City of Morro Bay and
Cayucos Sanitary District

OFFSHORE MONITORING AND REPORTING PROGRAM

SEMIANNUAL EFFLUENT SAMPLING

CHEMICAL AND BIOASSAY ANALYSIS RESULTS

JANUARY 2006

Marine Research Specialists

3140 Telegraph Rd., Suite A
Ventura, California 93003

Report to

City of Morro Bay and
Cayucos Sanitary District

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

MONITORING AND REPORTING PROGRAM

SEMI-ANNUAL EFFLUENT REPORT

CHEMICAL AND BIOASSAY ANALYSIS RESULTS

JANUARY 2006

Prepared by

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February 2006

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3140 Telegraph Road, Suite A · Ventura, CA 93003 · (805) 644-1180

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

2 February 2006

Reference: Chemical and Bioassay Analysis Results for Effluent Samples Collected in January 2006

Dear Mr. Keogh:

Enclosed are the results of chemical analyses conducted on grab and composite effluent samples collected on 11 January 2006, a chronic bioassay on one composite effluent sample collected on 16 January 2006, and an acute bioassay conducted on four effluent samples collected daily from 16 January through 19 January 2006. All analyses were conducted in accordance with the requirements of Monitoring and Reporting Program Number 98-15[1] to assess compliance with effluent limitations specified in the Waste Discharge Requirements of the NPDES Discharge Permit.[2] Bioassay protocols conformed to the revised requirements specified by RWQCB[3] staff that eliminated techniques previously used to mitigate interference from ammonia toxicity.[4] All of the measured chemical concentrations and toxicity endpoints complied with the limitations promulgated by the current discharge permit. This includes acute-toxicity limitations that are no longer promulgated by the current version of the California Ocean Plan[5] because they were determined to be unnecessarily stringent. This cover letter summarizes the bioassay results and discusses the chemical compounds that were detected in the effluent samples. The full laboratory results as well as the pertinent QA/QC data and chains of custody are included as attachments.

Chronic Bioassay

As summarized in Table 1, the chronic bioassay tests demonstrated that effluent toxicity was an order of magnitude lower than the limitations specified in the NPDES permit. Results were comparable to the low toxicities determined in tests conducted for more than a decade. Chronic bioassays provide a far more sensitive and accurate measure of toxic effects to marine organisms than do acute toxicity tests, which are plagued with interference from ammonia, as is described below. As with past bioassays, the chronic toxicity tests conducted in January 2006 measured spore germination and growth response in giant kelp (*Macrocystis pyrifera*) after exposure to a range of effluent dilutions. Toxic screening studies conducted in 1993[6]

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[1] Monitoring and Reporting Program No. 98-15 for City of Morro Bay and Cayucos Sanitary District Wastewater Treatment Plant, San Luis Obispo County promulgated by the State of California Regional Water Quality Control Board Central Coast Region and the United States Environmental Protection Agency Region IX, San Francisco California. 11 December 1998

[2] State of California Regional Water Quality Control Board Central Coast Region Waste Discharge Requirements Order No. 98-15 and United States Environmental Protection Agency Region IX, San Francisco California National Pollutant Discharge Elimination System Permit No. CA0047881 for City of Morro Bay and Cayucos Sanitary District Wastewater Treatment Plant, San Luis Obispo County

[3] California Regional Water Quality Control Board, Central Coast Division

[4] Letter from Roger W. Briggs, Executive Officer of the RWQCB to Mr. Bruce Keogh, City of Morro Bay WWTP, dated 14 March 2003: 2002 Annual Offshore monitoring Report, City of Morro Bay and Cayucos Sanitary District Wastewater Treatment Plant, San Luis Obispo County

[5] State Water Resources Control Board (SWRCB). 2001. Water quality control plan, ocean waters of California, California Ocean Plan. California Environmental Protection Agency. Effective December 3, 2001

[6] Table 2-4, Page 2-7 of the MBCSD 1993 Annual Monitoring. Report to the City of Morro Bay and Cayucos Sanitary District. Prepared by Marine Research Specialists, 1994

Table 1. Comparison of Measured Toxicity Levels with Permit Limitations

Bioassay Test	End Point (%)	Toxicity Concentration (TU)	Permit Limitations (TU)		
			30-day Average	7-day Average	Instantaneous Maximum
Chronic: Giant Kelp (*Macrocystis pyrifera*) Chronic Germination	18[8]	5.6			134
Chronic Growth	18[8]	5.6			134
Acute: Fathead Minnow (*Pimephales promelas*)	70.7[9]	1.41	1.5	2.0	2.5

established that giant kelp (*M. pyrifera*) is substantially more sensitive to MBCSD[7] effluent than other species, such as the larvae of the inland silverside (*Menidia beryllina*) and bay mussel (*Mytilus edulis*).

The chronic bioassay results presented in Table 1 demonstrate the effluent's continuing low toxicity to this most-sensitive marine species. Both chronic-toxicity concentrations (5.6 TUc) were more than 20 times lower than the applicable permit limitation (134 TUc). The reported chronic toxic units (TUc) were based on a 'No Observable Effects Concentration' (NOEC), which is the highest effluent concentration that does not cause an adverse effect statistically different from a control sample. Chronic bioassays did not reveal adverse effects in marine organisms with effluent concentrations at or below 18%, while the permit allows adverse effects in concentrations as low as 0.75%.

As part of quality control, chronic bioassays were also conducted using a reference toxic chemical (copper chloride) to determine the sensitivity of this particular set of giant kelp spores (*M. pyrifera*) to toxins. Results demonstrated that the kelp specimens were susceptible to toxic exposure because they experienced a significant reduction in germination and growth in concentrations as low as 32 µg/L of the reference toxicant. The concomitant NOEC for the reference toxicant, at 18 µg/L, was comparable to toxic concentrations found in reference tests conducted over the last several years.[10] This suggests that the susceptibility of this particular batch of kelp spores to toxic materials was comparable to previous batches. Nevertheless, they were only minimally affected by exposure to treatment-plant effluent.

Acute Bioassay

In contrast to the chronic toxicity test, the acute bioassay was confounded by toxic interference caused by the presence of ammonia in the test sample. Current bioassay protocols[11] limit the use of techniques that, in the past, have been widely used to reduce the confounding influence of ammonia during acute bioassay tests. The acute bioassay test examined the mortality of the Fathead Minnow (*Pimephales promelas*) exposed to various concentrations of effluent. Historically, Fathead Minnow tests have reliably evaluated a broad range of freshwater, marine, and effluent samples. However, they are problematic when test samples contain ammonia, a constituent that is naturally elevated in sewage-derived wastewater. Under ambient ocean conditions, ammonia is not particularly toxic to marine organisms. This is reflected by the strikingly high

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

[8] NOEC or the No Observed Effects Concentration, which is the highest concentration of effluent that did not produce an adverse effect statistically different from the control experiment

[9] LC_{50} or the effluent concentration that produces death of 50% of the test organisms exposed to the toxicants for 96 hours

[10] *cf.* The Giant Kelp Germ Tube Growth Laboratory Control Chart attached to this report

[11] Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, Fifth Edition. October 2002. U.S. Environmental Protection Agency, Office of Water (4303T), 1200 Pennsylvania Avenue, NW Washington, DC 20460. EPA-821-R-02-012

limit for ammonia concentrations that is specified in the NPDES discharge permit (804 mg/L)[12] as compared to typical effluent ammonia concentrations (≤ 33 mg/L).[13] This is because ammonia remains in a relatively benign, ionic ammonium[14] form in seawater and wastewater. However, in an acute bioassay, effluent remains static in the test chambers for an extended period of time, during which complex interactions among the organic constituents cause pH to increase. As pH increases, ammonium is converted into a deionized ammonia form[15] that is highly toxic to the test organisms. In contrast to the static conditions in the test chambers, the pH of the marine receiving waters is stabilized by the highly buffered oceanic carbonate system. Thus, the acute bioassay tests are not representative of the alkalinity conditions in the ocean environment and, as a result, the tests report artificially elevated toxic concentrations.

Various methods have been developed over the years to reduce the well-recognized artifactual toxicity that results from changes in wastewater ammonia during bioassay tests.[16] Ammonia interference in the acute bioassays conducted on MBCSD effluent samples has previously been successfully reduced through the use of zeolite pretreatment. As a result, in the 21 acute tests conducted since 1997, and prior to April 2003, the highest measured acute toxicity was 0.59 TUa. This practice was discontinued in April 2003 when the RWQCB staff specified the use of new EPA protocols in their comments on the 2002 Annual Monitoring Report for the MBSCD Wastewater Discharge.[17] Among other changes, the new protocols use much younger, smaller test specimens, and encourage the use of sample-renewal techniques to reduce moderate levels of ammonia interference, rather than chemical techniques. Based on this, the RWQCB staff further required that the acute toxicity tests no longer implement any form of chemical sample manipulation to reduce toxic ammonia interference.

Unfortunately, renewal methods, in which test chambers are periodically refreshed with new sample solutions, are significantly more complex and costly to implement than previous bioassay procedures. More importantly, they fall far short of eliminating significant artifactual toxicity arising from ammonia deionization. As a result, the acute toxicity reported here is conspicuously elevated compared to past tests, although it remained below the permitted limit. The apparent increase is not attributable to an actual change in the characteristic toxicity of the effluent itself. Instead, it is an artifact of changes in the protocols used to assess acute toxicity. This is obvious because there was no commensurate increase in the accompanying chronic-toxicity measurements.

Because static renewal is only marginally effective in accommodating pH-induced ammonia interference, extraordinary measures were instituted in an attempt to reduce impacts from ammonia toxicity to the maximum extent possible. For example, the current bioassay protocols were implemented using daily grab effluent samples that were hand delivered to the testing facility in Ventura, California, shortly after collection at the MBCSD treatment plant. Extra care was also taken to remove all headspace in sample containers and to maintain a uniform sample temperature during transit to the bioassay laboratory. Finally, care was also taken during renewal in the laboratory to avoid physical impact to the extremely small larval-fish specimens.

Despite these extraordinary measures, the presence of ammonia toxicity was unmistakable during the tests. The artificially elevated acute toxicity that is reported in Table 1 is a direct result of this test-related toxicity.

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[12] Instantaneous maximum ammonia concentration specified in the NPDES waste-discharge requirements for the MBCSD effluent

[13] Marine Research Specialists (MRS). 2006. City of Morro Bay and Cayucos Sanitary District, Offshore Monitoring and Reporting Program, 2005 Annual Report. Submitted February 2006 to the City of Morro Bay and Cayucos Sanitary District, Morro Bay, CA

[14] NH_4^+

[15] NH_3

[16] Mercer, B.W., Ames, L.L, Touhill, C.J, Slyke, W.J, Dean, R.B. 1970. Ammonia removal from secondary effuents by selective ion exchange. *Journal of the Water Pollution Control Federation* 42 (2,Part 2), R95–R107.

[17] RWQCB. 2003 (Footnote 4) *op. cit.*

The test results incorrectly imply that the effluent acute toxicity was only 0.09 TUa below the permitted limit, or 94% of the permitted toxicity. In reality, the effluent discharge does not result in pH-induced ammonia toxicity, DO depletion, or physical stress on marine organisms upon discharge into receiving waters. Consequently, the reported results do not accurately reflect the toxicity that is experienced by marine organisms exposed to MBCSD effluent. Instead, ancillary measurements collected during the tests demonstrate that all of these confounding influences were present, and that they caused elevated measured toxicities that were close to the NPDES discharge permit limit.

The impact of unmitigated ammonia interference on the acute bioassay is evident in the water quality measurements reported in the attached raw test data. The increase in the toxic deionized form of ammonia can be computed from the changes in pH measured in the test chambers. Prior to renewal on the first day of the test (January 17), pH increased from 7.3 to 8.0 in the test chamber containing 100% effluent. This caused toxic deionized ammonia concentrations to quadruple from 0.3 mg/l to 1.6 mg/l, and resulted in the mortality of two of the test specimens in the two test chambers containing 100% effluent on the first day of the test. On the following day, deionized ammonia concentrations only doubled but the dissolved oxygen concentrations fell precipitously, from 9.2 mg/L to 4.4 mg/L. This resulted in the mortality of the remaining test specimens in the 100% effluent. In test chambers with lower effluent concentrations, daily static renewal was also only partially successful at ameliorating pH fluctuations. However, because the effluent was diluted, the concentrations of deionized ammonia were proportionally smaller, and despite the observed increases in pH that occurred, all the test organisms survived in the other test chambers. Nevertheless, the impacts apparent in the test chambers containing 100% effluent demonstrate that artifactual ammonia toxicity was not sufficiently accommodated by static renewal methods.

As part of the quality control procedures, acute bioassay tests were also conducted using a reference toxic chemical[18] in order to determine the relative sensitivity of the test organisms. Results demonstrated that the batch of Fathead Minnows (*P. promelas*) used in the January 2006 bioassay were highly susceptible to toxic exposure. They experienced 100% mortality in concentrations as low as 8 mg/L of the reference toxicant.[19] The concomitant LC_{50} for the reference toxicant was 4.9 mg/L, which was comparable to the average toxicant concentrations found in reference tests conducted in previous years.

The foregoing discussion demonstrates that the apparent increase in acute toxicity, which was first measured in April 2003, and has continued into January 2006, is an artifact of the change in protocols rather than a true increase in marine toxicity. Additionally, chronic bioassays conducted over the past decade, including the one reported here, demonstrate that the MBCSD effluent has had a consistently low toxicity to marine organisms. Chronic bioassays are far more accurate and sensitive than the acute bioassays, particularly because the current acute bioassay protocols are fraught with interference from toxic ammonia artifacts.

Quantifiable Chemical Constituents

The nontoxic character of the MBCSD effluent was confirmed by the general absence of chemical contaminants within the grab and composite samples collected on 11 January 2006. The samples were tested for the presence of 145 chemical compounds. Table 2 shows that only seven compounds were detected in quantifiable amounts in the January-2006 effluent samples. These compounds were ammonia, copper, lead, zinc, benzyl alcohol, chloroform, and a commonly occurring phthalate compound (bis 2-ethylhexyl phthalate). Table 2 also shows that the concentrations measured for these seven compounds were all well below the discharge limitations promulgated by the NPDES permit. The permit limits were derived from the

[18] Sodium dodecyl sulfate
[19] *cf.* The Larval Fathead Minnow Juvenile Acute Laboratory Control Chart attached to this report

Table 2. Comparison of Effluent Chemical Concentrations with NPDES Permit Limitations

		Concentration	
Constituent	**Units**	**Measured**	**Limitation**[23]
Copper	µg/L	**14**	140.
Lead	µg/L	**2.2**	270.
Zinc	µg/L	**61**	1620.
Benzyl alcohol	µg/L	**2.3**	—[24]
Bis (2-ethylhexyl) phthalate	µg/L	**16**	470.[25]
Chloroform	µg/L	**1.2**	17400.[25]
Ammonia (as N)	mg/L	**19.**	80.4

receiving-water objectives stated in Table B of the California Ocean Plan,[20] and a critical initial dilution ratio of 133:1 computed from a conservative oceanic dispersion model applied to the MBCSD outfall.[21] Because the PQL's[22] for nearly all undetected compounds were well below their respective permit limits, the chemical analyses were sensitive enough to detect potentially toxic levels of compounds in the effluent. All analyses were conducted in accordance with EPA protocols.

Ammonia

Most of the compounds have been routinely detected at low but quantifiable concentrations within effluent[26] and biosolid[27] samples collected over the past decade. Ammonia as nitrogen[28] is measured in grab effluent samples that are collected on a monthly basis. It has always been present in detectable concentrations that are well below the most-stringent permit limit of 80.4 mg/L, which applies to a 6-month median. The ammonia concentration of 19 mg/L measured in the January-2006 sample was somewhat lower than the historical average concentration of 25 mg/L.

Metals

Similarly, the presence of copper, lead, and zinc at low concentrations in the January effluent sample is not indicative of any significant new contaminant sources within the influent stream. Unlike synthetic organic compounds, these metals occur naturally within the mineralogy of sediments along the central California coast. They enter the wastewater collection system through erosion of natural mineral deposits. Copper, lead, and zinc also frequently enter the wastewater collection system through internal corrosion of household plumbing systems. Lead can also be introduced to the system from the illegal dumping of lead-based paints, gasoline, or fuel-contaminated dusts. However, given the history of consistently low but detectable lead concentrations within MBCSD effluent, the latter methods of introducing lead into the collection system are

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[20] State Water Resources Control Board (SWRCB). 1997. California Ocean Plan, Water Quality Control Plan Ocean Waters of California. State Water Resources Control Board, California Environmental Protection Agency. Effective July 23, 1997.

[21] See the discussion beginning on Page III-1 in: Supplement to the 2003 Renewal Application for Ocean Discharge under NPDES Permit No. CA0047881. Prepared for the City of Morro Bay, Morro Bay, CA, July 2003.

[22] The Practical Quantification Limit is the smallest quantifiable concentration based on the sample size and analytical technique.

[23] 6-month median limitation unless otherwise indicated.

[24] No limit specified

[25] 30-Day Average

[26] Table 14 (Page III-20) in: Supplement to the 2003 Renewal Application for Ocean Discharge under NPDES Permit No. CA0047881. Prepared for the City of Morro Bay, Morro Bay, CA. July 2003.

[27] Table 22 (Page III-78) *op. cit.*

[28] NH_3-N

probably not a common occurrence, and are not likely to have tangibly contributed to the concentrations measured in the January-2006 effluent samples.

In addition, the measured concentrations of lead (2.2 µg/L), copper (14 µg/L), and zinc (61 µg/L) were low, and only slightly above their respective PQLs (1 µg/L, 10 µg/L, and 50 µg/L). The measured lead concentration was more than 100 times lower than the limit specified in the NPDES discharge permit for 6-month median concentrations, while the measured concentration of zinc was more than 26 times lower. Similarly, the copper concentration was an order of magnitude lower than its 6-month median limit.

BEHP

The phthalate compound, bis (2-ethylhexyl) phthalate (BEHP), is another ubiquitous compound that has also been consistently detected at low levels in effluent and biosolid samples collected over the past decade.[29] Phthalate esters, such as BEHP, are components of synthetic dyes, resins, plasticizers, insecticides, and, pharmaceuticals. Nearly 2.7 million metric tons (6 billion pounds) of phthalate esters are produced each year, of which more than half is BEHP. BEHP is a physical plasticizer that is added to plastic resins to soften them, providing increased flexibility. It is not, however, covalently bound to the resin, which allows it to slowly leach out of the plastic and into the environment over time through evaporation or dissolution. Because of their mobility, high vapor pressure, and the massive scale at which they are produced, phthalate esters, and BEHP in particular, have become pervasive in the environment. However, although this phthalate compound can negatively affect human health, concentrations would have to be more than 29-times higher than those measured in January 2006 to be of a human-health concern.

Benzyl Alcohol

The presence of measurable concentrations (2.3 µg/L) of benzyl alcohol in the effluent sample is somewhat unusual in that it has been detected in effluent samples on only one other occasion. In 1997, it was measured in an effluent sample at a comparable concentration of 2.2 µg/L. Both detections were only slightly above the PQL of 2.0 µg/L. Alcohols are widely used as solvents, fuels and chemical raw materials. Benzyl alcohol is also used in making soap, perfume, and flavors, and as an antipruritic to relieve itching. Most commonly, however, this compound is used as a dyeing assistant for filament nylons, such as nylon carpeting. Benzyl alcohol enters the environment through fugitive emissions during its production, and during its formulation and use in commercial products, and from the exhaust of motor vehicles.

When released to water, this compound is expected to undergo microbial degradation, and is not expected to bioaccumulate in fish and aquatic organisms. Consequently, it does not have a limiting concentration in the discharge permit.

