

**City of Morro Bay and  
Cayucos Sanitary District**

**OFFSHORE MONITORING  
AND REPORTING PROGRAM**

**SEMIANNUAL EFFLUENT SAMPLING**

**CHEMICAL AND BIOASSAY  
ANALYSIS RESULTS**

**JULY 2007**



**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**

**JULY 2007**

**Prepared by**

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**August 2007**

# marine research specialists

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

10 August 2007

## **Reference: Chemical and Bioassay Analysis Results for Effluent Samples Collected in July 2007**

Dear Mr. Keogh:

Enclosed are the results of:

- A chronic bioassay conducted on a composite effluent sample collected on 16 July 2007;
- An acute bioassay conducted on four effluent grab samples collected daily from 16 July through 19 July 2007;
- Chemical analyses conducted on grab and composite effluent samples collected on 2 July 2007; and
- Radioactivity measured in a composite effluent sample collected on 2 July 2007.

All analyses were conducted in accordance with the requirements of Monitoring and Reporting Program Number 98-15<sup>1</sup> to assess compliance with effluent limitations specified in the Waste Discharge Requirements of the NPDES Discharge Permit.<sup>2</sup>

Bioassay protocols conformed to the revised requirements specified by RWQCB<sup>3</sup> staff that eliminated techniques previously used to mitigate test interference from ammonia toxicity.<sup>4</sup> Nevertheless, all of the measured chemical concentrations and toxicity endpoints complied with the limitations specified in the current discharge permit. This includes outdated acute-toxicity limitations that are no longer promulgated in the current version of the California Ocean Plan<sup>5</sup> 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 to marine organisms 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 over the last decade. Chronic bioassays provide a far more sensitive and accurate measure of toxic effects to marine organisms than do acute toxicity

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<sup>1</sup> 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

<sup>2</sup> 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

<sup>3</sup> California Regional Water Quality Control Board, Central Coast Division

<sup>4</sup> 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

<sup>5</sup> 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

**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 ( <i>Macrocystis pyrifera</i> )					
Chronic Germination	32 <sup>8</sup>	3.12			134
Chronic Growth	32 <sup>8</sup>	3.12			134
Acute:					
Fathead Minnow ( <i>Pimephales promelas</i> )	>70.7 <sup>9</sup>	1.41	1.5	2.0	2.5

tests, which are plagued with interference from ammonia, as is described below. As with past bioassays, the chronic toxicity tests conducted in July 2007 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<sup>6</sup> established that giant kelp (*M. pyrifera*) is substantially more sensitive to MBCSD<sup>7</sup> 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 (3.12 TUc) were more than 40-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 as high as 32%, while the permit allows adverse effects in effluent concentrations exceeding 0.75%, which corresponds to the limiting TUc of 134.

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 in concentrations as low as 56 µg/L, and a significant reduction in growth in concentrations as low as 32 µg/L of the reference toxicant. The concomitant NOECs for the reference toxicant of 32 µg/L for germination and 18 µg/L for growth were comparable to toxic concentrations found in reference tests conducted over the last several years.<sup>10</sup> This suggests that this particular batch of kelp spores was highly susceptible to toxic materials. Nevertheless, they were only minimally affected by exposure to treatment-plant effluent.

### Acute Bioassay

In contrast to the chronic toxicity tests, the acute bioassay was confounded by toxic interference caused by the presence of ammonia in the test sample. Current bioassay protocols<sup>11</sup> limit the use of techniques that, in the past, have been widely used to reduce the confounding influence of ammonia during acute bioassay tests.

<sup>6</sup> 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, February 1994.

<sup>7</sup> City of Morro Bay and the Cayucos Sanitary District, joint owners of the wastewater treatment and disposal facility

<sup>8</sup> 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

<sup>9</sup> LC<sub>50</sub> or the effluent concentration that produces mortality in 50% of the test organisms exposed to the toxicants for 96 hours

<sup>10</sup> cf. The Giant Kelp Germ Tube Growth Laboratory Control Chart attached to this report

<sup>11</sup> 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

The acute bioassay test examined the mortality of the Fathead Minnow (*Pimephales promelas*) exposed to various concentrations of effluent. Historically, these 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 limit for ammonia concentrations that is specified in the NPDES discharge permit (804 mg/L)<sup>12</sup> as compared to typical MBCSD effluent ammonia concentrations ( $\leq 36$  mg/L).<sup>13</sup> This is because ammonia remains in a relatively benign, ionic ammonium<sup>14</sup> form in seawater and wastewater. However, in an acute bioassay, effluent remains static in the test chambers for an extended period during which complex interactions among the organic constituents cause pH to increase. As pH increases, ammonium is converted into a deionized ammonia form<sup>15</sup> that is highly toxic to the test organisms. In contrast, 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, report artificially elevated toxic concentrations.

Various methods have been developed over the years to reduce the artifactual toxicity that results from changes in wastewater ammonia during bioassay tests.<sup>16</sup> 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.<sup>17</sup> 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.

However, 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, and fall far short of eliminating significant artifactual toxicity arising from ammonia deionization. As a result, the acute toxicity reported here is somewhat 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 the artifactual toxicity resulting from pH-induced ammonia interference in MBCSD effluent samples, extraordinary measures were instituted in an attempt to reduce impacts from ammonia toxicity to the maximum extent possible. 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

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<sup>12</sup> Instantaneous maximum ammonia concentration specified in the NPDES waste-discharge requirements for the MBCSD effluent

<sup>13</sup> Marine Research Specialists (MRS). 2007. City of Morro Bay and Cayucos Sanitary District, Offshore Monitoring and Reporting Program, 2006 Annual Report. Submitted February 2007 to the City of Morro Bay and Cayucos Sanitary District, Morro Bay, CA

<sup>14</sup>  $\text{NH}_4^+$

<sup>15</sup>  $\text{NH}_3$

<sup>16</sup> Mercer, B.W., Ames, L.L., Touhill, C.J., Slyke, W.J., Dean, R.B., 1970. Ammonia removal from secondary effluents by selective ion exchange. *Journal of the Water Pollution Control Federation* 42 (2, Part 2), R95-R107.

<sup>17</sup> RWQCB, 2003 (Footnote 4) *op. cit.*

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 artifactual toxicity. 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, oxygen 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 (July 17), pH increased from 7.3 to 7.9 in the test chamber containing 100% effluent. This caused toxic deionized ammonia concentrations to nearly quadruple, from 0.3 mg/l to 1.3 mg/l, and resulted in the mortality of 16 of the 20 test specimens in the two test chambers containing 100% effluent on the first day of the test. 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, 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<sup>18</sup> in order to determine the relative sensitivity of the test organisms. Results demonstrated that the batch of Fathead Minnows (*P. promelas*) used in the July 2007 bioassay were particularly susceptible to toxic exposure. They experienced 100% mortality in concentrations as low as 8 mg/L of the reference toxicant.<sup>19</sup> The concomitant LC<sub>50</sub> for the reference toxicant was 5.3 mg/L, which is comparable to the average toxic concentrations found in reference tests conducted over the last several years.

### 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 2 July 2007. The samples were tested for the presence of 164 chemical compounds. Table 2 shows that only eight compounds were detected in quantifiable amounts in the July-2007 effluent samples. These compounds were ammonia, copper, zinc, cyanide, chloroform, low-toxicity congeners of the herbicide dioxin, a non-chlorinated phenolic compound (3- & 4-methylphenol), 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 receiving-water objectives stated in Table B of the California Ocean Plan,<sup>20</sup> and a critical initial dilution ratio of 133:1

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<sup>18</sup> Sodium dodecyl sulfate

<sup>19</sup> cf. The Larval Fathead Minnow Juvenile Acute Laboratory Control Chart attached to this report

<sup>20</sup> 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.

