No**	
Turnaround Time:	**STD**	**Specify:**	

Comments:
*** Homogenize each replicate for each sample. Take a subsample for each sample replicate and composite. Perform lipd analysis on composite sample.**

Report on a Wet Weight Basis

Sample date is date tests were terminated.

Samples shipped on dry ice.

RELIQUINSHED BY			
Signature:	[signature]	**Signature:**	
Print:	A. Gastu	**Print:**	
Organization: PER		**Organization:**	
DATE: 4/28/15	**TIME:** 1500	**DATE:**	**TIME:**

RECEIVED BY			
Signature:	[signature]	**Signature:**	
Print:	PRECY SORIANO	**Print:**	
Organization:	EZY	**Organization:**	
DATE: 4/30/15	**TIME:** 0935	**DATE:**	**TIME:**

***MATRIX CODES**: (**SED** = Sediment); (**FW** = Freshwater); (**WW** = Wastewater); (**STRMW** = Stormwater)

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Revised COC 5/8/15

Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CalScience CHAIN-OF-CUSTODY RECORD

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	PER
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas
Project Name:	Port of Redwood City
PO Number:	23613 (PER)

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	PAHs	% lipids	PCBs (EPA 8082)	Dioxin							
1	Macoma-T0-A	2/17/15	12:00	Tissue	1	poly bag											
2	Macoma-T0-B	2/17/15	12:00	Tissue	1	poly bag											
3	Macoma-T0-C	2/17/15	12:00	Tissue	1	poly bag	X	X	X	X							
4	Macoma-T0-D	2/17/15	12:00	Tissue	1	poly bag											
5	Macoma-T0-E	2/17/15	12:00	Tissue	1	poly bag											
6	Control-A-Macoma-Day 28	3/17/15	12:01	Tissue	1	poly bag											
7	Control-B-Macoma-Day 28	3/17/15	12:01	Tissue	1	poly bag											
8	Control-C-Macoma-Day 28	3/17/15	12:01	Tissue	1	poly bag	X	X	X	X							
9	Control-D-Macoma-Day 28	3/17/15	12:01	Tissue	1	poly bag											
10	Control-E-Macoma-Day 28	3/17/15	12:01	Tissue	1	poly bag											

Correct Containers:	**Yes**	**No**	
Sample Temperature:	**Ambient**	**Cold**	**Warm**
Sample Preservative:	**Yes**	**No**	
Turnaround Time:	**STD**	**Specify:**	

Comments:
*** Homogenize each replicate for each sample. Take a subsample for each sample replicate and composite. Perform analyses on composite sample.**

Report on a Wet Weight Basis

Sample date is date tests were terminated.

Samples shipped on dry ice.

RELIQUINSHED BY

Signature:		**Signature:**	
Print:		**Print:**	
Organization: PER		**Organization:**	
DATE:	**TIME:**	**DATE:**	**TIME:**

RECEIVED BY

Signature:		**Signature:**	
Print:		**Print:**	
Organization:		**Organization:**	
DATE:	**TIME:**	**DATE:**	**TIME:**

***MATRIX CODES:** (**SED** = Sediment); (**FW** = Freshwater); (**WW** = Wastewater); (**STRMW** = Stormwater)

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Pacific EcoRisk
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(707)207-7760

CalScience CHAIN-OF-CUSTODY RECORD

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	PER
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas
Project Name:	Port of Redwood City
PO Number:	23613 (PER)

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	PAHs	% lipids	PCBs (EPA 8082)	Dioxin							
1	APC-DU1-A-Macoma-Day 28	3/26/15	12:02	Tissue	1	poly bag											
2	APC-DU1-B-Macoma-Day 28	3/26/15	12:02	Tissue	1	poly bag											
3	APC-DU1-C-Macoma-Day 28	3/26/15	12:02	Tissue	1	poly bag	X	X	X	X							
4	APC-DU1-D-Macoma-Day 28	3/26/15	12:02	Tissue	1	poly bag											
5	APC-DU1-E-Macoma-Day 28	3/26/15	12:02	Tissue	1	poly bag											
6	APC-DU2-A-Macoma-Day 28	3/26/15	12:03	Tissue	1	poly bag											
7	APC-DU2-B-Macoma-Day 28	3/26/15	12:03	Tissue	1	poly bag											
8	APC-DU2-C-Macoma-Day 28	3/26/15	12:03	Tissue	1	poly bag	X	X		X							
9	APC-DU2-D-Macoma-Day 28	3/26/15	12:03	Tissue	1	poly bag											
10	APC-DU2-E-Macoma-Day 28	3/26/15	12:03	Tissue	1	poly bag											

Correct Containers:	**Yes**	**No**	
Sample Temperature:	**Ambient**	**Cold**	**Warm**
Sample Preservative:	**Yes**	**No**	
Turnaround Time:	**STD**	**Specify:**	

Comments:
*** Homogenize each replicate for each sample. Take a subsample for each sample replicate and composite. Perform analyses on composite sample.**

Report on a Wet Weight Basis

Sample date is date tests were terminated.

Samples shipped on dry ice.

RELIQUINSHED BY

Signature:		**Signature:**	
Print:		**Print:**	
Organization: PER		**Organization:**	
DATE:	**TIME:**	**DATE:**	**TIME:**

RECEIVED BY

Signature:		**Signature:**	
Print:		**Print:**	
Organization:		**Organization:**	
DATE:	**TIME:**	**DATE:**	**TIME:**

***MATRIX CODES:** (**SED** = Sediment); (**FW** = Freshwater); (**WW** = Wastewater); (**STRMW** = Stormwater)

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Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	PER
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas
Project Name:	Port of Redwood City
PO Number:	23613 (PER)

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	PAHs	% lipids	PCBs (EPA 8082)	Dioxin							
1	Nereis-T0-A	2/19/15	12:00	Tissue	1	poly bag											
2	Nereis-T0-B	2/19/15	12:00	Tissue	1	poly bag											
3	Nereis-T0-C	2/19/15	12:00	Tissue	1	poly bag	X	X	X	X							
4	Nereis-T0-D	2/19/15	12:00	Tissue	1	poly bag											
5	Nereis-T0-E	2/19/15	12:00	Tissue	1	poly bag											
6	Control-A-Nereis-Day 28	3/19/15	12:01	Tissue	1	poly bag											
7	Control-B-Nereis-Day 28	3/19/15	12:01	Tissue	1	poly bag											
8	Control-C-Nereis-Day 28	3/19/15	12:01	Tissue	1	poly bag	X	X	X	X							
9	Control-D-Nereis-Day 28	3/19/15	12:01	Tissue	1	poly bag											
10	Control-E-Nereis-Day 28	3/19/15	12:01	Tissue	1	poly bag											

Correct Containers:	**Yes**	**No**	
Sample Temperature:	**Ambient**	**Cold**	**Warm**
Sample Preservative:	**Yes**	**No**	
Turnaround Time:	**STD**	**Specify:**	

Comments:
Homogenize each replicate for each sample. Take a subsample for each sample replicate and composite. Perform analyses on composite sample.

Report on a Wet Weight Basis

Sample date is date tests were terminated.

Samples shipped on dry ice.

RELIQUINSHED BY

Signature:		**Signature:**	
Print:		**Print:**	
Organization: PER		**Organization:**	
DATE:	**TIME:**	**DATE:**	**TIME:**

RECEIVED BY

Signature:		**Signature:**	
Print:		**Print:**	
Organization:		**Organization:**	
DATE:	**TIME:**	**DATE:**	**TIME:**

***MATRIX CODES:** (**SED** = Sediment); (**FW** = Freshwater); (**WW** = Wastewater); (**STRMW** = Stormwater)

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Pacific EcoRisk
ENVIRONMENTAL CONSULTING & TESTING
2250 Cordelia Rd., Fairfield, CA 94534
(707)207-7760

CalScience CHAIN-OF-CUSTODY RECORD

Client Name:	Pacific EcoRisk
Client Address:	2250 Cordelia Rd. Fairfield, CA 94534
Sampled By:	PER
Phone:	(707) 207-7760
FAX:	(707) 207-7916
Project Manager:	Jeff Cotsifas
Project Name:	Port of Redwood City
PO Number:	23613 (PER)

REQUESTED ANALYSIS

	Client Sample ID	Sample Date	Sample Time	Sample Matrix*	Container Number	Container Type	PAHs	% lipids	PCBs (EPA 8082)	Dioxin							
1	PR-DU1-A-Nereis-Day 28	3/19/15	12:02	Tissue	1	poly bag											
2	APC-DU1-B-Nereis-Day 28	3/19/15	12:02	Tissue	1	poly bag											
3	APC-DU1-C-Nereis-Day 28	3/19/15	12:02	Tissue	1	poly bag	X	X	X	X							
4	APC-DU1-D-Nereis-Day 28	3/19/15	12:02	Tissue	1	poly bag											
5	APC-DU1-E-Nereis-Day 28	3/19/15	12:02	Tissue	1	poly bag											
6	APC-DU2-A-Nereis-Day 28	3/19/15	12:03	Tissue	1	poly bag											
7	APC-DU2-B-Nereis-Day 28	3/19/15	12:03	Tissue	1	poly bag											
8	APC-DU2-C-Nereis-Day 28	3/19/15	12:03	Tissue	1	poly bag	X	X		X							
9	APC-DU2-D-Nereis-Day 28	3/19/15	12:03	Tissue	1	poly bag											
10	APC-DU2-E-Nereis-Day 28	3/19/15	12:03	Tissue	1	poly bag											

Correct Containers:	**Yes**	**No**	
Sample Temperature:	**Ambient**	**Cold**	**Warm**
Sample Preservative:	**Yes**	**No**	
Turnaround Time:	**STD**	**Specify:**	

Comments:
*** Homogenize each replicate for each sample. Take a subsample for each sample replicate and composite. Perform analyses on composite sample.**

Report on a Wet Weight Basis

Sample date is date tests were terminated.

Samples shipped on dry ice.

RELIQUINSHED BY			
Signature:		**Signature:**	
Print:		**Print:**	
Organization: PER		**Organization:**	
DATE:	**TIME:**	**DATE:**	**TIME:**

RECEIVED BY			
Signature:		**Signature:**	
Print:		**Print:**	
Organization:		**Organization:**	
DATE:	**TIME:**	**DATE:**	**TIME:**

***MATRIX CODES:** (**SED** = Sediment); (**FW** = Freshwater); (**WW** = Wastewater); (**STRMW** = Stormwater)

Return to Contents

From: (707) 207-7760
Helen Le
PACIFIC ECORISK
2250 Cordelia Road

Faifield, CA 94534

Origin ID: CCRA

FedEx Express

J151215022303uv

Ship Date: 29APR15
ActWgt: 50.0 LB
CAD: 2549479/INET3610

Dry Ice: 3.7 KGS

2231

Delivery Address Bar Code

SHIP TO: (714) 895-5494 BILL SENDER

Danielle Grosman
Calscience Environmental Labs
7440 Lincoln Way

Garden Grove, CA 92841

Ref # Leidos, P of Redwood City
Invoice #
PO #
Dept #

THU - 30 APR 10:30A
PRIORITY OVERNIGHT

TRK# 0201 7734 9042 7994

ICE
92841
CA-US
SNA

92 APVA

537J1/25E2/EE4B

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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WORK ORDER NUMBER: 15-04- 2231

SAMPLE RECEIPT CHECKLIST

COOLER 1 OF 1

CLIENT: Pacific Ecorisk

DATE: 04 / 30 / 2015

TEMPERATURE: (Criteria: 0.0°C – 6.0°C, not frozen except sediment/tissue)

Thermometer ID: SC2 (CF:-0.3°C); Temperature (w/o CF): -11.6 °C (w/ CF): -11.3 °C; ☐ Blank ☑ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____)

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling

☐ Sample(s) received at ambient temperature; placed on ice for transport by courier

Ambient Temperature: ☐ Air ☐ Filter Checked by: 836

CUSTODY SEAL:

Cooler	☐ Present and Intact	☐ Present but Not Intact	☑ Not Present	☐ N/A	Checked by: 836
Sample(s)	☐ Present and Intact	☐ Present but Not Intact	☑ Not Present	☐ N/A	Checked by: 965

SAMPLE CONDITION:	Yes	No	N/A
Chain-of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Sampling date ☐ Sampling time ☐ Matrix ☐ Number of containers			
☐ No analysis requested ☐ Not relinquished ☐ No relinquished date ☐ No relinquished time			
Sampler's name indicated on COC	☑	☐	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and in good condition	☑	☐	☐
Proper containers for analyses requested	☑	☐	☐
Sufficient volume/mass for analyses requested	☑	☐	☐
Samples received within holding time	☑	☐	☐
Aqueous samples for certain analyses received within 15-minute holding time			
☐ pH ☐ Residual Chlorine ☐ Dissolved Sulfide ☐ Dissolved Oxygen	☐	☐	☑
Proper preservation chemical(s) noted on COC and/or sample container	☑	☐	☐
Unpreserved aqueous sample(s) received for certain analyses			
☐ Volatile Organics ☐ Total Metals ☐ Dissolved Metals			
Container(s) for certain analysis free of headspace	☐	☐	☑
☐ Volatile Organics ☐ Dissolved Gases (RSK-175) ☐ Dissolved Oxygen (SM 4500)			
☐ Carbon Dioxide (SM 4500) ☐ Ferrous Iron (SM 3500) ☐ Hydrogen Sulfide (Hach)			
Tedlar™ bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE: (Trip Blank Lot Number: _____)

Aqueous: ☐ VOA ☐ VOAh ☐ VOAna_2 ☐ 100PJ ☐ 100PJna_2 ☐ 125AGB ☐ 125AGBh ☐ 125AGBp ☐ 125PB ☐ 125PBznna ☐ 250AGB ☐ 250CGB ☐ 250CGBs ☐ 250PB ☐ 250PBn ☐ 500AGB ☐ 500AGJ ☐ 500AGJs ☐ 500PB ☐ 1AGB ☐ 1AGBna_2 ☐ 1AGBs ☐ 1PB ☐ 1PBna ☐ _____ ☐ _____ ☐ _____ ☐ _____

Solid: ☐ 4ozCGJ ☐ 8ozCGJ ☐ 16ozCGJ ☐ Sleeve (_____) ☐ EnCores® (_____) ☐ TerraCores® (_____) ☑ Z

Air: ☐ Tedlar™ ☐ Canister ☐ Sorbent Tube ☐ PUF ☐ _____ **Other Matrix** (_____): ☐ _____ ☐ _____

Container: **A** = Amber, **B** = Bottle, **C** = Clear, **E** = Envelope, **G** = Glass, **J** = Jar, **P** = Plastic, and **Z** = Ziploc/Resealable Bag

Preservative: **b** = buffered, **f** = filtered, **h** = HCl, **n** = HNO_3, **na** = NaOH, **na$_2$** = $Na_2S_2O_3$, **p** = H_3PO_4, **s** = H_2SO_4, **u** = ultra-pure, **znna** = $Zn(CH_3CO_2)_2$ + NaOH

Labeled/Checked by: 965

Reviewed by: [illegible]

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Subcontractor Analysis Report

Work Order: 15-04-2231 Page 1 of 1

One or more samples in this work order have tests that were subcontracted. The subcontract report(s) follows.

For subcontracted tests, please reference the laboratory information noted below.

1. ALS - Columbia Analytical Services, Inc. - Kelso,WA CA ELAP 2286
   EPA 8082 PCB Congeners
2. Eurofins Lancaster Laboratories - Lancaster,PA NELAP 10276CA
   EPA 8270C SIM PAHs
   Percent Lipids
   EPA 8290A Dioxins/Furans

Return to Contents

ALS Environmental
ALS Group USA, Corp
1317 South 13th Avenue
Kelso, WA 98626
T : +1 360 577 7222
F : +1 360 636 1068
www.alsglobal.com

June 09, 2015

Analytical Report for Service Request No: K1505215
Revised Service Request No: K1505215.01

Danielle Gonsman
Calscience Environmental Laboratory, Inc.
7440 Lincoln Way
Garden Grove, CA 92841-1427

RE: 15-04-2231

Dear Danielle,

Enclosed is the revised report for the sample(s) submitted to our laboratory May 14, 2015
For your reference, these analyses have been assigned our service request number **K1505215.**

The client requested that we report the RMP 40 list for the PCB Congeners and provide a Tier-II report instead of a Tier IV.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at howard.holmes@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Howard Holmes
Project Manager

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

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Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

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ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjlabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

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Case Narrative

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ALS Environmental—Kelso Laboratory
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ALS ENVIRONMENTAL

Client:	Eurofins Calscience Environmental Laboratory	**Service Request No.:**	K1505215
Project:	15-04-2231	**Date Received:**	05/14/15
Sample Matrix:	Animal Tissue		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Thirty animal tissue samples were received for analysis at ALS Environmental on 05/14/15. As instructed, the discreet samples were composited at the laboratory to create six composite samples. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a frozen at –20ºC upon receipt at the laboratory.

PCB Congeners by EPA Method 8082

Calibration Verification Exceptions:
The upper control criterion was exceeded for many analytes in the associated Continuing Calibration Verification (CCV). The field samples analyzed in this sequence did not contain the analytes in question above the reporting limit. Since the apparent problem indicated a potential high bias, the data quality was not affected. No further corrective action was required.

Lab Control Sample Exceptions:
The recovery of several analytes in KWG1504658-1/2 was outside the control limits listed in the results summary. The limits are default values temporarily in use until sufficient data points are generated to calculate statistical control limits. Based on the method and historic data, the recoveries observed were in the range expected for this procedure. No further corrective action was taken.

Elevated Detection Limits:
The detection limit was elevated for at least one analyte in all field samples. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compounds at the normal limit. The results were flagged to indicate the matrix interference.

Second Source Exceptions:
The analysis of PCB Congeners by EPA 8082 requires the use of dual column confirmation. When the Initial Calibration Verification (ICV) criteria are met for both columns, the lower of the two sample results is generally reported. The criteria were not met for PCB 77 in CAL 14030. The data quality was not affected. No further corrective action was necessary.

No other anomalies associated with the analysis of these samples were observed.