Chloroform

Chloroform was the only other compound was detected in measurable concentrations within the January-2006 effluent sample. Chloroform is a typical by-product of drinking-water chlorination and wastewater chlorination programs, and has been detected at low levels in about one-third of the effluent samples. At 1.2 µg/L, the measured concentration in the January 2006 sample was slightly higher than all but one of the concentrations measured in previous samples. An equivalent chloroform concentration was measured in the July-1999 effluent sample. In any regard, the measured concentration was only slightly above the detection limit (PQL=0.5 µg/L) and was over four orders of magnitude lower than levels considered harmful to human health. Because chloroform rapidly volatizes in water, low concentrations are not of ecological concern in the marine environment. At the low measured concentration and flow rates comparable to 2005, the mass

[29] Table 3 (Page II-9) in: Supplement to the 2003 Renewal Application for Ocean Discharge under NPDES Permit No. CA0047881. Prepared for the City of Morro Bay, Morro Bay, CA. July 2003.

emission of chloroform will remain well below the stringent mass-loading goal of 5 kg/yr identified in the NPDES permit.

Table 3. Non-quantifiable Effluent Constituent Detects

Constituent	Concentration				
	Units	MDL	Estimated [30]	PQL	Limitation [23]
Antimony	mg/L	4.5	**21.**	100.	160.8 [25]
Arsenic	µg/L	0.89	**1.8**	2.0	670.
Selenium	µg/L	0.31	**0.99**	2.0	2010.
Mercury	µg/L	0.02	**0.03**	0.2	5.
Toluene	µg/L	0.057	**0.16**	0.5	11400000. [25]
Xylenes	µg/L	0.23	**0.48**	1.0	—
Benzyl butyl phthalate	µg/L	0.74	**1.5**	2.0	—
Diethyl phthalate	µg/L	0.39	**0.82**	2.0	4420000. [25]
Bromodichloromethane	µg/L	0.067	**0.10**	0.5	17400. [25, 31]
Bromoform	µg/L	0.051	**0.16**	0.5	17400. [25, 31]
Dibromochloromethane	µg/L	0.056	**0.26**	0.5	17400. [25, 31]

Detectable Chemical Constituents

In addition to the seven compounds detected in the effluent at quantifiable levels, eleven other constituents were detected at levels too minute to be accurately quantified by standard laboratory procedures. These compounds are listed in Table 3 along with their estimated concentrations. They include four naturally occurring metals, two gasoline-related compounds, two phthalate esters, and three chlorination by-products. Except for antimony, all of the estimated concentrations are more than an order of magnitude less than their limiting concentrations. The estimated antimony concentration is more than seven-times lower than its limit. As such, the presence of these compounds in the effluent cannot be considered a threat to human health or the marine environment.

Like BEHP, Diethyl phthalate and benzyl butyl phthalate are part of the class of compounds known as phthalate esters. These ubiquitous compounds are often components of synthetic dyes, resins, plasticizers, insecticides, and, pharmaceuticals.

Bromoform, bromodichloromethane, and dibromochloromethane are halomethanes which form during the chlorine disinfection process when organic substances are present. At these low concentrations, it is not clear whether their presence is the result of wastewater disinfection within the treatment plant, or is the result of drinking-water chlorination.

The two gasoline-related compounds, toluene and xylene, comprise one-half of the group of aromatic hydrocarbon compounds collectively known as BTEX (benzene, toluene, ethyl benzene, and xylene). BTEX compounds are primarily associated with gasoline contamination and elevated BTEX concentrations were detected in 1999 in conjunction with an infiltration of gasoline-contaminated groundwater.[32] Given the low concentrations measured in the January-2006, and the absence of other gasoline-related compounds, the presence of a significant new source of gasoline contamination within the collection system is unlikely.

[30] Not detected at levels above the indicated practical quantification (detection) limit
[31] Limit on the sum of halomethanes
[32] Marine Research Specialists (MRS). 2000. City of Morro Bay and Cayucos Sanitary District, Offshore Monitoring and Reporting Program, 1999 Annual Report. Submitted February 2000 to the City of Morro Bay and Cayucos Sanitary District, Morro Bay, CA

Conclusions

The comprehensive chemical and bioassay analyses conducted on effluent samples collected in January 2006 augment data collected over the last two decades. Together, these measurements demonstrate the consistently benign nature of the discharge from the MBSCD treatment plant. The absence of heavy industry within the collection area and the high performance of the treatment process are reflected in the general lack of toxicity and chemical contaminants within the effluent samples. The concentrations of the few chemical compounds that were detected in the January-2006 samples were typical of wastewater derived from domestic sources, and all were far below limits specified in the NPDES discharge permit. All measurements fully complied with the requirements and limitations specified in the current NPDES discharge permit.

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

Sincerely,

Douglas A. Coats, Ph.D.
Program Manager

Enclosure (Four Report Copies)

ACUTE AND CHRONIC BIOASSAY RESULTS

LABORATORY REPORT

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

Date: January 21, 2006

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

Laboratory No.: A-06011701
Sample I.D.: Morro Bay Effluent

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

Date Sampled:	01/16, 01/17, 01/18, 01/19/06
Date Received:	01/17, 01/17, 01/19, 01/20/06
Temp. Received:	2°C, 4°C, 2°C, 2°C
Chlorine (TRC):	0.0 mg/l, 0.0 mg/l, 0.0 mg/l, 0.0 mg/l
Dates Tested:	01/17/06 to 01/21/06

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

Fathead Minnow 96hr Acute Static-Renewal Toxicity Test (EPA Method 2000.0),
Giant Kelp Germination and Growth Short-Term Toxicity Test (EPA Method 1009.0).

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

Result Summary:

Sample ID.	Test	LC50	TUa
Grab Effluent	Fathead Minnow	70.7%	1.41
		NOEC	**TUc**
Comp Effluent	Kelp Germination:	18%	5.6
	Kelp Growth:	18%	5.6

Quality Control: Reviewed and approved by:

Joseph A. LeMay
Laboratory Director

FATHEAD MINNOW ACUTE NPDES TEST

Aquatic Testing Laboratories

Lab No.: A-06011701
Client/ID: MRS - Morro Bay

Start Date: 01/17/06

TEST SUMMARY

Species: *Pimephales promelas*.
Age: 11 (1-14) days.
Regulations: NPDES.
Test solution volume: 250 ml.
Feeding: prior to renewal at 48 hrs.
Aeration: None, unless DO drops below 4.0 mg/l.
Number of replicates: 2.
Dilution water: Moderately hard reconstituted water.
QA/QC Batch No.: RT-060104.

Source: In-laboratory Culture.
Test type: Static-Renewal.
Test Protocol: EPA-821-R-02-012.
Endpoints: Percent Survival at 96 hrs.
Test chamber: 500 ml beakers.
Temperature: 20 +/- 1°C.
Number of fish per chamber: 10.
Photoperiod: 16/8 hrs light/dark.

INITIAL WATER QUALITY PARAMETERS

Additional Parameters	Control	100% Sample			
		Day 1	Day 2	Day 3	Day 4
Temperature (°C)	20.1	2	4	2	2
DO (mg/l)	9.0	8.7	9.2	9.1	9.0
pH	7.7	7.3	7.4	7.5	7.5
Total Res. Chlorine (mg/l)	0	0	0	0	0
Ammonia (mg/l NH_3-N)**	0.2	40	36	42	36
Alkalinity (mg/l $CaCO_3$)	55	265	264	281	292
Hardness (mg/l $CaCO_3$)	94	244	322	342	324
Conductivity (umhos)	325	1455	1780	1900	1800

Comments:

*** Chlorine neutralized with sodium thiosulfate (one drop per liter of 10% solution).**

**** Ammonia reading by Hach Kit - only approximate indication.**

FATHEAD MINNOW ACUTE NPDES TEST

Aquatic Testing Laboratories

Lab No.: A-06011701
Client/ID: MRS - Morro Bay

Start Date: 01/17/06

RAW TEST DATA

			DAY 1		DAY 2		DAY 3		DAY 4	
			0 hr	24hr	0 hr	24hr	0 hr	24hr	0 hr	24hr
Analyst Initials:			LM	LM	LM	LM	LM	LM	LM	LM
Time of Readings:			1130	1130	1130	1300	1300	1200	1200	1100
Control	DO		9.0	7.1	8.9	6.2	8.9	4.8	9.0	4.7
	pH		7.7	7.2	7.8	7.3	7.8	7.4	7.8	7.1
	Temp		20.1	20.1	20.2	19.9	20.2	19.7	20.0	19.3
	# Alive	Rep A	---	10	---	10	---	10	---	10
		Rep B	---	10	---	10	---	10	---	10
6.25%	DO		9.0	5.1	8.9	5.7	8.9	5.3	9.0	5.6
	pH		7.7	7.1	7.8	7.2	7.8	7.3	7.8	7.1
	Temp		20.1	20.1	20.2	19.8	20.2	19.6	20.0	19.4
	# Alive	Rep A	---	10	---	10	---	10	---	10
		Rep B	---	10	---	10	---	10	---	10
12.5%	DO		9.0	4.7	9.0	5.6	8.9	4.7	9.0	5.2
	pH		7.6	7.1	7.7	7.2	7.7	7.3	7.7	7.0
	Temp		20.0	20.1	20.1	19.8	20.2	19.6	20.1	19.4
	# Alive	Rep A	---	10	---	10	---	10	---	10
		Rep B	---	10	---	10	---	10	---	10
25%	DO		8.9	4.3	9.0	5.8	8.9	4.7	9.0	4.9
	pH		7.5	7.3	7.6	7.4	7.7	7.4	7.7	7.2
	Temp		20.0	20.1	20.1	19.8	20.1	19.7	20.1	19.4
	# Alive	Rep A	---	10	---	10	---	10	---	10
		Rep B	---	10	---	10	---	10	---	10
50%	DO		8.9	4.7	9.0	5.1	8.9	4.2	8.9	4.6
	pH		7.4	7.6	7.6	7.5	7.6	7.6	7.6	7.5
	Temp		20.0	20.1	19.9	19.8	20.1	19.8	20.2	19.4
	# Alive	Rep A	---	10	---	10	---	10	---	10
		Rep B	---	10	---	10	---	10	---	10
100%	DO		8.7	8.1	9.2	4.4	9.1	—	—	—
	pH		7.3	8.0	7.4	7.8	7.5	—	—	—
	Temp		20.0	20.2	19.8	19.9	19.7	—	—	—
	# Alive	Rep A	---	10	---	0	---	—	---	—
		Rep B	---	8	---	0	---	—	---	—

Acute Fish Test-96 Hr Survival

Start Date:	17 Jan-06 11:30	Test ID:	6011701a	Sample ID:	CA0047881-Morro Bay SD
End Date:	21 Jan-06 11:00	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	16 Jan-06 00:00	Protocol:	EPAA 91-EPA Acute	Test Species:	MB-Menidia beryllina

Comments:

Conc-%	1	2
D-Control	1.0000	1.0000
6.25	1.0000	1.0000
12.5	1.0000	1.0000
25	1.0000	1.0000
50	1.0000	1.0000
100	0.0000	0.0000

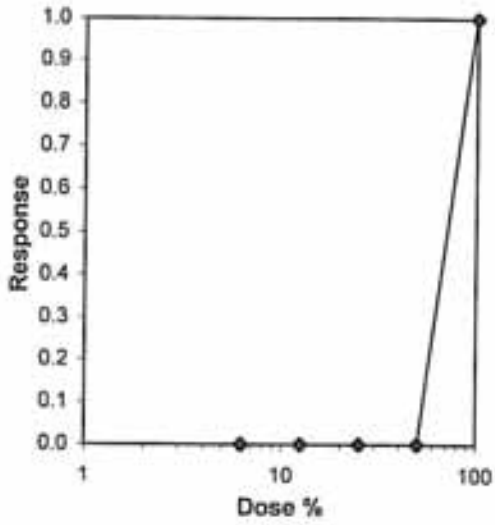
			Transform: Arcsin Square Root					Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
6.25	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
12.5	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
25	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
50	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
100	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	2	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Normality of the data set cannot be confirmed				
Equality of variance cannot be confirmed				

Graphical Method

Trim Level	EC50
0.0%	70.711

TUa = 1.41



ToxCalc v5.0

Reviewed by: _____

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

Lab No.: A-06011701
Client/ID: MRS - Morro Bay Comp. Effluent

Date Tested: 01/17/06 - 01/19/06

TEST SUMMARY

Species: *Macrocystis pyrifera*.
Protocol: EPA Method 1009.0.
Test type: Static.
Test chamber: 100 ml plastic petri dishes.
Temperature: 15 +/- 1°C.
Number of spores per ml: 7,500 (approx.).
QA/QC Batch No.: RT-060117 (ran concurrently).

Source: Field collected.
Dilution water: Lab seawater.
Endpoints: NOEC, IC25 at 48 hrs.
Test volume: 50 ml.
Aeration: None.
Number of replicates: 5.

RESULTS SUMMARY

Sample Concentration	Percent Germination		Mean Germ Tube Length (μm)	
Control (Brine)	84.0%		14.95	
5.6%	84.4%		14.95	
10%	84.6%		14.70	
18%	84.8%		14.55	
32%	71.6%	*	11.50	*
56%	32.6%	*	9.05	*
* Statistically significantly less than control at P = 0.05 level				

CHRONIC TOXICITY

END POINT	GERMINATION	GERM TUBE LENGTH
NOEC	18%	18%
TUc (100/NOEC)	5.56	5.56

QA/QC TEST ACCEPTABILITY

Parameter	Result
Mean control germination ≥70%	Yes (84.0%)
Mean control germination tube length >10 μm	Yes (14.95 μm)
Please see RT-060117 report for additional test acceptability criteria.	

Macrocystis Germination and Growth Test-Proportion Germinated

Start Date:	17 Jan-06 15:00	Test ID:	6011701k	Sample ID:	CA0047881-Morro Bay SD
End Date:	19 Jan-06 15:00	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	16 Jan-06 00:00	Protocol:	MBP 90	Test Species:	MP-Macrocystis pyrifera
Comments:					

Conc-%	1	2	3	4	5
B-Control	0.8654	0.8039	0.8515	0.8416	0.8350
D-Control	0.8137	0.8750	0.8700	0.9126	0.8431
5.6	0.8218	0.8700	0.8148	0.8137	0.9010
10	0.8725	0.9020	0.8058	0.8235	0.8269
18	0.8812	0.8679	0.8333	0.7921	0.8627
32	0.8137	0.6887	0.7339	0.6604	0.6832
56	0.3868	0.3204	0.3084	0.2233	0.3925

			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
B-Control	0.8395	0.9728	1.1593	1.1121	1.1951	2.665	5				82	511
D-Control	0.8629	1.0000	1.1940	1.1245	1.2707	4.575	5					
5.6	0.8443	0.9784	1.1676	1.1245	1.2507	4.833	5	-0.228	2.360	0.0867	80	512
10	0.8462	0.9806	1.1703	1.1145	1.2523	4.873	5	-0.301	2.360	0.0867	79	513
18	0.8475	0.9821	1.1713	1.0973	1.2189	4.125	5	-0.328	2.360	0.0867	78	512
*32	0.7160	0.8297	1.0108	0.9487	1.1245	6.921	5	4.040	2.360	0.0867	149	524
*56	0.3263	0.3781	0.6062	0.4922	0.6771	12.393	5	15.047	2.360	0.0867	354	526

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.98129	0.9	0.18818	-0.3209
Bartlett's Test indicates equal variances (p = 0.69)	3.08009	15.0863		
The control means are not significantly different (p = 0.25)	1.23943	2.30601		

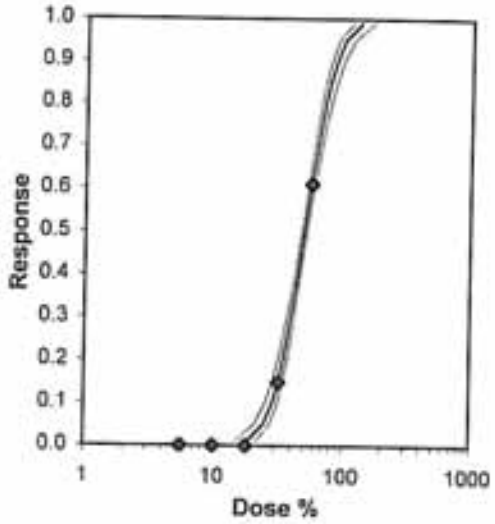
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSB	MSE	F-Stat	F-Prob	df
Dunnett's Test	18	32	24	5.55556	0.06839	0.25344	0.00338	75.0418	7.4E-14	5, 24

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits	
Slope	5.44978	0.49647	4.4767	6.42285
Intercept	-4.2366	0.83428	-5.8718	-2.6014
TSCR	0.1544	0.00836	0.13801	0.1708

Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
0.16047	0.34523	11.3449	0.95	1.69486	0.18349	3

Point	Probits	%	95% Fiducial Limits	
EC01	2.674	18.5349	14.9236	21.5975
EC05	3.355	24.7196	21.1366	27.6425
EC10	3.718	28.8207	25.4213	31.5596
EC15	3.964	31.9656	28.7706	34.5381
EC20	4.158	34.708	31.7205	37.1325
EC25	4.326	37.2475	34.4623	39.5462
EC40	4.747	44.5014	42.1879	46.6558
EC50	5.000	49.5292	47.2582	51.9581
EC60	5.253	55.1251	52.5228	58.3204
EC75	5.674	65.8607	61.8487	71.5288
EC80	5.842	70.6796	65.8455	77.7392
EC85	6.036	76.7433	70.7724	85.7335
EC90	6.282	85.1174	77.435	97.0498
EC95	6.645	99.2389	88.3921	116.744
EC99	7.326	132.352	113.115	165.373



Macrocystis Germination and Growth Test-Growth-Length

Start Date:	17 Jan-06 15:00	Test ID:	6011701k	Sample ID:	CA0047881-Morro Bay SD
End Date:	19 Jan-06 15:00	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	EFF1-POTW
Sample Date:	16 Jan-06 00:00	Protocol:	MBP 90	Test Species:	MP-Macrocystis pyrifera
Comments:					

Conc-%	1	2	3	4	5
B-Control	15.000	15.000	14.250	15.500	15.000
D-Control	15.000	15.250	14.750	15.000	15.250
5.6	14.500	15.000	15.750	14.750	14.750
10	15.000	14.750	14.250	14.750	14.750
18	14.500	14.750	15.250	13.750	14.500
32	10.500	10.500	11.500	12.500	12.500
56	9.250	8.250	8.750	8.500	10.500

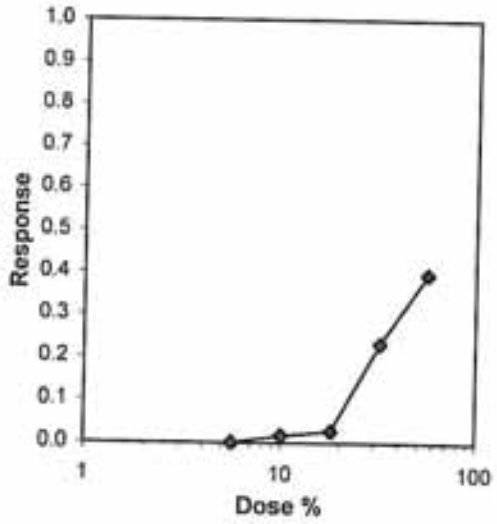
			Transform: Untransformed					1-Tailed			Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
B-Control	14.950	0.9934	14.950	14.250	15.500	2.991	5				14.950	1.0000
D-Control	15.050	1.0000	15.050	14.750	15.250	1.390	5					
5.6	14.950	0.9934	14.950	14.500	15.750	3.217	5	0.000	2.360	0.981	14.950	1.0000
10	14.700	0.9767	14.700	14.250	15.000	1.863	5	0.601	2.360	0.981	14.700	0.9833
18	14.550	0.9668	14.550	13.750	15.250	3.725	5	0.962	2.360	0.981	14.550	0.9732
*32	11.500	0.7641	11.500	10.500	12.500	8.696	5	8.297	2.360	0.981	11.500	0.7692
*56	9.050	0.6013	9.050	8.250	10.500	9.844	5	14.188	2.360	0.981	9.050	0.6054