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

Constituent	Units	Concentration	
		Measured	Limitation <sup>23</sup>
Copper	µg/L	17.	140.
Zinc	µg/L	51.	1620.
Chloroform	µg/L	0.71	17400. <sup>24</sup>
Cyanide	µg/L	58.	130
Dioxin (TCDD equivalents)	pg/L	.0781	0.52 <sup>24</sup>
Radioactivity (gross α)	pCi/L	0.801±0.83	15. <sup>25</sup>
Radioactivity (gross β)	pCi/L	19.2±3.64	50. <sup>25</sup>
3- & 4-Methylphenol	µg/L	3.4	4020 <sup>26</sup>
Bis (2-ethylhexyl) phthalate	µg/L	5.2	740. <sup>24</sup>
Ammonia (as N)	mg/L	29.	80.4

computed from a conservative oceanic dispersion model applied to the MBCSD outfall.<sup>21</sup> Because the PQL's<sup>22</sup> 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.

Most of the compounds found in Table 2 have been routinely detected at low but quantifiable concentrations within effluent<sup>27</sup> and biosolid<sup>28</sup> samples collected over the past decade. Ammonia as nitrogen<sup>29</sup> is measured in grab effluent samples that are collected on a monthly basis. It has always been present in detectable concentrations that average approximately 25 mg/L, well below the most-stringent permit limit of 80.4 mg/L, which applies to a 6-month median.

### **Metals**

The presence of copper, and zinc at low concentrations within the July 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 and zinc also frequently enter the wastewater collection system through internal corrosion of household plumbing systems. In addition, the measured concentration of zinc (51 µg/L) was only slightly above its PQL (50 µg/L), and was more than 30 times lower than the limit specified in the NPDES discharge permit.

<sup>21</sup> 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.

<sup>22</sup> The Practical Quantification Limit is the smallest quantifiable concentration based on the sample size and analytical technique.

<sup>23</sup> 6-month median limitation unless otherwise indicated

<sup>24</sup> 30-Day Average

<sup>25</sup> Drinking Water Limit

<sup>26</sup> The methylphenol concentration was measured in the grab sample as part of the determination of non-chlorinated phenolic compounds. The limit listed in the table is the limit on total non-chlorinated phenolic compounds.

<sup>27</sup> 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.

<sup>28</sup> Table 22 (Page III-78) *op. cit.*

<sup>29</sup> NH<sub>3</sub>-N

### ***BEHP***

The phthalate compound, bis (2-ethylhexyl) phthalate (BEHP), is a ubiquitous compound that has also been consistently detected at low levels in effluent and biosolid samples collected over the past decade. 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 140-times higher than those measured in July 2007 to be of a human-health concern.

### ***Dioxin***

Like the phthalate compounds, dioxins are ubiquitous in the environment. Trace amounts of dioxin are released to the environment primarily through emissions from the incineration of municipal and chemical wastes, in exhaust from automobiles using leaded gasoline, and from the improper disposal of certain chlorinated chemical wastes. Dioxins are chemically stable and do not easily break down into other compounds. Therefore, once produced, dioxins persist in the environment and are found almost everywhere. Extremely small concentrations, less than a part-per-trillion, of various dioxin congeners are often found in effluent and biosolids discharged from publicly owned treatment works where they are formed during the chlorination process. Low concentrations of dioxin have been detected in 77% of the samples of MBCSD effluent collected over the last decade.

### ***Chloroform***

Chloroform is part of a group of compounds known as halomethanes. These compounds are common by-products of wastewater and drinking water chlorination which form during the chlorine disinfection process when organic substances are present. Chloroform has been detected in approximately half of the effluent samples collected over the last decade and a half. However, at the low concentrations normally detected, it is not clear whether the presence of chloroform derives from wastewater disinfection within the treatment plant, or is the result of drinking-water chlorination. Although halomethanes, including chloroform, can negatively affect human health, the concentration of chloroform detected in July 2007 was more than four orders of magnitude below the permitted limit.

### ***Methylphenol***

3-&4-methylphenol (p-cresol) is a non-chlorinated phenolic compound that is a natural product present in many foods, crude oil, and coal tar. It is also detected in animal and human urine. In addition to its industrial uses, p-cresol is also used as an antiseptic and disinfectant because of its bactericidal and fungicidal properties. As a metabolite of toluene, p-cresol is a known toxin; however, the combined concentrations of all non-chlorinated phenolic compounds in the grab sample would have to be more than four orders of magnitude higher than those measured to be of human health concern.

### ***Radioactivity***

As in the past, radioactivity was also measured in effluent samples at low levels that are well below drinking water standards. Alpha particle activity arises from natural mineral deposits that enter the collection system through erosion. Beta particle activity arises from radioactive decay in both natural and man-made materials.

## Cyanide

Only one additional compound was detected at quantifiable amounts in the July-2007 effluent sample. Cyanide was detected at a concentration of 58 µg/L. However, the measured concentration was less than half of the permit limitation and therefore, not of ecological concern. Cyanide has been detected at quantifiable levels within 17% of the effluent samples collected in the past decade and a half, and is commonly found in low concentrations in biosolids.<sup>30</sup>

Although typically not present in significant amounts in wastewater influent, there are many natural sources of cyanide. It is frequently used in pigments and can be introduced into the collection system during photo processing, newspaper printing, jewelry making, chemicals used to develop photographs, electroplating, and metal cleaning. Cyanide is also a component in many insecticides.

In addition to natural sources, a growing body of evidence indicates that many measurements of elevated cyanide in effluent may be artifacts of the analytical protocol used for the analysis.<sup>31</sup> This question is currently being explored in a national research study sponsored by the Water Environment Research Foundation (WERF). Previous WERF studies have also indicated that cyanide levels can be increased by chlorination in the treatment plant disinfection process. Cyanide is also a byproduct of required treatment plant disinfection procedures that utilize ultraviolet irradiation.<sup>32,33</sup> Until recently, much of the chemistry surrounding the formation and/or degradation of cyanide in treatment plant processes was largely unknown. However, in 2003, the WERF confirmed that most, if not all, treatment plants produce cyanide in their treatment process.<sup>34</sup> Although cyanide formation patterns varied significantly among treatment plants, the chlorination of thiocyanate seemed to be the most important mechanism for the formation of cyanide in wastewater treatment processes

## Detected, but Non-Quantifiable Chemical Constituents

In addition to the eight compounds measured in the effluent at quantifiable concentrations, nine 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 six naturally occurring metals, a gasoline-related compound, and two chlorination by-products.

The gasoline-related compound, toluene, comprises one of the four aromatic hydrocarbon compounds collectively known as BTEX (benzene, toluene, ethyl benzene, and xylene). BTEX compounds are primarily associated with gasoline contamination. Laboratory contamination may have played a substantial part in the detection of this compound, because the estimated concentration detected in the sample travel blank (0.14 µg/L) was comparable to the estimated concentration detected within the sample itself.

Chloromethane and dibromochloromethane are, like chloroform, halomethanes which can form during the chlorine disinfection process when organic substances are present. At the extremely low levels detected in the July 2007 effluent sample, these compounds do not pose a human health concern.

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<sup>30</sup> Table 22 (Page III-77) *op. cit.*

<sup>31</sup> Khoury, J.; Pang, M.; Young, C.; Pandit, A.; Carr, S.; and Fischer, D. (2005) Cyanide generation during preservation of chlorinated wastewater effluent samples for total cyanide analysis. Water Environment Research, Submitted Nov 07, 2005.