Approved by_____

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Chain of Custody

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K1505215

eurofins | Calscience

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TEL: (714) 895-5494 . FAX: (714) 894-7501

TO: ALS
1317 S. 13th Avenue
Kelso, WA 98626 USA

CHAIN OF CUSTODY RECORD

DATE: 05/14/15
PAGE: 1 OF 2

LABORATORY CLIENT: Eurofins Calscience, Inc.
ADDRESS: 7440 Lincoln Way
CITY: Garden Grove, CA 92841-1427
TEL: (714) 895-5494
E-MAIL: DanielleGonsman@EurofinsUS.com

CLIENT PROJECT NAME / NUMBER: 15-04-2231
P.O. NO.: 15-04-2231
PROJECT CONTACT: Danielle Gonsman
TEMP BLANK:
SAMPLER(S): (PRINT)
LAB USE ONLY

TURNAROUND TIME
___SAME DAY ___24 HR ___48HR ___72 HR __5 DAYS x 10-DAY TAT

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
ARCHIVE SAMPLES UNTIL _12__ / __31__ / __15__ Archive all samples frozen (-18 deg C) after analysis

SPECIAL INSTRUCTIONS
EDD needed
Samples were stored frozen after bioaccumulation test termination (sample date)
Report on a wet wt. basis
Samples already homogenized. Take a subsample from each replicate & create composite.

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	EPA 8082 PCB Congeners (RMP 40 list)
	Nereis-T0-A	02/19/15	1200	Tissue	1	
	Nereis-T0-B	02/19/15	1200	Tissue	1	
	Nereis-T0-C	02/19/15	1200	Tissue	1	x
	Nereis-T0-D	02/19/15	1200	Tissue	1	
	Nereis-T0-E	02/19/15	1200	Tissue	1	
	Control-A-Nereis-Day 28	03/19/15	1201	Tissue	1	
	Control-B-Nereis-Day 28	03/19/15	1201	Tissue	1	
	Control-C-Nereis-Day 28	03/19/15	1201	Tissue	1	x
	Control-D-Nereis-Day 28	03/19/15	1201	Tissue	1	
	Control-E-Nereis-Day 28	03/19/15	1201	Tissue	1	
	Macoma-T0-A	02/17/15	1200	Tissue	1	
	Macoma-T0-B	02/17/15	1200	Tissue	1	
	Macoma-T0-C	02/17/15	1200	Tissue	1	x
	Macoma-T0-D	02/17/15	1200	Tissue	1	
	Macoma-T0-E	02/17/15	1200	Tissue	1	

Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
(Eurofins Calscience)			
Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:

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K1505215

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TO: ALS
1317 S. 13th Avenue
Kelso, WA 98626 USA

CHAIN OF CUSTODY RECORD

DATE: 05/14/15
PAGE: 2 OF 2

LABORATORY CLIENT: Eurofins Calscience, Inc.
ADDRESS: 7440 Lincoln Way
CITY: Garden Grove, CA 92841-1427
TEL: (714) 895-5494
E-MAIL: DanielleGonsman@EurofinsUS.com

CLIENT PROJECT NAME / NUMBER: 15-04-2231
P.O. NO.: 15-04-2231
PROJECT CONTACT: Danielle Gonsman
TEMP BLANK:
SAMPLER(S): (PRINT)
LAB USE ONLY:

TURNAROUND TIME
___SAME DAY ___24 HR ___48HR ___72 HR __5 DAYS x 10-DAY TAT

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
ARCHIVE SAMPLES UNTIL _12__ / __31__ / __15__ Archive all samples frozen (-18 deg C) after analysis

SPECIAL INSTRUCTIONS
EDD needed
Samples were stored frozen after bioaccumulation test termination (sample date)
Report on a wet wt. basis
Samples already homogenized. Take a subsample from each replicate & create composite.

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	EPA 8082 PCB Congeners (RMP 40 list)
	Control-A-Macoma-Day 28	03/17/15	1201	Tissue	1	
	Control-B-Macoma-Day 28	03/17/15	1201	Tissue	1	
	Control-C-Macoma-Day 28	03/17/15	1201	Tissue	1	x
	Control-D-Macoma-Day 28	03/17/15	1201	Tissue	1	
	Control-E-Macoma-Day 28	03/17/15	1201	Tissue	1	
	PRC-DU1-A-Nereis-Day 28	03/19/15	1202	Tissue	1	
	PRC-DU1-B-Nereis-Day 28	03/19/15	1202	Tissue	1	
	PRC-DU1-C-Nereis-Day 28	03/19/15	1202	Tissue	1	x
	PRC-DU1-D-Nereis-Day 28	03/19/15	1202	Tissue	1	
	PRC-DU1-E-Nereis-Day 28	03/19/15	1202	Tissue	1	
	PRC-DU1-A-Macoma-Day 28	03/17/15	1202	Tissue	1	
	PRC-DU1-B-Macoma-Day 28	03/17/15	1202	Tissue	1	
	PRC-DU1-C-Macoma-Day 28	03/17/15	1202	Tissue	1	x
	PRC-DU1-D-Macoma-Day 28	03/17/15	1202	Tissue	1	
	PRC-DU1-E-Macoma-Day 28	03/17/15	1202	Tissue	1	

Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
(Eurofins Calscience)			
Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:

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PC H2

Cooler Receipt and Preservation Form

Client / Project: Eurofins/Calscience Service Request K15 05215

Received: 5/14/15 Opened: 5/14/15 By: cu Unloaded: 5/14/15 By: cu

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where?_____

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
2.6	2.5	0.3	0.2	-0.1	325		5035 4240 3334	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* Box
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N (1)
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: (1) See attached copy of COC for samples received that match the COC. Received the following that do not match up with the COC: PRC-DU1-A-Neresis Day 28 tissue (through DU1-E) 7872047, 2048, 2049, 2050, 2051. PRC-DU1-A-Macoma Day 28 Tissue (through DU1-E) 7872059, 2060, 2061, 2062, 2063. Still missing 10 samples. (received a total of 30 jars - COCs list 40 jars).

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Congener Specific PCBs

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ALS Environmental—Kelso Laboratory
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Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Analytical Results

Client: Eurofins Calscience Environmental Labora
Project: 15-04-2231
Sample Matrix: Animal tissue

Service Request: K1505215
Date Collected: 02/19/2015
Date Received: 05/14/2015

Congener Specific PCBs

Sample Name: Nereis-TO-Composite
Lab Code: K1505215-006

Units: ug/Kg
Basis: Wet

Extraction Method: EPA 3541
Analysis Method: 8082A

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 8	ND	U	0.55	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 18	ND	U	0.55	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 28	ND	U	0.55	0.15	1	05/26/15	05/31/15	KWG1504658	
PCB 33	ND	Ui	0.65	0.65	1	05/26/15	05/31/15	KWG1504658	*
PCB 44	ND	U	0.55	0.39	1	05/26/15	05/31/15	KWG1504658	
PCB 52	ND	U	0.55	0.43	1	05/26/15	05/31/15	KWG1504658	
PCB 56	ND	U	0.55	0.40	1	05/26/15	05/31/15	KWG1504658	
PCB 66	ND	U	1.1	0.65	1	05/26/15	05/31/15	KWG1504658	
PCB 70	ND	U	0.55	0.31	1	05/26/15	05/31/15	KWG1504658	
PCB 74	ND	U	0.55	0.32	1	05/26/15	05/31/15	KWG1504658	
PCB 87	ND	U	0.55	0.18	1	05/26/15	05/31/15	KWG1504658	
PCB 97	ND	U	0.55	0.20	1	05/26/15	05/31/15	KWG1504658	*
PCB 99	ND	U	0.55	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 101	ND	U	0.55	0.43	1	05/26/15	05/31/15	KWG1504658	*
PCB 110	ND	U	0.55	0.38	1	05/26/15	05/31/15	KWG1504658	
PCB 132	ND	U	0.55	0.22	1	05/26/15	05/31/15	KWG1504658	
PCB 138	**0.48**	JP	0.55	0.10	1	05/26/15	05/31/15	KWG1504658	
PCB 141	ND	U	0.55	0.55	1	05/26/15	05/31/15	KWG1504658	
PCB 151	ND	U	0.55	0.098	1	05/26/15	05/31/15	KWG1504658	
PCB 156	ND	U	1.1	0.62	1	05/26/15	05/31/15	KWG1504658	
PCB 177	ND	U	0.55	0.42	1	05/26/15	05/31/15	KWG1504658	
PCB 180	ND	Ui	0.71	0.71	1	05/26/15	05/31/15	KWG1504658	
PCB 183	ND	U	0.55	0.17	1	05/26/15	05/31/15	KWG1504658	
PCB 187	**0.33**	J	0.55	0.092	1	05/26/15	05/31/15	KWG1504658	
PCB 194	ND	U	0.55	0.077	1	05/26/15	05/31/15	KWG1504658	
PCB 195	ND	U	0.55	0.37	1	05/26/15	05/31/15	KWG1504658	
PCB 201	ND	U	0.55	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 203	ND	Ui	0.55	0.45	1	05/26/15	05/31/15	KWG1504658	
PCB 31	ND	Ui	0.55	0.28	1	05/26/15	05/31/15	KWG1504658	
PCB 49	ND	U	0.55	0.13	1	05/26/15	05/31/15	KWG1504658	*
PCB 60	ND	U	0.55	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 95	ND	U	0.55	0.17	1	05/26/15	05/31/15	KWG1504658	*
PCB 105	ND	U	0.55	0.11	1	05/26/15	05/31/15	KWG1504658	

Comments:

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Analytical Results

Client:	Eurofins Calscience Environmental Labora	**Service Request:**	K1505215
Project:	15-04-2231	**Date Collected:**	02/19/2015
Sample Matrix:	Animal tissue	**Date Received:**	05/14/2015

Congener Specific PCBs

Sample Name:	Nereis-TO-Composite	**Units:**	ug/Kg
Lab Code:	K1505215-006	**Basis:**	Wet
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 118	ND	U	0.55	0.13	1	05/26/15	05/31/15	KWG1504658	
PCB 128	ND	U	0.55	0.18	1	05/26/15	05/31/15	KWG1504658	
PCB 149	ND	U	0.55	0.14	1	05/26/15	05/31/15	KWG1504658	*
PCB 153	**0.76**		0.55	0.15	1	05/26/15	05/31/15	KWG1504658	
PCB 158	ND	U	0.55	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 170	ND	U	0.55	0.42	1	05/26/15	05/31/15	KWG1504658	
PCB 174	ND	Ui	0.55	0.19	1	05/26/15	05/31/15	KWG1504658	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	78	27-122	05/31/15	Acceptable

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Comments:

Analytical Results

Client: Eurofins Calscience Environmental Labora
Project: 15-04-2231
Sample Matrix: Animal tissue

Service Request: K1505215
Date Collected: 03/19/2015
Date Received: 05/14/2015

Congener Specific PCBs

Sample Name: Control Nereis-Day 28-Composite
Lab Code: K1505215-012

Units: ug/Kg
Basis: Wet

Extraction Method: EPA 3541
Analysis Method: 8082A

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 8	ND	U	0.57	0.12	1	05/26/15	05/31/15	KWG1504658	
PCB 18	ND	U	0.57	0.12	1	05/26/15	05/31/15	KWG1504658	
PCB 28	ND	U	0.57	0.15	1	05/26/15	05/31/15	KWG1504658	
PCB 33	ND	Ui	0.87	0.87	1	05/26/15	05/31/15	KWG1504658	*
PCB 44	ND	U	0.57	0.40	1	05/26/15	05/31/15	KWG1504658	
PCB 52	ND	U	0.57	0.45	1	05/26/15	05/31/15	KWG1504658	
PCB 56	ND	U	0.57	0.41	1	05/26/15	05/31/15	KWG1504658	
PCB 66	ND	U	1.2	0.67	1	05/26/15	05/31/15	KWG1504658	
PCB 70	ND	U	0.57	0.32	1	05/26/15	05/31/15	KWG1504658	
PCB 74	ND	U	0.57	0.33	1	05/26/15	05/31/15	KWG1504658	
PCB 87	ND	U	0.57	0.19	1	05/26/15	05/31/15	KWG1504658	
PCB 97	ND	U	0.57	0.21	1	05/26/15	05/31/15	KWG1504658	*
PCB 99	ND	U	0.57	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 101	ND	U	0.57	0.45	1	05/26/15	05/31/15	KWG1504658	*
PCB 110	ND	U	0.57	0.39	1	05/26/15	05/31/15	KWG1504658	
PCB 132	ND	U	0.57	0.23	1	05/26/15	05/31/15	KWG1504658	
PCB 138	**0.43**	JP	0.57	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 141	ND	U	0.57	0.57	1	05/26/15	05/31/15	KWG1504658	
PCB 151	ND	U	0.57	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 156	ND	U	1.2	0.64	1	05/26/15	05/31/15	KWG1504658	
PCB 177	ND	U	0.57	0.43	1	05/26/15	05/31/15	KWG1504658	
PCB 180	ND	Ui	0.78	0.78	1	05/26/15	05/31/15	KWG1504658	
PCB 183	ND	U	0.57	0.17	1	05/26/15	05/31/15	KWG1504658	
PCB 187	**0.33**	JP	0.57	0.094	1	05/26/15	05/31/15	KWG1504658	
PCB 194	ND	Ui	0.57	0.28	1	05/26/15	05/31/15	KWG1504658	
PCB 195	ND	U	0.57	0.38	1	05/26/15	05/31/15	KWG1504658	
PCB 201	ND	U	0.57	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 203	ND	Ui	0.57	0.46	1	05/26/15	05/31/15	KWG1504658	
PCB 31	ND	Ui	0.57	0.42	1	05/26/15	05/31/15	KWG1504658	
PCB 49	ND	U	0.57	0.13	1	05/26/15	05/31/15	KWG1504658	*
PCB 60	ND	U	0.57	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 95	ND	U	0.57	0.17	1	05/26/15	05/31/15	KWG1504658	*
PCB 105	ND	U	0.57	0.12	1	05/26/15	05/31/15	KWG1504658	

Comments:

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Analytical Results

Client:	Eurofins Calscience Environmental Labora	**Service Request:**	K1505215
Project:	15-04-2231	**Date Collected:**	03/19/2015
Sample Matrix:	Animal tissue	**Date Received:**	05/14/2015

Congener Specific PCBs

Sample Name:	Control Nereis-Day 28-Composite	**Units:**	ug/Kg
Lab Code:	K1505215-012	**Basis:**	Wet
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 118	ND	U	0.57	0.13	1	05/26/15	05/31/15	KWG1504658	
PCB 128	ND	U	0.57	0.19	1	05/26/15	05/31/15	KWG1504658	
PCB 149	ND	U	0.57	0.14	1	05/26/15	05/31/15	KWG1504658	*
PCB 153	**0.93**		0.57	0.15	1	05/26/15	05/31/15	KWG1504658	
PCB 158	ND	U	0.57	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 170	ND	U	0.57	0.43	1	05/26/15	05/31/15	KWG1504658	
PCB 174	ND	U	0.57	0.15	1	05/26/15	05/31/15	KWG1504658	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	80	27-122	05/31/15	Acceptable

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Analytical Results

Client: Eurofins Calscience Environmental Labora
Project: 15-04-2231
Sample Matrix: Animal tissue

Service Request: K1505215
Date Collected: 02/17/2015
Date Received: 05/14/2015

Congener Specific PCBs

Sample Name: Macoma-TO-Composite
Lab Code: K1505215-018

Units: ug/Kg
Basis: Wet

Extraction Method: EPA 3541
Analysis Method: 8082A

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 8	ND	U	0.49	0.10	1	05/26/15	05/31/15	KWG1504658	
PCB 18	ND	U	0.49	0.098	1	05/26/15	05/31/15	KWG1504658	
PCB 28	ND	U	0.49	0.13	1	05/26/15	05/31/15	KWG1504658	
PCB 33	ND	U	0.49	0.49	1	05/26/15	05/31/15	KWG1504658	*
PCB 44	ND	U	0.49	0.35	1	05/26/15	05/31/15	KWG1504658	
PCB 52	ND	U	0.49	0.39	1	05/26/15	05/31/15	KWG1504658	
PCB 56	ND	U	0.49	0.36	1	05/26/15	05/31/15	KWG1504658	
PCB 66	ND	U	0.98	0.59	1	05/26/15	05/31/15	KWG1504658	
PCB 70	ND	U	0.49	0.28	1	05/26/15	05/31/15	KWG1504658	
PCB 74	ND	U	0.49	0.29	1	05/26/15	05/31/15	KWG1504658	
PCB 87	ND	U	0.49	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 97	ND	U	0.49	0.18	1	05/26/15	05/31/15	KWG1504658	*
PCB 99	ND	U	0.49	0.14	1	05/26/15	05/31/15	KWG1504658	
PCB 101	ND	U	0.49	0.39	1	05/26/15	05/31/15	KWG1504658	*
PCB 110	ND	U	0.49	0.34	1	05/26/15	05/31/15	KWG1504658	
PCB 132	ND	U	0.49	0.20	1	05/26/15	05/31/15	KWG1504658	
PCB 138	ND	U	0.49	0.091	1	05/26/15	05/31/15	KWG1504658	
PCB 141	ND	U	0.49	0.49	1	05/26/15	05/31/15	KWG1504658	
PCB 151	ND	U	0.49	0.089	1	05/26/15	05/31/15	KWG1504658	
PCB 156	ND	U	0.98	0.56	1	05/26/15	05/31/15	KWG1504658	
PCB 177	ND	U	0.49	0.38	1	05/26/15	05/31/15	KWG1504658	
PCB 180	ND	U	0.49	0.34	1	05/26/15	05/31/15	KWG1504658	
PCB 183	ND	U	0.49	0.15	1	05/26/15	05/31/15	KWG1504658	
PCB 187	ND	U	0.49	0.083	1	05/26/15	05/31/15	KWG1504658	
PCB 194	ND	U	0.49	0.070	1	05/26/15	05/31/15	KWG1504658	
PCB 195	ND	U	0.49	0.33	1	05/26/15	05/31/15	KWG1504658	
PCB 201	ND	U	0.49	0.14	1	05/26/15	05/31/15	KWG1504658	
PCB 203	ND	U	0.49	0.29	1	05/26/15	05/31/15	KWG1504658	
PCB 31	ND	U	0.49	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 49	ND	U	0.49	0.11	1	05/26/15	05/31/15	KWG1504658	*
PCB 60	ND	U	0.49	0.097	1	05/26/15	05/31/15	KWG1504658	
PCB 95	ND	U	0.49	0.15	1	05/26/15	05/31/15	KWG1504658	*
PCB 105	ND	U	0.49	0.10	1	05/26/15	05/31/15	KWG1504658	