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95634	0.9	0.4066	0.1152
Bartlett's Test indicates equal variances (p = 0.18)	7.61211	15.0863		
The control means are not significantly different (p = 0.66)	0.45291	2.30601		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSB	MSE	F-Stat	F-Prob	df
Dunnett's Test	18	32	24	5.55556	0.98136	30.2683	0.43229	70.0183	1.6E-13	5, 24

Linear Interpolation (80 Resamples)

Point	%	SE	95% CL(Exp)		Skew
IC05	19.595	1.867	11.082	21.345	-1.9949
IC10	23.026	1.035	19.955	24.610	-0.3146
IC15	26.457	1.176	23.511	29.050	0.0121
IC20	29.889	1.521	26.149	33.271	0.2626
IC25	34.816	2.829	28.177	41.824	0.0902
IC40	>56				
IC50	>56				



GIANT KELP GERMINATION AND GROWTH
SHORT-TERM TOXICITY TEST

Lab No.: A-06011701-MarloBuf

TEST DATA

Petri Dish No.	Test Sample Conc.	Total Number Counted	Number of Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					1	2	3	4	5	6	7	8	9	10
1	18	106	92	14	7	6	5	4	7	6	6	7	5	6
2	13	104	90	14	6	7	5	7	7	6	5	5	6	6
3	32	102	83	19	6	4	5	4	6	6	4	2	2	3
4	5-6	108	88	20	6	7	5	6	7	7	5	7	7	6
5	56	107	33	74	4	5	4	3	3	2	5	4	3	2
6	10	102	89	13	6	6	7	5	5	6	7	5	6	7
7	5-6	102	83	19	7	7	6	5	4	5	7	6	6	6
8	18	102	85	17	6	5	5	7	7	6	7	6	7	5
9	13	102	82	20	7	6	7	7	5	4	7	6	5	6
10	32	106	73	33	3	6	3	4	6	5	6	4	2	3
11	10	102	92	10	7	5	7	6	5	4	5	6	7	7
12	56	103	23	80	2	4	3	3	4	5	4	3	2	4
13	13	101	86	15	6	7	6	5	4	7	6	5	5	6
14	18	101	80	21	7	6	4	5	5	6	6	7	5	4
15	10	103	83	20	6	7	5	7	6	6	4	7	5	4
16	32	109	80	29	4	5	4	4	5	6	3	4	6	5
17	5-6	101	91	10	7	5	5	6	7	5	7	4	6	7
18	56	107	42	65	3	5	4	7	4	6	4	4	2	3
19	18	102	88	14	6	7	5	7	6	5	4	6	6	6
20	10	102	84	18	6	7	7	6	6	4	5	6	7	5

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

Analyst: _____

Date: 1-19-06

GIANT KELP GERMINATION AND GROWTH
SHORT-TERM TOXICITY TEST

Lab No.: A-06011701-Morro Bay

TEST DATA

Petri Dish No.	Test Sample Conc.	Total Number Counted	Number of Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					1	2	3	4	5	6	7	8	9	10
21	13	101	85	16	6	5	7	6	7	5	7	7	6	6
22	32	106	70	36	5	4	4	3	5	6	7	4	6	6
23	5.6	101	83	18	7	6	5	4	7	4	7	7	6	5
24	5.6	106	41	65	4	3	3	4	5	5	4	2	4	3
25	5.6	100	87	13	6	7	7	7	4	4	6	7	7	5
26	18	101	89	12	7	5	6	4	5	5	7	6	7	6
27	10	104	86	18	6	6	7	5	6	6	7	7	4	5
28	13	103	86	17	6	4	7	4	7	7	6	6	7	6
29	56	103	33	70	3	4	2	5	4	3	2	4	3	3
30	32	101	69	32	2	4	4	7	7	5	6	6	4	5
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														

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

Analyst: [signature]

Date: 1-19-06

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

Lab No.: A-06011701
Client ID: MRS - Morro Bay Effluent

Start Date: 01/17/2006

WATER QUALITY READINGS

Sample	Initial Readings				Final Readings			
	Temp (°C)	DO (mg/l)	pH	Salinity (o/oo)	Temp (°C)	DO (mg/l)	pH	Salinity (o/oo)
Control	15.4	7.5	8.2	34	15.3	7.8	8.1	34
Brine Control	15.6	7.4	8.2	34	14.8	7.6	8.1	34
5.6%	14.9	7.5	8.2	34	15.4	7.7	8.1	34
10%	14.9	7.5	8.2	34	15.5	7.7	8.1	34
18%	14.7	7.4	8.2	34	15.2	7.6	8.1	34
32%	14.7	7.3	8.2	34	15.6	7.5	8.1	34
56%	14.8	7.2	8.2	34	14.7	7.6	8.1	34

Sample as received: Chlorine: 0.0 mg/l; pH: 8.2; Salinity: 2 ppt; Temp: 2°C; DO: 20 mg/l; NH_3-N: 40 mg/l..

Brine Control contains equivalent amount of artificial sea salts as highest effluent concentration.

Initial readings: Analyst: _____ Date: 1-17-06 Time: 15:00

Final readings: Analyst: _____ Date: 1-19-06 Time: 15:00

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

Lab No.: A-06011701

Client ID: MRS - Morro Bay Effluent

Start Date: 01/17/2006

RANDOMIZATION WORKSHEET

Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Notes
1	18	11	10	21	B	Need 7500/ml x 50 ml = 375,000 spores. Add 0.25 ml spore stock of 6 spores per 5x5 hemacytometer grid
2	B	12	56	22	32	
3	32	13	B	23	5.6	
4	5.6	14	18	24	56	
5	56	15	10	25	5.6	
6	10	16	32	26	18	
7	5.6	17	5.6	27	10	
8	18	18	56	28	B	
9	B	19	18	29	56	
10	32	20	10	30	32	

Analyst: _____ Date: 1-17-06 Time: 1200

CHEMICAL ANALYSIS RESULTS

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

Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Water Analysis (General Chemistry)

BCL Sample ID: 0600355-01 | **Client Sample Name:** Grab, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Ammonia as N (Distilled)	19	mg/L	2.5	1.0	EPA-350.1	01/20/06	01/21/06 08:30	VC1	AAII-5	50	BPA0690	ND	

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

Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Water Analysis (General Chemistry)

BCL Sample ID: 0600355-02 | **Client Sample Name:** Composite, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Total Cyanide	ND	mg/L	0.020	0.0063	EPA-335.3	01/17/06	01/18/06 04:00	MRM	AAII-1	1	BPA0690	ND	

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

Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Water Analysis (Metals)

BCL Sample ID: 0600355-02 | **Client Sample Name:** Composite, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Total Antimony	21	ug/L	100	4.5	EPA-200.7	01/16/06	01/17/06 18:06	EMC	PE-OP2	1	BPA0629	5.0	J
Total Beryllium	ND	ug/L	10	0.68	EPA-200.7	01/16/06	01/17/06 18:06	EMC	PE-OP2	1	BPA0629	0.27	
Total Cadmium	ND	ug/L	10	2.6	EPA-200.7	01/16/06	01/17/06 18:06	EMC	PE-OP2	1	BPA0629	ND	
Total Chromium	ND	ug/L	10	1.7	EPA-200.7	01/16/06	01/17/06 18:06	EMC	PE-OP2	1	BPA0629	0.35	
Total Copper	14	ug/L	10	1.2	EPA-200.7	01/16/06	01/17/06 18:06	EMC	PE-OP2	1	BPA0629	1.9	
Total Mercury	0.030	ug/L	0.20	0.020	EPA-245.1	01/18/06	01/19/06 10:58	DKC	CETAC1	1	BPA0730	0.018	J
Total Nickel	ND	ug/L	10	3.5	EPA-200.7	01/16/06	01/17/06 18:06	EMC	PE-OP2	1	BPA0629	0.25	
Total Silver	ND	ug/L	10	1.4	EPA-200.7	01/16/06	01/17/06 18:06	EMC	PE-OP2	1	BPA0629	ND	
Total Zinc	61	ug/L	50	7.3	EPA-200.7	01/16/06	01/17/06 18:06	EMC	PE-OP2	1	BPA0629	15	
Total Recoverable Arsenic	1.8	ug/L	2.0	0.89	EPA-200.8	01/17/06	01/19/06 13:29	PPS	PE-EL1	1	BPA0673	ND	J
Total Recoverable Lead	2.2	ug/L	1.0	0.019	EPA-200.8	01/17/06	01/19/06 13:29	PPS	PE-EL1	1	BPA0673	0.20	
Total Recoverable Selenium	0.99	ug/L	2.0	0.31	EPA-200.8	01/17/06	01/19/06 13:29	PPS	PE-EL1	1	BPA0673	ND	J
Total Recoverable Thallium	ND	ug/L	1.0	0.024	EPA-200.8	01/17/06	01/19/06 13:29	PPS	PE-EL1	1	BPA0673	0.067	

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

Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Organochlorine Pesticides and PCB's (EPA Method 608)

BCL Sample ID: 0600355-02 | **Client Sample Name:** Composite, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Aldrin	ND	ug/L	0.0050	0.00092	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
alpha-BHC	ND	ug/L	0.0050	0.00094	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
beta-BHC	ND	ug/L	0.0050	0.00063	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
delta-BHC	ND	ug/L	0.0050	0.00054	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
gamma-BHC (Lindane)	ND	ug/L	0.0050	0.00081	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Chlordane (Technical)	ND	ug/L	0.50	0.38	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
4,4'-DDD	ND	ug/L	0.0050	0.00057	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
4,4'-DDE	ND	ug/L	0.0050	0.00063	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
4,4'-DDT	ND	ug/L	0.0050	0.00047	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Dieldrin	ND	ug/L	0.0050	0.00068	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Endosulfan I	ND	ug/L	0.0050	0.00085	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Endosulfan II	ND	ug/L	0.0050	0.00082	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Endosulfan sulfate	ND	ug/L	0.0050	0.0010	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Endrin	ND	ug/L	0.0050	0.00067	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Endrin aldehyde	ND	ug/L	0.010	0.00087	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Heptachlor	ND	ug/L	0.0050	0.00079	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Heptachlor epoxide	ND	ug/L	0.0050	0.00020	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Methoxychlor	ND	ug/L	0.0050	0.0024	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Toxaphene	ND	ug/L	2.0	0.42	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
PCB-1016	ND	ug/L	0.20	0.034	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
PCB-1221	ND	ug/L	0.20	0.089	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
PCB-1232	ND	ug/L	0.20	0.090	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
PCB-1242	ND	ug/L	0.20	0.095	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Organochlorine Pesticides and PCB's (EPA Method 608)

BCL Sample ID: 0600355-02 | **Client Sample Name:** Composite, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
PCB-1248	ND	ug/L	0.20	0.025	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
PCB-1254	ND	ug/L	0.20	0.042	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
PCB-1260	ND	ug/L	0.20	0.043	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
Total PCB's (Summation)	ND	ug/L	0.20	0.10	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588	ND	
TCMX (Surrogate)	119	%	55 - 123	(LCL - UCL)	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588		
Dibutyl chlorendate (Surrogate)	134	%	48 - 149	(LCL - UCL)	EPA-608	01/13/06	01/17/06 22:36	SAM	GC-1	1	BPA0588		

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 0600355-02 | **Client Sample Name:** Composite, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Benzene	ND	ug/L	0.50	0.11	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Bromodichloromethane	0.10	ug/L	0.50	0.067	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	J
Bromoform	0.16	ug/L	0.50	0.051	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	J
Bromomethane	ND	ug/L	1.0	0.45	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Carbon tetrachloride	ND	ug/L	0.50	0.099	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Chlorobenzene	ND	ug/L	0.50	0.050	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Chloroethane	ND	ug/L	0.50	0.12	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Chloroform	1.2	ug/L	0.50	0.050	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Chloromethane	ND	ug/L	0.50	0.21	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Dibromochloromethane	0.26	ug/L	0.50	0.056	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	J
1,2-Dichlorobenzene	ND	ug/L	0.50	0.085	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
1,3-Dichlorobenzene	ND	ug/L	0.50	0.081	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
1,4-Dichlorobenzene	ND	ug/L	0.50	0.062	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
1,1-Dichloroethane	ND	ug/L	0.50	0.17	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
1,2-Dichloroethane	ND	ug/L	0.50	0.11	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
1,1-Dichloroethene	ND	ug/L	0.50	0.088	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
trans-1,2-Dichloroethene	ND	ug/L	0.50	0.11	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
1,2-Dichloropropane	ND	ug/L	0.50	0.13	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
cis-1,3-Dichloropropene	ND	ug/L	0.50	0.079	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
trans-1,3-Dichloropropene	ND	ug/L	0.50	0.13	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Ethylbenzene	ND	ug/L	0.50	0.13	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Methylene chloride	ND	ug/L	1.0	0.16	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Methyl t-butyl ether	ND	ug/L	0.50	0.052	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	0.11	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 0600355-02 | **Client Sample Name:** Composite, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	0.057	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Tetrachloroethene	ND	ug/L	0.50	0.12	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Toluene	0.16	ug/L	0.50	0.057	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	J
1,1,1-Trichloroethane	ND	ug/L	0.50	0.093	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
1,1,2-Trichloroethane	ND	ug/L	0.50	0.063	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Trichloroethene	ND	ug/L	0.50	0.055	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	0.26	
Trichlorofluoromethane	ND	ug/L	0.50	0.094	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ug/L	0.50	0.18	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Vinyl chloride	ND	ug/L	0.50	0.098	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
Total Xylenes	0.48	ug/L	1.0	0.23	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	J
Acrolein	ND	ug/L	50	1.0	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	V11
Acrylonitrile	ND	ug/L	20	0.66	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	
p- & m-Xylenes	0.35	ug/L	0.50	0.10	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	J
o-Xylene	0.13	ug/L	0.50	0.13	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785	ND	J
1,2-Dichloroethane-d4 (Surrogate)	108	%	76 - 114	(LCL - UCL)	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785		
Toluene-d8 (Surrogate)	96.7	%	88 - 110	(LCL - UCL)	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785		
4-Bromofluorobenzene (Surrogate)	96.2	%	86 - 115	(LCL - UCL)	EPA-624	01/19/06	01/20/06 00:38	mgc	MS-V7	1	BPA0785		

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Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

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

BCL Sample ID: 0600355-01 | **Client Sample Name:** Grab, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
4-Chloro-3-methylphenol	ND	ug/L	5.0	0.32	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
2-Chlorophenol	ND	ug/L	2.0	0.27	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
2,4-Dichlorophenol	ND	ug/L	2.0	0.30	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
2,4-Dimethylphenol	ND	ug/L	2.0	0.58	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
4,6-Dinitro-2-methylphenol	ND	ug/L	10	0.30	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
2,4-Dinitrophenol	ND	ug/L	10	0.21	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
2-Methylphenol	ND	ug/L	2.0	0.36	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
3- & 4-Methylphenol	ND	ug/L	2.0	0.60	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
2-Nitrophenol	ND	ug/L	2.0	0.35	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
4-Nitrophenol	ND	ug/L	2.0	0.16	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
Pentachlorophenol	ND	ug/L	10	0.42	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
Phenol	ND	ug/L	2.0	0.18	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
2,4,5-Trichlorophenol	ND	ug/L	5.0	0.36	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
2,4,6-Trichlorophenol	ND	ug/L	5.0	0.39	EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604	ND	
2-Fluorophenol (Surrogate)	54.7	%	22 - 83 (LCL - UCL)		EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604		
Phenol-d5 (Surrogate)	57.2	%	12 - 69 (LCL - UCL)		EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604		
Nitrobenzene-d5 (Surrogate)	77.6	%	52 - 115 (LCL - UCL)		EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604		
2-Fluorobiphenyl (Surrogate)	75.5	%	40 - 109 (LCL - UCL)		EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604		
2,4,6-Tribromophenol (Surrogate)	85.7	%	54 - 126 (LCL - UCL)		EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604		
p-Terphenyl-d14 (Surrogate)	89.6	%	54 - 112 (LCL - UCL)		EPA-625	01/12/06	01/19/06 23:35	SKC	MS-B2	1	BPA0604		

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

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

BCL Sample ID: 0600355-02 | **Client Sample Name:** Composite, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Acenaphthene	ND	ug/L	2.0	0.26	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Acenaphthylene	ND	ug/L	2.0	0.25	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Aldrin	ND	ug/L	2.0	0.45	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Aniline	ND	ug/L	5.0	0.72	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Anthracene	ND	ug/L	2.0	0.27	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Benzidine	ND	ug/L	20	5.3	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Benzo[a]anthracene	ND	ug/L	2.0	0.35	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Benzo[b]fluoranthene	ND	ug/L	2.0	0.41	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Benzo[k]fluoranthene	ND	ug/L	2.0	0.21	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Benzo[a]pyrene	ND	ug/L	2.0	0.31	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Benzo[g,h,i]perylene	ND	ug/L	2.0	0.66	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Benzoic acid	ND	ug/L	10	1.3	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Benzyl alcohol	2.3	ug/L	2.0	0.30	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Benzyl butyl phthalate	1.5	ug/L	2.0	0.74	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	J
alpha-BHC	ND	ug/L	2.0	0.42	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
beta-BHC	ND	ug/L	2.0	0.44	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
delta-BHC	ND	ug/L	2.0	0.33	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
gamma-BHC (Lindane)	ND	ug/L	2.0	0.41	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
bis(2-Chloroethoxy)methane	ND	ug/L	2.0	0.37	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
bis(2-Chloroethyl) ether	ND	ug/L	2.0	0.37	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
bis(2-Chloroisopropyl)ether	ND	ug/L	2.0	0.28	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
bis(2-Ethylhexyl)phthalate	16	ug/L	5.0	1.3	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
4-Bromophenyl phenyl ether	ND	ug/L	2.0	0.41	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

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

BCL Sample ID: 0600355-02 | **Client Sample Name:** Composite, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
4-Chloroaniline	ND	ug/L	2.0	0.66	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2-Chloronaphthalene	ND	ug/L	2.0	0.31	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
4-Chlorophenyl phenyl ether	ND	ug/L	2.0	0.27	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Chrysene	ND	ug/L	2.0	0.43	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
4,4'-DDD	ND	ug/L	2.0	1.3	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
4,4'-DDE	ND	ug/L	3.0	1.2	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
4,4'-DDT	ND	ug/L	2.0	1.6	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Dibenzo[a,h]anthracene	ND	ug/L	3.0	0.68	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Dibenzofuran	ND	ug/L	2.0	0.29	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
1,2-Dichlorobenzene	ND	ug/L	2.0	0.32	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
1,3-Dichlorobenzene	ND	ug/L	2.0	0.34	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
1,4-Dichlorobenzene	ND	ug/L	2.0	0.39	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
3,3-Dichlorobenzidine	ND	ug/L	10	2.5	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Dieldrin	ND	ug/L	3.0	1.5	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Diethyl phthalate	0.82	ug/L	2.0	0.39	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	J
Dimethyl phthalate	ND	ug/L	2.0	0.24	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Di-n-butyl phthalate	ND	ug/L	2.0	0.31	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2,4-Dinitrotoluene	ND	ug/L	2.0	0.23	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2,6-Dinitrotoluene	ND	ug/L	2.0	0.29	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Di-n-octyl phthalate	ND	ug/L	2.0	0.67	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
1,2-Diphenylhydrazine	ND	ug/L	2.0	0.22	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Endosulfan I	ND	ug/L	10	1.7	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Endosulfan II	ND	ug/L	10	0.85	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