<sup>32</sup> Zheng A, Dzombak DA, Luthy RG, Kavanaugh MC, Deeb RA. 2004. The occurrence of cyanide formation in six full-scale publicly owned treatment works. Water Environ Res. 2004 Mar-Apr;76(2):101-12

<sup>33</sup> Zheng, Anping; Dzombak, David A.; Zheng, Richard G. 2004. Effects of Nitrosation on the Formation of Cyanide in Publicly Owned Treatment Works Secondary Effluent. Water Environment Research, Volume 76, Number 3, May/June 2004, pp. 197-204(8)

<sup>34</sup> WERF. 2003. Cyanide formation and fate in complex effluents and its relation to water quality criteria. publication No. 98-HHE-5. Water Environment Research Foundation, Alexandria, Va.

**Table 3. Effluent Constituents Detected at Non-Quantifiable Concentrations**

Constituent	Units	MDL	Concentration		
			Estimated <sup>35</sup>	PQL	Limitation <sup>23</sup>
Antimony	µg/L	16.	<b>26.</b>	100.	160800. <sup>24</sup>
Arsenic	µg/L	0.37	<b>1.5</b>	2.	670.
Chromium	µg/L	0.89	<b>2.2</b>	10.	270.
Lead	µg/L	0.057	<b>0.63</b>	1.0	270.
Nickel	µg/L	1.8	<b>3.6</b>	10.	670.
Selenium	µg/L	0.47	<b>0.96</b>	2.	2010.
Dibromochloromethane	µg/L	0.12	<b>0.16</b>	0.5	17400. <sup>24,36</sup>
Chloromethane	µg/L	0.14	<b>0.21</b>	0.5	17400. <sup>24,36</sup>
Toluene	µg/L	0.12	<b>0.13</b>	0.5	11400000. <sup>24</sup>

### Conclusions

The comprehensive chemical and bioassay analyses conducted on effluent samples collected in July 2007 augment data collected over the last two decades. Together, the 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 July-2007 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)

<sup>35</sup> Not detected at levels above the indicated practical quantification (detection) limit

<sup>36</sup> Limit on the sum of halomethanes.

**CHEMICAL ANALYSIS RESULTS**

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

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

Reported: 07/23/2007 14:19

## Water Analysis (General Chemistry)

BCL Sample ID: 0707489-02	Client Sample Name: GRAB A.R.S EFF, 7/2/2007 11:15:00AM												
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru- ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Ammonia as N (Distilled)	29	mg/L	10	4.0	EPA-350.1	07/10/07	07/11/07 10:30	TDC	AAII-5	200	BQG0372	ND	A01

Marine Research Specialists  
 3140 Telegraph Road, Suite A  
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Project: Semi-annual eff  
 Project Number: [none]  
 Project Manager: Doug Coats

Reported: 07/23/2007 14:19

## Water Analysis (General Chemistry)

BCL Sample ID: 0707489-01	Client Sample Name: COMPOSITE A.R.S. EFF, 7/2/2007 10:40:00AM												
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru- ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Total Cyanide	0.058	mg/L	0.0050	0.0032	EPA-335.4	07/06/07	07/06/07 10:58	TOC	KONE-1	1	BQG0205	ND	

Marine Research Specialists  
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Project: Semi-annual eff  
 Project Number: (none)  
 Project Manager: Doug Coats

Reported: 07/23/2007 14:19

## Water Analysis (Metals)

BCL Sample ID: 0707489-01		Client Sample Name: COMPOSITE A.R.S. EFF, 7/2/2007 10:40:00AM											
Constituent	Result	Units	PQL	MDL	Method	Prep	Run	Analyst	Instru- ment ID	Dilution	QC	MB	Lab
						Date	Date/Time				Batch ID	Bias	Quals
Total Antimony	26	ug/L	100	16	EPA-200.7	07/06/07	07/06/07 19:25	ARD	PE-OP2	1	BQG0248	ND	J
Total Beryllium	ND	ug/L	10	0.72	EPA-200.7	07/06/07	07/06/07 19:25	ARD	PE-OP2	1	BQG0248	ND	
Total Cadmium	ND	ug/L	10	3.3	EPA-200.7	07/06/07	07/06/07 19:25	ARD	PE-OP2	1	BQG0248	ND	
Total Chromium	2.2	ug/L	10	0.89	EPA-200.7	07/06/07	07/06/07 19:25	ARD	PE-OP2	1	BQG0248	ND	J
Total Copper	17	ug/L	10	2.6	EPA-200.7	07/06/07	07/06/07 19:25	ARD	PE-OP2	1	BQG0248	ND	
Total Mercury	ND	ug/L	0.20	0.022	EPA-245.1	07/05/07	07/05/07 16:13	PRA	CETAC1	1	BQG0166	ND	
Total Nickel	3.6	ug/L	10	1.8	EPA-200.7	07/06/07	07/06/07 19:25	ARD	PE-OP2	1	BQG0248	ND	J
Total Silver	ND	ug/L	10	9.4	EPA-200.7	07/06/07	07/06/07 19:25	ARD	PE-OP2	1	BQG0248	ND	
Total Zinc	51	ug/L	50	8.2	EPA-200.7	07/06/07	07/06/07 19:25	ARD	PE-OP2	1	BQG0248	ND	
Total Recoverable Arsenic	1.5	ug/L	2.0	0.37	EPA-200.8	07/06/07	07/10/07 19:05	PPS	PE-EL1	1	BQG0250	ND	J
Total Recoverable Lead	0.63	ug/L	1.0	0.057	EPA-200.8	07/06/07	07/10/07 19:05	PPS	PE-EL1	1	BQG0250	ND	J
Total Recoverable Selenium	0.96	ug/L	2.0	0.47	EPA-200.8	07/06/07	07/10/07 19:05	PPS	PE-EL1	1	BQG0250	ND	J
Total Recoverable Thallium	ND	ug/L	1.0	0.016	EPA-200.8	07/06/07	07/10/07 19:05	PPS	PE-EL1	1	BQG0250	ND	

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 Project Number: [none]  
 Project Manager: Doug Coats

Reported: 07/23/2007 14:19

## Organochlorine Pesticides and PCB's (EPA Method 608)

BCL Sample ID: 0707489-01		Client Sample Name: COMPOSITE A.R.S. EFF, 7/2/2007 10:40:00AM												
Constituent	Result	Units	PQL	MDL	Method	Prep		Run		Instru- ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
						Date	Date/Time	Analyst						
Aldrin	ND	ug/L	0.0050	0.0014	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
alpha-BHC	ND	ug/L	0.0050	0.0017	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
beta-BHC	ND	ug/L	0.0050	0.0037	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
delta-BHC	ND	ug/L	0.0050	0.00090	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
gamma-BHC (Lindane)	ND	ug/L	0.0050	0.0017	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
Chlordane (Technical)	ND	ug/L	0.50	0.38	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
4,4'-DDD	ND	ug/L	0.0050	0.0024	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND	V11	
4,4'-DDE	ND	ug/L	0.0050	0.0015	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND	V11	
4,4'-DDT	ND	ug/L	0.0050	0.0019	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
Dieldrin	ND	ug/L	0.0050	0.0021	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
Endosulfan I	ND	ug/L	0.0050	0.0016	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
Endosulfan II	ND	ug/L	0.0050	0.0031	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
Endosulfan sulfate	ND	ug/L	0.0050	0.0019	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
Endrin	ND	ug/L	0.0050	0.0022	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
Endrin aldehyde	ND	ug/L	0.010	0.0022	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
Heptachlor	ND	ug/L	0.0050	0.0044	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
Heptachlor epoxide	ND	ug/L	0.0050	0.0019	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
Methoxychlor	ND	ug/L	0.0050	0.0036	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND	V11	
Toxaphene	ND	ug/L	2.0	0.42	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
PCB-1016	ND	ug/L	0.20	0.048	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
PCB-1221	ND	ug/L	0.20	0.089	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		
PCB-1232	ND	ug/L	0.20	0.090	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND		

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## Organochlorine Pesticides and PCB's (EPA Method 608)