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Analytical Results

Client:	Eurofins Calscience Environmental Labora	**Service Request:**	K1505215
Project:	15-04-2231	**Date Collected:**	02/17/2015
Sample Matrix:	Animal tissue	**Date Received:**	05/14/2015

Congener Specific PCBs

Sample Name:	Macoma-TO-Composite	**Units:**	ug/Kg
Lab Code:	K1505215-018	**Basis:**	Wet
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 118	ND	U	0.49	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 128	ND	U	0.49	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 149	ND	U	0.49	0.12	1	05/26/15	05/31/15	KWG1504658	*
PCB 153	ND	U	0.49	0.13	1	05/26/15	05/31/15	KWG1504658	
PCB 158	ND	U	0.49	0.096	1	05/26/15	05/31/15	KWG1504658	
PCB 170	ND	U	0.49	0.38	1	05/26/15	05/31/15	KWG1504658	
PCB 174	ND	U	0.49	0.13	1	05/26/15	05/31/15	KWG1504658	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	81	27-122	05/31/15	Acceptable

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Analytical Results

Client: Eurofins Calscience Environmental Labora
Project: 15-04-2231
Sample Matrix: Animal tissue

Service Request: K1505215
Date Collected: 03/17/2015
Date Received: 05/14/2015

Congener Specific PCBs

Sample Name: Control-Macoma-Day 28 Composite
Lab Code: K1505215-024

Units: ug/Kg
Basis: Wet

Extraction Method: EPA 3541
Analysis Method: 8082A

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 8	ND	U	0.50	0.10	1	05/26/15	05/31/15	KWG1504658	
PCB 18	ND	U	0.50	0.098	1	05/26/15	05/31/15	KWG1504658	
PCB 28	ND	U	0.50	0.13	1	05/26/15	05/31/15	KWG1504658	
PCB 33	ND	U	0.50	0.50	1	05/26/15	05/31/15	KWG1504658	*
PCB 44	ND	U	0.50	0.35	1	05/26/15	05/31/15	KWG1504658	
PCB 52	ND	U	0.50	0.39	1	05/26/15	05/31/15	KWG1504658	
PCB 56	ND	U	0.50	0.36	1	05/26/15	05/31/15	KWG1504658	
PCB 66	ND	U	0.99	0.59	1	05/26/15	05/31/15	KWG1504658	
PCB 70	ND	U	0.50	0.28	1	05/26/15	05/31/15	KWG1504658	
PCB 74	ND	U	0.50	0.29	1	05/26/15	05/31/15	KWG1504658	
PCB 87	ND	U	0.50	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 97	ND	U	0.50	0.18	1	05/26/15	05/31/15	KWG1504658	*
PCB 99	ND	U	0.50	0.14	1	05/26/15	05/31/15	KWG1504658	
PCB 101	ND	U	0.50	0.39	1	05/26/15	05/31/15	KWG1504658	*
PCB 110	ND	U	0.50	0.34	1	05/26/15	05/31/15	KWG1504658	
PCB 132	ND	U	0.50	0.20	1	05/26/15	05/31/15	KWG1504658	
PCB 138	ND	U	0.50	0.091	1	05/26/15	05/31/15	KWG1504658	
PCB 141	ND	U	0.50	0.50	1	05/26/15	05/31/15	KWG1504658	
PCB 151	ND	U	0.50	0.089	1	05/26/15	05/31/15	KWG1504658	
PCB 156	ND	U	0.99	0.56	1	05/26/15	05/31/15	KWG1504658	
PCB 177	ND	U	0.50	0.38	1	05/26/15	05/31/15	KWG1504658	
PCB 180	ND	U	0.50	0.34	1	05/26/15	05/31/15	KWG1504658	
PCB 183	ND	U	0.50	0.15	1	05/26/15	05/31/15	KWG1504658	
PCB 187	ND	U	0.50	0.083	1	05/26/15	05/31/15	KWG1504658	
PCB 194	ND	U	0.50	0.070	1	05/26/15	05/31/15	KWG1504658	
PCB 195	ND	U	0.50	0.33	1	05/26/15	05/31/15	KWG1504658	
PCB 201	ND	U	0.50	0.14	1	05/26/15	05/31/15	KWG1504658	
PCB 203	ND	U	0.50	0.29	1	05/26/15	05/31/15	KWG1504658	
PCB 31	ND	Ui	0.50	0.46	1	05/26/15	05/31/15	KWG1504658	
PCB 49	ND	U	0.50	0.11	1	05/26/15	05/31/15	KWG1504658	*
PCB 60	ND	U	0.50	0.097	1	05/26/15	05/31/15	KWG1504658	
PCB 95	ND	U	0.50	0.15	1	05/26/15	05/31/15	KWG1504658	*
PCB 105	ND	U	0.50	0.10	1	05/26/15	05/31/15	KWG1504658	

Comments:

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Analytical Results

Client:	Eurofins Calscience Environmental Labora	**Service Request:**	K1505215
Project:	15-04-2231	**Date Collected:**	03/17/2015
Sample Matrix:	Animal tissue	**Date Received:**	05/14/2015

Congener Specific PCBs

Sample Name:	Control-Macoma-Day 28 Composite	**Units:**	ug/Kg
Lab Code:	K1505215-024	**Basis:**	Wet
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 118	ND	U	0.50	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 128	ND	U	0.50	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 149	ND	U	0.50	0.12	1	05/26/15	05/31/15	KWG1504658	*
PCB 153	ND	U	0.50	0.13	1	05/26/15	05/31/15	KWG1504658	
PCB 158	ND	U	0.50	0.096	1	05/26/15	05/31/15	KWG1504658	
PCB 170	ND	U	0.50	0.38	1	05/26/15	05/31/15	KWG1504658	
PCB 174	ND	U	0.50	0.13	1	05/26/15	05/31/15	KWG1504658	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	76	27-122	05/31/15	Acceptable

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Comments:

Analytical Results

Client: Eurofins Calscience Environmental Labora
Project: 15-04-2231
Sample Matrix: Animal tissue

Service Request: K1505215
Date Collected: 03/19/2015
Date Received: 05/14/2015

Congener Specific PCBs

Sample Name: PRC-DU1-Nereis-Day 28 Composite
Lab Code: K1505215-030

Units: ug/Kg
Basis: Wet

Extraction Method: EPA 3541
Analysis Method: 8082A

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 8	ND	U	0.52	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 18	ND	U	0.52	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 28	ND	U	0.52	0.14	1	05/26/15	05/31/15	KWG1504658	
PCB 33	ND	Ui	0.55	0.55	1	05/26/15	05/31/15	KWG1504658	*
PCB 44	ND	U	0.52	0.37	1	05/26/15	05/31/15	KWG1504658	
PCB 52	ND	U	0.52	0.41	1	05/26/15	05/31/15	KWG1504658	
PCB 56	ND	U	0.52	0.38	1	05/26/15	05/31/15	KWG1504658	
PCB 66	ND	U	1.1	0.62	1	05/26/15	05/31/15	KWG1504658	
PCB 70	ND	U	0.52	0.29	1	05/26/15	05/31/15	KWG1504658	
PCB 74	ND	U	0.52	0.31	1	05/26/15	05/31/15	KWG1504658	
PCB 87	ND	U	0.52	0.17	1	05/26/15	05/31/15	KWG1504658	
PCB 97	ND	U	0.52	0.19	1	05/26/15	05/31/15	KWG1504658	*
PCB 99	ND	U	0.52	0.15	1	05/26/15	05/31/15	KWG1504658	
PCB 101	ND	U	0.52	0.41	1	05/26/15	05/31/15	KWG1504658	*
PCB 110	ND	U	0.52	0.36	1	05/26/15	05/31/15	KWG1504658	
PCB 132	ND	U	0.52	0.21	1	05/26/15	05/31/15	KWG1504658	
PCB 138	**0.29**	J	0.52	0.095	1	05/26/15	05/31/15	KWG1504658	
PCB 141	ND	U	0.52	0.52	1	05/26/15	05/31/15	KWG1504658	
PCB 151	ND	U	0.52	0.093	1	05/26/15	05/31/15	KWG1504658	
PCB 156	ND	U	1.1	0.58	1	05/26/15	05/31/15	KWG1504658	
PCB 177	ND	U	0.52	0.40	1	05/26/15	05/31/15	KWG1504658	
PCB 180	ND	U	0.52	0.36	1	05/26/15	05/31/15	KWG1504658	
PCB 183	ND	U	0.52	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 187	**0.14**	JP	0.52	0.086	1	05/26/15	05/31/15	KWG1504658	
PCB 194	ND	Ui	0.52	0.12	1	05/26/15	05/31/15	KWG1504658	
PCB 195	ND	U	0.52	0.35	1	05/26/15	05/31/15	KWG1504658	
PCB 201	ND	U	0.52	0.15	1	05/26/15	05/31/15	KWG1504658	
PCB 203	ND	U	0.52	0.31	1	05/26/15	05/31/15	KWG1504658	
PCB 31	ND	Ui	0.52	0.36	1	05/26/15	05/31/15	KWG1504658	
PCB 49	ND	U	0.52	0.12	1	05/26/15	05/31/15	KWG1504658	*
PCB 60	ND	U	0.52	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 95	ND	U	0.52	0.16	1	05/26/15	05/31/15	KWG1504658	*
PCB 105	ND	U	0.52	0.11	1	05/26/15	05/31/15	KWG1504658	

Comments:

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Analytical Results

Client:	Eurofins Calscience Environmental Labora	**Service Request:**	K1505215
Project:	15-04-2231	**Date Collected:**	03/19/2015
Sample Matrix:	Animal tissue	**Date Received:**	05/14/2015

Congener Specific PCBs

Sample Name:	PRC-DU1-Nereis-Day 28 Composite	**Units:**	ug/Kg
Lab Code:	K1505215-030	**Basis:**	Wet
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 118	ND	U	0.52	0.12	1	05/26/15	05/31/15	KWG1504658	
PCB 128	ND	U	0.52	0.17	1	05/26/15	05/31/15	KWG1504658	
PCB 149	ND	U	0.52	0.13	1	05/26/15	05/31/15	KWG1504658	*
PCB 153	**0.58**		0.52	0.14	1	05/26/15	05/31/15	KWG1504658	
PCB 158	ND	U	0.52	0.10	1	05/26/15	05/31/15	KWG1504658	
PCB 170	ND	U	0.52	0.40	1	05/26/15	05/31/15	KWG1504658	
PCB 174	ND	U	0.52	0.14	1	05/26/15	05/31/15	KWG1504658	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	83	27-122	05/31/15	Acceptable

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Comments:

Analytical Results

Client: Eurofins Calscience Environmental Labora
Project: 15-04-2231
Sample Matrix: Animal tissue

Service Request: K1505215
Date Collected: 03/17/2015
Date Received: 05/14/2015

Congener Specific PCBs

Sample Name: PRC-DU1-Macoma-Day 28 Composite
Lab Code: K1505215-036

Units: ug/Kg
Basis: Wet

Extraction Method: EPA 3541
Analysis Method: 8082A

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 8	ND	U	0.49	0.10	1	05/26/15	05/31/15	KWG1504658	
PCB 18	ND	U	0.49	0.098	1	05/26/15	05/31/15	KWG1504658	
PCB 28	ND	U	0.49	0.13	1	05/26/15	05/31/15	KWG1504658	
PCB 33	ND	U	0.49	0.49	1	05/26/15	05/31/15	KWG1504658	*
PCB 44	ND	U	0.49	0.35	1	05/26/15	05/31/15	KWG1504658	
PCB 52	ND	U	0.49	0.39	1	05/26/15	05/31/15	KWG1504658	
PCB 56	ND	U	0.49	0.36	1	05/26/15	05/31/15	KWG1504658	
PCB 66	ND	U	0.98	0.59	1	05/26/15	05/31/15	KWG1504658	
PCB 70	ND	U	0.49	0.28	1	05/26/15	05/31/15	KWG1504658	
PCB 74	**0.30**	J	0.49	0.29	1	05/26/15	05/31/15	KWG1504658	
PCB 87	ND	U	0.49	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 97	ND	U	0.49	0.18	1	05/26/15	05/31/15	KWG1504658	*
PCB 99	ND	U	0.49	0.14	1	05/26/15	05/31/15	KWG1504658	
PCB 101	**0.43**	J	0.49	0.39	1	05/26/15	05/31/15	KWG1504658	*
PCB 110	ND	U	0.49	0.34	1	05/26/15	05/31/15	KWG1504658	
PCB 132	ND	U	0.49	0.20	1	05/26/15	05/31/15	KWG1504658	
PCB 138	**0.15**	JP	0.49	0.091	1	05/26/15	05/31/15	KWG1504658	
PCB 141	ND	U	0.49	0.49	1	05/26/15	05/31/15	KWG1504658	
PCB 151	ND	U	0.49	0.089	1	05/26/15	05/31/15	KWG1504658	
PCB 156	ND	U	0.98	0.56	1	05/26/15	05/31/15	KWG1504658	
PCB 177	ND	U	0.49	0.38	1	05/26/15	05/31/15	KWG1504658	
PCB 180	ND	U	0.49	0.34	1	05/26/15	05/31/15	KWG1504658	
PCB 183	ND	U	0.49	0.15	1	05/26/15	05/31/15	KWG1504658	
PCB 187	ND	U	0.49	0.083	1	05/26/15	05/31/15	KWG1504658	
PCB 194	ND	U	0.49	0.070	1	05/26/15	05/31/15	KWG1504658	
PCB 195	ND	U	0.49	0.33	1	05/26/15	05/31/15	KWG1504658	
PCB 201	ND	U	0.49	0.14	1	05/26/15	05/31/15	KWG1504658	
PCB 203	ND	U	0.49	0.29	1	05/26/15	05/31/15	KWG1504658	
PCB 31	ND	Ui	0.57	0.57	1	05/26/15	05/31/15	KWG1504658	
PCB 49	ND	U	0.49	0.11	1	05/26/15	05/31/15	KWG1504658	*
PCB 60	ND	U	0.49	0.097	1	05/26/15	05/31/15	KWG1504658	
PCB 95	ND	U	0.49	0.15	1	05/26/15	05/31/15	KWG1504658	*
PCB 105	ND	U	0.49	0.10	1	05/26/15	05/31/15	KWG1504658	

Comments:

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Analytical Results

Client:	Eurofins Calscience Environmental Labora	**Service Request:**	K1505215
Project:	15-04-2231	**Date Collected:**	03/17/2015
Sample Matrix:	Animal tissue	**Date Received:**	05/14/2015

Congener Specific PCBs

Sample Name:	PRC-DU1-Macoma-Day 28 Composite	**Units:**	ug/Kg
Lab Code:	K1505215-036	**Basis:**	Wet
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 118	ND	U	0.49	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 128	ND	U	0.49	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 149	ND	U	0.49	0.12	1	05/26/15	05/31/15	KWG1504658	*
PCB 153	**0.18**	JP	0.49	0.13	1	05/26/15	05/31/15	KWG1504658	
PCB 158	ND	U	0.49	0.096	1	05/26/15	05/31/15	KWG1504658	
PCB 170	ND	U	0.49	0.38	1	05/26/15	05/31/15	KWG1504658	
PCB 174	ND	U	0.49	0.13	1	05/26/15	05/31/15	KWG1504658	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	75	27-122	05/31/15	Acceptable

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Comments:

Analytical Results

Client: Eurofins Calscience Environmental Labora
Project: 15-04-2231
Sample Matrix: Animal tissue

Service Request: K1505215
Date Collected: NA
Date Received: NA

Congener Specific PCBs

Sample Name: Method Blank
Lab Code: KWG1504658-5

Units: ug/Kg
Basis: Wet

Extraction Method: EPA 3541
Analysis Method: 8082A

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 8	ND	U	0.49	0.10	1	05/26/15	05/31/15	KWG1504658	
PCB 18	ND	U	0.49	0.098	1	05/26/15	05/31/15	KWG1504658	
PCB 28	ND	U	0.49	0.13	1	05/26/15	05/31/15	KWG1504658	
PCB 33	ND	U	0.49	0.49	1	05/26/15	05/31/15	KWG1504658	*
PCB 44	ND	U	0.49	0.35	1	05/26/15	05/31/15	KWG1504658	
PCB 52	ND	U	0.49	0.39	1	05/26/15	05/31/15	KWG1504658	
PCB 56	ND	U	0.49	0.36	1	05/26/15	05/31/15	KWG1504658	
PCB 66	ND	U	0.98	0.59	1	05/26/15	05/31/15	KWG1504658	
PCB 70	ND	U	0.49	0.28	1	05/26/15	05/31/15	KWG1504658	
PCB 74	ND	U	0.49	0.29	1	05/26/15	05/31/15	KWG1504658	
PCB 87	ND	U	0.49	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 97	ND	U	0.49	0.18	1	05/26/15	05/31/15	KWG1504658	*
PCB 99	ND	U	0.49	0.14	1	05/26/15	05/31/15	KWG1504658	
PCB 101	ND	U	0.49	0.39	1	05/26/15	05/31/15	KWG1504658	*
PCB 110	ND	U	0.49	0.34	1	05/26/15	05/31/15	KWG1504658	
PCB 132	ND	U	0.49	0.20	1	05/26/15	05/31/15	KWG1504658	
PCB 138	ND	U	0.49	0.091	1	05/26/15	05/31/15	KWG1504658	
PCB 141	ND	U	0.49	0.49	1	05/26/15	05/31/15	KWG1504658	
PCB 151	ND	U	0.49	0.089	1	05/26/15	05/31/15	KWG1504658	
PCB 156	ND	U	0.98	0.56	1	05/26/15	05/31/15	KWG1504658	
PCB 177	ND	U	0.49	0.38	1	05/26/15	05/31/15	KWG1504658	
PCB 180	ND	U	0.49	0.34	1	05/26/15	05/31/15	KWG1504658	
PCB 183	ND	U	0.49	0.15	1	05/26/15	05/31/15	KWG1504658	
PCB 187	ND	U	0.49	0.083	1	05/26/15	05/31/15	KWG1504658	
PCB 194	ND	U	0.49	0.070	1	05/26/15	05/31/15	KWG1504658	
PCB 195	ND	U	0.49	0.33	1	05/26/15	05/31/15	KWG1504658	
PCB 201	ND	U	0.49	0.14	1	05/26/15	05/31/15	KWG1504658	
PCB 203	ND	U	0.49	0.29	1	05/26/15	05/31/15	KWG1504658	
PCB 31	ND	U	0.49	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 49	ND	U	0.49	0.11	1	05/26/15	05/31/15	KWG1504658	*
PCB 60	ND	U	0.49	0.097	1	05/26/15	05/31/15	KWG1504658	
PCB 95	ND	U	0.49	0.15	1	05/26/15	05/31/15	KWG1504658	*
PCB 105	ND	U	0.49	0.10	1	05/26/15	05/31/15	KWG1504658	