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

BCL Sample ID: 0600355-02 | **Client Sample Name:** Composite, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Endosulfan sulfate	ND	ug/L	3.0	1.3	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Endrin	ND	ug/L	2.0	1.8	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Endrin aldehyde	ND	ug/L	10	4.0	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Fluoranthene	ND	ug/L	2.0	0.28	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Fluorene	ND	ug/L	2.0	0.32	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Heptachlor	ND	ug/L	2.0	0.35	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Heptachlor epoxide	ND	ug/L	2.0	0.54	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Hexachlorobenzene	ND	ug/L	2.0	0.44	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Hexachlorobutadiene	ND	ug/L	2.0	0.37	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Hexachlorocyclopentadiene	ND	ug/L	2.0	0.70	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Hexachloroethane	ND	ug/L	2.0	0.45	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Indeno[1,2,3-cd]pyrene	ND	ug/L	2.0	0.61	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Isophorone	ND	ug/L	2.0	0.35	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2-Methylnaphthalene	ND	ug/L	2.0	0.39	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Naphthalene	ND	ug/L	2.0	0.33	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2-Naphthylamine	ND	ug/L	20	4.1	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	V11
2-Nitroaniline	ND	ug/L	2.0	0.29	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
3-Nitroaniline	ND	ug/L	2.0	0.49	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
4-Nitroaniline	ND	ug/L	5.0	0.28	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Nitrobenzene	ND	ug/L	2.0	0.26	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
N-Nitrosodimethylamine	ND	ug/L	2.0	0.17	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
N-Nitrosodi-N-propylamine	ND	ug/L	2.0	0.41	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
N-Nitrosodiphenylamine	ND	ug/L	2.0	0.30	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

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

BCL Sample ID: 0600355-02 | **Client Sample Name:** Composite, 1/11/2006 9:20:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Phenanthrene	ND	ug/L	2.0	0.30	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Pyrene	ND	ug/L	2.0	0.81	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
1,2,4-Trichlorobenzene	ND	ug/L	2.0	0.35	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
4-Chloro-3-methylphenol	ND	ug/L	5.0	0.32	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2-Chlorophenol	ND	ug/L	2.0	0.27	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2,4-Dichlorophenol	ND	ug/L	2.0	0.30	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2,4-Dimethylphenol	ND	ug/L	2.0	0.58	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
4,6-Dinitro-2-methylphenol	ND	ug/L	10	0.30	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2,4-Dinitrophenol	ND	ug/L	10	0.21	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2-Methylphenol	ND	ug/L	2.0	0.36	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
3- & 4-Methylphenol	ND	ug/L	2.0	0.60	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2-Nitrophenol	ND	ug/L	2.0	0.35	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
4-Nitrophenol	ND	ug/L	2.0	0.16	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Pentachlorophenol	ND	ug/L	10	0.42	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
Phenol	ND	ug/L	2.0	0.18	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2,4,5-Trichlorophenol	ND	ug/L	5.0	0.36	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2,4,6-Trichlorophenol	ND	ug/L	5.0	0.39	EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604	ND	
2-Fluorophenol (Surrogate)	50.0	%	22 - 83 (LCL - UCL)		EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604		
Phenol-d5 (Surrogate)	49.9	%	12 - 69 (LCL - UCL)		EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604		
Nitrobenzene-d5 (Surrogate)	70.8	%	52 - 115 (LCL - UCL)		EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604		
2-Fluorobiphenyl (Surrogate)	74.1	%	40 - 109 (LCL - UCL)		EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604		
2,4,6-Tribromophenol (Surrogate)	78.5	%	54 - 126 (LCL - UCL)		EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604		
p-Terphenyl-d14 (Surrogate)	84.2	%	54 - 112 (LCL - UCL)		EPA-625	01/12/06	01/20/06 00:03	SKC	MS-B2	1	BPA0604		

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Project Manager: Doug Coats

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Notes and Definitions

V11	The Continuing Calibration Verification (CCV) recovery is not within established control limits.
S09	The surrogate recovery on the sample for this compound was not within the control limits
S08	The internal standard on the sample was not within the control limits.
M03	Analyte detected in the Method Blank at a level between the PQL and the MDL.
J	Estimated value
A02	The difference between duplicate readings is less than the PQL.
ND	Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

QA/QC REPORTS & CHAINS OF CUSTODY

Marine Research Specialists
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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Water Analysis (General Chemistry)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample ID	QC Sample Type	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Total Cyanide	BPA0690	BPA0690-DUP1	Duplicate	ND	ND		mg/L			10		
		BPA0690-MS1	Matrix Spike	ND	0.25900	0.25000	mg/L		104		90 - 110	
		BPA0690-MSD1	Matrix Spike Duplicate	ND	0.26225	0.25000	mg/L	0.957	105	20	90 - 110	
Ammonia as N (Distilled)	BPA0890	BPA0890-DUP1	Duplicate	19.321	19.636		mg/L	1.62		20		
		BPA0890-MS1	Matrix Spike	19.321	21.530	4.0000	mg/L		55.2		80 - 120	
		BPA0890-MSD1	Matrix Spike Duplicate	19.321	21.846	4.0000	mg/L	13.4	63.1	20	80 - 120	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Water Analysis (General Chemistry)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Total Cyanide	BPA0690	BPA0690-BLK1	ND	mg/L	0.020	0.0063	
Ammonia as N (Distilled)	BPA0890	BPA0890-BLK1	ND	mg/L	0.050	0.020	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Water Analysis (General Chemistry)

Quality Control Report - Laboratory Control Sample

Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
Total Cyanide	BPA0690	BPA0690-BS1	LCS	0.39150	0.37500	0.020	mg/L	104		90 - 110		
Ammonia as N (Distilled)	BPA0890	BPA0890-BS1	LCS	0.72720	0.80000	0.050	mg/L	90.9		85 - 115		

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Water Analysis (Metals)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample ID	QC Sample Type	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Total Antimony	BPA0629	BPA0629-DUP1	Duplicate	11.222	9.3382		ug/L	18.3		20		J
		BPA0629-MS1	Matrix Spike	11.222	393.94	400.00	ug/L		95.7		75 - 125	
		BPA0629-MSD1	Matrix Spike Duplicate	11.222	398.49	400.00	ug/L	1.14	96.8	20	75 - 125	
Total Beryllium	BPA0629	BPA0629-DUP1	Duplicate	ND	ND		ug/L			20		
		BPA0629-MS1	Matrix Spike	ND	203.25	200.00	ug/L		102		75 - 125	
		BPA0629-MSD1	Matrix Spike Duplicate	ND	203.42	200.00	ug/L	0.00	102	20	75 - 125	
Total Cadmium	BPA0629	BPA0629-DUP1	Duplicate	ND	ND		ug/L			20		
		BPA0629-MS1	Matrix Spike	ND	204.76	200.00	ug/L		102		75 - 125	
		BPA0629-MSD1	Matrix Spike Duplicate	ND	202.67	200.00	ug/L	0.985	101	20	75 - 125	
Total Chromium	BPA0629	BPA0629-DUP1	Duplicate	ND	ND		ug/L			20		
		BPA0629-MS1	Matrix Spike	ND	193.69	200.00	ug/L		96.8		75 - 125	
		BPA0629-MSD1	Matrix Spike Duplicate	ND	193.49	200.00	ug/L	0.103	96.7	20	75 - 125	
Total Copper	BPA0629	BPA0629-DUP1	Duplicate	57.280	59.061		ug/L	3.06		20		
		BPA0629-MS1	Matrix Spike	57.280	259.96	200.00	ug/L		101		75 - 125	
		BPA0629-MSD1	Matrix Spike Duplicate	57.280	260.58	200.00	ug/L	0.985	102	20	75 - 125	
Total Nickel	BPA0629	BPA0629-DUP1	Duplicate	4.8771	5.6848		ug/L	15.3		20		J
		BPA0629-MS1	Matrix Spike	4.8771	411.98	400.00	ug/L		102		75 - 125	
		BPA0629-MSD1	Matrix Spike Duplicate	4.8771	414.69	400.00	ug/L	0.00	102	20	75 - 125	
Total Silver	BPA0629	BPA0629-DUP1	Duplicate	ND	ND		ug/L			20		
		BPA0629-MS1	Matrix Spike	ND	92.154	100.00	ug/L		92.2		75 - 125	
		BPA0629-MSD1	Matrix Spike Duplicate	ND	91.280	100.00	ug/L	0.981	91.3	20	75 - 125	
Total Zinc	BPA0629	BPA0629-DUP1	Duplicate	119.19	124.90		ug/L	4.68		20		
		BPA0629-MS1	Matrix Spike	119.19	321.86	200.00	ug/L		101		75 - 125	
		BPA0629-MSD1	Matrix Spike Duplicate	119.19	322.70	200.00	ug/L	0.985	102	20	75 - 125	
Total Recoverable Arsenic	BPA0673	BPA0673-DUP1	Duplicate	22.042	21.853		ug/L	0.861		20		
		BPA0673-MS1	Matrix Spike	22.042	63.518	50.000	ug/L		83.0		70 - 130	
		BPA0673-MSD1	Matrix Spike Duplicate	22.042	64.000	50.000	ug/L	1.08	83.9	20	70 - 130	
Total Recoverable Lead	BPA0673	BPA0673-DUP1	Duplicate	0.94600	0.93500		ug/L	1.17		20		J
		BPA0673-MS1	Matrix Spike	0.94600	51.187	50.000	ug/L		100		70 - 130	
		BPA0673-MSD1	Matrix Spike Duplicate	0.94600	51.871	50.000	ug/L	1.98	102	20	70 - 130	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

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Water Analysis (Metals)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample ID	QC Sample Type	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Total Recoverable Selenium	BPA0673	BPA0673-DUP1	Duplicate	ND	ND		ug/L			20		
		BPA0673-MS1	Matrix Spike	ND	39.594	50.000	ug/L		79.2		70 - 130	
		BPA0673-MSD1	Matrix Spike Duplicate	ND	39.686	50.000	ug/L	0.252	79.4	20	70 - 130	
Total Recoverable Thallium	BPA0673	BPA0673-DUP1	Duplicate	0.33900	0.085000		ug/L	120		20		A02, J
		BPA0673-MS1	Matrix Spike	0.33900	19.439	20.000	ug/L		95.5		70 - 130	
		BPA0673-MSD1	Matrix Spike Duplicate	0.33900	19.761	20.000	ug/L	1.66	97.1	20	70 - 130	
Total Mercury	BPA0730	BPA0730-DUP1	Duplicate	ND	0.025000		ug/L			20		J
		BPA0730-MS1	Matrix Spike	ND	1.0725	1.0000	ug/L		107		70 - 130	
		BPA0730-MSD1	Matrix Spike Duplicate	ND	1.0225	1.0000	ug/L	4.78	102	20	70 - 130	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Water Analysis (Metals)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Total Antimony	BPA0629	BPA0629-BLK1	5.0230	ug/L	100	4.5	J
Total Beryllium	BPA0629	BPA0629-BLK1	ND	ug/L	10	0.68	
Total Cadmium	BPA0629	BPA0629-BLK1	ND	ug/L	10	2.6	
Total Chromium	BPA0629	BPA0629-BLK1	ND	ug/L	10	1.7	
Total Copper	BPA0629	BPA0629-BLK1	1.9364	ug/L	10	1.2	J
Total Nickel	BPA0629	BPA0629-BLK1	ND	ug/L	10	3.5	
Total Silver	BPA0629	BPA0629-BLK1	ND	ug/L	10	1.4	
Total Zinc	BPA0629	BPA0629-BLK1	14.676	ug/L	50	7.3	J
Total Recoverable Arsenic	BPA0673	BPA0673-BLK1	ND	ug/L	2.0	0.89	
Total Recoverable Lead	BPA0673	BPA0673-BLK1	0.20000	ug/L	1.0	0.019	J
Total Recoverable Selenium	BPA0673	BPA0673-BLK1	ND	ug/L	2.0	0.31	
Total Recoverable Thallium	BPA0673	BPA0673-BLK1	0.067000	ug/L	1.0	0.024	J
Total Mercury	BPA0730	BPA0730-BLK1	ND	ug/L	0.20	0.020	

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Project: Semi-annual eff
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Water Analysis (Metals)

Quality Control Report - Laboratory Control Sample

Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
Total Antimony	BPA0629	BPA0629-BS1	LCS	384.76	400.00	100	ug/L	96.2		85 - 115		
Total Beryllium	BPA0629	BPA0629-BS1	LCS	201.01	200.00	10	ug/L	101		85 - 115		
Total Cadmium	BPA0629	BPA0629-BS1	LCS	202.58	200.00	10	ug/L	101		85 - 115		
Total Chromium	BPA0629	BPA0629-BS1	LCS	190.24	200.00	10	ug/L	95.1		85 - 115		
Total Copper	BPA0629	BPA0629-BS1	LCS	194.57	200.00	10	ug/L	97.3		85 - 115		
Total Nickel	BPA0629	BPA0629-BS1	LCS	409.63	400.00	10	ug/L	102		85 - 115		
Total Silver	BPA0629	BPA0629-BS1	LCS	91.670	100.00	10	ug/L	91.7		85 - 115		
Total Zinc	BPA0629	BPA0629-BS1	LCS	205.99	200.00	50	ug/L	103		85 - 115		
Total Recoverable Arsenic	BPA0673	BPA0673-BS1	LCS	49.881	50.000	2.0	ug/L	99.8		85 - 115		
Total Recoverable Lead	BPA0673	BPA0673-BS1	LCS	51.122	50.000	1.0	ug/L	102		85 - 115		
Total Recoverable Selenium	BPA0673	BPA0673-BS1	LCS	49.756	50.000	2.0	ug/L	99.5		85 - 115		
Total Recoverable Thallium	BPA0673	BPA0673-BS1	LCS	19.395	20.000	1.0	ug/L	97.0		85 - 115		
Total Mercury	BPA0730	BPA0730-BS1	LCS	1.0000	1.0000	0.20	ug/L	100		85 - 115		

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Project Manager: Doug Coats

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Organochlorine Pesticides and PCB's (EPA Method 608)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample ID	QC Sample Type	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Aldrin	BPA0588	BPA0588-MS1	Matrix Spike	ND	0.26152	0.25000	ug/L		105		50 - 143	
		BPA0588-MSD1	Matrix Spike Duplicate	ND	0.25341	0.25000	ug/L	3.88	101	22	50 - 143	
gamma-BHC (Lindane)	BPA0588	BPA0588-MS1	Matrix Spike	ND	0.24381	0.25000	ug/L		97.5		38 - 134	
		BPA0588-MSD1	Matrix Spike Duplicate	ND	0.24282	0.25000	ug/L	0.411	97.1	20	38 - 134	
4,4'-DDT	BPA0588	BPA0588-MS1	Matrix Spike	ND	0.23563	0.25000	ug/L		94.3		30 - 154	
		BPA0588-MSD1	Matrix Spike Duplicate	ND	0.22540	0.25000	ug/L	4.44	90.2	30	30 - 154	
Dieldrin	BPA0588	BPA0588-MS1	Matrix Spike	ND	0.28320	0.25000	ug/L		113		60 - 150	
		BPA0588-MSD1	Matrix Spike Duplicate	ND	0.27167	0.25000	ug/L	3.60	109	22	60 - 150	
Endrin	BPA0588	BPA0588-MS1	Matrix Spike	ND	0.27090	0.25000	ug/L		108		57 - 163	
		BPA0588-MSD1	Matrix Spike Duplicate	ND	0.26162	0.25000	ug/L	2.82	105	24	57 - 163	
Heptachlor	BPA0588	BPA0588-MS1	Matrix Spike	ND	0.26294	0.25000	ug/L		105		51 - 148	
		BPA0588-MSD1	Matrix Spike Duplicate	ND	0.25650	0.25000	ug/L	1.92	103	22	51 - 148	
TCMX (Surrogate)	BPA0588	BPA0588-MS1	Matrix Spike	ND	0.40615	0.30000	ug/L		135		55 - 123	S09
		BPA0588-MSD1	Matrix Spike Duplicate	ND	0.40339	0.30000	ug/L		134		55 - 123	S09
Dibutyl chlorendate (Surrogate)	BPA0588	BPA0588-MS1	Matrix Spike	ND	1.0021	0.75000	ug/L		134		48 - 149	
		BPA0588-MSD1	Matrix Spike Duplicate	ND	0.97740	0.75000	ug/L		130		48 - 149	

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Organochlorine Pesticides and PCB's (EPA Method 608)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Aldrin	BPA0588	BPA0588-BLK1	ND	ug/L	0.050	0.0023	
alpha-BHC	BPA0588	BPA0588-BLK1	ND	ug/L	0.050	0.0016	
beta-BHC	BPA0588	BPA0588-BLK1	ND	ug/L	0.050	0.0027	
delta-BHC	BPA0588	BPA0588-BLK1	ND	ug/L	0.050	0.0020	
gamma-BHC (Lindane)	BPA0588	BPA0588-BLK1	ND	ug/L	0.050	0.0018	
Chlordane (Technical)	BPA0588	BPA0588-BLK1	ND	ug/L	0.50	0.44	
4,4'-DDD	BPA0588	BPA0588-BLK1	ND	ug/L	0.10	0.0011	
4,4'-DDE	BPA0588	BPA0588-BLK1	ND	ug/L	0.10	0.0019	
4,4'-DDT	BPA0588	BPA0588-BLK1	ND	ug/L	0.10	0.0021	
Dieldrin	BPA0588	BPA0588-BLK1	ND	ug/L	0.10	0.0020	
Endosulfan I	BPA0588	BPA0588-BLK1	ND	ug/L	0.050	0.0019	
Endosulfan II	BPA0588	BPA0588-BLK1	ND	ug/L	0.10	0.0021	
Endosulfan sulfate	BPA0588	BPA0588-BLK1	ND	ug/L	0.10	0.0021	
Endrin	BPA0588	BPA0588-BLK1	ND	ug/L	0.10	0.0025	
Endrin aldehyde	BPA0588	BPA0588-BLK1	ND	ug/L	0.10	0.0024	
Heptachlor	BPA0588	BPA0588-BLK1	ND	ug/L	0.050	0.0023	
Heptachlor epoxide	BPA0588	BPA0588-BLK1	ND	ug/L	0.050	0.0019	
Methoxychlor	BPA0588	BPA0588-BLK1	ND	ug/L	0.50	0.0021	
Toxaphene	BPA0588	BPA0588-BLK1	ND	ug/L	2.0	0.42	
PCB-1016	BPA0588	BPA0588-BLK1	ND	ug/L	0.20	0.034	
PCB-1221	BPA0588	BPA0588-BLK1	ND	ug/L	0.20	0.089	
PCB-1232	BPA0588	BPA0588-BLK1	ND	ug/L	0.20	0.090	
PCB-1242	BPA0588	BPA0588-BLK1	ND	ug/L	0.20	0.095	
PCB-1248	BPA0588	BPA0588-BLK1	ND	ug/L	0.20	0.025	
PCB-1254	BPA0588	BPA0588-BLK1	ND	ug/L	0.20	0.042	

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Organochlorine Pesticides and PCB's (EPA Method 608)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
PCB-1260	BPA0588	BPA0588-BLK1	ND	ug/L	0.20	0.043	
Total PCB's (Summation)	BPA0588	BPA0588-BLK1	ND	ug/L	0.20	0.10	
TCMX (Surrogate)	BPA0588	BPA0588-BLK1	108	%	55 - 123 (LCL - UCL)		
Dibutyl chlorendate (Surrogate)	BPA0588	BPA0588-BLK1	127	%	48 - 149 (LCL - UCL)		

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Organochlorine Pesticides and PCB's (EPA Method 608)