BCL Sample ID: 0707489-01		Client Sample Name: COMPOSITE A.R S. EFF, 7/2/2007 10:40:00AM											
Constituent	Result	Units	PQL	MDL	Method	Prep	Run	Analyst	Instru- ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
						Date	Date/Time						
PCB-1242	ND	ug/L	0.20	0.095	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND	
PCB-1248	ND	ug/L	0.20	0.025	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND	
PCB-1254	ND	ug/L	0.20	0.042	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND	
PCB-1260	ND	ug/L	0.20	0.024	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND	
Total PCB's (Summation)	ND	ug/L	0.20	0.10	EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227	ND	
TCMX (Surrogate)	146	%	58 - 153 (LCL - UCL)		EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227		
Dibutyl chlorendate (Surrogate)	61.0	%	56 - 151 (LCL - UCL)		EPA-608	07/03/07	07/14/07 04:26	JRS	GC-1	1	BQG0227		

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## Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 0707489-01		Client Sample Name: COMPOSITE A.R.S. EFF, 7/2/2007 10:40:00AM											
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru-ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Benzene	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
Bromodichloromethane	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
Bromoform	NO	ug/L	0.50	0.22	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
Bromomethane	ND	ug/L	1.0	0.31	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
Carbon tetrachloride	ND	ug/L	0.50	0.089	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
Chlorobenzene	ND	ug/L	0.50	0.11	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
Chloroethane	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
Chloroform	0.71	ug/L	0.50	0.098	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
Chloromethane	0.21	ug/L	0.50	0.14	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		J
Dibromochloromethane	0.16	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		J
1,2-Dichlorobenzene	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
1,3-Dichlorobenzene	ND	ug/L	0.50	0.14	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
1,4-Dichlorobenzene	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
1,1-Dichloroethane	ND	ug/L	0.50	0.11	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
1,2-Dichloroethane	ND	ug/L	0.50	0.098	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
1,1-Dichloroethene	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
trans-1,2-Dichloroethene	ND	ug/L	0.50	0.14	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
1,2-Dichloropropane	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
cis-1,3-Dichloropropene	ND	ug/L	0.50	0.086	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
trans-1,3-Dichloropropene	ND	ug/L	0.50	0.11	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
Ethylbenzene	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
Methylene chloride	ND	ug/L	1.0	0.16	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	

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## Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 0707489-01		Client Sample Name: COMPOSITE A.R.S. EFF, 7/2/2007 10:40:00AM											
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru-ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Methyl t-butyl ether	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	0.22	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
Tetrachloroethene	ND	ug/L	0.50	0.11	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
Toluene	0.13	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	J
1,1,1-Trichloroethane	ND	ug/L	0.50	0.27	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
1,1,2-Trichloroethane	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
Trichloroethene	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
Trichlorofluoromethane	ND	ug/L	0.50	0.14	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
Vinyl chloride	ND	ug/L	0.50	0.14	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
Total Xylenes	ND	ug/L	1.0	0.33	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
Acrolein	ND	ug/L	20	3.7	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		V11
Acrylonitrile	ND	ug/L	5.0	2.0	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086	ND	
p- & m-Xylenes	ND	ug/L	0.50	0.21	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
o-Xylene	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
1,2-Dichloroethane-d4 (Surrogate)	100	%	76 - 114 (LCL - UCL)		EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
Toluene-d8 (Surrogate)	99.2	%	88 - 110 (LCL - UCL)		EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		
4-Bromofluorobenzene (Surrogate)	94.6	%	86 - 115 (LCL - UCL)		EPA-624	07/03/07	07/03/07 18:22	MGC	MS-V7	1	BQG0086		

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

BCL Sample ID: 0707489-02		Client Sample Name: GRAB A.R.S EFF, 7/2/2007 11:15:00AM											
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru-ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
4-Chloro-3-methylphenol	ND	ug/L	5.0	0.39	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BOG0229	ND	
2-Chlorophenol	ND	ug/L	2.0	0.39	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
2,4-Dichlorophenol	ND	ug/L	2.0	0.37	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
2,4-Dimethylphenol	ND	ug/L	2.0	1.5	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
4,6-Dinitro-2-methylphenol	ND	ug/L	10	2.5	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
2,4-Dinitrophenol	ND	ug/L	10	0.35	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
2-Methylphenol	ND	ug/L	2.0	1.3	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
3- & 4-Methylphenol	3.4	ug/L	2.0	1.4	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
2-Nitrophenol	ND	ug/L	2.0	0.33	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
4-Nitrophenol	ND	ug/L	2.0	0.35	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
Pentachlorophenol	ND	ug/L	10	0.55	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
Phenol	ND	ug/L	2.0	0.30	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
2,4,5-Trichlorophenol	ND	ug/L	5.0	0.37	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
2,4,6-Trichlorophenol	ND	ug/L	5.0	0.47	EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229	ND	
2-Fluorophenol (Surrogate)	48.6	%	31 - 116 (LCL - UCL)		EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BOG0229		
Phenol-d5 (Surrogate)	46.2	%	24 - 77 (LCL - UCL)		EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BOG0229		
Nitrobenzene-d5 (Surrogate)	87.4	%	38 - 148 (LCL - UCL)		EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229		
2-Fluorobiphenyl (Surrogate)	82.9	%	39 - 149 (LCL - UCL)		EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BOG0229		
2,4,6-Tribromophenol (Surrogate)	81.0	%	49 - 187 (LCL - UCL)		EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229		
p-Terphenyl-d14 (Surrogate)	80.1	%	35 - 192 (LCL - UCL)		EPA-625	07/03/07	07/10/07 19:24	SKC	MS-B2	0.990	BQG0229		

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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)

BCL Sample ID: 0707489-01		Client Sample Name: COMPOSITE A.R.S. EFF, 7/2/2007 10:40:00AM											
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru-ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Acenaphthene	ND	ug/L	2.0	0.35	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Acenaphthylene	ND	ug/L	2.0	0.32	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Aldrin	ND	ug/L	2.0	0.47	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Aniline	ND	ug/L	5.0	1.8	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Anthracene	ND	ug/L	2.0	0.27	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Benzidine	ND	ug/L	20	4.7	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	V11
Benzo[a]anthracene	ND	ug/L	2.0	0.34	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Benzo[b]fluoranthene	ND	ug/L	2.0	0.38	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Benzo[k]fluoranthene	ND	ug/L	2.0	0.47	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Benzo[a]pyrene	ND	ug/L	2.0	0.45	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Benzo[g,h,i]perylene	ND	ug/L	2.0	0.56	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Benzoic acid	ND	ug/L	10	0.61	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Benzyl alcohol	ND	ug/L	2.0	0.44	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Benzyl butyl phthalate	ND	ug/L	2.0	0.32	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
alpha-BHC	ND	ug/L	2.0	0.42	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
beta-BHC	ND	ug/L	2.0	0.46	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
delta-BHC	ND	ug/L	2.0	0.28	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
gamma-BHC (Lindane)	ND	ug/L	2.0	0.35	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
bis(2-Chloroethoxy)methane	ND	ug/L	2.0	1.6	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
bis(2-Chloroethyl) ether	ND	ug/L	2.0	0.49	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
bis(2-Chloroisopropyl)ether	ND	ug/L	2.0	0.57	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
bis(2-Ethylhexyl)phthalate	5.2	ug/L	5.0	0.98	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	

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Project: Semi-annual eff  
 Project Number: (none)  
 Project Manager: Doug Coats