Comments:

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Analytical Results

Client:	Eurofins Calscience Environmental Labora	**Service Request:**	K1505215
Project:	15-04-2231	**Date Collected:**	NA
Sample Matrix:	Animal tissue	**Date Received:**	NA

Congener Specific PCBs

Sample Name:	Method Blank	**Units:**	ug/Kg
Lab Code:	KWG1504658-5	**Basis:**	Wet
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8082A		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
PCB 118	ND	U	0.49	0.11	1	05/26/15	05/31/15	KWG1504658	
PCB 128	ND	U	0.49	0.16	1	05/26/15	05/31/15	KWG1504658	
PCB 149	ND	U	0.49	0.12	1	05/26/15	05/31/15	KWG1504658	*
PCB 153	ND	U	0.49	0.13	1	05/26/15	05/31/15	KWG1504658	
PCB 158	ND	U	0.49	0.096	1	05/26/15	05/31/15	KWG1504658	
PCB 170	ND	U	0.49	0.38	1	05/26/15	05/31/15	KWG1504658	
PCB 174	ND	U	0.49	0.13	1	05/26/15	05/31/15	KWG1504658	*

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	75	27-122	05/31/15	Acceptable

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Comments:

QA/QC Report

Client: Eurofins Calscience Environmental Labora
Service Request: K1505215
Project: 15-04-2231
Sample Matrix: Animal tissue

Surrogate Recovery Summary
Congener Specific PCBs

Extraction Method: EPA 3541
Units: Percent
Analysis Method: 8082A
Level: Low

Sample Name	Lab Code	Sur1
Nereis-TO-Composite	K1505215-006	78
Control Nereis-Day 28-Composite	K1505215-012	80
Macoma-TO-Composite	K1505215-018	81
Control-Macoma-Day 28 Composite	K1505215-024	76
PRC-DU1-Nereis-Day 28 Composite	K1505215-030	83
PRC-DU1-Macoma-Day 28 Composit	K1505215-036	75
Method Blank	KWG1504658-5	75
Lab Control Sample	KWG1504658-1	81
Duplicate Lab Control Sample	KWG1504658-2	87

Surrogate Recovery Control Limits (%)

Sur1 = Tetrachloro-m-xylene 27-122

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

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QA/QC Report

Client: Eurofins Calscience Environmental Labora
Project: 15-04-2231
Sample Matrix: Animal tissue

Service Request: K1505215
Date Extracted: 05/26/2015
Date Analyzed: 05/31/2015

Lab Control Spike/Duplicate Lab Control Spike Summary
Congener Specific PCBs

Extraction Method: EPA 3541
Analysis Method: 8082A

Units: ug/Kg
Basis: Wet
Level: Low
Extraction Lot: KWG1504658

	Lab Control Sample KWG1504658-1 Lab Control Spike				Duplicate Lab Control Sample KWG1504658-2 Duplicate Lab Control Spike						
Analyte Name	**Result**	**Spike Amount**	**%Rec**		**Result**	**Spike Amount**	**%Rec**		**%Rec Limits**	**RPD**	**RPD Limit**
PCB 8	1.82	2.50	73		1.88	2.50	75		24-139	3	40
PCB 18	1.66	2.50	66		1.69	2.50	67		17-127	1	40
PCB 28	1.97	2.50	79		2.09	2.50	84		20-147	6	40
PCB 33	1.72	2.50	69	*	1.72	2.50	69	*	70-130	0	40
PCB 44	1.65	2.50	66		1.69	2.50	67		21-133	2	40
PCB 52	1.75	2.50	70		1.69	2.50	68		20-125	3	40
PCB 56	1.99	2.50	79		1.98	2.50	79		70-130	0	40
PCB 66	1.93	2.50	77		1.96	2.50	79		25-128	2	40
PCB 70	1.89	2.50	75		1.94	2.50	78		70-130	3	40
PCB 74	1.90	2.50	76		1.97	2.50	79		70-130	3	40
PCB 87	1.78	2.50	71		1.83	2.50	73		19-127	3	40
PCB 97	1.72	2.50	69	*	1.89	2.50	76		70-130	9	40
PCB 99	1.82	2.50	73		1.79	2.50	72		70-130	1	40
PCB 101	1.68	2.50	67	*	1.73	2.50	69	*	70-130	3	40
PCB 110	1.77	2.50	71		1.85	2.50	74		70-130	4	40
PCB 132	1.76	2.50	70		1.78	2.50	71		70-130	1	40
PCB 138	2.07	2.50	83		2.09	2.50	84		22-116	1	40
PCB 141	1.92	2.50	77		1.95	2.50	78		70-130	1	40
PCB 151	1.75	2.50	70		1.75	2.50	70		70-130	0	40
PCB 156	2.26	2.50	90		2.34	2.50	94		35-114	4	40
PCB 177	1.94	2.50	77		1.97	2.50	79		70-130	2	40
PCB 180	2.04	2.50	82		2.09	2.50	84		24-120	3	40
PCB 183	1.97	2.50	79		1.97	2.50	79		11-130	0	40
PCB 187	1.88	2.50	75		1.94	2.50	77		30-128	3	40
PCB 194	2.16	2.50	86		2.13	2.50	85		70-130	1	40
PCB 195	2.14	2.50	85		2.16	2.50	87		23-112	1	40
PCB 201	1.90	2.50	76		1.99	2.50	79		70-130	4	40
PCB 203	2.04	2.50	81		2.15	2.50	86		70-130	5	40
PCB 31	2.13	2.50	85		2.18	2.50	87		70-130	3	40
PCB 49	1.27	2.50	51	*	1.61	2.50	64	*	70-130	23	40
PCB 60	1.68	2.50	67		1.98	2.50	79		10-166	16	40
PCB 95	1.21	2.50	49	*	1.49	2.50	60	*	70-130	21	40
PCB 105	1.76	2.50	70		2.08	2.50	83		30-107	17	40
PCB 118	1.63	2.50	65		2.03	2.50	81		30-110	22	40
PCB 128	1.86	2.50	74		2.23	2.50	89		20-105	18	40

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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QA/QC Report

Client:	Eurofins Calscience Environmental Labora	**Service Request:**	K1505215
Project:	15-04-2231	**Date Extracted:**	05/26/2015
Sample Matrix:	Animal tissue	**Date Analyzed:**	05/31/2015

Lab Control Spike/Duplicate Lab Control Spike Summary
Congener Specific PCBs

Extraction Method:	EPA 3541	**Units:**	ug/Kg
Analysis Method:	8082A	**Basis:**	Wet
		Level:	Low
		Extraction Lot:	KWG1504658

	Lab Control Sample KWG1504658-1 Lab Control Spike				Duplicate Lab Control Sample KWG1504658-2 Duplicate Lab Control Spike					
Analyte Name	**Result**	**Spike Amount**	**%Rec**		**Result**	**Spike Amount**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
PCB 149	1.46	2.50	58	*	1.81	2.50	72	70-130	22	40
PCB 153	1.58	2.50	63		2.00	2.50	80	19-123	24	40
PCB 158	1.84	2.50	74		2.21	2.50	88	19-110	18	40
PCB 170	1.91	2.50	76		2.24	2.50	89	19-101	16	40
PCB 174	1.51	2.50	60	*	1.76	2.50	70	70-130	16	40

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Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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Analysis Report

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

June 04, 2015

Project: 15-04-2231

Submittal Date: 05/01/2015
Group Number: 1558138
PO Number: 15-04-2231
State of Sample Origin: NA

Client Sample Description	Lancaster Labs (LL) #
Nereis-T0-A Tissue	7872023
Nereis-T0-B Tissue	7872024
Nereis-T0-C Tissue	7872025
Nereis-T0-D Tissue	7872026
Nereis-T0-E Tissue	7872027
Nereis-T0-(A-E) Composite Tissue	7872028
Control-A-Nereis-Day 28 Tissue	7872029
Control-B-Nereis-Day 28 Tissue	7872030
Control-C-Nereis-Day 28 Tissue	7872031
Control-D-Nereis-Day 28 Tissue	7872032
Control-E-Nereis-Day 28 Tissue	7872033
Control-(A-E)-Nereis-Day 28 Composite Tissue	7872034
Macoma-T0-A Tissue	7872035
Macoma-T0-B Tissue	7872036
Macoma-T0-C Tissue	7872037
Macoma-T0-D Tissue	7872038
Macoma-T0-E Tissue	7872039
Macoma-T0-(A-E) Composite Tissue	7872040
Control-A-Macoma-Day 28 Tissue	7872041
Control-B-Macoma-Day 28 Tissue	7872042
Control-C-Macoma-Day 28 Tissue	7872043
Control-D-Macoma-Day 28 Tissue	7872044
Control-E-Macoma-Day 28 Tissue	7872045
Control-(A-E)-Macoma-Day 28 Composite Tissue	7872046
PRC-DU1-A-Nereis-Day 28 Tissue	7872047
PRC-DU1-B-Nereis-Day 28 Tissue	7872048
PRC-DU1-C-Nereis-Day 28 Tissue	7872049
PRC-DU1-D-Nereis-Day 28 Tissue	7872050
PRC-DU1-E-Nereis-Day 28 Tissue	7872051
PRC-DU1-(A-E)-Nereis-Day 28 Composite Tissue	7872052
PRC-DU2-A-Nereis-Day 28 Tissue	7872053
PRC-DU2-B-Nereis-Day 28 Tissue	7872054

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Analysis Report

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PRC-DU2-C-Nereis-Day 28 Tissue	7872055
PRC-DU2-D-Nereis-Day 28 Tissue	7872056
PRC-DU2-E-Nereis-Day 28 Tissue	7872057
PRC-DU2-(A-E)-Nereis-Day 28 Composite Tissue	7872058
PRC-DU1-A-Macoma-Day 28 Tissue	7872059
PRC-DU1-B-Macoma-Day 28 Tissue	7872060
PRC-DU1-C-Macoma-Day 28 Tissue	7872061
PRC-DU1-D-Macoma-Day 28 Tissue	7872062
PRC-DU1-E-Macoma-Day 28 Tissue	7872063
PRC-DU1-(A-E)-Macoma-Day 28 Composite Tissue	7872064
PRC-DU2-A-Macoma-Day 28 Tissue	7872065
PRC-DU2-B-Macoma-Day 28 Tissue	7872066
PRC-DU2-C-Macoma-Day 28 Tissue	7872067
PRC-DU2-D-Macoma-Day 28 Tissue	7872068
PRC-DU2-E-Macoma-Day 28 Tissue	7872069
PRC-DU2-(A-E)-Macoma-Day 28 Composite Tissue	7872070

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ .

ELECTRONIC COPY TO	Eurofins Calscience, Inc.	Attn: Nicole Scott
ELECTRONIC COPY TO	Eurofins Calscience, Inc.	Attn: Danielle Gonsman

Respectfully Submitted,

Nicole L. Maljovec
Manager

(717) 556-7259

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Case Narrative

Project Name: 15-04-2231
LL Group #: 1558138

General Comments:

See the Laboratory Sample Analysis Record section of the Analysis Report for the method references.

All QC met criteria unless otherwise noted in an Analysis Specific Comment below. Refer to the QC Summary for specific values and acceptance criteria.

Project specific QC samples are not included in this data set

Matrix QC may not be reported if site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

Surrogate recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in an Analysis Specific Comment below.

The samples were received at the appropriate temperature and in accordance with the chain of custody unless otherwise noted.

Analysis Specific Comments:

SW-846 8270C SIM, GC/MS Semivolatiles

Sample #s: 7872028, 7872034, 7872040, 7872046, 7872052, 7872058, 7872064, 7872070

Reporting limits were raised due to interference from the sample matrix. The samples were recieved outside the EPA Method recommended solid sample holding times for EPA 8270C SIM PAHs. However, the tissue samples were frozen immediately after collection and remained in that condition until sample preparation. SWAMP and PSEP guidelines for holding times in tissue samples state holding times may be extended up to one year if stored frozen at -18oC after collection. In addition, there are no EPA recommended holding times established for tissue samples. Therefore, the sample results have not been flagged as exceeding the EPA Method recommended holding times.
The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance:
Benzo(b)fluoranthene

Batch #: 15140SLH026 (Sample number(s): 7872028, 7872034, 7872040, 7872046, 7872052, 7872058, 7872064, 7872070)

The recovery(ies) for the following analyte(s) in the LCS and/or LCSD were below the acceptance window: Benzo(b)fluoranthene

EPA 1613B October 1994, Percent Lipids

Batch #: 151421348AASE2 (Sample number(s): 7872028, 7872034, 7872040, 7872046, 7872052, 7872058, 7872064, 7872070)

The duplicate RPD for the following analyte(s) exceeded the acceptance window: Percent Lipids

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Analysis Report

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Sample Description: Nereis-T0-A Tissue
Port of Redwood City

LL Sample # G5 7872023
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/19/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

NERTA

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

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Sample Description: Nereis-T0-B Tissue
Port of Redwood City

LL Sample # G5 7872024
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/19/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

NERTB

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

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Sample Description: Nereis-T0-C Tissue
Port of Redwood City

LL Sample # G5 7872025
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/19/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

NERTC

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

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Sample Description: Nereis-T0-D Tissue
Port of Redwood City

LL Sample # G5 7872026
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/19/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

NERTD

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

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Sample Description: Nereis-T0-E Tissue
Port of Redwood City

LL Sample # G5 7872027
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/19/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
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Garden Grove CA 92841-1427

NERTE

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: Nereis-T0-(A-E) Composite Tissue
Port of Redwood City

LL Sample # G5 7872028
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/19/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

NERTT

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	Acenaphthene	83-32-9	N.D.	2.6	6.5	1
10725	Acenaphthylene	208-96-8	N.D.	1.3	6.5	1
10725	Anthracene	120-12-7	N.D.	1.3	6.5	1
10725	Benzo(a)anthracene	56-55-3	N.D.	2.6	6.5	1
10725	Benzo(a)pyrene	50-32-8	N.D.	2.6	6.5	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	2.6	6.5	1
10725	Benzo(e)pyrene	192-97-2	N.D.	13	66	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	2.6	6.5	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	2.6	6.5	1
10725	Biphenyl	92-52-4	N.D.	2.6	6.5	1
10725	Chrysene	218-01-9	N.D.	1.3	6.5	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	2.6	6.5	1
10725	Dibenzothiophene	132-65-0	N.D.	2.6	6.5	1
10725	2,6-Dimethylnaphthalene	581-42-0	N.D.	2.6	6.5	1
10725	Fluoranthene	206-44-0	N.D.	2.6	6.5	1
10725	Fluorene	86-73-7	N.D.	2.6	6.5	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	2.6	6.5	1
10725	1-Methylnaphthalene	90-12-0	N.D.	2.6	6.5	1
10725	2-Methylnaphthalene	91-57-6	N.D.	2.6	6.5	1
10725	1-Methylphenanthrene	832-69-9	N.D.	2.6	6.5	1
10725	Naphthalene	91-20-3	N.D.	2.6	6.5	1
10725	Perylene	198-55-0	N.D.	2.6	6.5	1
10725	Phenanthrene	85-01-8	N.D.	2.6	6.5	1
10725	Pyrene	129-00-0	N.D.	2.6	6.5	1
10725	2,3,5-Trimethylnaphthalene	2245-38-7	N.D.	2.6	6.5	1

Reporting limits were raised due to interference from the sample matrix.

The samples were recieved outside the EPA Method recommended solid sample holding times for EPA 8270C SIM PAHs. However, the tissue samples were frozen immediately after collection and remained in that condition until sample preparation. SWAMP and PSEP guidelines for holding times in tissue samples state holding times may be extended up to one year if stored frozen at -18oC after collection. In addition, there are no EPA recommended holding times established for tissue samples. Therefore, the sample results have not been flagged as exceeding the EPA Method recommended holding times.