Quality Control Report - Laboratory Control Sample

Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
Aldrin	BPA0588	BPA0588-BS1	LCS	0.25106	0.25000	0.050	ug/L	100		48 - 138		
gamma-BHC (Lindane)	BPA0588	BPA0588-BS1	LCS	0.23462	0.25000	0.050	ug/L	93.8		49 - 124		
4,4'-DDT	BPA0588	BPA0588-BS1	LCS	0.22396	0.25000	0.10	ug/L	89.6		46 - 134		
Dieldrin	BPA0588	BPA0588-BS1	LCS	0.27033	0.25000	0.10	ug/L	108		57 - 146		
Endrin	BPA0588	BPA0588-BS1	LCS	0.26038	0.25000	0.10	ug/L	104		52 - 169		
Heptachlor	BPA0588	BPA0588-BS1	LCS	0.25250	0.25000	0.050	ug/L	101		59 - 140		
TCMX (Surrogate)	BPA0588	BPA0588-BS1	LCS	0.39754	0.30000	1.0	ug/L	133		55 - 123		S09
Dibutyl chlorendate (Surrogate)	BPA0588	BPA0588-BS1	LCS	0.96038	0.75000	1.0	ug/L	131		48 - 149		

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Volatile Organic Analysis (EPA Method 624)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample ID	QC Sample Type	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Benzene	BPA0785	BPA0785-MS1	Matrix Spike	ND	26.960	25.000	ug/L		108		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	26.830	25.000	ug/L	0.930	107	20	70 - 130	
Bromodichloromethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	28.280	25.000	ug/L		113		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.910	25.000	ug/L	0.889	112	20	70 - 130	
Bromoform	BPA0785	BPA0785-MS1	Matrix Spike	ND	28.290	25.000	ug/L		113		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	26.840	25.000	ug/L	5.45	107	20	70 - 130	
Bromomethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	29.880	25.000	ug/L		120		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	31.190	25.000	ug/L	4.08	125	20	70 - 130	
Carbon tetrachloride	BPA0785	BPA0785-MS1	Matrix Spike	ND	27.250	25.000	ug/L		109		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.550	25.000	ug/L	0.913	110	20	70 - 130	
Chlorobenzene	BPA0785	BPA0785-MS1	Matrix Spike	ND	28.630	25.000	ug/L		115		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	28.060	25.000	ug/L	2.64	112	20	70 - 130	
Chloroethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	27.450	25.000	ug/L		110		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	29.000	25.000	ug/L	5.31	116	20	70 - 130	
Chloroform	BPA0785	BPA0785-MS1	Matrix Spike	ND	27.100	25.000	ug/L		108		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.290	25.000	ug/L	0.922	109	20	70 - 130	
Chloromethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	28.100	25.000	ug/L		112		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	29.540	25.000	ug/L	5.22	118	20	70 - 130	
Dibromochloromethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	27.560	25.000	ug/L		110		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.730	25.000	ug/L	0.905	111	20	70 - 130	
1,2-Dichlorobenzene	BPA0785	BPA0785-MS1	Matrix Spike	ND	28.490	25.000	ug/L		114		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.710	25.000	ug/L	2.67	111	20	70 - 130	
1,3-Dichlorobenzene	BPA0785	BPA0785-MS1	Matrix Spike	ND	28.740	25.000	ug/L		115		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.990	25.000	ug/L	2.64	112	20	70 - 130	
1,4-Dichlorobenzene	BPA0785	BPA0785-MS1	Matrix Spike	ND	28.910	25.000	ug/L		116		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.870	25.000	ug/L	4.41	111	20	70 - 130	
1,1-Dichloroethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	25.710	25.000	ug/L		103		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	26.200	25.000	ug/L	1.92	105	20	70 - 130	

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Volatile Organic Analysis (EPA Method 624)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample ID	QC Sample Type	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
1,2-Dichloroethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	26.410	25.000	ug/L		106		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	26.690	25.000	ug/L	0.939	107	20	70 - 130	
1,1-Dichloroethene	BPA0785	BPA0785-MS1	Matrix Spike	ND	26.080	25.000	ug/L		104		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	26.330	25.000	ug/L	0.957	105	20	70 - 130	
trans-1,2-Dichloroethene	BPA0785	BPA0785-MS1	Matrix Spike	ND	26.750	25.000	ug/L		107		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.180	25.000	ug/L	1.85	109	20	70 - 130	
1,2-Dichloropropane	BPA0785	BPA0785-MS1	Matrix Spike	ND	26.320	25.000	ug/L		105		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	25.980	25.000	ug/L	0.957	104	20	70 - 130	
cis-1,3-Dichloropropene	BPA0785	BPA0785-MS1	Matrix Spike	ND	28.060	25.000	ug/L		112		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	28.020	25.000	ug/L	0.00	112	20	70 - 130	
trans-1,3-Dichloropropene	BPA0785	BPA0785-MS1	Matrix Spike	ND	27.680	25.000	ug/L		111		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.310	25.000	ug/L	1.82	109	20	70 - 130	
Ethylbenzene	BPA0785	BPA0785-MS1	Matrix Spike	ND	28.790	25.000	ug/L		115		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.680	25.000	ug/L	3.54	111	20	70 - 130	
Methylene chloride	BPA0785	BPA0785-MS1	Matrix Spike	ND	24.330	25.000	ug/L		97.3		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	24.660	25.000	ug/L	1.33	98.6	20	70 - 130	
Methyl t-butyl ether	BPA0785	BPA0785-MS1	Matrix Spike	ND	24.810	25.000	ug/L		99.2		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	24.490	25.000	ug/L	1.22	98.0	20	70 - 130	
1,1,2,2-Tetrachloroethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	29.000	25.000	ug/L		116		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.920	25.000	ug/L	3.51	112	20	70 - 130	
Tetrachloroethene	BPA0785	BPA0785-MS1	Matrix Spike	ND	27.020	25.000	ug/L		108		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.340	25.000	ug/L	0.922	109	20	70 - 130	
Toluene	BPA0785	BPA0785-MS1	Matrix Spike	ND	27.220	25.000	ug/L		109		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.150	25.000	ug/L	0.00	109	20	70 - 130	
1,1,1-Trichloroethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	27.450	25.000	ug/L		110		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.940	25.000	ug/L	1.80	112	20	70 - 130	
1,1,2-Trichloroethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	27.240	25.000	ug/L		109		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	26.850	25.000	ug/L	1.85	107	20	70 - 130	

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Volatile Organic Analysis (EPA Method 624)

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample ID	QC Sample Type	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Trichloroethene	BPA0785	BPA0785-MS1	Matrix Spike	0.17000	26.780	25.000	ug/L		106		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	0.17000	26.450	25.000	ug/L	0.948	105	20	70 - 130	
Trichlorofluoromethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	29.480	25.000	ug/L		118		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	29.490	25.000	ug/L	0.00	118	20	70 - 130	
1,1,2-Trichloro-1,2,2-trifluoroethane	BPA0785	BPA0785-MS1	Matrix Spike	ND	27.350	25.000	ug/L		109		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.720	25.000	ug/L	1.82	111	20	70 - 130	
Vinyl chloride	BPA0785	BPA0785-MS1	Matrix Spike	ND	26.910	25.000	ug/L		108		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	28.140	25.000	ug/L	4.52	113	20	70 - 130	
Total Xylenes	BPA0785	BPA0785-MS1	Matrix Spike	ND	85.690	75.000	ug/L		114		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	83.400	75.000	ug/L	2.67	111	20	70 - 130	
p- & m-Xylenes	BPA0785	BPA0785-MS1	Matrix Spike	ND	57.680	50.000	ug/L		115		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	55.960	50.000	ug/L	2.64	112	20	70 - 130	
o-Xylene	BPA0785	BPA0785-MS1	Matrix Spike	ND	28.010	25.000	ug/L		112		70 - 130	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	27.440	25.000	ug/L	1.80	110	20	70 - 130	
1,2-Dichloroethane-d4 (Surrogate)	BPA0785	BPA0785-MS1	Matrix Spike	ND	9.9100	10.000	ug/L		99.1		76 - 114	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	10.040	10.000	ug/L		100		76 - 114	
Toluene-d8 (Surrogate)	BPA0785	BPA0785-MS1	Matrix Spike	ND	10.030	10.000	ug/L		100		88 - 110	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	9.8500	10.000	ug/L		98.5		88 - 110	
4-Bromofluorobenzene (Surrogate)	BPA0785	BPA0785-MS1	Matrix Spike	ND	10.070	10.000	ug/L		101		86 - 115	
		BPA0785-MSD1	Matrix Spike Duplicate	ND	10.130	10.000	ug/L		101		86 - 115	

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Volatile Organic Analysis (EPA Method 624)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Benzene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.11	
Bromodichloromethane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.067	
Bromoform	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.051	
Bromomethane	BPA0785	BPA0785-BLK1	ND	ug/L	1.0	0.45	
Carbon tetrachloride	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.099	
Chlorobenzene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.050	
Chloroethane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.12	
Chloroform	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.050	
Chloromethane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.21	
Dibromochloromethane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.056	
1,2-Dichlorobenzene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.085	
1,3-Dichlorobenzene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.081	
1,4-Dichlorobenzene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.062	
1,1-Dichloroethane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.17	
1,2-Dichloroethane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.11	
1,1-Dichloroethene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.088	
trans-1,2-Dichloroethene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.11	
1,2-Dichloropropane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.13	
cis-1,3-Dichloropropene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.079	
trans-1,3-Dichloropropene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.13	
Ethylbenzene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.13	
Methylene chloride	BPA0785	BPA0785-BLK1	ND	ug/L	1.0	0.16	
Methyl t-butyl ether	BPA0785	BPA0785-BLK1	0.11000	ug/L	0.50	0.052	M03, J
1,1,2,2-Tetrachloroethane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.057	
Tetrachloroethene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.12	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

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Volatile Organic Analysis (EPA Method 624)

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Toluene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.057	
1,1,1-Trichloroethane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.093	
1,1,2-Trichloroethane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.063	
Trichloroethene	BPA0785	BPA0785-BLK1	0.26000	ug/L	0.50	0.055	M03, J
Trichlorofluoromethane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.094	
1,1,2-Trichloro-1,2,2-trifluoroethane	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.18	
Vinyl chloride	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.098	
Total Xylenes	BPA0785	BPA0785-BLK1	ND	ug/L	1.0	0.23	
Acrolein	BPA0785	BPA0785-BLK1	ND	ug/L	50	1.0	
Acrylonitrile	BPA0785	BPA0785-BLK1	ND	ug/L	20	0.66	
p- & m-Xylenes	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.10	
o-Xylene	BPA0785	BPA0785-BLK1	ND	ug/L	0.50	0.13	
1,2-Dichloroethane-d4 (Surrogate)	BPA0785	BPA0785-BLK1	102	%	76 - 114 (LCL - UCL)		
Toluene-d8 (Surrogate)	BPA0785	BPA0785-BLK1	99.9	%	88 - 110 (LCL - UCL)		
4-Bromofluorobenzene (Surrogate)	BPA0785	BPA0785-BLK1	98.5	%	86 - 115 (LCL - UCL)		

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Volatile Organic Analysis (EPA Method 624)

Quality Control Report - Laboratory Control Sample

Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
Benzene	BPA0785	BPA0785-BS1	LCS	26.750	25.000	0.50	ug/L	107		70 - 130		
Bromodichloromethane	BPA0785	BPA0785-BS1	LCS	27.580	25.000	0.50	ug/L	110		70 - 130		
Bromoform	BPA0785	BPA0785-BS1	LCS	27.580	25.000	0.50	ug/L	110		70 - 130		
Bromomethane	BPA0785	BPA0785-BS1	LCS	30.210	25.000	1.0	ug/L	121		70 - 130		
Carbon tetrachloride	BPA0785	BPA0785-BS1	LCS	28.000	25.000	0.50	ug/L	112		70 - 130		
Chlorobenzene	BPA0785	BPA0785-BS1	LCS	27.430	25.000	0.50	ug/L	110		70 - 130		
Chloroethane	BPA0785	BPA0785-BS1	LCS	28.260	25.000	0.50	ug/L	113		70 - 130		
Chloroform	BPA0785	BPA0785-BS1	LCS	27.320	25.000	0.50	ug/L	109		70 - 130		
Chloromethane	BPA0785	BPA0785-BS1	LCS	28.410	25.000	0.50	ug/L	114		70 - 130		
Dibromochloromethane	BPA0785	BPA0785-BS1	LCS	27.780	25.000	0.50	ug/L	111		70 - 130		
1,2-Dichlorobenzene	BPA0785	BPA0785-BS1	LCS	28.160	25.000	0.50	ug/L	113		70 - 130		
1,3-Dichlorobenzene	BPA0785	BPA0785-BS1	LCS	28.050	25.000	0.50	ug/L	112		70 - 130		
1,4-Dichlorobenzene	BPA0785	BPA0785-BS1	LCS	28.310	25.000	0.50	ug/L	113		70 - 130		
1,1-Dichloroethane	BPA0785	BPA0785-BS1	LCS	26.030	25.000	0.50	ug/L	104		70 - 130		
1,2-Dichloroethane	BPA0785	BPA0785-BS1	LCS	27.260	25.000	0.50	ug/L	109		70 - 130		
1,1-Dichloroethene	BPA0785	BPA0785-BS1	LCS	25.730	25.000	0.50	ug/L	103		70 - 130		
trans-1,2-Dichloroethene	BPA0785	BPA0785-BS1	LCS	26.650	25.000	0.50	ug/L	107		70 - 130		
1,2-Dichloropropane	BPA0785	BPA0785-BS1	LCS	26.250	25.000	0.50	ug/L	105		70 - 130		
cis-1,3-Dichloropropene	BPA0785	BPA0785-BS1	LCS	28.410	25.000	0.50	ug/L	114		70 - 130		
trans-1,3-Dichloropropene	BPA0785	BPA0785-BS1	LCS	27.910	25.000	0.50	ug/L	112		70 - 130		
Ethylbenzene	BPA0785	BPA0785-BS1	LCS	27.680	25.000	0.50	ug/L	111		70 - 130		
Methylene chloride	BPA0785	BPA0785-BS1	LCS	24.430	25.000	1.0	ug/L	97.7		70 - 130		
Methyl t-butyl ether	BPA0785	BPA0785-BS1	LCS	25.410	25.000	0.50	ug/L	102		70 - 130		
1,1,2,2-Tetrachloroethane	BPA0785	BPA0785-BS1	LCS	28.950	25.000	0.50	ug/L	116		70 - 130		
Tetrachloroethene	BPA0785	BPA0785-BS1	LCS	26.650	25.000	0.50	ug/L	107		70 - 130		
Toluene	BPA0785	BPA0785-BS1	LCS	26.780	25.000	0.50	ug/L	107		70 - 130		
1,1,1-Trichloroethane	BPA0785	BPA0785-BS1	LCS	27.830	25.000	0.50	ug/L	111		70 - 130		

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

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Volatile Organic Analysis (EPA Method 624)

Quality Control Report - Laboratory Control Sample

Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
1,1,2-Trichloroethane	BPA0785	BPA0785-BS1	LCS	27.410	25.000	0.50	ug/L	110		70 - 130		
Trichloroethene	BPA0785	BPA0785-BS1	LCS	26.230	25.000	0.50	ug/L	105		70 - 130		
Trichlorofluoromethane	BPA0785	BPA0785-BS1	LCS	29.730	25.000	0.50	ug/L	119		70 - 130		
1,1,2-Trichloro-1,2,2-trifluoroethane	BPA0785	BPA0785-BS1	LCS	27.760	25.000	0.50	ug/L	111		70 - 130		
Vinyl chloride	BPA0785	BPA0785-BS1	LCS	27.090	25.000	0.50	ug/L	108		70 - 130		
Total Xylenes	BPA0785	BPA0785-BS1	LCS	82.720	75.000	1.0	ug/L	110		70 - 130		
p- & m-Xylenes	BPA0785	BPA0785-BS1	LCS	55.530	50.000	0.50	ug/L	111		70 - 130		
o-Xylene	BPA0785	BPA0785-BS1	LCS	27.190	25.000	0.50	ug/L	109		70 - 130		
1,2-Dichloroethane-d4 (Surrogate)	BPA0785	BPA0785-BS1	LCS	10.130	10.000	0.50	ug/L	101		76 - 114		
Toluene-d8 (Surrogate)	BPA0785	BPA0785-BS1	LCS	9.9200	10.000	0.50	ug/L	99.2		88 - 110		
4-Bromofluorobenzene (Surrogate)	BPA0785	BPA0785-BS1	LCS	10.170	10.000	0.50	ug/L	102		86 - 115		

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Project Manager: Doug Coats

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Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 0600355-03 | **Client Sample Name:** Trip Blank, 1/11/2006 9:00:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Benzene	ND	ug/L	0.50	0.11	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Bromodichloromethane	ND	ug/L	0.50	0.067	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Bromoform	ND	ug/L	0.50	0.051	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Bromomethane	ND	ug/L	1.0	0.45	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Carbon tetrachloride	ND	ug/L	0.50	0.099	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Chlorobenzene	ND	ug/L	0.50	0.050	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Chloroethane	ND	ug/L	0.50	0.12	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Chloroform	ND	ug/L	0.50	0.050	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Chloromethane	ND	ug/L	0.50	0.21	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Dibromochloromethane	ND	ug/L	0.50	0.056	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
1,2-Dichlorobenzene	ND	ug/L	0.50	0.085	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
1,3-Dichlorobenzene	ND	ug/L	0.50	0.081	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
1,4-Dichlorobenzene	ND	ug/L	0.50	0.062	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
1,1-Dichloroethane	ND	ug/L	0.50	0.17	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
1,2-Dichloroethane	ND	ug/L	0.50	0.11	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
1,1-Dichloroethene	ND	ug/L	0.50	0.088	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
trans-1,2-Dichloroethene	ND	ug/L	0.50	0.11	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
1,2-Dichloropropane	ND	ug/L	0.50	0.13	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
cis-1,3-Dichloropropene	ND	ug/L	0.50	0.079	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
trans-1,3-Dichloropropene	ND	ug/L	0.50	0.13	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Ethylbenzene	ND	ug/L	0.50	0.13	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Methylene chloride	0.86	ug/L	1.0	0.16	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	J
Methyl t-butyl ether	ND	ug/L	0.50	0.052	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	0.11	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 0600355-03 | **Client Sample Name:** Trip Blank, 1/11/2006 9:00:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	0.057	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Tetrachloroethene	ND	ug/L	0.50	0.12	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Toluene	ND	ug/L	0.50	0.057	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
1,1,1-Trichloroethane	ND	ug/L	0.50	0.093	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
1,1,2-Trichloroethane	ND	ug/L	0.50	0.063	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Trichloroethene	ND	ug/L	0.50	0.055	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	0.26	
Trichlorofluoromethane	ND	ug/L	0.50	0.094	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ug/L	0.50	0.18	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Vinyl chloride	ND	ug/L	0.50	0.098	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Total Xylenes	ND	ug/L	1.0	0.23	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
Acrolein	ND	ug/L	50	1.0	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	V11
Acrylonitrile	ND	ug/L	20	0.66	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
p- & m-Xylenes	ND	ug/L	0.50	0.10	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
o-Xylene	ND	ug/L	0.50	0.13	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785	ND	
1,2-Dichloroethane-d4 (Surrogate)	107	%	76 - 114	(LCL - UCL)	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785		
Toluene-d8 (Surrogate)	101	%	88 - 110	(LCL - UCL)	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785		
4-Bromofluorobenzene (Surrogate)	97.7	%	86 - 115	(LCL - UCL)	EPA-624	01/19/06	01/20/06 00:12	mgc	MS-V7	1	BPA0785		