Reported: 07/23/2007 14:19

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

BCL Sample ID: 0707489-01		Client Sample Name: COMPOSITE A.R.S. EFF, 7/2/2007 10:40:00AM											
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru- ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
4-Bromophenyl phenyl ether	ND	ug/L	2.0	0.40	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
4-Chloroaniline	ND	ug/L	2.0	0.99	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2-Chloronaphthalene	ND	ug/L	2.0	0.41	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
4-Chlorophenyl phenyl ether	ND	ug/L	2.0	0.33	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Chrysene	ND	ug/L	2.0	0.30	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
4,4'-DDD	ND	ug/L	2.0	0.38	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
4,4'-DDE	ND	ug/L	3.0	0.52	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
4,4'-DDT	ND	ug/L	2.0	0.36	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Dibenzo(a,h)anthracene	ND	ug/L	3.0	0.48	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	V11
Dibenzofuran	ND	ug/L	2.0	0.37	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
1,2-Dichlorobenzene	ND	ug/L	2.0	0.35	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
1,3-Dichlorobenzene	ND	ug/L	2.0	0.35	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
1,4-Dichlorobenzene	ND	ug/L	2.0	0.25	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
3,3-Dichlorobenzidine	ND	ug/L	10	1.5	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Dieldrin	ND	ug/L	3.0	0.52	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Diethyl phthalate	ND	ug/L	2.0	0.34	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Dimethyl phthalate	ND	ug/L	2.0	0.32	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Di-n-butyl phthalate	ND	ug/L	2.0	0.40	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2,4-Dinitrotoluene	ND	ug/L	2.0	0.39	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2,6-Dinitrotoluene	ND	ug/L	2.0	0.48	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Di-n-octyl phthalate	ND	ug/L	2.0	0.41	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
1,2-Diphenylhydrazine	ND	ug/L	2.0	0.38	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	

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

Reported: 07/23/2007 14:19

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

BCL Sample ID: 0707489-01      Client Sample Name: COMPOSITE A.R.S. EFF, 7/2/2007 10:40:00AM

Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru-ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Endosulfan I	ND	ug/L	10	2.3	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Endosulfan II	ND	ug/L	10	1.6	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Endosulfan sulfate	ND	ug/L	3.0	0.67	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Endrin	ND	ug/L	2.0	0.68	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Endrin aldehyde	ND	ug/L	10	3.6	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Fluoranthene	ND	ug/L	2.0	0.30	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Fluorene	ND	ug/L	2.0	0.36	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Heptachlor	ND	ug/L	2.0	0.53	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Heptachlor epoxide	ND	ug/L	2.0	0.24	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Hexachlorobenzene	ND	ug/L	2.0	0.35	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Hexachlorobutadiene	ND	ug/L	2.0	0.40	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Hexachlorocyclopentadiene	ND	ug/L	2.0	0.36	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Hexachloroethane	ND	ug/L	2.0	0.29	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Indeno[1,2,3-cd]pyrene	ND	ug/L	2.0	0.47	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Isophorone	ND	ug/L	2.0	0.31	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2-Methylnaphthalene	ND	ug/L	2.0	0.27	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Naphthalene	ND	ug/L	2.0	0.30	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2-Naphthylamine	ND	ug/L	20	5.3	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	V11
2-Nitroaniline	ND	ug/L	2.0	0.82	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
3-Nitroaniline	ND	ug/L	2.0	1.6	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
4-Nitroaniline	ND	ug/L	5.0	0.44	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Nitrobenzene	ND	ug/L	2.0	0.37	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	

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

Reported: 07/23/2007 14.19

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

BCL Sample ID: 0707489-01		Client Sample Name: COMPOSITE A.R.S. EFF, 7/2/2007 10:40:00AM											
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru- ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
N-Nitrosodimethylamine	ND	ug/L	2.0	0.53	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
N-Nitrosodi-N-propylamine	ND	ug/L	2.0	0.88	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
N-Nitrosodiphenylamine	ND	ug/L	2.0	0.42	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Phenanthrene	ND	ug/L	2.0	0.29	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Pyrene	ND	ug/L	2.0	0.29	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
1,2,4-Trichlorobenzene	ND	ug/L	2.0	0.26	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
4-Chloro-3-methylphenol	ND	ug/L	5.0	0.39	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2-Chlorophenol	ND	ug/L	2.0	0.39	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2,4-Dichlorophenol	ND	ug/L	2.0	0.37	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2,4-Dimethylphenol	ND	ug/L	2.0	1.5	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
4,6-Dinitro-2-methylphenol	ND	ug/L	10	2.5	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2,4-Dinitrophenol	ND	ug/L	10	0.35	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2-Methylphenol	ND	ug/L	2.0	1.3	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
3- & 4-Methylphenol	ND	ug/L	2.0	1.4	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2-Nitrophenol	ND	ug/L	2.0	0.33	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
4-Nitrophenol	ND	ug/L	2.0	0.35	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Pentachlorophenol	ND	ug/L	10	0.55	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
Phenol	ND	ug/L	2.0	0.30	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2,4,5-Trichlorophenol	ND	ug/L	5.0	0.37	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2,4,6-Trichlorophenol	ND	ug/L	5.0	0.47	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229	ND	
2-Fluorophenol (Surrogate)	54.0	%	31 - 116 (LCL - UCL)		EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229		
Phenol-d5 (Surrogate)	51.8	%	24 - 77 (LCL - UCL)		EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229		

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

Reported: 07/23/2007 14:19

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

BCL Sample ID: 0707489-01		Client Sample Name: COMPOSITE A.R.S. EFF, 7/2/2007 10:40:00AM											
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instrument ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Nitrobenzene-d5 (Surrogate)	103	%	38 - 148	(LCL - UCL)	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229		
2-Fluorobiphenyl (Surrogate)	96.3	%	39 - 149	(LCL - UCL)	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229		
2,4,6-Tribromophenol (Surrogate)	92.9	%	49 - 187	(LCL - UCL)	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229		
p-Terphenyl-d14 (Surrogate)	91.8	%	35 - 192	(LCL - UCL)	EPA-625	07/03/07	07/10/07 18:55	SKC	MS-B2	1	BQG0229		

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

Reported: 07/23/2007 14:19

## Organo-Phosphorus Pesticide Analysis (EPA Method 8140)

BCL Sample ID: 0707489-01		Client Sample Name: COMPOSITE A.R.S. EFF, 7/2/2007 10:40:00AM												
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru- ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals	
Azinphos methyl	ND	ug/L	0.20	0.055	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND	V11	
Bofstar	ND	ug/L	0.20	0.055	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Chlorpyrifos	ND	ug/L	0.20	0.024	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Coumaphos	ND	ug/L	0.20	0.054	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Demeton O/S	ND	ug/L	0.20	0.026	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Diazinon	ND	ug/L	0.20	0.044	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Dichlorvos	ND	ug/L	0.20	0.070	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND	V11	
Disulfoton	ND	ug/L	0.50	0.039	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Ethoprop	ND	ug/L	0.20	0.025	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Fensulfothion	ND	ug/L	0.20	0.068	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND	V11	
Fenthion	ND	ug/L	0.20	0.033	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Merphos	ND	ug/L	0.20	0.058	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Methyl parathion	ND	ug/L	0.20	0.074	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Mevinphos	ND	ug/L	0.20	0.053	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Naled	ND	ug/L	0.20	0.072	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND	V11	
Phorate	ND	ug/L	0.20	0.041	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Rannel (Fenchlorphos)	ND	ug/L	0.20	0.067	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Stirophos (Tetrachlorvinphos)	ND	ug/L	0.20	0.046	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Tokuthion (Prothofos)	ND	ug/L	0.20	0.032	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND	V11	
Trichloronate	ND	ug/L	0.20	0.038	EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226	ND		
Triphenylphosphate (Surrogate)	52.8	%	55 - 132 (LCL - UCL)		EPA-8140	07/05/07	07/20/07 18:46	OAA	GC-7	1	BQG0226		V11	

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

Attached are the Asbestos results analyzed by EMSL

<b>BC Lab #</b>	<b>EMSL #</b>	<b>Client Description</b>	<b>Date/Time Sampled</b>
07-7489-1	090703273-0001	Composite – A.R.S eff	7-2-07 1040