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance:
Benzo(b)fluoranthene

Percent Lipids	**EPA 1613B October 1994**		**% by wt.**	**% by wt.**	**% by wt.**	
04193	Percent Lipids	66455-18-3	0.40	0.10	0.10	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: Nereis-T0-(A-E) Composite Tissue
Port of Redwood City

LL Sample # G5 7872028
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/19/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

NERTT

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor
Dioxins/Furans	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	2378-TCDD	1746-01-6	N.D.	0.0408	0.984	1
12937	12378-PeCDD	40321-76-4	0.171 JQ	0.0910	4.92	1
12937	123478-HxCDD	39227-28-6	0.0817 JBQ	0.0397	4.92	1
12937	123678-HxCDD	57653-85-7	0.327 JBQ	0.0412	4.92	1
12937	123789-HxCDD	19408-74-3	0.144 JB	0.0407	4.92	1
12937	1234678-HpCDD	35822-46-9	7.42 B	0.0413	4.92	1
12937	OCDD	3268-87-9	54.6 B	0.0350	9.84	1
12937	2378-TCDF	51207-31-9	0.890 JB	0.0555	0.984	1
12937	12378-PeCDF	57117-41-6	0.239 JBQ	0.0232	4.92	1
12937	23478-PeCDF	57117-31-4	0.340 JB	0.0183	4.92	1
12937	123478-HxCDF	70648-26-9	0.121 JBQ	0.0298	4.92	1
12937	123678-HxCDF	57117-44-9	0.137 JB	0.0287	4.92	1
12937	123789-HxCDF	72918-21-9	0.0432 JBQ	0.0346	4.92	1
12937	234678-HxCDF	60851-34-5	0.118 JBQ	0.0298	4.92	1
12937	1234678-HpCDF	67562-39-4	1.17 JBQ	0.0195	4.92	1
12937	1234789-HpCDF	55673-89-7	0.0873 JBQ	0.0284	4.92	1
12937	OCDF	39001-02-0	1.15 JBQ	0.0225	9.84	1
D/F Toxic Equivalents	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	TEQ WHO 2005 - EDLx0.0+EMPC	n.a.	0.569			1
12937	TEQ WHO 2005 - EDLx1.0+EMPC	n.a.	0.610			1

Labeled Compounds	%Rec	Windows
13C12-2378-TCDD	82	40 - 135
13C12-12378-PeCDD	114	40 - 135
13C12-123478-HxCDD	90	40 - 135
13C12-123678-HxCDD	90	40 - 135
13C12-123789-HxCDD	87	40 - 135
13C12-1234678-HpCDD	83	40 - 135
13C12-OCDD	83	40 - 135
13C12-2378-TCDF	92	40 - 135
13C12-12378-PeCDF	110	40 - 135
13C12-23478-PeCDF	126	40 - 135
13C12-123478-HxCDF	101	40 - 135
13C12-123678-HxCDF	105	40 - 135
13C12-234678-HxCDF	102	40 - 135
13C12-123789-HxCDF	103	40 - 135
13C12-1234678-HpCDF	105	40 - 135
13C12-1234789-HpCDF	88	40 - 135
13C12-OCDF	85	40 - 135

Dioxins/Furans Data Qualifiers:

B *Detected in Method Blank*
U *Undetected*
J *Estimated concentration between Estimated Detection Limit and Minimum Level*

*=This limit was used in the evaluation of the final result

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Analysis Report

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Sample Description: Nereis-T0-(A-E) Composite Tissue
Port of Redwood City

LL Sample # G5 7872028
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/19/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

NERTT

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor

E	*Exceeds calibration range*
C	*Confirmed quantitation on secondary GC column*
Q	*EMPC - Estimated Maximum Possible Concentration*
F	*Interference is present*
S	*Saturation of detection signal*

*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: Nereis-T0-(A-E) Composite Tissue
Port of Redwood City

LL Sample # G5 7872028
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/19/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

NERTT

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	SIM SVOA (microwave)	SW-846 8270C SIM	1	15140SLH026	06/02/2015 03:13	Brian K Graham	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	15140SLH026	05/21/2015 08:30	Katheryne V Dinan	1
12937	Dioxins/Furans in Solids-8290	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/21/2015 00:26	Michael A Ziegler	1
11030	Dioxins/Furans in Solids - Sox	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/16/2015 12:00	Ginelle L McQuaid	1
04193	Percent Lipids	EPA 1613B October 1994	1	151421348AASE2	05/22/2015 09:00	Robert T Vincent	1

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*=This limit was used in the evaluation of the final result

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Analysis Report

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Sample Description: Control-A-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872029
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:01

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CN--A

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: Control-B-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872030
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:01

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CN--B

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: Control-C-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872031
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:01

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CN--C

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

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Sample Description: Control-D-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872032
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:01

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CN--D

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

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Sample Description: Control-E-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872033
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:01

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CN--E

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: Control-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872034
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:01

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CN--T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	Acenaphthene	83-32-9	N.D.	2.7	6.7	1
10725	Acenaphthylene	208-96-8	N.D.	1.3	6.7	1
10725	Anthracene	120-12-7	N.D.	1.3	6.7	1
10725	Benzo(a)anthracene	56-55-3	N.D.	2.7	6.7	1
10725	Benzo(a)pyrene	50-32-8	2.9 J	2.7	6.7	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	2.7	6.7	1
10725	Benzo(e)pyrene	192-97-2	N.D.	13	68	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	2.7	6.7	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	2.7	6.7	1
10725	Biphenyl	92-52-4	N.D.	2.7	6.7	1
10725	Chrysene	218-01-9	N.D.	1.3	6.7	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	2.7	6.7	1
10725	Dibenzothiophene	132-65-0	N.D.	2.7	6.7	1
10725	2,6-Dimethylnaphthalene	581-42-0	N.D.	2.7	6.7	1
10725	Fluoranthene	206-44-0	N.D.	2.7	6.7	1
10725	Fluorene	86-73-7	N.D.	2.7	6.7	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	2.7	6.7	1
10725	1-Methylnaphthalene	90-12-0	N.D.	2.7	6.7	1
10725	2-Methylnaphthalene	91-57-6	N.D.	2.7	6.7	1
10725	1-Methylphenanthrene	832-69-9	N.D.	2.7	6.7	1
10725	Naphthalene	91-20-3	N.D.	2.7	6.7	1
10725	Perylene	198-55-0	N.D.	2.7	6.7	1
10725	Phenanthrene	85-01-8	N.D.	2.7	6.7	1
10725	Pyrene	129-00-0	N.D.	2.7	6.7	1
10725	2,3,5-Trimethylnaphthalene	2245-38-7	N.D.	2.7	6.7	1

Reporting limits were raised due to interference from the sample matrix.

The samples were recieved outside the EPA Method recommended solid sample holding times for EPA 8270C SIM PAHs. However, the tissue samples were frozen immediately after collection and remained in that condition until sample preparation. SWAMP and PSEP guidelines for holding times in tissue samples state holding times may be extended up to one year if stored frozen at -18oC after collection. In addition, there are no EPA recommended holding times established for tissue samples. Therefore, the sample results have not been flagged as exceeding the EPA Method recommended holding times.

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance:
Benzo(b)fluoranthene

Percent Lipids	**EPA 1613B October 1994**		**% by wt.**	**% by wt.**	**% by wt.**	
04193	Percent Lipids	66455-18-3	0.48	0.10	0.10	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: Control-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872034
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:01

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CN--T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor
Dioxins/Furans	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	2378-TCDD	1746-01-6	0.0379 JQ	0.0297	0.984	1
12937	12378-PeCDD	40321-76-4	0.140 JQ	0.0462	4.92	1
12937	123478-HxCDD	39227-28-6	0.0808 JBQ	0.0321	4.92	1
12937	123678-HxCDD	57653-85-7	0.216 JBQ	0.0319	4.92	1
12937	123789-HxCDD	19408-74-3	0.109 JB	0.0350	4.92	1
12937	1234678-HpCDD	35822-46-9	3.53 JB	0.0326	4.92	1
12937	OCDD	3268-87-9	30.7 B	0.0328	9.84	1
12937	2378-TCDF	51207-31-9	0.913 JB	0.0346	0.984	1
12937	12378-PeCDF	57117-41-6	0.217 JB	0.0177	4.92	1
12937	23478-PeCDF	57117-31-4	0.324 JB	0.0152	4.92	1
12937	123478-HxCDF	70648-26-9	0.0774 JBQ	0.0209	4.92	1
12937	123678-HxCDF	57117-44-9	0.0680 JBQ	0.0195	4.92	1
12937	123789-HxCDF	72918-21-9	0.0539 JBQ	0.0248	4.92	1
12937	234678-HxCDF	60851-34-5	0.0630 JB	0.0204	4.92	1
12937	1234678-HpCDF	67562-39-4	0.432 JB	0.0153	4.92	1
12937	1234789-HpCDF	55673-89-7	0.0544 JB	0.0206	4.92	1
12937	OCDF	39001-02-0	0.270 JBQ	0.0194	9.84	1
D/F Toxic Equivalents	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	TEQ WHO 2005 - EDLx0.0+EMPC	n.a.	0.489			1
12937	TEQ WHO 2005 - EDLx1.0+EMPC	n.a.	0.489			1

Labeled Compounds	%Rec	Windows
13C12-2378-TCDD	94	40 - 135
13C12-12378-PeCDD	115	40 - 135
13C12-123478-HxCDD	105	40 - 135
13C12-123678-HxCDD	107	40 - 135
13C12-123789-HxCDD	100	40 - 135
13C12-1234678-HpCDD	91	40 - 135
13C12-OCDD	92	40 - 135
13C12-2378-TCDF	106	40 - 135
13C12-12378-PeCDF	114	40 - 135
13C12-23478-PeCDF	126	40 - 135
13C12-123478-HxCDF	114	40 - 135
13C12-123678-HxCDF	118	40 - 135
13C12-234678-HxCDF	112	40 - 135
13C12-123789-HxCDF	117	40 - 135
13C12-1234678-HpCDF	111	40 - 135
13C12-1234789-HpCDF	101	40 - 135
13C12-OCDF	96	40 - 135

Dioxins/Furans Data Qualifiers:

B *Detected in Method Blank*
U *Undetected*
J *Estimated concentration between Estimated Detection Limit and Minimum Level*

*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: Control-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872034
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:01

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CN--T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor

E	*Exceeds calibration range*
C	*Confirmed quantitation on secondary GC column*
Q	*EMPC - Estimated Maximum Possible Concentration*
F	*Interference is present*
S	*Saturation of detection signal*

*=This limit was used in the evaluation of the final result

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2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

Sample Description: Control-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872034
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:01

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CN--T

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	SIM SVOA (microwave)	SW-846 8270C SIM	1	15140SLH026	06/02/2015 03:43	Brian K Graham	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	15140SLH026	05/21/2015 08:30	Katheryne V Dinan	1
12937	Dioxins/Furans in Solids-8290	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/21/2015 01:23	Michael A Ziegler	1
11030	Dioxins/Furans in Solids - Sox	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/16/2015 12:00	Ginelle L McQuaid	1
04193	Percent Lipids	EPA 1613B October 1994	1	151421348AASE2	05/22/2015 09:00	Robert T Vincent	1

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*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: Macoma-T0-A Tissue
Port of Redwood City

LL Sample # G5 7872035
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

MCT-A

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: Macoma-T0-B Tissue
Port of Redwood City

LL Sample # G5 7872036
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

MCT-B

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: Macoma-T0-C Tissue
Port of Redwood City

LL Sample # G5 7872037
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

MCT-C

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: Macoma-T0-D Tissue
Port of Redwood City

LL Sample # G5 7872038
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

MCT-D

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: Macoma-T0-E Tissue
Port of Redwood City

LL Sample # G5 7872039
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

MCT-E

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: Macoma-T0-(A-E) Composite Tissue
Port of Redwood City

LL Sample # G5 7872040
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

MCT-T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	Acenaphthene	83-32-9	N.D.	2.6	6.6	1
10725	Acenaphthylene	208-96-8	N.D.	1.3	6.6	1
10725	Anthracene	120-12-7	N.D.	1.3	6.6	1
10725	Benzo(a)anthracene	56-55-3	N.D.	2.6	6.6	1
10725	Benzo(a)pyrene	50-32-8	N.D.	2.6	6.6	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	2.6	6.6	1
10725	Benzo(e)pyrene	192-97-2	N.D.	13	68	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	2.6	6.6	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	2.6	6.6	1
10725	Biphenyl	92-52-4	N.D.	2.6	6.6	1
10725	Chrysene	218-01-9	N.D.	1.3	6.6	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	2.6	6.6	1
10725	Dibenzothiophene	132-65-0	N.D.	2.6	6.6	1
10725	2,6-Dimethylnaphthalene	581-42-0	N.D.	2.6	6.6	1
10725	Fluoranthene	206-44-0	N.D.	2.6	6.6	1
10725	Fluorene	86-73-7	N.D.	2.6	6.6	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	2.6	6.6	1
10725	1-Methylnaphthalene	90-12-0	N.D.	2.6	6.6	1
10725	2-Methylnaphthalene	91-57-6	N.D.	2.6	6.6	1
10725	1-Methylphenanthrene	832-69-9	4.1 J	2.6	6.6	1
10725	Naphthalene	91-20-3	N.D.	2.6	6.6	1
10725	Perylene	198-55-0	N.D.	2.6	6.6	1
10725	Phenanthrene	85-01-8	N.D.	2.6	6.6	1
10725	Pyrene	129-00-0	N.D.	2.6	6.6	1
10725	2,3,5-Trimethylnaphthalene	2245-38-7	N.D.	2.6	6.6	1

Reporting limits were raised due to interference from the sample matrix.

The samples were recieved outside the EPA Method recommended solid sample holding times for EPA 8270C SIM PAHs. However, the tissue samples were frozen immediately after collection and remained in that condition until sample preparation. SWAMP and PSEP guidelines for holding times in tissue samples state holding times may be extended up to one year if stored frozen at -18oC after collection. In addition, there are no EPA recommended holding times established for tissue samples. Therefore, the sample results have not been flagged as exceeding the EPA Method recommended holding times.

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance:
Benzo(b)fluoranthene

Percent Lipids	**EPA 1613B October 1994**		**% by wt.**	**% by wt.**	**% by wt.**	
04193	Percent Lipids	66455-18-3	0.79	0.10	0.10	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: Macoma-T0-(A-E) Composite Tissue
Port of Redwood City

LL Sample # G5 7872040
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

MCT-T

CAT No.	Analysis Name	CAS Number	As Received Result		As Received EDL*	As Received MRL	Dilution Factor
Dioxins/Furans	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**		**ng/kg**	**ng/kg**	
12937	2378-TCDD	1746-01-6	N.D.		0.0271	0.952	1
12937	12378-PeCDD	40321-76-4	N.D.		0.0354	4.76	1
12937	123478-HxCDD	39227-28-6	0.0197	JBQ	0.0134	4.76	1
12937	123678-HxCDD	57653-85-7	N.D.		0.0137	4.76	1
12937	123789-HxCDD	19408-74-3	0.0213	JBQ	0.0144	4.76	1
12937	1234678-HpCDD	35822-46-9	0.230	JB	0.0143	4.76	1
12937	OCDD	3268-87-9	1.12	JBQ	0.0199	9.52	1
12937	2378-TCDF	51207-31-9	N.D.		0.0227	0.952	1
12937	12378-PeCDF	57117-41-6	0.138	JBQ	0.0114	4.76	1
12937	23478-PeCDF	57117-31-4	0.0235	JBQ	0.0105	4.76	1
12937	123478-HxCDF	70648-26-9	0.0274	JBQ	0.0114	4.76	1
12937	123678-HxCDF	57117-44-9	0.0162	JBQ	0.0106	4.76	1
12937	123789-HxCDF	72918-21-9	0.0327	JBQ	0.0121	4.76	1
12937	234678-HxCDF	60851-34-5	0.0132	JBQ	0.0110	4.76	1
12937	1234678-HpCDF	67562-39-4	0.0410	JBQ	0.00585	4.76	1
12937	1234789-HpCDF	55673-89-7	0.00857	JBQ	0.00800	4.76	1
12937	OCDF	39001-02-0	0.0452	JBQ	0.0158	9.52	1
D/F Toxic Equivalents	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**		**ng/kg**	**ng/kg**	
12937	TEQ WHO 2005 - EDLx0.0+EMPC	n.a.	0.0274				1
12937	TEQ WHO 2005 - EDLx1.0+EMPC	n.a.	0.0936				1

Labeled Compounds	%Rec	Windows
13C12-2378-TCDD	91	40 - 135
13C12-12378-PeCDD	105	40 - 135
13C12-123478-HxCDD	104	40 - 135
13C12-123678-HxCDD	104	40 - 135
13C12-123789-HxCDD	99	40 - 135
13C12-1234678-HpCDD	99	40 - 135
13C12-OCDD	108	40 - 135
13C12-2378-TCDF	99	40 - 135
13C12-12378-PeCDF	110	40 - 135
13C12-23478-PeCDF	114	40 - 135
13C12-123478-HxCDF	108	40 - 135
13C12-123678-HxCDF	113	40 - 135
13C12-234678-HxCDF	106	40 - 135
13C12-123789-HxCDF	117	40 - 135
13C12-1234678-HpCDF	123	40 - 135
13C12-1234789-HpCDF	110	40 - 135
13C12-OCDF	110	40 - 135

Dioxins/Furans Data Qualifiers:

B *Detected in Method Blank*
U *Undetected*
J *Estimated concentration between Estimated Detection Limit and Minimum Level*

*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: Macoma-T0-(A-E) Composite Tissue
Port of Redwood City

LL Sample # G5 7872040
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

MCT-T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor

E	*Exceeds calibration range*
C	*Confirmed quantitation on secondary GC column*
Q	*EMPC - Estimated Maximum Possible Concentration*
F	*Interference is present*
S	*Saturation of detection signal*

*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: Macoma-T0-(A-E) Composite Tissue
Port of Redwood City

LL Sample # G5 7872040
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 02/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

MCT-T

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	SIM SVOA (microwave)	SW-846 8270C SIM	1	15140SLH026	06/02/2015 04:13	Brian K Graham	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	15140SLH026	05/21/2015 08:30	Katheryne V Dinan	1
12937	Dioxins/Furans in Solids-8290	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/21/2015 02:20	Michael A Ziegler	1
11030	Dioxins/Furans in Solids - Sox	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/16/2015 12:00	Ginelle L McQuaid	1
04193	Percent Lipids	EPA 1613B October 1994	1	151421348AASE2	05/22/2015 09:00	Robert T Vincent	1

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*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: Control-A-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872041
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CNM-A

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: Control-B-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872042
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CNM-B

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: Control-C-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872043
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CNM-C

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: Control-D-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872044
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CNM-D

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: Control-E-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872045
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CNM-E

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: Control-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872046
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CNM-T

CAT No.	Analysis Name	CAS Number	As Received Result		As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg		ug/kg	ug/kg	
10725	Acenaphthene	83-32-9	N.D.		2.7	6.7	1
10725	Acenaphthylene	208-96-8	N.D.		1.3	6.7	1
10725	Anthracene	120-12-7	N.D.		1.3	6.7	1
10725	Benzo(a)anthracene	56-55-3	2.8	J	2.7	6.7	1
10725	Benzo(a)pyrene	50-32-8	N.D.		2.7	6.7	1
10725	Benzo(b)fluoranthene	205-99-2	3.3	J	2.7	6.7	1
10725	Benzo(e)pyrene	192-97-2	N.D.		13	68	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.		2.7	6.7	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.		2.7	6.7	1
10725	Biphenyl	92-52-4	N.D.		2.7	6.7	1
10725	Chrysene	218-01-9	3.5	J	1.3	6.7	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.		2.7	6.7	1
10725	Dibenzothiophene	132-65-0	N.D.		2.7	6.7	1
10725	2,6-Dimethylnaphthalene	581-42-0	N.D.		2.7	6.7	1
10725	Fluoranthene	206-44-0	8.7		2.7	6.7	1
10725	Fluorene	86-73-7	N.D.		2.7	6.7	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		2.7	6.7	1
10725	1-Methylnaphthalene	90-12-0	N.D.		2.7	6.7	1
10725	2-Methylnaphthalene	91-57-6	N.D.		2.7	6.7	1
10725	1-Methylphenanthrene	832-69-9	5.1	J	2.7	6.7	1
10725	Naphthalene	91-20-3	N.D.		2.7	6.7	1
10725	Perylene	198-55-0	N.D.		2.7	6.7	1
10725	Phenanthrene	85-01-8	N.D.		2.7	6.7	1
10725	Pyrene	129-00-0	7.1		2.7	6.7	1
10725	2,3,5-Trimethylnaphthalene	2245-38-7	N.D.		2.7	6.7	1

Reporting limits were raised due to interference from the sample matrix.