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

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

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample ID	QC Sample Type	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
Acenaphthene	BPA0604	BPA0604-MS1	Matrix Spike	ND	61.674	80.000	ug/L		77.1		38 - 102	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	60.224	80.000	ug/L	2.36	75.3	30	38 - 102	
1,4-Dichlorobenzene	BPA0604	BPA0604-MS1	Matrix Spike	ND	67.517	80.000	ug/L		84.4		39 - 101	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	60.043	80.000	ug/L	11.7	75.1	30	39 - 101	
2,4-Dinitrotoluene	BPA0604	BPA0604-MS1	Matrix Spike	ND	61.798	80.000	ug/L		77.2		40 - 117	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	60.854	80.000	ug/L	1.44	76.1	30	40 - 117	
Hexachlorobenzene	BPA0604	BPA0604-MS1	Matrix Spike	ND	75.234	80.000	ug/L		94.0		48 - 108	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	75.370	80.000	ug/L	0.213	94.2	30	48 - 108	
Hexachlorobutadiene	BPA0604	BPA0604-MS1	Matrix Spike	ND	51.018	80.000	ug/L		63.8		33 - 95	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	46.824	80.000	ug/L	8.67	58.5	30	33 - 95	
Hexachloroethane	BPA0604	BPA0604-MS1	Matrix Spike	ND	62.242	80.000	ug/L		77.8		33 - 97	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	55.864	80.000	ug/L	10.8	69.8	30	33 - 97	
Nitrobenzene	BPA0604	BPA0604-MS1	Matrix Spike	ND	72.946	80.000	ug/L		91.2		48 - 106	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	71.232	80.000	ug/L	2.44	89.0	30	48 - 106	
N-Nitrosodi-N-propylamine	BPA0604	BPA0604-MS1	Matrix Spike	ND	59.958	80.000	ug/L		74.9		44 - 95	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	57.660	80.000	ug/L	3.81	72.1	28	44 - 95	
Pyrene	BPA0604	BPA0604-MS1	Matrix Spike	ND	59.567	80.000	ug/L		74.5		40 - 111	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	63.543	80.000	ug/L	6.37	79.4	29	40 - 111	
1,2,4-Trichlorobenzene	BPA0604	BPA0604-MS1	Matrix Spike	ND	64.827	80.000	ug/L		81.0		40 - 95	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	60.114	80.000	ug/L	7.56	75.1	30	40 - 95	
4-Chloro-3-methylphenol	BPA0604	BPA0604-MS1	Matrix Spike	ND	73.671	80.000	ug/L		92.1		57 - 115	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	72.731	80.000	ug/L	1.31	90.9	26	57 - 115	
2-Chlorophenol	BPA0604	BPA0604-MS1	Matrix Spike	ND	56.832	80.000	ug/L		71.0		46 - 96	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	54.652	80.000	ug/L	3.88	68.3	26	46 - 96	
2-Methylphenol	BPA0604	BPA0604-MS1	Matrix Spike	ND	66.553	80.000	ug/L		83.2		47 - 99	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	62.784	80.000	ug/L	5.81	78.5	25	47 - 99	
3- & 4-Methylphenol	BPA0604	BPA0604-MS1	Matrix Spike	ND	111.65	80.000	ug/L		140		72 - 160	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	105.44	80.000	ug/L	5.88	132	24	72 - 160	

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Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

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

Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample ID	QC Sample Type	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits RPD	Control Limits Percent Recovery	Lab Quals
4-Nitrophenol	BPA0604	BPA0604-MS1	Matrix Spike	ND	30.610	80.000	ug/L		38.3		12 - 86	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	29.612	80.000	ug/L	3.45	37.0	24	12 - 86	
Pentachlorophenol	BPA0604	BPA0604-MS1	Matrix Spike	ND	76.468	80.000	ug/L		95.6		53 - 134	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	74.876	80.000	ug/L	2.11	93.6	23	53 - 134	
Phenol	BPA0604	BPA0604-MS1	Matrix Spike	ND	33.652	80.000	ug/L		42.1		18 - 55	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	30.234	80.000	ug/L	10.8	37.8	26	18 - 55	
2,4,6-Trichlorophenol	BPA0604	BPA0604-MS1	Matrix Spike	ND	60.892	80.000	ug/L		76.1		48 - 124	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	58.773	80.000	ug/L	3.48	73.5	30	48 - 124	
2-Fluorophenol (Surrogate)	BPA0604	BPA0604-MS1	Matrix Spike	ND	48.520	80.000	ug/L		60.6		22 - 83	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	45.827	80.000	ug/L		57.3		22 - 83	
Phenol-d5 (Surrogate)	BPA0604	BPA0604-MS1	Matrix Spike	ND	36.590	80.000	ug/L		45.7		12 - 69	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	32.868	80.000	ug/L		41.1		12 - 69	
Nitrobenzene-d5 (Surrogate)	BPA0604	BPA0604-MS1	Matrix Spike	ND	66.092	80.000	ug/L		82.6		52 - 115	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	62.380	80.000	ug/L		78.0		52 - 115	
2-Fluorobiphenyl (Surrogate)	BPA0604	BPA0604-MS1	Matrix Spike	ND	62.113	80.000	ug/L		77.6		40 - 109	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	59.063	80.000	ug/L		73.8		40 - 109	
2,4,6-Tribromophenol (Surrogate)	BPA0604	BPA0604-MS1	Matrix Spike	ND	67.845	80.000	ug/L		84.8		54 - 126	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	66.360	80.000	ug/L		83.0		54 - 126	
p-Terphenyl-d14 (Surrogate)	BPA0604	BPA0604-MS1	Matrix Spike	ND	33.056	40.000	ug/L		82.6		54 - 112	
		BPA0604-MSD1	Matrix Spike Duplicate	ND	34.977	40.000	ug/L		87.4		54 - 112	

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

Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

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

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Acenaphthene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.26	
Acenaphthylene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.25	
Aldrin	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.45	
Aniline	BPA0604	BPA0604-BLK1	ND	ug/L	5.0	0.72	
Anthracene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.27	
Benzidine	BPA0604	BPA0604-BLK1	ND	ug/L	20	5.3	
Benzo[a]anthracene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.35	
Benzo[b]fluoranthene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.41	
Benzo[k]fluoranthene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.21	
Benzo[a]pyrene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.31	
Benzo[g,h,i]perylene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.66	
Benzoic acid	BPA0604	BPA0604-BLK1	ND	ug/L	10	1.3	
Benzyl alcohol	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.30	
Benzyl butyl phthalate	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.74	
alpha-BHC	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.42	
beta-BHC	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.44	
delta-BHC	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.33	
gamma-BHC (Lindane)	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.41	
bis(2-Chloroethoxy)methane	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.37	
bis(2-Chloroethyl) ether	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.37	
bis(2-Chloroisopropyl)ether	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.28	
bis(2-Ethylhexyl)phthalate	BPA0604	BPA0604-BLK1	ND	ug/L	5.0	1.3	
4-Bromophenyl phenyl ether	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.41	
4-Chloroaniline	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.66	
2-Chloronaphthalene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.31	

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

Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

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

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
4-Chlorophenyl phenyl ether	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.27	
Chrysene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.43	
4,4'-DDD	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	1.3	
4,4'-DDE	BPA0604	BPA0604-BLK1	ND	ug/L	3.0	1.2	
4,4'-DDT	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	1.6	
Dibenzo[a,h]anthracene	BPA0604	BPA0604-BLK1	ND	ug/L	3.0	0.68	
Dibenzofuran	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.29	
1,2-Dichlorobenzene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.32	
1,3-Dichlorobenzene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.34	
1,4-Dichlorobenzene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.39	
3,3-Dichlorobenzidine	BPA0604	BPA0604-BLK1	ND	ug/L	10	2.5	
Dieldrin	BPA0604	BPA0604-BLK1	ND	ug/L	3.0	1.5	
Diethyl phthalate	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.39	
Dimethyl phthalate	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.24	
Di-n-butyl phthalate	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.31	
2,4-Dinitrotoluene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.23	
2,6-Dinitrotoluene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.29	
Di-n-octyl phthalate	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.67	
1,2-Diphenylhydrazine	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.22	
Endosulfan I	BPA0604	BPA0604-BLK1	ND	ug/L	10	1.7	
Endosulfan II	BPA0604	BPA0604-BLK1	ND	ug/L	10	0.85	
Endosulfan sulfate	BPA0604	BPA0604-BLK1	ND	ug/L	3.0	1.3	
Endrin	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	1.8	
Endrin aldehyde	BPA0604	BPA0604-BLK1	ND	ug/L	10	4.0	
Fluoranthene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.28	

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

Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

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

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Fluorene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.32	
Heptachlor	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.35	
Heptachlor epoxide	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.54	
Hexachlorobenzene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.44	
Hexachlorobutadiene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.37	
Hexachlorocyclopentadiene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.70	
Hexachloroethane	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.45	
Indeno[1,2,3-cd]pyrene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.61	
Isophorone	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.35	
2-Methylnaphthalene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.39	
Naphthalene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.33	
2-Naphthylamine	BPA0604	BPA0604-BLK1	ND	ug/L	20	4.1	
2-Nitroaniline	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.29	
3-Nitroaniline	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.49	
4-Nitroaniline	BPA0604	BPA0604-BLK1	ND	ug/L	5.0	0.28	
Nitrobenzene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.26	
N-Nitrosodimethylamine	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.17	
N-Nitrosodi-N-propylamine	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.41	
N-Nitrosodiphenylamine	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.30	
Phenanthrene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.30	
Pyrene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.81	
1,2,4-Trichlorobenzene	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.35	
4-Chloro-3-methylphenol	BPA0604	BPA0604-BLK1	ND	ug/L	5.0	0.32	
2-Chlorophenol	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.27	
2,4-Dichlorophenol	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.30	

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

Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

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

Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
2,4-Dimethylphenol	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.58	
4,6-Dinitro-2-methylphenol	BPA0604	BPA0604-BLK1	ND	ug/L	10	0.30	
2,4-Dinitrophenol	BPA0604	BPA0604-BLK1	ND	ug/L	10	0.21	
2-Methylphenol	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.36	
3- & 4-Methylphenol	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.60	
2-Nitrophenol	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.35	
4-Nitrophenol	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.16	
Pentachlorophenol	BPA0604	BPA0604-BLK1	ND	ug/L	10	0.42	
Phenol	BPA0604	BPA0604-BLK1	ND	ug/L	2.0	0.18	
2,4,5-Trichlorophenol	BPA0604	BPA0604-BLK1	ND	ug/L	5.0	0.36	
2,4,6-Trichlorophenol	BPA0604	BPA0604-BLK1	ND	ug/L	5.0	0.39	
2-Fluorophenol (Surrogate)	BPA0604	BPA0604-BLK1	56.7	%	22 - 83 (LCL - UCL)		
Phenol-d5 (Surrogate)	BPA0604	BPA0604-BLK1	43.9	%	12 - 69 (LCL - UCL)		
Nitrobenzene-d5 (Surrogate)	BPA0604	BPA0604-BLK1	81.9	%	52 - 115 (LCL - UCL)		
2-Fluorobiphenyl (Surrogate)	BPA0604	BPA0604-BLK1	80.2	%	40 - 109 (LCL - UCL)		
2,4,6-Tribromophenol (Surrogate)	BPA0604	BPA0604-BLK1	85.4	%	54 - 126 (LCL - UCL)		
p-Terphenyl-d14 (Surrogate)	BPA0604	BPA0604-BLK1	83.5	%	54 - 112 (LCL - UCL)		

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

Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

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

Quality Control Report - Laboratory Control Sample

Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Control Limits Percent Recovery	Control Limits RPD	Lab Quals
Acenaphthene	BPA0604	BPA0604-BS1	LCS	63.617	80.000	2.0	ug/L	79.5		43 - 104		
1,4-Dichlorobenzene	BPA0604	BPA0604-BS1	LCS	70.415	80.000	2.0	ug/L	88.0		46 - 102		
2,4-Dinitrotoluene	BPA0604	BPA0604-BS1	LCS	64.833	80.000	2.0	ug/L	81.0		45 - 120		
Hexachlorobenzene	BPA0604	BPA0604-BS1	LCS	78.900	80.000	2.0	ug/L	98.6		54 - 111		
Hexachlorobutadiene	BPA0604	BPA0604-BS1	LCS	53.610	80.000	2.0	ug/L	67.0		39 - 97		
Hexachloroethane	BPA0604	BPA0604-BS1	LCS	64.682	80.000	2.0	ug/L	80.9		43 - 94		
Nitrobenzene	BPA0604	BPA0604-BS1	LCS	78.551	80.000	2.0	ug/L	98.2		52 - 109		
N-Nitrosodi-N-propylamine	BPA0604	BPA0604-BS1	LCS	66.260	80.000	2.0	ug/L	82.8		48 - 97		
Pyrene	BPA0604	BPA0604-BS1	LCS	62.798	80.000	2.0	ug/L	78.5		42 - 105		
1,2,4-Trichlorobenzene	BPA0604	BPA0604-BS1	LCS	68.736	80.000	2.0	ug/L	85.9		44 - 97		
4-Chloro-3-methylphenol	BPA0604	BPA0604-BS1	LCS	78.096	80.000	5.0	ug/L	97.6		58 - 121		
2-Chlorophenol	BPA0604	BPA0604-BS1	LCS	59.001	80.000	2.0	ug/L	73.8		50 - 96		
2-Methylphenol	BPA0604	BPA0604-BS1	LCS	67.393	80.000	2.0	ug/L	84.2		52 - 101		
3- & 4-Methylphenol	BPA0604	BPA0604-BS1	LCS	106.69	80.000	2.0	ug/L	133		81 - 158		
4-Nitrophenol	BPA0604	BPA0604-BS1	LCS	28.200	80.000	2.0	ug/L	35.2		13 - 87		
Pentachlorophenol	BPA0604	BPA0604-BS1	LCS	79.871	80.000	10	ug/L	99.8		48 - 136		
Phenol	BPA0604	BPA0604-BS1	LCS	29.750	80.000	2.0	ug/L	37.2		18 - 57		
2,4,6-Trichlorophenol	BPA0604	BPA0604-BS1	LCS	63.730	80.000	5.0	ug/L	79.7		55 - 125		
2-Fluorophenol (Surrogate)	BPA0604	BPA0604-BS1	LCS	44.835	80.000	5.0	ug/L	56.0		22 - 83		
Phenol-d5 (Surrogate)	BPA0604	BPA0604-BS1	LCS	31.468	80.000	5.0	ug/L	39.3		12 - 69		
Nitrobenzene-d5 (Surrogate)	BPA0604	BPA0604-BS1	LCS	69.257	80.000	5.0	ug/L	86.6		52 - 115		
2-Fluorobiphenyl (Surrogate)	BPA0604	BPA0604-BS1	LCS	63.426	80.000	5.0	ug/L	79.3		40 - 109		
2,4,6-Tribromophenol (Surrogate)	BPA0604	BPA0604-BS1	LCS	72.667	80.000	5.0	ug/L	90.8		54 - 126		
p-Terphenyl-d14 (Surrogate)	BPA0604	BPA0604-BS1	LCS	33.634	40.000	5.0	ug/L	84.1		54 - 112		

BC Laboratories, Inc

Date of Report: 01/26/2006

Doug Coats

Marine Research Specialists
3140 Telegraph Road, Suite A
Suite A
Ventura, CA 93003-3238
RE: Semi-annual eff
BC Lab Number: 0600355

Enclosed are the results of analyses for samples received by the laboratory on 01/11/06 16:40. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Contact Person: Tina Green
Client Services Manager

Authorized Signature

BC Laboratories, Inc.

Chain of Custody Form

PLEASE COMPLETE BCL QUOTE ID:

41639

Page ____ of ____

Report To:
Client: Marine Research Spec
Attn:
Street Address: 3140 Telegraph Rd, suite A
City, State, Zip: Ventura, CA. 93003
Phone: 805-644-1180 Fax:
Email Address: Doug.Coats@mrsenv.com
Submittal #: 0610355

Project #:
Project Name:
Project Code:
Sampler(s):

Analysis Requested

Please refer to the back of this page for completion instructions and method #'s

Sample #	Description	Date Sampled	Time Sampled	Ammonia	Nitrate Chlorinated 625	Total Chlorinated 625	Ag, As, Cd, Sb, Be, Cu, Cr, Pb, Hg	Ni, Se, Tl, Zn	CYANIDE	EPA 608 625	624+ ACRYLAMIDE/MTBE	Sample Matrix: Soil	Sludge	Drinking Water	Ground Water	Waste Water	Other	Turnaround # of work days*
1	Grab	1/11/06	0920	X	X	X										X		
2	COMPOSITE	1/11/06	0920				X	X	X	X	X					X		

CHK BY JTO
DISTRIBUTION ANALYSIS
SUB-OUT ☐

Comments:

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

* Standard Turnaround = 15 work days

Notes

Billing ☐ Same as above

Client:
Address:
City: State Zip
Attn:
PO#:

Report Drinking Waters on State Form? ☐ Yes ☐ No

Send Copy to State of CA? ☐ Yes ☐ No

Sample Disposal: ☐ Return to Client ☐ Disposal by lab ☐ Archive: Months

Special Reporting: ☐ QC ☐ WIP ☐ Raw Data

	Relinquished By	Date	Time	Received By	Date	Time
1.	Steven R. Archer	1-11-06	1350		1-11-06	1350
2.		1-11-06	1631	Brenna Jauregui	1/11/06	1640
3.						

: LABORATORIES INC. SAMPLE RECEIPT FORM Rev. No. 10 01/21/04 Page ___ Of ___

Submission #: 06-00355 | Project Code: | TB Batch #

SHIPPING INFORMATION

:deral Express ☐ UPS ☐ Hand Delivery ☐
BC Lab Field Service ☒ Other ☐ (Specify)_____

SHIPPING CONTAINER

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

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

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

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

COC Received ☒ YES ☐ NO

Ice Chest ID _____ Temperature: 1.9 °C Thermometer ID: #48
Emissivity 1.00 Container Pt A
Date/Time 1/11/00 Analyst Init MAL

SAMPLE CONTAINERS	SAMPLE NUMBERS 1	2	3	4	5	6	7	8	9	10
ul GENERAL MINERAL/ GENERAL PHYSICAL										
PT PE UNPRESERVED		B								
INORGANIC CHEMICAL METALS										
. . INORGANIC CHEMICAL METALS										
PT CYANIDE		C								
NITROGEN FORMS	A									
TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
3ml TOTAL ORGANIC CARBON										
TOX										
PT CHEMICAL OXYGEN DEMAND										
S PHENOLICS										
ml VOA VIAL TRAVEL BLANK			A(1)							
40ml VOA VIAL		A-4								
OT EPA 413.1, 413.2, 418.1										
ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
ml VOA VIAL - 504										
EPA 508/608/8080										
QT EPA 515.1/~~8150~~ 609		F								
EPA 515	B,C	D,E								
EPA 515 TRAVEL BLANK										
100ml EPA 547										
8ml EPA 531.1										
EPA 548										
QT EPA 549										
EPA 632										
EPA 8015M										
QT QA/QC										
AMBER										
OZ. JAR										
32 OZ. JAR										
WL SLEEVE										
B VIAL										
PLASTIC BAG										
RROUS IRON										
CORE										

Comments _____

Sample Numbering Completed By _____ Date/Time 1/11/00 1900

#06-00355

Analyses of Effluent Samples to be collected from the Morro Bay Wastewater Treatment Plant in January 2006

Analysis	Sample	Method
Level IIA QC Report concentrations that are detected above the MDL, but are below the PQL		
Ammonia as N w/ distillation	Grab	EPA-350.1
Total Chlorinated and Total Non-Chlorinated Phenolic Compounds (Report only the phenolic compounds)	Grab	EPA-625
13 Metals:		
Ag Silver	Composite	EPA 200.7
As Arsenic	Composite	EPA 200.8
Be Beryllium	Composite	EPA 200.7
Cd Cadmium	Composite	EPA 200.7
Cr Chromium	Composite	EPA 200.7
Cu Copper	Composite	EPA 200.7
Hg Mercury	Composite	EPA 245.1 LS
Ni Nickel	Composite	EPA 200.7
Pb Lead	Composite	EPA 200.8
Sb Antimony	Composite	EPA 200.7
Se Selenium	Composite	EPA 200.8
Tl Thallium	Composite	EPA 200.8
Zn Zinc	Composite	EPA 200.7
Volatile Organics - Low Level Including Acrolein, Acrylonitrile, MTBE	Composite	EPA 624/8240
Organochlorine Pesticides and PCBs	Composite	EPA 608/8080
Phenolic Compounds: Full list of base-neutral and acid-extractable congeners	Composite	EPA 625/8270
Cyanide	Composite	EPA 335.3