**EMSL Analytical, Inc**

2235 Polvorosa Ave , Suite 230, San Leandro, CA 94577

Phone: (510) 895-3675 Fax: (510) 895-3680 Email: milpitaslab@emsl.com

Attn: **Tina Green**  
**BC Laboratories, Inc.**  
**4100 Atlas Court**  
**Bakersfield, CA 93308**

Fax: (661) 327-1918 Phone: (661) 327-4911  
Project: 0707489

Customer ID: BCLA50  
Customer PO: 0707489  
Received: 07/05/07 9:45 AM  
EMSL Order: 090703273

EMSL Proj:  
Analysis Date: 7/17/2007  
Report Date: 7/25/2007

**Determination of Asbestos Structures over 10um in Length in Waste Water Performed by the EPA 100.2 Method**

Sample ID	Sample Prep Date	# Fibers Asbestos	# Fibers Non-Asbestos	Type(s) Of Asbestos	Analytical Sensitivity (MFL)	Confidence Limits	Concentration Of Asbestos Fibers (MFL)	Comments
0707489-01 090703273-0001	7/5/2007	0	0		0.99	0.00-3.70	<0.99	CA ELAP NOTES: Aliquot 1000:10 ml; EFA 1288.25 sq. mm.; Area examined 0.13 sq. mm. Due to the presence of many large, non-fibrous particulate matter in the sample we were unable to filter the water to achieve an analytical sensitivity of 0.2 MFL.

Analyst(s)

Bradford Ross (1)

Daniel Kocher, Laboratory Manager  
or other approved signatory

Sample collection and containers provided by the client, acceptable bottle blank level is defined as <=0.01MFL> 10um, ND=None Detected. This report may not be reproduced, except in full, without written permission by EMSL Analytical, Inc. This report relates only to those items tested. Samples received in good condition unless otherwise noted.

ACCREDITATIONS: NVLAP 101048-3

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

Attached are the Gross Alpha, Beta results analyzed by Test America

<b>BC Lab #</b>	<b>Test America #</b>	<b>Client Description</b>	<b>Date/Time Sampled</b>
07-7489-1	36232	Composite - A.R.S eff	7-2-07 1040

**FORM I**  
**SAMPLE RESULTS**

Date: 02-Aug-07

Lab Name: TA Richland  
Lot-Sample No.: J7G090166-1  
Client Sample ID: 0707489-01

SDG: 35189  
Report No.: 36232  
COC No.:

Collection Date: 7/2/2007 10:40:00 AM  
Received Date: 7/6/2007 3:00:00 PM  
Matrix: WATER

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rs MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Allquot Size	Primary Detector
Batch: 7193582	RICHRC5014											
	BETA		2.7	3.6	3.62	pCi/L	100%	(5.3)	7/29/07 09:58 a		0.1069	GPC27A
							1.74	4.0			L	
								(10.6)				
Batch: 7211168	B0S7											
	ALPHA	U	0.81	0.83	1.34	pCi/L	100%	0.6	7/31/07 02:37 p		0.1983	GPC10C
							0.483	3.0			L	
								(2.)				

No. of Results: 2  
∞

Comments:

July 17, 2007

**Vista Project I.D.: 29160**

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

Dear Dr. Coats,

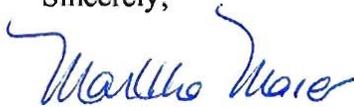
Enclosed are the results for the one effluent sample received at Vista Analytical Laboratory on July 06, 2007 under your Project Name "Morro Bay WWTP". This sample was extracted and analyzed using EPA Method 1613 for tetra-through-octa chlorinated dioxins and furans. A standard turnaround time was provided for this work. As requested, the analyses of the two aqueous samples were cancelled.

Vista's lower calibration limits for Method 1613 analysis in aqueous samples are: 5 pg/L tetra; 25 pg/L penta, hexa, hepta; and 50 pg/L octa, based on a 1L sample size.

The following report consists of a Sample Inventory (Section I), Analytical Results (Section II) and the Appendix, which contains the chain-of-custody, a list of data qualifiers and abbreviations, Vista's current certifications, and copies of the raw data (if requested).

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com). Thank you for choosing Vista as part of your analytical support team.

Sincerely,



Martha M. Maier  
Laboratory Director



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



Sample ID: <b>COMP EFF #1</b>						EPA Method 1613			
Client Data			Sample Data			Laboratory Data			
Name:	Marine Research Specialists		Matrix:	Effluent		Lab Sample:	29160-001	Date Received:	6-Jul-07
Project:	Morro Bay WWTP		Sample Size:	1.01 L		QC Batch No.:	9178	Date Extracted:	12-Jul-07
Date Collected:	3-Jul-07					Date Analyzed DB-5:	13-Jul-07	Date Analyzed DB-225:	NA
Time Collected:	1040								
Analyte	Conc. (pg/L)	DL <sup>a</sup>	EMPC <sup>b</sup>	MDL <sup>c</sup>	Qualifiers	Labeled Standard	%R	LCL-UCL <sup>d</sup>	Qualifiers
2,3,7,8-TCDD	ND	0.930		0.560		<b>IS</b> 13C-2,3,7,8-TCDD	83.5	25 - 164	
1,2,3,7,8-PeCDD	ND	0.757		0.860		13C-1,2,3,7,8-PeCDD	84.5	25 - 181	
1,2,3,4,7,8-HxCDD	ND	1.57		1.02		13C-1,2,3,4,7,8-HxCDD	79.1	32 - 141	
1,2,3,6,7,8-HxCDD	ND	1.68		0.910		13C-1,2,3,6,7,8-HxCDD	71.6	28 - 130	
1,2,3,7,8,9-HxCDD	ND	1.63		0.870		13C-1,2,3,4,6,7,8-HpCDD	92.2	23 - 140	
1,2,3,4,6,7,8-HpCDD	4.34			1.19	J	13C-OCDD	77.2	17 - 157	
OCDD	34.7			1.87	J	13C-2,3,7,8-TCDF	84.6	24 - 169	
2,3,7,8-TCDF	ND	0.809		0.470		13C-1,2,3,7,8-PeCDF	86.6	24 - 185	
1,2,3,7,8-PeCDF	ND	1.16		0.870		13C-2,3,4,7,8-PeCDF	89.9	21 - 178	
2,3,4,7,8-PeCDF	ND	1.07		0.710		13C-1,2,3,4,7,8-HxCDF	87.1	26 - 152	
1,2,3,4,7,8-HxCDF	ND	0.389		0.660		13C-1,2,3,6,7,8-HxCDF	74.9	26 - 123	
1,2,3,6,7,8-HxCDF	ND	0.372		0.840		13C-2,3,4,6,7,8-HxCDF	76.7	28 - 136	
2,3,4,6,7,8-HxCDF	ND	0.451		0.990		13C-1,2,3,7,8,9-HxCDF	79.7	29 - 147	
1,2,3,7,8,9-HxCDF	ND	0.645		1.30		13C-1,2,3,4,6,7,8-HpCDF	71.3	28 - 143	
1,2,3,4,6,7,8-HpCDF	ND	1.30		0.600		13C-1,2,3,4,7,8,9-HpCDF	101	26 - 138	
1,2,3,4,7,8,9-HpCDF	ND	0.997		0.560		13C-OCDF	77.0	17 - 157	
OCDF	ND	2.53		4.20		<b>CRS</b> 37Cl-2,3,7,8-TCDD	93.1	35 - 197	
Totals						Toxic Equivalent Quotient (TEQ) Data <sup>e</sup>			
Total TCDD	10.4					TEQ (Min):	0.0469		
Total PeCDD	ND	2.08				a. Sample specific estimated detection limit.			
Total HxCDD	ND	1.63				b. Estimated maximum possible concentration.			
Total HpCDD	8.58					c. Method detection limit.			
Total TCDF	ND	0.809				d. Lower control limit - upper control limit.			
Total PeCDF	ND	1.12				e. TEQ based on (1997) World Health Organization Toxic Equivalent Factors.(WHO)			
Total HxCDF	ND	0.452							
Total HpCDF	ND	1.14							