The samples were recieved outside the EPA Method recommended solid sample holding times for EPA 8270C SIM PAHs. However, the tissue samples were frozen immediately after collection and remained in that condition until sample preparation. SWAMP and PSEP guidelines for holding times in tissue samples state holding times may be extended up to one year if stored frozen at -18oC after collection. In addition, there are no EPA recommended holding times established for tissue samples. Therefore, the sample results have not been flagged as exceeding the EPA Method recommended holding times.

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance:
Benzo(b)fluoranthene

Percent Lipids	**EPA 1613B October 1994**		% by wt.	% by wt.	% by wt.	
04193	Percent Lipids	66455-18-3	0.67	0.10	0.10	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: Control-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872046
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CNM-T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor
Dioxins/Furans	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	2378-TCDD	1746-01-6	N.D.	0.0490	0.973	1
12937	12378-PeCDD	40321-76-4	0.132 JQ	0.0436	4.86	1
12937	123478-HxCDD	39227-28-6	0.0320 JBQ	0.0273	4.86	1
12937	123678-HxCDD	57653-85-7	0.115 JB	0.0277	4.86	1
12937	123789-HxCDD	19408-74-3	0.0711 JBQ	0.0273	4.86	1
12937	1234678-HpCDD	35822-46-9	0.781 JBQ	0.0295	4.86	1
12937	OCDD	3268-87-9	2.82 JB	0.0317	9.73	1
12937	2378-TCDF	51207-31-9	0.154 JB	0.0536	0.973	1
12937	12378-PeCDF	57117-41-6	N.D.	0.0196	4.86	1
12937	23478-PeCDF	57117-31-4	0.131 JBQ	0.0164	4.86	1
12937	123478-HxCDF	70648-26-9	0.0680 JBQ	0.0186	4.86	1
12937	123678-HxCDF	57117-44-9	0.0750 JBQ	0.0176	4.86	1
12937	123789-HxCDF	72918-21-9	0.0647 JBQ	0.0217	4.86	1
12937	234678-HxCDF	60851-34-5	0.0956 JBQ	0.0181	4.86	1
12937	1234678-HpCDF	67562-39-4	0.0921 JB	0.0117	4.86	1
12937	1234789-HpCDF	55673-89-7	0.0495 JB	0.0175	4.86	1
12937	OCDF	39001-02-0	0.212 JB	0.0258	9.73	1
D/F Toxic Equivalents	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	TEQ WHO 2005 - EDLx0.0+EMPC	n.a.	0.249			1
12937	TEQ WHO 2005 - EDLx1.0+EMPC	n.a.	0.299			1

Labeled Compounds	%Rec	Windows
13C12-2378-TCDD	52	40 - 135
13C12-12378-PeCDD	73	40 - 135
13C12-123478-HxCDD	78	40 - 135
13C12-123678-HxCDD	79	40 - 135
13C12-123789-HxCDD	74	40 - 135
13C12-1234678-HpCDD	73	40 - 135
13C12-OCDD	73	40 - 135
13C12-2378-TCDF	53	40 - 135
13C12-12378-PeCDF	71	40 - 135
13C12-23478-PeCDF	77	40 - 135
13C12-123478-HxCDF	77	40 - 135
13C12-123678-HxCDF	80	40 - 135
13C12-234678-HxCDF	78	40 - 135
13C12-123789-HxCDF	81	40 - 135
13C12-1234678-HpCDF	90	40 - 135
13C12-1234789-HpCDF	75	40 - 135
13C12-OCDF	71	40 - 135

Dioxins/Furans Data Qualifiers:

B *Detected in Method Blank*
U *Undetected*
J *Estimated concentration between Estimated Detection Limit and Minimum Level*

*=This limit was used in the evaluation of the final result

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Analysis Report

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Sample Description: Control-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872046
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CNM-T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor

E	*Exceeds calibration range*
C	*Confirmed quantitation on secondary GC column*
Q	*EMPC - Estimated Maximum Possible Concentration*
F	*Interference is present*
S	*Saturation of detection signal*

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: Control-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872046
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:00

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

CNM-T

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	SIM SVOA (microwave)	SW-846 8270C SIM	1	15140SLH026	06/02/2015 04:43	Brian K Graham	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	15140SLH026	05/21/2015 08:30	Katheryne V Dinan	1
12937	Dioxins/Furans in Solids-8290	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/21/2015 03:17	Michael A Ziegler	1
11030	Dioxins/Furans in Solids - Sox	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/16/2015 12:00	Ginelle L McQuaid	1
04193	Percent Lipids	EPA 1613B October 1994	1	151421348AASE2	05/22/2015 09:00	Robert T Vincent	1

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*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: PRC-DU1-A-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872047
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

D1--A

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: PRC-DU1-B-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872048
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

D1--B

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: PRC-DU1-C-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872049
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

D1--C

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: PRC-DU1-D-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872050
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

D1--D

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

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Sample Description: PRC-DU1-E-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872051
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

D1--E

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: PRC-DU1-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872052
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

D1--T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	Acenaphthene	83-32-9	N.D.	2.6	6.6	1
10725	Acenaphthylene	208-96-8	N.D.	1.3	6.6	1
10725	Anthracene	120-12-7	N.D.	1.3	6.6	1
10725	Benzo(a)anthracene	56-55-3	N.D.	2.6	6.6	1
10725	Benzo(a)pyrene	50-32-8	N.D.	2.6	6.6	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	2.6	6.6	1
10725	Benzo(e)pyrene	192-97-2	N.D.	13	68	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	2.6	6.6	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	2.6	6.6	1
10725	Biphenyl	92-52-4	N.D.	2.6	6.6	1
10725	Chrysene	218-01-9	N.D.	1.3	6.6	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	2.6	6.6	1
10725	Dibenzothiophene	132-65-0	N.D.	2.6	6.6	1
10725	2,6-Dimethylnaphthalene	581-42-0	N.D.	2.6	6.6	1
10725	Fluoranthene	206-44-0	N.D.	2.6	6.6	1
10725	Fluorene	86-73-7	N.D.	2.6	6.6	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	2.6	6.6	1
10725	1-Methylnaphthalene	90-12-0	N.D.	2.6	6.6	1
10725	2-Methylnaphthalene	91-57-6	N.D.	2.6	6.6	1
10725	1-Methylphenanthrene	832-69-9	N.D.	2.6	6.6	1
10725	Naphthalene	91-20-3	N.D.	2.6	6.6	1
10725	Perylene	198-55-0	N.D.	2.6	6.6	1
10725	Phenanthrene	85-01-8	N.D.	2.6	6.6	1
10725	Pyrene	129-00-0	N.D.	2.6	6.6	1
10725	2,3,5-Trimethylnaphthalene	2245-38-7	N.D.	2.6	6.6	1

Reporting limits were raised due to interference from the sample matrix.

The samples were recieved outside the EPA Method recommended solid sample holding times for EPA 8270C SIM PAHs. However, the tissue samples were frozen immediately after collection and remained in that condition until sample preparation. SWAMP and PSEP guidelines for holding times in tissue samples state holding times may be extended up to one year if stored frozen at -18oC after collection. In addition, there are no EPA recommended holding times established for tissue samples. Therefore, the sample results have not been flagged as exceeding the EPA Method recommended holding times.

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance:
Benzo(b)fluoranthene

Percent Lipids	**EPA 1613B October 1994**		**% by wt.**	**% by wt.**	**% by wt.**	
04193	Percent Lipids	66455-18-3	2.7	0.10	0.10	1

*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU1-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872052
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

D1--T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor
Dioxins/Furans	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	2378-TCDD	1746-01-6	N.D.	0.0274	0.972	1
12937	12378-PeCDD	40321-76-4	0.270 JQ	0.0627	4.86	1
12937	123478-HxCDD	39227-28-6	0.102 JBQ	0.0318	4.86	1
12937	123678-HxCDD	57653-85-7	0.206 JB	0.0310	4.86	1
12937	123789-HxCDD	19408-74-3	0.0969 JBQ	0.0334	4.86	1
12937	1234678-HpCDD	35822-46-9	2.62 JB	0.0261	4.86	1
12937	OCDD	3268-87-9	32.9 B	0.0214	9.72	1
12937	2378-TCDF	51207-31-9	0.472 JBQ	0.0319	0.972	1
12937	12378-PeCDF	57117-41-6	0.247 JB	0.0150	4.86	1
12937	23478-PeCDF	57117-31-4	0.311 JB	0.0127	4.86	1
12937	123478-HxCDF	70648-26-9	0.120 JB	0.0216	4.86	1
12937	123678-HxCDF	57117-44-9	0.138 JBQ	0.0199	4.86	1
12937	123789-HxCDF	72918-21-9	0.0978 JBQ	0.0262	4.86	1
12937	234678-HxCDF	60851-34-5	0.120 JB	0.0206	4.86	1
12937	1234678-HpCDF	67562-39-4	0.357 JB	0.0133	4.86	1
12937	1234789-HpCDF	55673-89-7	0.0691 JBQ	0.0184	4.86	1
12937	OCDF	39001-02-0	0.285 JBQ	0.0178	9.72	1
D/F Toxic Equivalents	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	TEQ WHO 2005 - EDLx0.0+EMPC	n.a.	0.547			1
12937	TEQ WHO 2005 - EDLx1.0+EMPC	n.a.	0.574			1

Labeled Compounds	%Rec	Windows
13C12-2378-TCDD	88	40 - 135
13C12-12378-PeCDD	117	40 - 135
13C12-123478-HxCDD	91	40 - 135
13C12-123678-HxCDD	91	40 - 135
13C12-123789-HxCDD	86	40 - 135
13C12-1234678-HpCDD	89	40 - 135
13C12-OCDD	83	40 - 135
13C12-2378-TCDF	94	40 - 135
13C12-12378-PeCDF	110	40 - 135
13C12-23478-PeCDF	123	40 - 135
13C12-123478-HxCDF	103	40 - 135
13C12-123678-HxCDF	107	40 - 135
13C12-234678-HxCDF	101	40 - 135
13C12-123789-HxCDF	101	40 - 135
13C12-1234678-HpCDF	106	40 - 135
13C12-1234789-HpCDF	92	40 - 135
13C12-OCDF	84	40 - 135

Dioxins/Furans Data Qualifiers:

B *Detected in Method Blank*
U *Undetected*
J *Estimated concentration between Estimated Detection Limit and Minimum Level*

*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU1-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872052
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

D1--T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor

E	*Exceeds calibration range*
C	*Confirmed quantitation on secondary GC column*
Q	*EMPC - Estimated Maximum Possible Concentration*
F	*Interference is present*
S	*Saturation of detection signal*

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*=This limit was used in the evaluation of the final result

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2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

Sample Description: PRC-DU1-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872052
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

D1--T

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	SIM SVOA (microwave)	SW-846 8270C SIM	1	15140SLH026	06/02/2015 05:13	Brian K Graham	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	15140SLH026	05/21/2015 08:30	Katheryne V Dinan	1
12937	Dioxins/Furans in Solids-8290	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/21/2015 07:19	Michael A Ziegler	1
11030	Dioxins/Furans in Solids - Sox	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/16/2015 12:00	Ginelle L McQuaid	1
04193	Percent Lipids	EPA 1613B October 1994	1	151421348AASE2	05/22/2015 09:00	Robert T Vincent	1

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*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-A-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872053
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2-A

General Sample Comments

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: PRC-DU2-B-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872054
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2-B

General Sample Comments

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

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Sample Description: PRC-DU2-C-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872055
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2-C

General Sample Comments

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-D-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872056
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2-D

General Sample Comments

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-E-Nereis-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872057
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2-E

General Sample Comments

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487C	05/06/2015 07:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: PRC-DU2-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872058
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2-T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		**ug/kg**	**ug/kg**	**ug/kg**	
10725	Acenaphthene	83-32-9	N.D.	2.6	6.5	1
10725	Acenaphthylene	208-96-8	N.D.	1.3	6.5	1
10725	Anthracene	120-12-7	N.D.	1.3	6.5	1
10725	Benzo(a)anthracene	56-55-3	N.D.	2.6	6.5	1
10725	Benzo(a)pyrene	50-32-8	N.D.	2.6	6.5	1
10725	Benzo(b)fluoranthene	205-99-2	N.D.	2.6	6.5	1
10725	Benzo(e)pyrene	192-97-2	N.D.	13	67	1
10725	Benzo(g,h,i)perylene	191-24-2	N.D.	2.6	6.5	1
10725	Benzo(k)fluoranthene	207-08-9	N.D.	2.6	6.5	1
10725	Biphenyl	92-52-4	N.D.	2.6	6.5	1
10725	Chrysene	218-01-9	N.D.	1.3	6.5	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.	2.6	6.5	1
10725	Dibenzothiophene	132-65-0	N.D.	2.6	6.5	1
10725	2,6-Dimethylnaphthalene	581-42-0	N.D.	2.6	6.5	1
10725	Fluoranthene	206-44-0	5.1 J	2.6	6.5	1
10725	Fluorene	86-73-7	N.D.	2.6	6.5	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.	2.6	6.5	1
10725	1-Methylnaphthalene	90-12-0	N.D.	2.6	6.5	1
10725	2-Methylnaphthalene	91-57-6	N.D.	2.6	6.5	1
10725	1-Methylphenanthrene	832-69-9	N.D.	2.6	6.5	1
10725	Naphthalene	91-20-3	N.D.	2.6	6.5	1
10725	Perylene	198-55-0	N.D.	2.6	6.5	1
10725	Phenanthrene	85-01-8	N.D.	2.6	6.5	1
10725	Pyrene	129-00-0	4.0 J	2.6	6.5	1
10725	2,3,5-Trimethylnaphthalene	2245-38-7	N.D.	2.6	6.5	1

Reporting limits were raised due to interference from the sample matrix.

The samples were recieved outside the EPA Method recommended solid sample holding times for EPA 8270C SIM PAHs. However, the tissue samples were frozen immediately after collection and remained in that condition until sample preparation. SWAMP and PSEP guidelines for holding times in tissue samples state holding times may be extended up to one year if stored frozen at -18oC after collection. In addition, there are no EPA recommended holding times established for tissue samples. Therefore, the sample results have not been flagged as exceeding the EPA Method recommended holding times.

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance:
Benzo(b)fluoranthene

Percent Lipids	**EPA 1613B October 1994**		**% by wt.**	**% by wt.**	**% by wt.**	
04193	Percent Lipids	66455-18-3	2.0	0.10	0.10	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: PRC-DU2-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872058
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2-T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor
Dioxins/Furans	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	2378-TCDD	1746-01-6	0.0432 J	0.0304	0.999	1
12937	12378-PeCDD	40321-76-4	N.D.	0.0599	5.00	1
12937	123478-HxCDD	39227-28-6	0.0670 JB	0.0352	5.00	1
12937	123678-HxCDD	57653-85-7	0.214 JB	0.0359	5.00	1
12937	123789-HxCDD	19408-74-3	0.0984 JBQ	0.0382	5.00	1
12937	1234678-HpCDD	35822-46-9	3.20 JB	0.0311	5.00	1
12937	OCDD	3268-87-9	31.0 B	0.0336	9.99	1
12937	2378-TCDF	51207-31-9	0.484 JB	0.0387	0.999	1
12937	12378-PeCDF	57117-41-6	0.182 JBQ	0.0176	5.00	1
12937	23478-PeCDF	57117-31-4	0.256 JB	0.0148	5.00	1
12937	123478-HxCDF	70648-26-9	0.0530 JBQ	0.0231	5.00	1
12937	123678-HxCDF	57117-44-9	0.0985 JBQ	0.0222	5.00	1
12937	123789-HxCDF	72918-21-9	0.0354 JBQ	0.0276	5.00	1
12937	234678-HxCDF	60851-34-5	0.0743 JBQ	0.0229	5.00	1
12937	1234678-HpCDF	67562-39-4	0.416 JBQ	0.0156	5.00	1
12937	1234789-HpCDF	55673-89-7	0.0517 JB	0.0235	5.00	1
12937	OCDF	39001-02-0	0.249 JB	0.0183	9.99	1
D/F Toxic Equivalents	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	TEQ WHO 2005 - EDLx0.0+EMPC	n.a.	0.284			1
12937	TEQ WHO 2005 - EDLx1.0+EMPC	n.a.	0.344			1

Labeled Compounds	%Rec	Windows
13C12-2378-TCDD	78	40 - 135
13C12-12378-PeCDD	103	40 - 135
13C12-123478-HxCDD	90	40 - 135
13C12-123678-HxCDD	91	40 - 135
13C12-123789-HxCDD	83	40 - 135
13C12-1234678-HpCDD	75	40 - 135
13C12-OCDD	78	40 - 135
13C12-2378-TCDF	85	40 - 135
13C12-12378-PeCDF	99	40 - 135
13C12-23478-PeCDF	115	40 - 135
13C12-123478-HxCDF	97	40 - 135
13C12-123678-HxCDF	99	40 - 135
13C12-234678-HxCDF	94	40 - 135
13C12-123789-HxCDF	96	40 - 135
13C12-1234678-HpCDF	97	40 - 135
13C12-1234789-HpCDF	83	40 - 135
13C12-OCDF	80	40 - 135

Dioxins/Furans Data Qualifiers:

B *Detected in Method Blank*
U *Undetected*
J *Estimated concentration between Estimated Detection Limit and Minimum Level*

*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872058
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2-T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor

E	*Exceeds calibration range*
C	*Confirmed quantitation on secondary GC column*
Q	*EMPC - Estimated Maximum Possible Concentration*
F	*Interference is present*
S	*Saturation of detection signal*

*=This limit was used in the evaluation of the final result

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Lancaster Laboratories Environmental
2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

Sample Description: PRC-DU2-(A-E)-Nereis-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872058
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/19/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU2-T

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	SIM SVOA (microwave)	SW-846 8270C SIM	1	15140SLH026	06/02/2015 05:43	Brian K Graham	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	15140SLH026	05/21/2015 08:30	Katheryne V Dinan	1
12937	Dioxins/Furans in Solids-8290	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/21/2015 08:15	Michael A Ziegler	1
11030	Dioxins/Furans in Solids - Sox	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/16/2015 12:00	Ginelle L McQuaid	1
04193	Percent Lipids	EPA 1613B October 1994	1	151421348AASE2	05/22/2015 09:00	Robert T Vincent	1

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*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: PRC-DU1-A-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872059
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1-A

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487D	05/06/2015 09:30	Joseph S Feister	n.a.