Invoice and Report to be sent to:

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

Samples to be collected from:

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

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

Project: Semi-annual eff
Project Number: [none]
Project Manager: Doug Coats

Reported: 01/26/06 12:14

Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information			
0600355-01	COC Number:	---	Receive Date:	01/11/06 16:40
	Project Number:	---	Sampling Date:	01/11/06 09:20
	Sampling Location:	---	Sample Depth:	---
	Sampling Point:	Grab	Sample Matrix:	Water
	Sampled By:	---		
0600355-02	COC Number:	---	Receive Date:	01/11/06 16:40
	Project Number:	---	Sampling Date:	01/11/06 09:20
	Sampling Location:	---	Sample Depth:	---
	Sampling Point:	Composite	Sample Matrix:	Water
	Sampled By:	---		
0600355-03	COC Number:	---	Receive Date:	01/11/06 16:40
	Project Number:	---	Sampling Date:	01/11/06 09:00
	Sampling Location:	---	Sample Depth:	---
	Sampling Point:	Trip Blank	Sample Matrix:	Water
	Sampled By:	---		

Aquatic
Testing
Laboratories

CHAIN OF CUSTODY

CHAIN OF CUSTODY

Client: City of Morro Bay

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

Project Manager: Doug Coats - MRS

Phone: (805) 644-1180

Fax: (805) 289-3935

Purchase Order No:

Aquatic Testing Laboratories

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

Sample ID	Sample Date	Sample Time	Sample Type *	Number of Containers	Testing Requested
Grab Eff. ARS	1/16/05	0735	E	1 (one gallon)	FHM Acute daily renewal
Comp. Eff.	1/16/05	1030	E	1 (one gallon)	Giant Kelp Chronic

Special Instructions:

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

CUSTODY TRANSFERS

Relinquished by (signature)	Received by (signature)	Date (mm/dd/yy)	Time (hh:mm)	Seals Intact? (Yes, No, NA)	Temperature Received (°C)
[signature]	Fed Ex	1-16-06	—	NA	—
Fed Ex	[signature]	1-17-06	0930	NA	2°C

CHAIN OF CUSTODY

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Purchase Order No:

Aquatic Testing Laboratories

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

Sample ID	Sample Date	Sample Time	Sample Type *	Number of Containers	Testing Requested
Grab Eff. ARS	1/17/06	825am	E	1 (one gallon)	FHM Acute daily renewal

Special Instructions:

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

CUSTODY TRANSFERS

Relinquished by (signature)	Received by (signature)	Date (mm/dd/yy)	Time (hh:mm)	Seals Intact? (Yes, No, NA)	Temperature Received (°C)
Bruce Keogh		1-17-06	1054	—	—
	ATL	1-17-06	15:40	NA	4°

CHAIN OF CUSTODY

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Fax: (805) 289-3935

Purchase Order No:

Aquatic Testing Laboratories

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

Sample ID	Sample Date	Sample Time	Sample Type *	Number of Containers	Testing Requested
Grab Eff. ARS	1/18/05	0835	E	1 (one gallon)	FHM Acute daily renewal

Special Instructions:

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

CUSTODY TRANSFERS

Relinquished by (signature)	Received by (signature)	Date (mm/dd/yy)	Time (hh:mm)	Seals Intact? (Yes, No, NA)	Temperature Received (°C)
		1/19/05	1410	—	—
		1-19-06	10:15	NA	2°

CHAIN OF CUSTODY

Client: City of Morro Bay

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160 Atascadero Road
Morro Bay, CA 93442

Project Manager: Doug Coats - MRS

Phone: (805) 644-1180

Fax: (805) 289-3935

Purchase Order No:

Aquatic Testing Laboratories

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

Sample ID	Sample Date	Sample Time	Sample Type *	Number of Containers	Testing Requested
Grab Eff. ARS	1/19/06	830	E	1 (one gallon)	FHM Acute daily renewal

Special Instructions:

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

CUSTODY TRANSFERS

Relinquished by (signature)	Received by (signature)	Date (mm/dd/yy)	Time (hh:mm)	Seals Intact? (Yes, No, NA)	Temperature Received (°C)
[signature]	[signature]	1/19/06	1430	—	—
Fed Ex	[signature]	1-20-06	1000	NA	2°C

Aquatic
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REFERENCE TOXICANT DATA

Aquatic
Testing
Laboratories

Fathead Minnow Reference Toxicant Data

FATHEAD MINNOW ACUTE
Method 2000.0
Reference Toxicant - SDS

Aquatic Testing Laboratories

QA/QC Batch No.: RT060104

TEST SUMMARY

Species: *Pimephales promelas.*
Age: 13 days old.
Regulations: NPDES.
Test chamber volume: 250 ml.
Feeding: Prior to renewal at 48 hrs.
Temperature: 20 +/- 1°C.
Number of replicates: 2.
Dilution water: MHSF.

Source: In-lab culture.
Test type: Static-Renewal.
Test Protocol: EPA-821-R-02-012.
Endpoints: LC50 at 96 hrs.
Test chamber: 600 ml glass beakers.
Aeration: None.
Number of organisms per chamber: 10.
Photoperiod: 16/8 hrs light/dark.

TEST DATA

	INITIAL			24 Hr					48 Hr				
Date/Time:	1-4-06 1200			1-5-06 1100					1-6-06 1300				
Analyst:													
	°C	DO	pH	°C	DO	pH	# Dead A	# Dead B	°C	DO	pH	# Dead A	# Dead B
Control	20.0	9.2	7.8	20.0	7.7	7.3	0	0	20.3	6.3	7.2	0	0
1.0 mg/l	20.1	9.1	7.8	20.0	6.8	7.2	0	0	20.3	6.5	7.2	0	0
2.0 mg/l	20.1	9.1	7.8	20.0	7.1	7.2	0	0	20.3	6.6	7.2	0	0
4.0 mg/l	20.1	9.2	7.8	20.1	6.8	7.1	1	2	20.4	6.1	7.1	1	0
8.0 mg/l	20.1	9.3	7.8	20.1	6.3	7.1	10	10	—	—	—	—	—

	RENEWAL			72 Hr					96 Hr				
Date/Time:	1-6-06 1300			1-7-06 1200					1-8-06 1700				
Analyst:													
	°C	DO	pH	°C	DO	pH	# Dead A	# Dead B	°C	DO	pH	# Dead A	# Dead B
Control	20.4	9.0	7.7	19.8	7.3	7.3	0	0	20.3	5.8	7.4	0	0
1.0 mg/l	20.4	9.1	7.7	19.8	7.1	7.2	0	0	20.0	6.0	7.3	0	0
2.0 mg/l	20.4	9.2	7.8	19.8	7.3	7.2	0	0	19.9	5.7	7.2	0	0
4.0 mg/l	20.4	9.2	7.8	19.8	7.5	7.3	0	0	19.9	6.1	7.2	0	0
8.0 mg/l	—	—	—	—	—	—	—	—	—	—	—	—	—

Comments:
Control: Alkalinity: 52 mg/l; Hardness: 91 mg/l; Conductivity: 335 umho.
SDS: Alkalinity: 51 mg/l; Hardness: 90 mg/l; Conductivity: 330 umho.

Acute Fish Test-96 Hr Survival

Start Date:	04 Jan-06 12:00	Test ID:	RT-060104f	Sample ID:	REF-Ref Toxicant
End Date:	08 Jan-06 12:00	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	SDS-Sodium dodecyl sulfate
Sample Date:	04 Jan-06 00:00	Protocol:	EPAA 91-EPA Acute	Test Species:	PP-Pimephales promelas
Comments:					

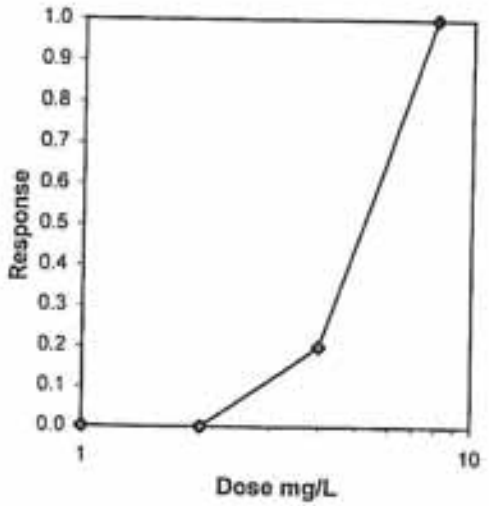
Conc-mg/L	1	2
D-Control	1.0000	1.0000
1	1.0000	1.0000
2	1.0000	1.0000
4	0.8000	0.8000
8	0.0000	0.0000

			Transform: Arcsin Square Root					Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
1	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
2	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
4	0.8000	0.8000	1.1071	1.1071	1.1071	0.000	2	4	20
8	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	2	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Normality of the data set cannot be confirmed				
Equality of variance cannot be confirmed				

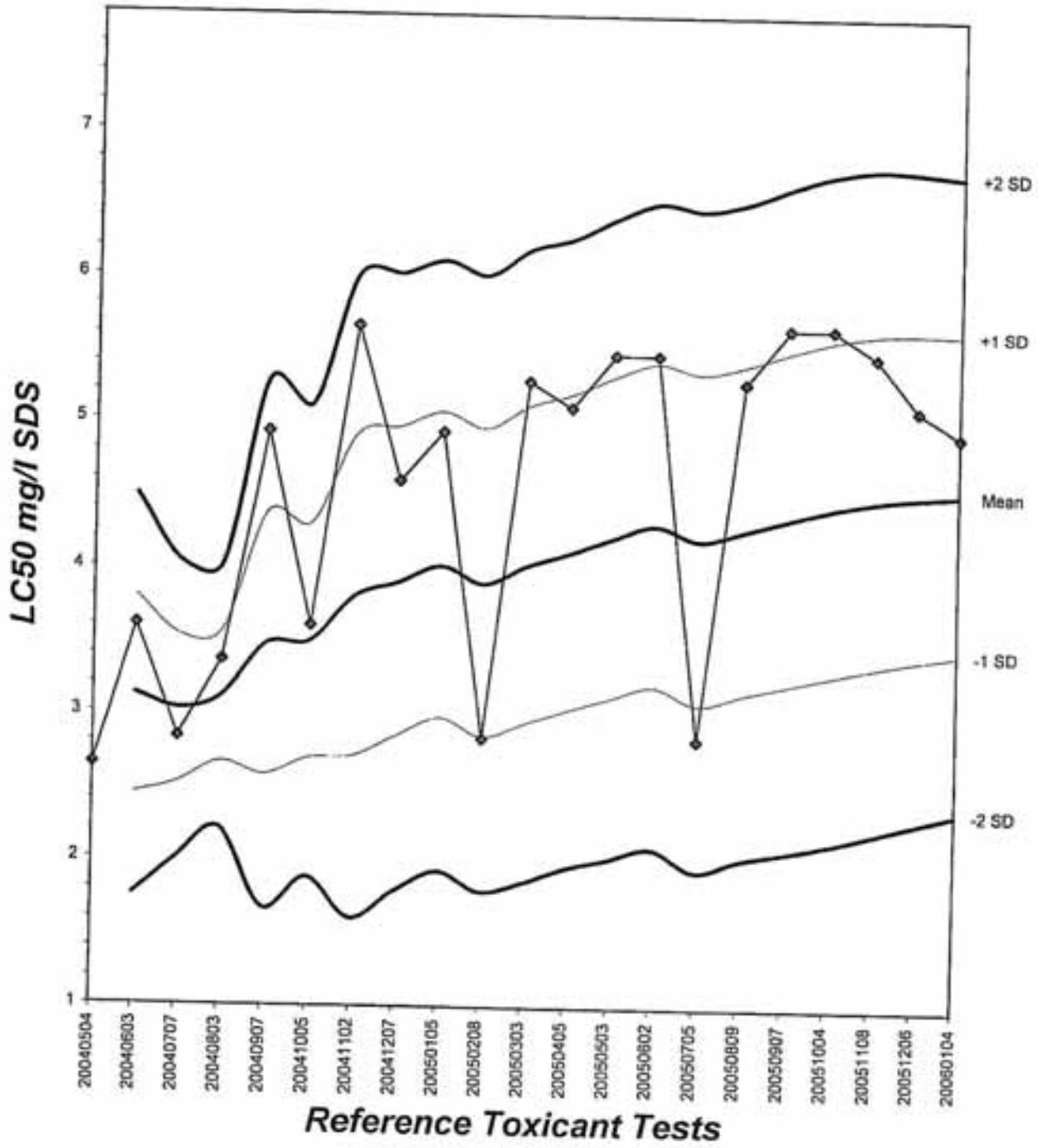
Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	4.9246	4.3503	5.5747
5.0%	5.0215	4.3576	5.7866
10.0%	5.1038	4.2923	6.0686
20.0%	5.1874	4.7084	5.7150
Auto-0.0%	4.9246	4.3503	5.5747



Fathead Minnow Acute Laboratory Control Chart

CV% = 24.2



TEST ORGANISM LOG

FATHEAD MINNOW - LARVAL
(*Pimephales promelas*)

QA/QC BATCH NO.: RT-060104

SOURCE: In-Lab Culture

DATE HATCHED: 12-22-05

APPROXIMATE QUANTITY: 400

GENERAL APPEARANCE: good

MORTALITIES 48 HOURS PRIOR TO TO USE IN TESTING: 0

DATES USED IN LAB: 1/4/06 to -/-/-

AVERAGE FISH WEIGHT: 0.006 gm

TEST LOADING LIMITS: 0.65 gm/liter

200 ml test solution volume = 0.013 gm mean fish weight limit
250 ml test solution volume = 0.016 gm mean fish weight limit

ACCLIMATION WATER QUALITY:

Temp.: 20.0 °C pH: 7.8 Ammonia: <0.2 mg/l NH_3-N

DO: 9.2 mg/l Alkalinity: 50 mg/l Hardness: 91 mg/l

READINGS RECORDED BY: _____ DATE: 1-4-06

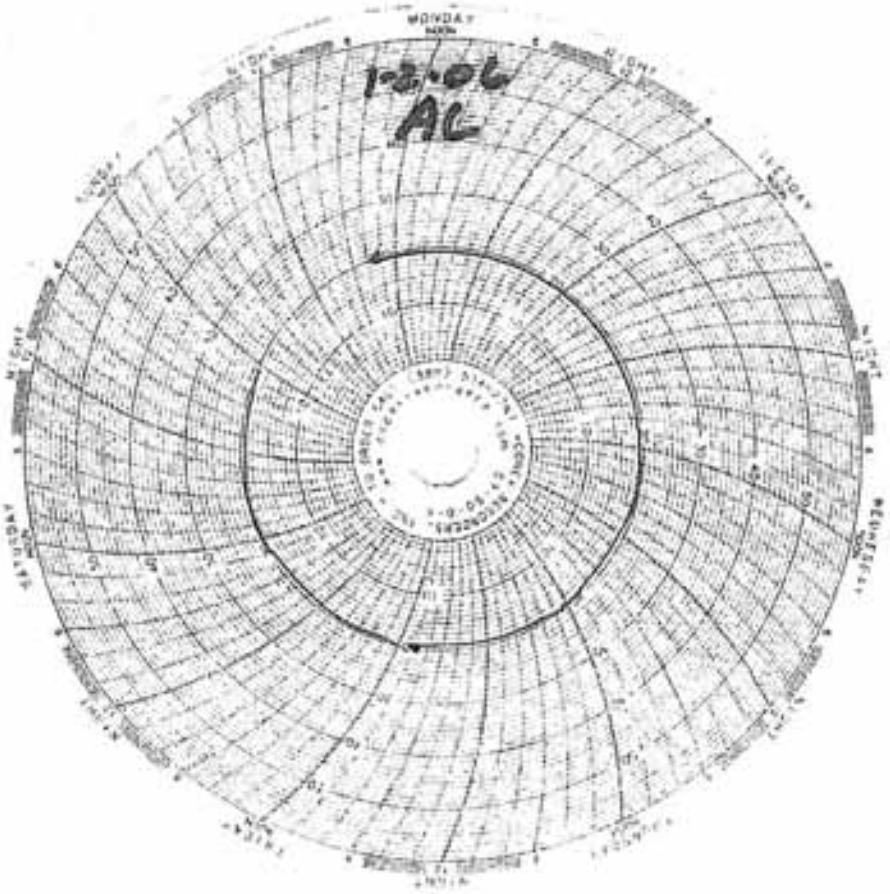
Aquatic Testing Laboratories

Laboratory Temperature Chart

QA/QC Batch No: RT-060104

Date Tested: 01/04/06 to 01/08/06

Acceptable Range: 20+/- 1°C



Aquatic
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Giant Kelp Germination and Germ Tube Growth Short-Term Toxicity Test

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

GIANT KELP GERMINATION AND GROWTH TEST
REFERENCE TOXICANT - COPPER

Aquatic Testing Laboratories

QA/QC Batch No.: RT-060117

Date Tested: 01/17/06 - 01/19/06

TEST SUMMARY

Species: *Macrocystis pyrifera*.
Protocol: EPA Method 1009.0.
Test type: Static.
Test chamber: 100 ml plastic petri dishes.
Temperature: 15 +/- 1°C.
Number of spores per ml: 7,500 (approx.).
Standard toxicant: Copper chloride.
Lab seawater: 0.2 um filtered seawater.

Source: Field collected.
Dilution water: Lab seawater.
Endpoints: NOEC, IC25 at 48 hrs.
Test volume: 50 ml.
Aeration: None.
Number of replicates: 5.
Ref. tox. source: Mallinckrodt.
Preservative: none.