Analyst: DMS

Approved By: Martha M. Maier 17-Jul-2007 07:10

***ACUTE AND CHRONIC BIOASSAY RESULTS***

# LABORATORY REPORT



**Date:** July 23, 2007

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

*"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

**Laboratory No.:** A-07071701  
**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: 07/16, 07/17, 07/18, 07/19/07  
Date Received: 07/17, 07/18, 07/19, 07/20/07  
Temp. Received: 2°C, 2°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: 07/17/07 to 07/21/07

**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:

<u>Sample ID.</u>	<u>Test</u>	<u>LC50</u>	<u>TU<sub>a</sub></u>
Grab Effluent	Fathead Minnow	70.7%	1.41
Comp Effluent	Kelp Germination:	<u>NOEC</u> 32%	<u>TU<sub>c</sub></u> 3.12
	Kelp Growth:	32%	3.12

**Quality Control:** Reviewed and approved by:

  
Joseph A. LeMay  
Laboratory Director

# FATHEAD MINNOW ACUTE NPDES TEST



Lab No.: A-07071701-001  
 Client/ID: MRS - Morro Bay

Start Date: 07/17/2007

## TEST SUMMARY

Species: *Pimephales promelas*.  
 Age: 13 (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-070717.

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)	19.6	2°	2°	2°	2°
DO (mg/l)	8.7	7.5	7.4	8.6	7.3
pH	7.8	7.3	7.4	7.5	7.6
Total Res. Chlorine (mg/l)	<0.1	0	0	0	0
Ammonia (mg/l NH <sub>3</sub> -N)**	<0.1	44	36	41	45
Alkalinity (mg/l CaCO <sub>3</sub> )	576	324	313	306	372
Hardness (mg/l CaCO <sub>3</sub> )	89	216	320	320	320
Conductivity (umhos)	320	1305	2220	2340	2390

### Comments:

- \* Chlorine neutralized with sodium thiosulfate (one drop per liter of 10% solution).
- \*\* Ammonia reading by Hach Kit - only approximate indication.

Concentration-response relationship acceptable? (see attached computer analysis):

- Yes (response curve normal)
- No (dose interrupted indicated or non-normal)

# FATHEAD MINNOW ACUTE NPDES TEST



Lab No.: A-07071701-001

Client/ID: MRS - Morro Bay

Start Date: 07/17/2007

## RAW TEST DATA

		DAY 1		DAY 2		DAY 3		DAY 4		
		0 hr	24hr							
Analyst Initials:		<i>Ru</i>								
Time of Readings:		1130	1130	1130	1130	1130	1130	1130	1130	
Control	DO	8.9	7.6	9.0	7.7	8.8	7.9	9.1	7.9	
	pH	7.9	7.5	7.8	7.5	7.8	7.7	7.8	7.5	
	Temp	19.6	19.3	19.7	19.1	19.6	19.1	20.3	19.1	
	# Alive	Rep A	---	10	---	10	---	10	---	10
		Rep B	---	10	---	10	---	10	---	10
6.25%	DO	9.0	7.1	8.9	7.9	8.9	7.6	9.0	7.5	
	pH	7.8	7.5	7.7	7.5	7.7	7.6	7.7	7.4	
	Temp	19.6	19.2	19.8	19.0	19.6	19.1	20.3	19.1	
	# Alive	Rep A	---	10	---	10	---	10	---	10
		Rep B	---	10	---	10	---	10	---	10
12.5%	DO	9.0	7.0	8.8	7.6	8.8	7.4	8.9	7.3	
	pH	7.6	7.6	7.6	7.6	7.7	7.5	7.7	7.4	
	Temp	19.7	19.1	19.9	19.0	19.6	19.0	20.3	19.0	
	# Alive	Rep A	---	10	---	10	---	10	---	10
		Rep B	---	10	---	10	---	10	---	10
25%	DO	8.8	6.6	8.5	7.2	8.7	7.0	8.7	6.8	
	pH	7.5	7.6	7.6	7.7	7.6	7.6	7.6	7.5	
	Temp	19.7	19.1	20.0	19.0	19.6	19.0	20.2	19.0	
	# Alive	Rep A	---	10	---	10	---	10	---	10
		Rep B	---	10	---	10	---	10	---	10
50%	DO	8.5	6.1	8.2	6.3	8.7	5.8	8.2	6.1	
	pH	7.4	7.8	7.6	7.7	7.5	7.7	7.6	7.6	
	Temp	19.6	19.1	20.0	19.0	19.5	19.0	20.1	19.0	
	# Alive	Rep A	---	10	---	10	---	10	---	10
		Rep B	---	10	---	10	---	10	---	10
100%	DO	7.7	5.3	7.4	5.8	8.1	4.6	---	---	
	pH	7.3	7.9	7.4	7.9	7.5	7.8	---	---	
	Temp	19.6	19.0	20.2	19.0	19.5	19.0	---	---	
	# Alive	Rep A	---	3	---	1	---	0	---	---
		Rep B	---	1	---	0	---	---	---	---

**Acute Fish Test-96 Hr Survival**

Start Date: 17 Jul-07 11:30 Test ID: 7071701f Sample ID: CA0047881-Morro Bay SD  
 End Date: 21 Jul-07 11:30 Lab ID: CAATL-Aquatic Testing Labs Sample Type: EFF1-POTW  
 Sample Date: 16 Jul-07 00:00 Protocol: FWCH 4TH-EPA-821-R-02-0 Test Species: PP-Pimephales promelas  
 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

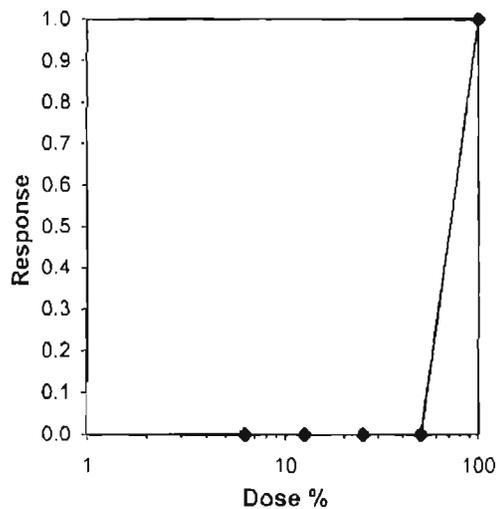
Conc-%	Transform: Arcsin Square Root							Number Resp	Total Number
	Mean	N-Mean	Mean	Min	Max	CV%	N		
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
6.25	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
12.5	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
25	1.0000	1.0000	1.4120	1.4120	1.4120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

$$TU_n = 100 / 70.711 = 1.41$$



# *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 SHORT-TERM TOXICITY TEST



Lab No.: A-07071701  
Client/ID: MRS - Morro Bay Comp. Effluent

Date Tested: 07/17/07 - 07/19/07

## TEST SUMMARY

Species: *Macrocystis pyrifera*.

Protocol: EPA Method 1009.0.

Test type: Static.

Test chamber: glass beaker.

Temperature: 15 +/- 1°C.

Number of spores per ml: 7,500 (approx.).

QA/QC Batch No.: RT-070717 (ran concurrently).

Source: Field collected.

Dilution water: Lab seawater.

Endpoints: NOEC, IC25 at 48 hrs.

Test volume: 200 ml.

Aeration: None.

Number of replicates: 5.