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Analysis Report

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Sample Description: PRC-DU1-B-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872060
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1-B

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487D	05/06/2015 09:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU1-C-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872061
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1-C

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487D	05/06/2015 09:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU1-D-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872062
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1-D

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487D	05/06/2015 09:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: PRC-DU1-E-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872063
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1-E

General Sample Comments

The analysis for PCB congeners was subcontracted to another laboratory (ALS).
See Attached Reports.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487D	05/06/2015 09:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: PRC-DU1-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872064
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1-T

CAT No.	Analysis Name	CAS Number	As Received Result		As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg		ug/kg	ug/kg	
10725	Acenaphthene	83-32-9	5.4	J	2.7	6.7	1
10725	Acenaphthylene	208-96-8	N.D.		1.3	6.7	1
10725	Anthracene	120-12-7	6.6	J	1.3	6.7	1
10725	Benzo(a)anthracene	56-55-3	13		2.7	6.7	1
10725	Benzo(a)pyrene	50-32-8	9.1		2.7	6.7	1
10725	Benzo(b)fluoranthene	205-99-2	15		2.7	6.7	1
10725	Benzo(e)pyrene	192-97-2	N.D.		13	68	1
10725	Benzo(g,h,i)perylene	191-24-2	3.6	J	2.7	6.7	1
10725	Benzo(k)fluoranthene	207-08-9	6.5	J	2.7	6.7	1
10725	Biphenyl	92-52-4	N.D.		2.7	6.7	1
10725	Chrysene	218-01-9	15		1.3	6.7	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.		2.7	6.7	1
10725	Dibenzothiophene	132-65-0	2.8	J	2.7	6.7	1
10725	2,6-Dimethylnaphthalene	581-42-0	N.D.		2.7	6.7	1
10725	Fluoranthene	206-44-0	80		2.7	6.7	1
10725	Fluorene	86-73-7	6.0	J	2.7	6.7	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	N.D.		2.7	6.7	1
10725	1-Methylnaphthalene	90-12-0	N.D.		2.7	6.7	1
10725	2-Methylnaphthalene	91-57-6	N.D.		2.7	6.7	1
10725	1-Methylphenanthrene	832-69-9	12		2.7	6.7	1
10725	Naphthalene	91-20-3	45		2.7	6.7	1
10725	Perylene	198-55-0	2.8	J	2.7	6.7	1
10725	Phenanthrene	85-01-8	33		2.7	6.7	1
10725	Pyrene	129-00-0	100		2.7	6.7	1
10725	2,3,5-Trimethylnaphthalene	2245-38-7	N.D.		2.7	6.7	1

Reporting limits were raised due to interference from the sample matrix.

The samples were recieved outside the EPA Method recommended solid sample holding times for EPA 8270C SIM PAHs. However, the tissue samples were frozen immediately after collection and remained in that condition until sample preparation. SWAMP and PSEP guidelines for holding times in tissue samples state holding times may be extended up to one year if stored frozen at -18oC after collection. In addition, there are no EPA recommended holding times established for tissue samples. Therefore, the sample results have not been flagged as exceeding the EPA Method recommended holding times.

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance:
Benzo(b)fluoranthene

Percent Lipids	**EPA 1613B October 1994**		% by wt.	% by wt.	% by wt.	
04193	Percent Lipids	66455-18-3	0.51	0.10	0.10	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: PRC-DU1-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872064
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1-T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor
Dioxins/Furans	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	2378-TCDD	1746-01-6	0.0505 J	0.0289	0.981	1
12937	12378-PeCDD	40321-76-4	0.109 JQ	0.0358	4.91	1
12937	123478-HxCDD	39227-28-6	0.0508 JBQ	0.0242	4.91	1
12937	123678-HxCDD	57653-85-7	0.132 JB	0.0240	4.91	1
12937	123789-HxCDD	19408-74-3	0.0560 JBQ	0.0254	4.91	1
12937	1234678-HpCDD	35822-46-9	1.12 JB	0.0199	4.91	1
12937	OCDD	3268-87-9	5.49 JB	0.0192	9.81	1
12937	2378-TCDF	51207-31-9	0.195 JB	0.0391	0.981	1
12937	12378-PeCDF	57117-41-6	N.D.	0.0147	4.91	1
12937	23478-PeCDF	57117-31-4	0.108 JBQ	0.0123	4.91	1
12937	123478-HxCDF	70648-26-9	0.0531 JBQ	0.0157	4.91	1
12937	123678-HxCDF	57117-44-9	0.0543 JB	0.0152	4.91	1
12937	123789-HxCDF	72918-21-9	0.0365 JBQ	0.0172	4.91	1
12937	234678-HxCDF	60851-34-5	0.0456 JB	0.0163	4.91	1
12937	1234678-HpCDF	67562-39-4	0.182 JB	0.0113	4.91	1
12937	1234789-HpCDF	55673-89-7	0.0512 JBQ	0.0154	4.91	1
12937	OCDF	39001-02-0	0.247 JBQ	0.0134	9.81	1
D/F Toxic Equivalents	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	TEQ WHO 2005 - EDLx0.0+EMPC	n.a.	0.270			1
12937	TEQ WHO 2005 - EDLx1.0+EMPC	n.a.	0.270			1

Labeled Compounds	%Rec	Windows
13C12-2378-TCDD	86	40 - 135
13C12-12378-PeCDD	97	40 - 135
13C12-123478-HxCDD	104	40 - 135
13C12-123678-HxCDD	107	40 - 135
13C12-123789-HxCDD	99	40 - 135
13C12-1234678-HpCDD	94	40 - 135
13C12-OCDD	100	40 - 135
13C12-2378-TCDF	94	40 - 135
13C12-12378-PeCDF	103	40 - 135
13C12-23478-PeCDF	107	40 - 135
13C12-123478-HxCDF	104	40 - 135
13C12-123678-HxCDF	107	40 - 135
13C12-234678-HxCDF	103	40 - 135
13C12-123789-HxCDF	113	40 - 135
13C12-1234678-HpCDF	113	40 - 135
13C12-1234789-HpCDF	103	40 - 135
13C12-OCDF	103	40 - 135

Dioxins/Furans Data Qualifiers:

B *Detected in Method Blank*
U *Undetected*
J *Estimated concentration between Estimated Detection Limit and Minimum Level*

*=This limit was used in the evaluation of the final result

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Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU1-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872064
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1-T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor

E	*Exceeds calibration range*
C	*Confirmed quantitation on secondary GC column*
Q	*EMPC - Estimated Maximum Possible Concentration*
F	*Interference is present*
S	*Saturation of detection signal*

*=This limit was used in the evaluation of the final result

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Lancaster Laboratories Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU1-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872064
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:02

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU1-T

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	SIM SVOA (microwave)	SW-846 8270C SIM	1	15140SLH026	06/02/2015 06:13	Brian K Graham	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	15140SLH026	05/21/2015 08:30	Katheryne V Dinan	1
12937	Dioxins/Furans in Solids-8290	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/21/2015 09:12	Michael A Ziegler	1
11030	Dioxins/Furans in Solids - Sox	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/16/2015 12:00	Ginelle L McQuaid	1
04193	Percent Lipids	EPA 1613B October 1994	1	151421348AASE2	05/22/2015 09:00	Robert T Vincent	1

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*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-A-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872065
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU-2A

General Sample Comments

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487D	05/06/2015 09:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-B-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872066
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU-2B

General Sample Comments

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487D	05/06/2015 09:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-C-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872067
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU-2C

General Sample Comments

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487D	05/06/2015 09:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-D-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872068
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU-2D

General Sample Comments

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487D	05/06/2015 09:30	Joseph S Feister	n.a.

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-E-Macoma-Day 28 Tissue
Port of Redwood City

LL Sample # G5 7872069
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU-2E

General Sample Comments

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
02487	Food and Tissue Preparation	RAD-PCO/AP001 modified	1	151268812487D	05/06/2015 09:30	Joseph S Feister	n.a.

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Analysis Report

Sample Description: PRC-DU2-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872070
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU-2T

CAT No.	Analysis Name	CAS Number	As Received Result		As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Semivolatiles	**SW-846 8270C SIM**		ug/kg		ug/kg	ug/kg	
10725	Acenaphthene	83-32-9	3.0	J	2.6	6.5	1
10725	Acenaphthylene	208-96-8	N.D.		1.3	6.5	1
10725	Anthracene	120-12-7	6.3	J	1.3	6.5	1
10725	Benzo(a)anthracene	56-55-3	34		2.6	6.5	1
10725	Benzo(a)pyrene	50-32-8	17		2.6	6.5	1
10725	Benzo(b)fluoranthene	205-99-2	31		2.6	6.5	1
10725	Benzo(e)pyrene	192-97-2	15	J	13	67	1
10725	Benzo(g,h,i)perylene	191-24-2	4.6	J	2.6	6.5	1
10725	Benzo(k)fluoranthene	207-08-9	13		2.6	6.5	1
10725	Biphenyl	92-52-4	N.D.		2.6	6.5	1
10725	Chrysene	218-01-9	37		1.3	6.5	1
10725	Dibenz(a,h)anthracene	53-70-3	N.D.		2.6	6.5	1
10725	Dibenzothiophene	132-65-0	3.1	J	2.6	6.5	1
10725	2,6-Dimethylnaphthalene	581-42-0	N.D.		2.6	6.5	1
10725	Fluoranthene	206-44-0	170		2.6	6.5	1
10725	Fluorene	86-73-7	N.D.		2.6	6.5	1
10725	Indeno(1,2,3-cd)pyrene	193-39-5	3.2	J	2.6	6.5	1
10725	1-Methylnaphthalene	90-12-0	N.D.		2.6	6.5	1
10725	2-Methylnaphthalene	91-57-6	N.D.		2.6	6.5	1
10725	1-Methylphenanthrene	832-69-9	13		2.6	6.5	1
10725	Naphthalene	91-20-3	N.D.		2.6	6.5	1
10725	Perylene	198-55-0	4.6	J	2.6	6.5	1
10725	Phenanthrene	85-01-8	17		2.6	6.5	1
10725	Pyrene	129-00-0	180		2.6	6.5	1
10725	2,3,5-Trimethylnaphthalene	2245-38-7	N.D.		2.6	6.5	1

Reporting limits were raised due to interference from the sample matrix.

The samples were recieved outside the EPA Method recommended solid sample holding times for EPA 8270C SIM PAHs. However, the tissue samples were frozen immediately after collection and remained in that condition until sample preparation. SWAMP and PSEP guidelines for holding times in tissue samples state holding times may be extended up to one year if stored frozen at -18oC after collection. In addition, there are no EPA recommended holding times established for tissue samples. Therefore, the sample results have not been flagged as exceeding the EPA Method recommended holding times.

The LCS and/or LCSD recoveries are outside the stated QC window but within the marginal exceedance allowance of +/- 4 standard deviations as defined in the NELAC Standards. The following analytes are accepted based on this allowance:
Benzo(b)fluoranthene

Percent Lipids	**EPA 1613B October 1994**		% by wt.	% by wt.	% by wt.	
04193	Percent Lipids	66455-18-3	0.59	0.10	0.10	1

*=This limit was used in the evaluation of the final result

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2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Analysis Report

Sample Description: PRC-DU2-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872070
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU-2T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor
Dioxins/Furans	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	2378-TCDD	1746-01-6	0.0513 JQ	0.0426	0.999	1
12937	12378-PeCDD	40321-76-4	0.114 J	0.0439	5.00	1
12937	123478-HxCDD	39227-28-6	0.0530 JBQ	0.0300	5.00	1
12937	123678-HxCDD	57653-85-7	0.137 JB	0.0299	5.00	1
12937	123789-HxCDD	19408-74-3	0.0732 JBQ	0.0312	5.00	1
12937	1234678-HpCDD	35822-46-9	1.11 JB	0.0233	5.00	1
12937	OCDD	3268-87-9	5.93 JB	0.0251	9.99	1
12937	2378-TCDF	51207-31-9	0.131 JB	0.0526	0.999	1
12937	12378-PeCDF	57117-41-6	0.178 JB	0.0188	5.00	1
12937	23478-PeCDF	57117-31-4	0.101 JB	0.0161	5.00	1
12937	123478-HxCDF	70648-26-9	0.0648 JBQ	0.0192	5.00	1
12937	123678-HxCDF	57117-44-9	0.0628 JB	0.0193	5.00	1
12937	123789-HxCDF	72918-21-9	N.D.	0.0189	5.00	1
12937	234678-HxCDF	60851-34-5	0.0568 JBQ	0.0198	5.00	1
12937	1234678-HpCDF	67562-39-4	0.170 JBQ	0.0154	5.00	1
12937	1234789-HpCDF	55673-89-7	0.0405 JB	0.0201	5.00	1
12937	OCDF	39001-02-0	0.302 JB	0.0197	9.99	1
D/F Toxic Equivalents	**SW-846 8290A Feb 2007 Rev 1**		**ng/kg**	**ng/kg**	**ng/kg**	
12937	TEQ WHO 2005 - EDLx0.0+EMPC	n.a.	0.274			1
12937	TEQ WHO 2005 - EDLx1.0+EMPC	n.a.	0.276			1

Labeled Compounds	%Rec	Windows
13C12-2378-TCDD	69	40 - 135
13C12-12378-PeCDD	83	40 - 135
13C12-123478-HxCDD	87	40 - 135
13C12-123678-HxCDD	91	40 - 135
13C12-123789-HxCDD	84	40 - 135
13C12-1234678-HpCDD	83	40 - 135
13C12-OCDD	88	40 - 135
13C12-2378-TCDF	78	40 - 135
13C12-12378-PeCDF	83	40 - 135
13C12-23478-PeCDF	88	40 - 135
13C12-123478-HxCDF	88	40 - 135
13C12-123678-HxCDF	89	40 - 135
13C12-234678-HxCDF	86	40 - 135
13C12-123789-HxCDF	106	40 - 135
13C12-1234678-HpCDF	96	40 - 135
13C12-1234789-HpCDF	89	40 - 135
13C12-OCDF	90	40 - 135

Dioxins/Furans Data Qualifiers:

B *Detected in Method Blank*
U *Undetected*
J *Estimated concentration between Estimated Detection Limit and Minimum Level*

*=This limit was used in the evaluation of the final result

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872070
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU-2T

CAT No.	Analysis Name	CAS Number	As Received Result	As Received EDL*	As Received MRL	Dilution Factor

E	*Exceeds calibration range*
C	*Confirmed quantitation on secondary GC column*
Q	*EMPC - Estimated Maximum Possible Concentration*
F	*Interference is present*
S	*Saturation of detection signal*

*=This limit was used in the evaluation of the final result

eurofins
Lancaster Laboratories Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: PRC-DU2-(A-E)-Macoma-Day 28 Composite Tissue
Port of Redwood City

LL Sample # G5 7872070
LL Group # 1558138
Account # 19744

Project Name: 15-04-2231

Collected: 03/17/2015 12:03

Submitted: 05/01/2015 09:10
Reported: 06/04/2015 09:24

Eurofins Calscience, Inc.
7440 Lincoln Way
Garden Grove CA 92841-1427

DU-2T

General Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10725	SIM SVOA (microwave)	SW-846 8270C SIM	1	15140SLH026	06/02/2015 06:43	Brian K Graham	1
10811	BNA Soil Microwave SIM	SW-846 3546	1	15140SLH026	05/21/2015 08:30	Katheryne V Dinan	1
12937	Dioxins/Furans in Solids-8290	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/21/2015 10:09	Michael A Ziegler	1
11030	Dioxins/Furans in Solids - Sox	SW-846 8290A Feb 2007 Rev 1	1	15139003	05/16/2015 12:00	Ginelle L McQuaid	1
04193	Percent Lipids	EPA 1613B October 1994	1	151421348AASE2	05/22/2015 09:00	Robert T Vincent	1

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*=This limit was used in the evaluation of the final result

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Analysis Report

Quality Control Summary

Client Name: Eurofins Calscience, Inc. Group Number: 1558138
Reported: 06/04/2015 09:24