RESULTS SUMMARY

Sample Concentration	Percent Germination		Mean Germ Tube Length (μm)	
Control	86.3%		15.05	
10 μg/l	87.4%		15.25	
18 μg/l	85.5%		14.95	
32 μg/l	74.7%	*	12.35	*
56 μg/l	48.9%	*	8.40	*
100 μg/l	19.4%	*	7.35	*
180 μg/l	4.0%	*	5.70	*
* Statistically significantly less than control at P = 0.05 level				

CHRONIC TOXICITY

Germination NOEC	18 μg/l
Germination EC25	40.7 μg/l
Germ Tube Growth NOEC	18 μg/l
Germ Tube Growth IC25	38.0 μg/l

QA/QC TEST ACCEPTABILITY

Parameter	Result
Mean control germination ≥70%	Yes (86.3%)
Mean control germination tube length >10 μm	Yes (15.05 μm)
Germination tube growth NOEC <35 μg/l Copper	Yes (18 μg/l)
%MSD <20% relative to control (germination & growth)	Yes (germ = 10.4%, growth = 3.9%)

Macrocystis Germination and Growth Test-Proportion Germinated

Start Date:	17 Jan-06 15:00	Test ID:	RT-060117k	Sample ID:	REF-Ref Toxicant
End Date:	19 Jan-06 15:00	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	CUCL-Copper chloride
Sample Date:	17 Jan-06 00:00	Protocol:	MBP 90	Test Species:	MP-Macrocystis pyrifera
Comments:					

Conc-ug/L	1	2	3	4	5
D-Control	0.8137	0.8750	0.8700	0.9126	0.8431
10	0.9020	0.9020	0.8317	0.8824	0.8544
18	0.8119	0.8835	0.8515	0.8544	0.8725
32	0.7248	0.8039	0.7426	0.7593	0.7030
56	0.5981	0.4860	0.3084	0.5825	0.4712
100	0.1068	0.2212	0.2522	0.0962	0.2952
180	0.0777	0.0196	0.0566	0.0381	0.0099

			Transform: Arcsin Square Root									
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	1-Tailed Critical	MSD	Number Resp	Total Number
D-Control	0.8629	1.0000	1.1940	1.1245	1.2707	4.575	5				70	511
10	0.8745	1.0134	1.2105	1.1481	1.2523	3.803	5	-0.338	2.409	0.1174	64	510
18	0.8548	0.9906	1.1810	1.1222	1.2225	3.233	5	0.268	2.409	0.1174	74	510
*32	0.7467	0.8653	1.0443	0.9944	1.1121	4.273	5	3.072	2.409	0.1174	132	521
*56	0.4892	0.5670	0.7738	0.5888	0.8842	15.242	5	8.623	2.409	0.1174	270	528
*100	0.1943	0.2252	0.4477	0.3153	0.5744	26.116	5	15.316	2.409	0.1174	427	531
*180	0.0404	0.0468	0.1919	0.0997	0.2824	38.393	5	20.565	2.409	0.1174	496	517

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9784	0.91	-0.4961	0.32218
Bartlett's Test indicates equal variances (p = 0.14)	9.56644	16.8119		

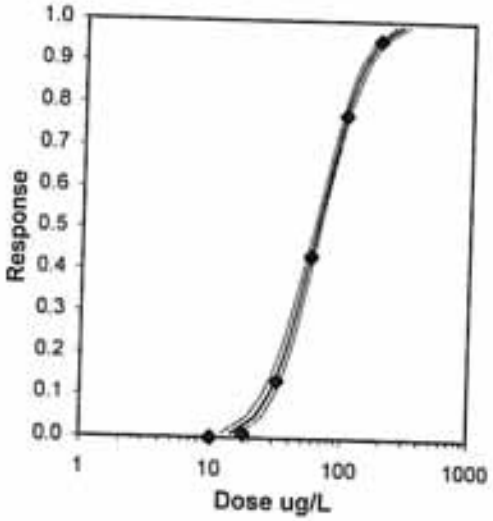
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSB	MSE	F-Stat	F-Prob	df
Dunnett's Test	18	32	24		0.08957	0.82936	0.00594	139.696	1.5E-19	6, 28

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits	
Slope	3.66781	0.17412	3.32653	4.0091
Intercept	-1.5788	0.32591	-2.2175	-0.94
TSCR	0.12863	0.00956	0.1099	0.14736

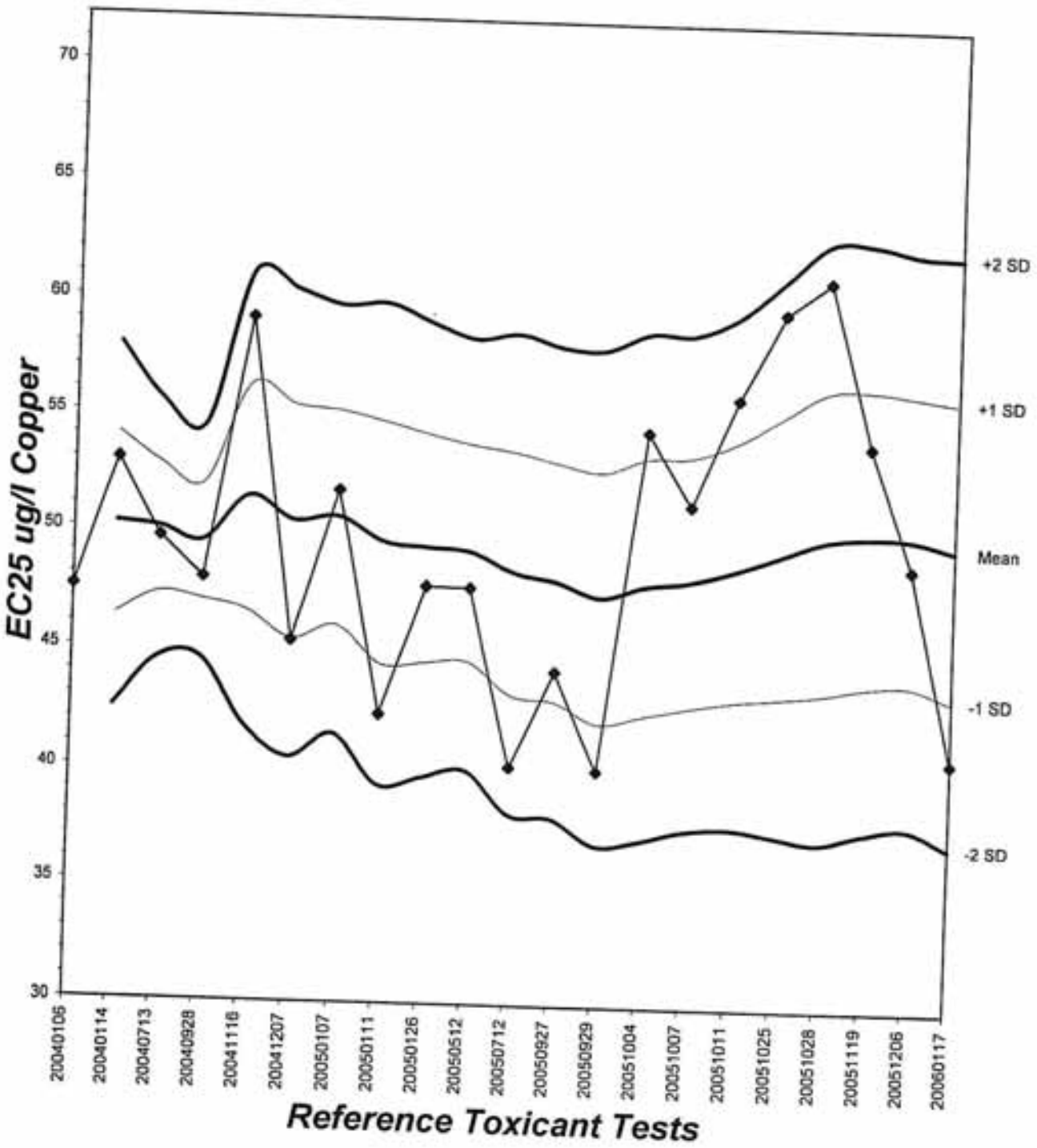
Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
0.13699	0.25902	13.2767	0.99	1.79365	0.27264	4

Point	Probits	ug/L	95% Fiducial Limits	
EC01	2.674	14.434	12.0216	16.8224
EC05	3.355	22.1407	19.2193	24.944
EC10	3.718	27.8127	24.6635	30.7951
EC15	3.964	32.4393	29.1693	35.5171
EC20	4.158	36.6595	33.3169	39.7973
EC25	4.326	40.7149	37.3274	43.8956
EC40	4.747	53.0364	49.581	56.3353
EC50	5.000	62.1795	58.649	65.643
EC60	5.253	72.8988	69.1473	76.7407
EC75	5.674	94.9602	90.0922	100.407
EC80	5.842	105.465	99.7673	112.045
EC85	6.036	119.185	112.18	127.532
EC90	6.282	139.012	129.774	150.374
EC95	6.645	174.624	160.663	192.433
EC99	7.326	267.86	238.838	306.863



Giant Kelp Germination Laboratory Control Chart

CV% = 12.8



Macrocystis Germination and Growth Test-Growth-Length

Start Date:	17 Jan-06 15:00	Test ID:	RT-060117k	Sample ID:	REF-Ref Toxicant
End Date:	19 Jan-06 15:00	Lab ID:	CAATL-Aquatic Testing Labs	Sample Type:	CUCL-Copper chloride
Sample Date:	17 Jan-06 00:00	Protocol:	MBP 90	Test Species:	MP-Macrocystis pyrifera
Comments:					

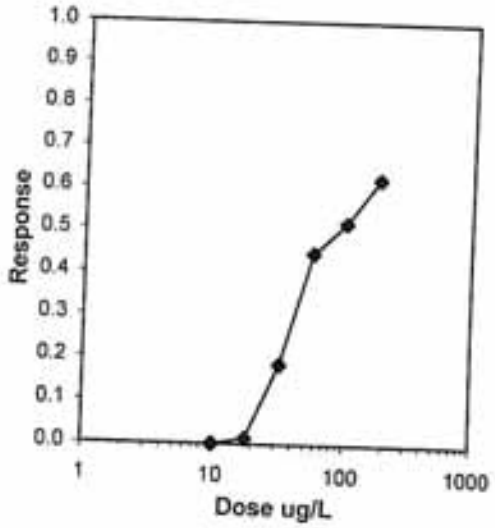
Conc-ug/L	1	2	3	4	5
D-Control	15.000	15.250	14.750	15.000	15.250
10	15.500	15.250	14.750	15.250	15.500
18	14.000	15.500	15.500	15.000	14.750
32	12.250	12.250	13.250	12.000	12.000
56	8.000	8.500	8.750	8.250	8.500
100	7.250	7.250	7.750	7.250	7.000
180	5.750	5.750	6.000	5.250	5.750

			Transform: Untransformed					1-Tailed			Isotonic	
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	15.050	1.0000	15.050	14.750	15.250	1.390	5				15.150	1.0000
10	15.250	1.0133	15.250	14.750	15.500	2.008	5	-0.826	2.409	0.583	15.150	1.0000
18	14.950	0.9934	14.950	14.000	15.500	4.164	5	0.413	2.409	0.583	14.950	0.9868
*32	12.350	0.8206	12.350	12.000	13.250	4.198	5	11.156	2.409	0.583	12.350	0.8152
*56	8.400	0.5581	8.400	8.000	8.750	3.393	5	27.478	2.409	0.583	8.400	0.5545
*100	7.300	0.4850	7.300	7.000	7.750	3.752	5	32.023	2.409	0.583	7.300	0.4818
*180	5.700	0.3787	5.700	5.250	6.000	4.805	5	38.634	2.409	0.583	5.700	0.3762

Auxiliary Tests					Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)					0.98072		0.91		-0.014	1.31724
Bartlett's Test indicates equal variances (p = 0.29)					7.30667		16.8119			
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**	**MSDu**	**MSB**	**MSE**	**F-Stat**	**F-Prob**	**df**
Dunnett's Test	18	32	24		0.58291	83.2155	0.14643	568.301	6.7E-28	6, 28

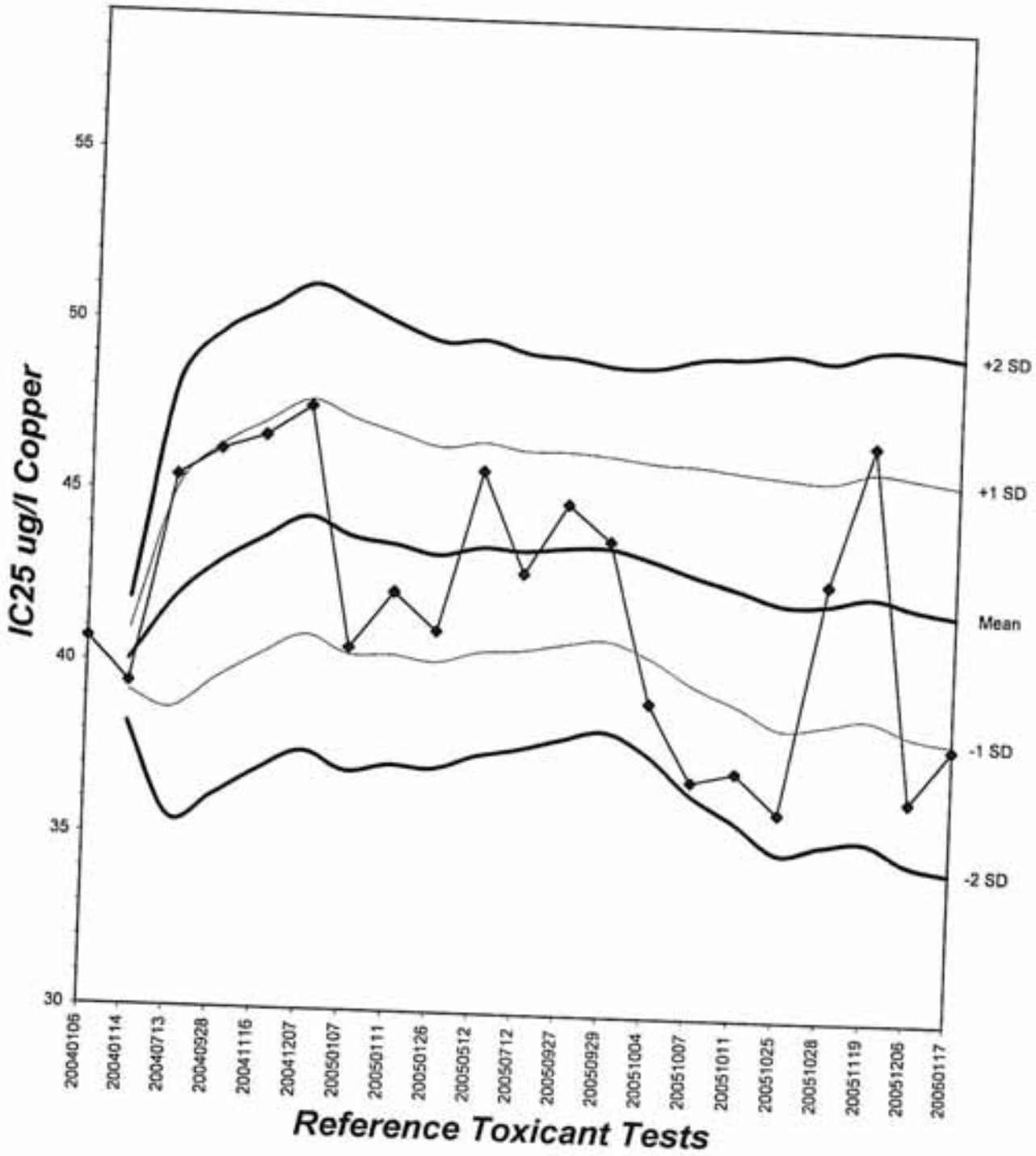
Linear Interpolation (80 Resamples)

Point	ug/L	SE	95% CL(Exp)		Skew
IC05	21.002	0.753	18.069	22.467	-1.0329
IC10	25.081	0.648	22.534	26.530	-0.5011
IC15	29.160	0.791	26.949	31.133	0.2313
IC20	33.397	1.056	30.488	35.524	0.1405
IC25	38.000	0.914	35.238	39.862	0.0083
IC40	51.808	0.629	50.190	53.421	-0.2132
IC50	89.000	3.080	81.469	96.827	-0.2048



Giant Kelp Germ Tube Growth Laboratory Control Chart

CV% = 9.0



GIANT KELP GERMINATION AND GROWTH
SHORT-TERM TOXICITY TEST

Lab No.: RT-060117

TEST DATA

Petri Dish No.	Test Sample Conc.	Total Number Counted	Number of Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					1	2	3	4	5	6	7	8	9	10
1	56	107	64	43	5	4	2	2	3	4	3	3	4	2
2	C	102	83	19	7	6	6	7	7	5	5	7	6	4
3	32	101	75	26	6	7	5	4	4	5	7	4	5	6
4	18	101	82	19	5	6	6	5	7	4	6	6	7	4
5	100	115	29	86	4	2	2	3	4	2	4	3	3	4
6	180	103	8	95	2	2	2	3	2	2	2	3	2	3
7	10	101	84	17	7	6	5	6	4	7	6	6	5	7
8	56	107	52	55	4	4	3	2	2	3	4	5	4	3
9	C	104	91	13	7	7	5	5	5	7	6	6	6	7
10	32	108	82	26	4	3	5	4	6	5	4	4	7	6
11	18	103	91	14	5	7	7	6	6	7	6	5	7	6
12	100	104	10	94	2	4	3	3	2	4	3	2	2	4
13	10	102	90	12	7	6	5	6	6	7	7	4	7	6
14	180	102	2	100	2	2	2	3	2	3	2	2	2	3
15	C	100	87	13	7	6	7	5	4	7	6	5	7	5
16	56	107	33	74	3	4	4	5	2	4	3	4	3	3
17	18	101	86	15	8	6	7	7	6	7	4	5	7	6
18	32	101	71	30	6	5	7	4	6	4	4	6	4	2
19	10	103	88	15	7	6	7	5	5	6	7	7	6	6
20	100	105	31	74	3	2	2	4	2	4	3	3	2	3

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

Analyst: [signature]

Date: 1-19-06

GIANT KELP GERMINATION AND GROWTH
SHORT-TERM TOXICITY TEST

Lab No.: RT-060117

TEST DATA

Petri Dish No.	Test Sample Conc.	Total Number Counted	Number of Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					1	2	3	4	5	6	7	8	9	10
21	180	106	6	100	3	2	2	2	3	2	2	2	3	3
22	32	104	74	30	5	6	4	7	4	5	5	4	5	4
23	10	102	92	10	7	6	7	5	4	7	6	6	7	7
24	100	103	11	92	2	2	3	4	2	3	4	3	3	3
25	C	103	94	9	6	5	7	6	7	5	6	6	5	7
26	18	103	88	15	5	6	6	5	7	7	6	5	7	6
27	56	103	60	43	3	2	3	4	5	3	4	4	2	3
28	180	105	4	101	2	2	2	2	3	2	2	2	2	2
29	18	102	89	13	6	7	6	5	7	7	6	5	4	6
30	100	104	23	81	3	2	3	3	2	4	3	4	2	3
31	32	102	82	20	5	6	5	4	5	4	4	7	4	5
32	C	102	86	16	6	5	7	6	6	6	7	5	6	7
33	10	102	92	10	6	5	7	6	7	7	7	6	5	5
34	56	104	49	55	4	3	4	5	4	3	2	2	4	3
35	180	101	1	100	3	2	2	2	2	3	2	2	2	3
36														
37														
38														
39														
40														

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

Analyst: [signature]

Date: 1-19-06

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

QA/QC No.: RT-060117

Start Date: 01/17/2006

WATER QUALITY READINGS

Sample	Initial Readings				Final Readings			
	Temp (°C)	DO (mg/l)	pH	Salinity (o/oo)	Temp (°C)	DO (mg/l)	pH	Salinity (o/oo)
Control	15.4	7.5	8.2	34	15.3	7.8	8.1	34
10 µg/l	15.2	7.6	8.2	34	14.8	7.7	8.1	34
18 µg/l	15.2	7.6	8.2	34	15.4	7.8	8.1	34
32µg/l	15.4	7.5	8.2	34	14.9	7.7	8.1	34
56 µg/l	15.3	7.6	8.2	34	14.8	7.7	8.1	34
100 µg/l	15.1	7.6	8.2	34	14.9	7.8	8.1	34
180 µg/l	15.2	7.7	8.2	34	14.8	7.7	8.1	34

Comments:

Reference toxicant: Copper chloride.

All dilutions made with reference lab seawater.

Illumination (16 hr light / 8 hr dark at 50 ± 10 uE/m²/s) at 5 locations in incubator: (four corners and center): 52, 50, 48, 55, 52 uE/m²/s.

Initial readings: Analyst: _____ Date: 1-17-06 Time: 15:00

Final readings: Analyst: _____ Date: 1-19-06 Time: 15:02

GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST

Aquatic Testing Laboratories

QA/QC No.: RT-060117

Start Date: 01/17/2006

RANDOMIZATION WORKSHEET

Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Beaker No.	Sample Conc.	Notes
1	56	11	18	21	180	31	32	Need 7500/ml x 50 ml = 375,000 spores. Add 0.25 ml spore stock of 6 spores per 5x5 hemacytometer grid
2	C	12	100	22	32	32	C	
3	32	13	10	23	10	33	10	
4	18	14	180	24	100	34	56	
5	100	15	C	25	C	35	180	
6	180	16	56	26	18	36		
7	10	17	18	27	56	37		
8	56	18	32	28	180	38		
9	C	19	10	29	18	39		
10	32	20	100	30	100	40		

Analyst: _____ Date: 1-17-06 Time: 1100

Aquatic
Testing
Laboratories

Laboratory Temperature Chart

QA/QC Batch No: RT-060117

Date Tested: 01/17/06 to 01/19/06

Acceptable Range: 15+/- 1°C