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL**	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 15140SLH026	Sample number(s): 7872028,7872034,7872040,7872046,7872052,7872058,7872064,7872070								
Acenaphthene	N.D.	2.7	6.7	ug/kg	90	91	84-118	1	30
Acenaphthylene	N.D.	1.3	6.7	ug/kg	91	93	78-120	2	30
Anthracene	N.D.	1.3	6.7	ug/kg	88	90	82-112	3	30
Benzo(a)anthracene	N.D.	2.7	6.7	ug/kg	86	86	80-120	0	30
Benzo(a)pyrene	N.D.	2.7	6.7	ug/kg	89	92	84-110	3	30
Benzo(b)fluoranthene	N.D.	2.7	6.7	ug/kg	86*	92	87-135	7	30
Benzo(e)pyrene	N.D.	13.	68	ug/kg	92	95	70-130	3	30
Benzo(g,h,i)perylene	N.D.	2.7	6.7	ug/kg	103	104	79-121	1	30
Benzo(k)fluoranthene	N.D.	2.7	6.7	ug/kg	92	93	82-116	2	30
Biphenyl	N.D.	2.7	6.7	ug/kg	92	94	70-130	2	30
Chrysene	N.D.	1.3	6.7	ug/kg	98	99	82-122	2	30
Dibenz(a,h)anthracene	N.D.	2.7	6.7	ug/kg	102	102	83-123	0	30
Dibenzothiophene	N.D.	2.7	6.7	ug/kg	80	81	70-130	2	30
2,6-Dimethylnaphthalene	N.D.	2.7	6.7	ug/kg	89	90	70-130	1	30
Fluoranthene	N.D.	2.7	6.7	ug/kg	86	87	85-116	1	30
Fluorene	N.D.	2.7	6.7	ug/kg	92	94	84-120	2	30
Indeno(1,2,3-cd)pyrene	N.D.	2.7	6.7	ug/kg	99	99	82-123	0	30
1-Methylnaphthalene	N.D.	2.7	6.7	ug/kg	89	92	78-119	3	30
2-Methylnaphthalene	N.D.	2.7	6.7	ug/kg	85	87	78-121	2	30
1-Methylphenanthrene	N.D.	2.7	6.7	ug/kg	84	85	70-130	2	30
Naphthalene	N.D.	2.7	6.7	ug/kg	91	94	79-113	3	30
Perylene	N.D.	2.7	6.7	ug/kg	111	114	70-130	2	30
Phenanthrene	N.D.	2.7	6.7	ug/kg	91	90	83-113	0	30
Pyrene	N.D.	2.7	6.7	ug/kg	79	80	68-111	2	30
2,3,5-Trimethylnaphthalene	N.D.	2.7	6.7	ug/kg	84	83	70-130	1	30
Batch number: 151421348AASE2	Sample number(s): 7872028,7872034,7872040,7872046,7872052,7872058,7872064,7872070								
Percent Lipids	N.D.	0.10	0.10	% by wt.	95		89-111		

Analysis Name	Blank Result	Blank EDL**	Blank MRL	Report Units	OPR %REC	OPRD %REC	OPR/OPRD Limits	RPD	RPD Max
Batch number: 15139003	Sample number(s): 7872028,7872034,7872040,7872046,7872052,7872058,7872064,7872070								
2378-TCDD	N.D.	0.0389	1.00	ng/kg	107		67-158		
12378-PeCDD	N.D.	0.0238	5.00	ng/kg	111		70-142		
123478-HxCDD	0.0757 J	0.0190	5.00	ng/kg	116		70-164		
123678-HxCDD	0.0547 J	0.0197	5.00	ng/kg	112		76-134		
123789-HxCDD	0.0408 J	0.0189	5.00	ng/kg	115		64-162		
1234678-HpCDD	0.0313 J	0.0144	5.00	ng/kg	114		70-140		

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ / MRL.
(2) The unspiked result was more than four times the spike added.

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Analysis Report

Quality Control Summary

Client Name: Eurofins Calscience, Inc. Group Number: 1558138
Reported: 06/04/2015 09:24

Analysis Name	Blank Result	Blank EDL**	Blank MRL	Report Units	OPR %REC	OPRD %REC	OPR/OPRD Limits	RPD	RPD Max
OCDD	0.119 J	0.0215	10.0	ng/kg	115		78-144		
2378-TCDF	0.0398 J	0.0223	1.00	ng/kg	112		75-158		
12378-PeCDF	0.0890 J	0.0106	5.00	ng/kg	115		80-134		
23478-PeCDF	0.0509 J	0.0104	5.00	ng/kg	113		68-160		
123478-HxCDF	0.0349 J	0.0105	5.00	ng/kg	112		72-134		
123678-HxCDF	0.0392 J	0.00928	5.00	ng/kg	111		84-130		
123789-HxCDF	0.0702 J	0.0131	5.00	ng/kg	115		78-130		
234678-HxCDF	0.0261 J	0.0107	5.00	ng/kg	112		70-156		
1234678-HpCDF	0.0185 J	0.00430	5.00	ng/kg	113		82-122		
1234789-HpCDF	0.0553 J	0.00801	5.00	ng/kg	114		78-138		
OCDF	0.0765 J	0.0249	10.0	ng/kg	111		63-170		
TEQ WHO 2005 - EDLx0.0+EMPC	0.0572			ng/kg					
TEQ WHO 2005 - EDLx1.0+EMPC	0.120			ng/kg					

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 151421348AASE2	Sample number(s): 7872028,7872034,7872040,7872046,7872052,7872058,7872064,7872070 BKG: 7872070								
Percent Lipids						0.59	0.73	22*	13.5

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: SIM SVOA (microwave)
Batch number: 15140SLH026

	Fluoranthene-d10	Benzo(a)pyrene-d12	1-Methylnaphthalene-d10
7872028	84	92	102
7872034	87	96	101
7872040	88	96	101
7872046	90	98	101
7872052	87	93	94
7872058	81	91	91
7872064	86	95	91
7872070	93	103	102
Blank	90	96	94
LCS	97	100	95
LCSD	98	104	98
Limits:	73-124	75-131	67-119

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ / MRL.
(2) The unspiked result was more than four times the spike added.

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Analysis Report

Quality Control Summary

Client Name: Eurofins Calscience, Inc. Group Number: 1558138
Reported: 06/04/2015 09:24

Surrogate Quality Control

Analysis Name: Dioxins/Furans in Solids-8290
Batch number: 15139003

	13C12-2378-TCDD	13C12-12378-PeCDD	13C12-123478-HxCDD	13C12-123678-HxCDD	13C12-123789-HxCDD	13C12-1234678-HpCDD
7872028	82	114	90	90	87	83
7872034	94	115	105	107	100	91
7872040	91	105	104	104	99	99
7872046	52	73	78	79	74	73
7872052	88	117	91	91	86	89
7872058	78	103	90	91	83	75
7872064	86	97	104	107	99	94
7872070	69	83	87	91	84	83
Blank	71	83	89	91	88	92
OPR	90	99	101	105	102	102
Limits:	40-135	40-135	40-135	40-135	40-135	40-135

	13C12-OCDD	13C12-2378-TCDF	13C12-12378-PeCDF	13C12-23478-PeCDF	13C12-123478-HxCDF	13C12-123678-HxCDF
7872028	83	92	110	126	101	105
7872034	92	106	114	126	114	118
7872040	108	99	110	114	108	113
7872046	73	53	71	77	77	80
7872052	83	94	110	123	103	107
7872058	78	85	99	115	97	99
7872064	100	94	103	107	104	107
7872070	88	78	83	88	88	89
Blank	97	78	94	88	94	104
OPR	93	100	108	107	108	112
Limits:	40-135	40-135	40-135	40-135	40-135	40-135

	13C12-234678-HxCDF	13C12-123789-HxCDF	13C12-1234678-HpCDF	13C12-1234789-HpCDF	13C12-OCDF
7872028	102	103	105	88	85
7872034	112	117	111	101	96
7872040	106	117	123	110	110
7872046	78	81	90	75	71
7872052	101	101	106	92	84
7872058	94	96	97	83	80
7872064	103	113	113	103	103
7872070	86	106	96	89	90
Blank	96	90	132	86	81
OPR	114	117	130	108	98
Limits:	40-135	40-135	40-135	40-135	40-135

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ / MRL.
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TO: EUROFINS LANCASTER

CHAIN OF CUSTODY RECORD

DATE: 04/30/15
PAGE: 1 OF 3

A-19744 G-1558138 S-787723-70

LABORATORY CLIENT: Eurofins Calscience, Inc.
ADDRESS: 7440 Lincoln Way
CITY: Garden Grove, CA 92841-1427
TEL: (714) 895-5494
E-MAIL: DanielleGonsman@EurofinsUS.com

CLIENT PROJECT NAME / NUMBER: Port of Redwood City
P.O. NO.: 15-04-2231
PROJECT CONTACT: Danielle Gonsman
TEMP BLANK:
LAB USE ONLY:
SAMPLER(S): (PRINT)

TURNAROUND TIME
____SAME DAY ____24 HR ____48HR ____72 HR __5 DAYS x 10-DAY TAT

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
ARCHIVE SAMPLES UNTIL _12__ / __31__ / __15__ Archive all samples frozen (-18 deg C) after analysis

SPECIAL INSTRUCTIONS
EDD needed
Samples were stored frozen after bioaccumulation test termination (sample date)
Report on a wet wt. basis
Homogenize each replicate. Take a subsample from each replicate & create composite for lipids.

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	EPA 8270C SIM PAHs (25 RMP list)	EPA 8290 Full list Dioxins/Total TCDD TEQ	EPA 8082 PCB Congeners (to ALS)	Composite A-E and run Percent lipids
	Nereis-T0-A	02/19/15	1200	Tissue	1 bag	x	x	x	
	Nereis-T0-B	02/19/15	1200	Tissue	1 bag	x	x	x	
	Nereis-T0-C	02/19/15	1200	Tissue	1 bag	x	x	x	x
	Nereis-T0-D	02/19/15	1200	Tissue	1 bag	x	x	x	
	Nereis-T0-E	02/19/15	1200	Tissue	1 bag	x	x	x	
	Control-A-Nereis-Day 28	03/19/15	1201	Tissue	1 bag	x	x	x	
	Control-B-Nereis-Day 28	03/19/15	1201	Tissue	1 bag	x	x	x	
	Control-C-Nereis-Day 28	03/19/15	1201	Tissue	1 bag	x	x	x	x
	Control-D-Nereis-Day 28	03/19/15	1201	Tissue	1 bag	x	x	x	
	Control-E-Nereis-Day 28	03/19/15	1201	Tissue	1 bag	x	x	x	
	Macoma-T0-A	02/17/15	1200	Tissue	1 bag	x	x	x	
	Macoma-T0-B	02/17/15	1200	Tissue	1 bag	x	x	x	
	Macoma-T0-B	02/17/15	1200	Tissue	1 bag	x	x	x	x
	Macoma-T0-B	02/17/15	1200	Tissue	1 bag	x	x	x	
	Macoma-T0-B	02/17/15	1200	Tissue	1 bag	x	x	x	

Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
(Eurofins Calscience)	FEDEX AB# 7735 01904689	4/30/15	1600
Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by / Affiliation: (Signature) / ELCE	5-1-15	900

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GARDEN GROVE, CA 92841-1427
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TO: EUROFINS LANCASTER

CHAIN OF CUSTODY RECORD

DATE: 04/30/15
PAGE: 2 OF 3

A-19744 G-1558138 S-7872023-70

LABORATORY CLIENT: Eurofins Calscience, Inc.
ADDRESS: 7440 Lincoln Way
CITY: Garden Grove, CA 92841-1427
TEL: (714) 895-5494
E-MAIL: DanielleGonsman@EurofinsUS.com

CLIENT PROJECT NAME / NUMBER: Port of Redwood City
P.O. NO.: 15-04-2231
PROJECT CONTACT: Danielle Gonsman
TEMP BLANK:
SAMPLER(S): (PRINT)
LAB USE ONLY

TURNAROUND TIME
___SAME DAY ___24 HR ___48HR ___72 HR __5 DAYS x 10-DAY TAT

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
ARCHIVE SAMPLES UNTIL _12__ / __31__ / __15__ Archive all samples frozen (-18 deg C) after analysis

SPECIAL INSTRUCTIONS
EDD needed
Samples were stored frozen after bioaccumulation test termination (sample date)
Report on a wet wt. basis
Homogenize each replicate. Take a subsample from each replicate & create composite for lipids.

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont		EPA 8270C SIM PAHs (25 RMP list)	EPA 8290 Full list Dioxins/Total TCDD TEQ	EPA 8082 PCB Congeners (to ALS)	Composite A-E and run Percent lipids
	Control-A-Macoma-Day 28	03/17/15	1200	Tissue	1 bag		x	x	x	
	Control-B-Macoma-Day 28	03/17/15	1200	Tissue	1 bag		x	x	x	
	Control-C-Macoma-Day 28	03/17/15	1200	Tissue	1 bag		x	x	x	x
	Control-D-Macoma-Day 28	03/17/15	1200	Tissue	1 bag		x	x	x	
	Control-E-Macoma-Day 28	03/17/15	1200	Tissue	1 bag		x	x	x	
	PRC-DU1-A-Nereis-Day 28	03/19/15	1202	Tissue	1 bag		x	x	x	
	PRC-DU1-B-Nereis-Day 28	03/19/15	1202	Tissue	1 bag		x	x	x	
	PRC-DU1-C-Nereis-Day 28	03/19/15	1202	Tissue	1 bag		x	x	x	x
	PRC-DU1-D-Nereis-Day 28	03/19/15	1202	Tissue	1 bag		x	x	x	
	PRC-DU1-E-Nereis-Day 28	03/19/15	1202	Tissue	1 bag		x	x	x	
	PRC-DU2-A-Nereis-Day 28	03/19/15	1203	Tissue	1 bag		x	x		
	PRC-DU2-B-Nereis-Day 28	03/19/15	1203	Tissue	1 bag		x	x		
	PRC-DU2-C-Nereis-Day 28	03/19/15	1203	Tissue	1 bag		x	x		x
	PRC-DU2-D-Nereis-Day 28	03/19/15	1203	Tissue	1 bag		x	x		
	PRC-DU2-E-Nereis-Day 28	03/19/15	1203	Tissue	1 bag		x	x		

Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
(Eurofins Calscience)	FedEx	4/30/15	1600
	ELLE	5.1.15	910

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GARDEN GROVE, CA 92841-1427
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TO: EUROFINS LANCASTER

CHAIN OF CUSTODY RECORD

DATE: 04/30/15
PAGE: 3 OF 3

A-19744 G-558138 S-7872023-70

LABORATORY CLIENT: Eurofins Calscience, Inc.
ADDRESS: 7440 Lincoln Way
CITY: Garden Grove, CA 92841-1427
TEL: (714) 895-5494
E-MAIL: DanielleGonsman@EurofinsUS.com

CLIENT PROJECT NAME / NUMBER: Port of Redwood City
P.O. NO.: 15-04-2231
PROJECT CONTACT: Danielle Gonsman
TEMP BLANK:
LAB USE ONLY:
SAMPLER(S): (PRINT)

TURNAROUND TIME
____SAME DAY ____24 HR ____48HR ____72 HR __5 DAYS x 10-DAY TAT

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Samples were stored frozen after bioaccumulation test termination (sample date)
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Homogenize each replicate. Take a subsample from each replicate & create composite for lipids.

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	EPA 8270C SIM PAHs (25 RMP list)	EPA 8290 Full list Dioxins/Total TCDD TEQ	EPA 8082 PCB Congeners (to ALS)	Composite A-E and run Percent lipids
	PRC-DU1-A-Macoma-Day 28	03/17/15	1202	Tissue	1 bag	x	x	x	
	PRC-DU1-B-Macoma-Day 28	03/17/15	1202	Tissue	1 bag	x	x	x	
	PRC-DU1-C-Macoma-Day 28	03/17/15	1202	Tissue	1 bag	x	x	x	x
	PRC-DU1-D-Macoma-Day 28	03/17/15	1202	Tissue	1 bag	x	x	x	
	PRC-DU1-E-Macoma-Day 28	03/17/15	1202	Tissue	1 bag	x	x	x	
	PRC-DU2-A-Macoma-Day 28	03/17/15	1203	Tissue	1 bag	x	x		
	PRC-DU2-B-Macoma-Day 28	03/17/15	1203	Tissue	1 bag	x	x		
	PRC-DU2-C-Macoma-Day 28	03/17/15	1203	Tissue	1 bag	x	x		x
	PRC-DU2-D-Macoma-Day 28	03/17/15	1203	Tissue	1 bag	x	x		
	PRC-DU2-E-Macoma-Day 28	03/17/15	1203	Tissue	1 bag	x	x		

Relinquished by: (Signature)	Received by / Affiliation: (Signature)	Date:	Time:
(Eurofins Calscience)	FedEx	4/30/15	1600
	ELLE	5-1-15	910

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Sample Administration Receipt Documentation Log

Doc Log ID: 67923

Group Number(s): 1558138

Client: Eurofins Calscience

15-04-2231

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	05/01/2015 9:10
Number of Packages:	2	Number of Projects:	2

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	No
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	No	VOA Vial Headspace ≥ 6mm:	N/A
Samples Chilled:	Yes	Total Trip Blank Qty:	0
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Timothy Cubberley (6520) at 14:17 on 05/01/2015

Samples Chilled Details: 15-04-2231

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	8013596-IR	2.5	IR	Ice Pack	Y	Loose	N
2	8013596-IR	1.5	IR	Ice Pack	Y	Loose	N

Sample ID Discrepancy Details: 15-04-2231

Sample ID on COC	Sample ID on Label	Comments
Macoma-TO-C through E	Macoma-TO-B	Samples should be labled with the letters C through E but they just are marked with B.

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Lancaster, PA 17605-2425
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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

< less than

> greater than

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Laboratory Data Qualifiers:

B - Analyte detected in the blank
C - Result confirmed by reanalysis
E - Concentration exceeds the calibration range
J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and the < Limit of Quantitation (LOQ or RL)
P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U - Analyte was not detected at the value indicated
V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference…

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, ISO17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

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Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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