## RESULTS SUMMARY

Sample Concentration	Percent Germination		Mean Germ Tube Length ( $\mu\text{m}$ )	
Control (Brine)	82.4%		16.20	
Control (Dilution)	82.6%		16.50	
5.6%	86.0%		16.50	
10%	85.4%		16.60	
18%	82.3%		16.30	
32%	75.3%	*	12.75	*
56%	48.4%	*	8.35	*

\* 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 $\geq 70\%$	Yes (82.6%)
Mean control germination tube length $> 10 \mu\text{m}$	Yes (16.50 $\mu\text{m}$ )

Please see RT-070717 report for additional test acceptability criteria.

**Macrocyctis Germination and Growth Test-Proportion Germinated**

Start Date: 17 Jul-07 14:00    Test ID: 7071701k    Sample ID: CA0047881-Morro Bay SD  
 End Date: 19 Jul-07 14:00    Lab ID: CAATL-Aquatic Testing Labs    Sample Type: EFF1-POTW  
 Sample Date: 16 Jul-07 00:00    Protocol: WCCH-EPA-600-R-95-136    Test Species: MP-Macrocyctis pyrifer

Comments:

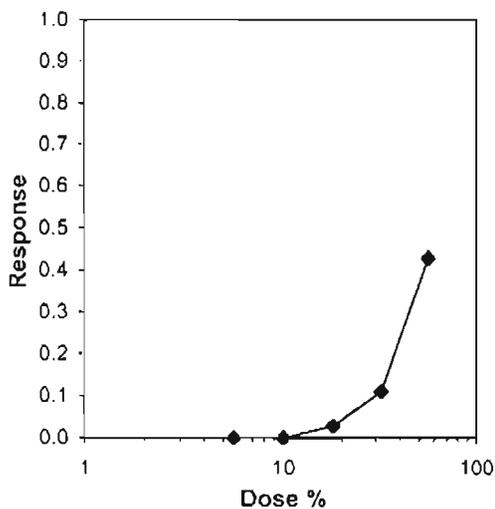
Conc-%	1	2	3	4	5
B-Control	0.7921	0.8641	0.8058	0.8058	0.8529
D-Control	0.8544	0.8155	0.8137	0.8447	0.8039
5.6	0.8654	0.8235	0.8911	0.8544	0.8641
10	0.8600	0.8627	0.8544	0.8515	0.8416
18	0.8235	0.8544	0.8416	0.7941	0.8020
32	0.7264	0.6990	0.7647	0.8020	0.7745
56	0.4953	0.6111	0.5636	0.4404	0.3107

Conc-%	Mean	N-Mean	Transform: Arcsin Square Root				Rank Sum	1-Tailed Critical	Isotonic	
			Mean	Min	Max	CV%			Mean	N-Mean
B-Control	0.8241	0.9972	1.1393	1.0973	1.1932	3.760	5			
D-Control	0.8264	1.0000	1.1417	1.1121	1.1793	2.545	5		0.8467 1.0000	
5.6	0.8597	1.0402	1.1879	1.1373	1.2345	2.943	5	37.50	16.00 0.8467 1.0000	
10	0.8540	1.0334	1.1789	1.1614	1.1913	0.988	5	36.50	16.00 0.8467 1.0000	
18	0.8231	0.9960	1.1375	1.0998	1.1793	2.953	5	25.50	16.00 0.8231 0.9721	
*32	0.7533	0.9115	1.0521	0.9901	1.1096	4.479	5	15.00	16.00 0.7533 0.8897	
*56	0.4842	0.5859	0.7688	0.5912	0.8974	15.465	5	15.00	16.00 0.4842 0.5719	

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.91812	0.9	-0.8061	4.49447
Bartlett's Test indicates unequal variances (p = 1.17E-03)	20.1576	15.0863		
The control means are not significantly different (p = 0.92)	0.10098	2.30601		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	18	32	24	5.55556

Linear Interpolation (80 Resamples)				
Point	%	SE	95% CL(Exp)	Skew
IC05	21.757	2.121	15.956 27.055	-0.1181
IC10	30.250	2.287	24.891 34.308	-0.2518
IC15	34.998	1.468	30.735 38.301	-0.3450
IC20	38.774	1.591	35.268 42.541	0.5644
IC25	42.549	1.991	38.162 47.231	0.9218
IC40	53.877			
IC50	>56			



**Macrocyctis Germination and Growth Test-Growth-Length**

Start Date: 17 Jul-07 14:00 Test ID: 7071701k Sample ID: CA0047881-Morro Bay SD  
 End Date: 19 Jul-07 14:00 Lab ID: CAATL-Aquatic Testing Labs Sample Type: EFF1-POTW  
 Sample Date: 16 Jul-07 00:00 Protocol: WCCH-EPA-600-R-95-136 Test Species: MP-Macrocyctis pyrifera

Comments:

Conc-%	1	2	3	4	5
B-Control	15.250	17.000	16.000	16.500	16.250
D-Control	17.000	16.000	16.750	15.750	17.000
5.6	16.750	16.500	17.000	16.500	15.750
10	16.500	17.500	16.500	16.000	16.500
18	16.500	17.000	16.500	14.750	16.750
32	13.000	12.250	11.750	13.250	13.500
56	8.000	11.000	8.250	7.750	6.750

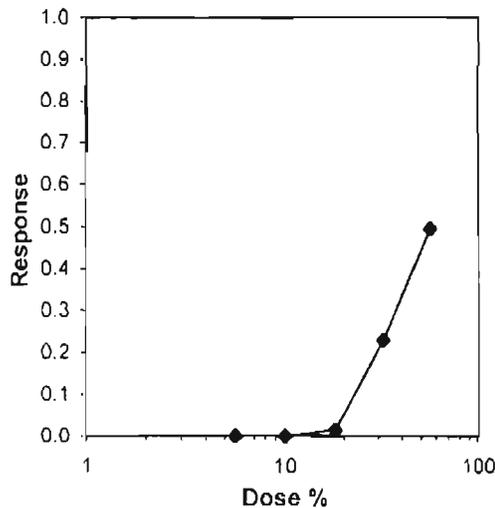
Conc-%	Mean	N-Mean	Transform: Untransformed					N	t-Stat	1-Tailed Critical	MSD	Isotonic	
			Mean	Min	Max	CV%	Mean					N-Mean	
B-Control	16.200	0.9818	16.200	15.250	17.000	3.994	5				16.533	1.0000	
D-Control	16.500	1.0000	16.500	15.750	17.000	3.553	5				16.533	1.0000	
5.6	16.500	1.0000	16.500	15.750	17.000	2.835	5	0.000	2.360	1.322	16.533	1.0000	
10	16.600	1.0061	16.600	16.000	17.500	3.300	5	-0.179	2.360	1.322	16.533	1.0000	
18	16.300	0.9879	16.300	14.750	17.000	5.466	5	0.357	2.360	1.322	16.300	0.9859	
*32	12.750	0.7727	12.750	11.750	13.500	5.717	5	6.695	2.360	1.322	12.750	0.7712	
*56	8.350	0.5061	8.350	6.750	11.000	19.007	5	14.550	2.360	1.322	8.350	0.5050	

Auxillary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9273	0.9	0.7322	3.22542
Bartlett's Test indicates equal variances (p = 0.14)	8.29067	15.0863		
The control means are not significantly different (p = 0.46)	0.76822	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	1.32192	56.535	0.78437	72.0765	1.2E-13	5, 24

**Linear Interpolation (80 Resamples)**

Point	%	SE	95% CL(Exp)		Skew
IC05	20.340	1.681	12.181	21.438	-1.9293
IC10	23.600	1.160	18.966	24.898	-1.1964
IC15	26.860	0.984	23.499	28.732	-0.1865
IC20	30.120	1.021	27.642	33.023	0.5329
IC25	33.909	1.485	30.244	37.206	0.9638
IC40	47.436				
IC50	>56				



**GIANT KELP GERMINATION  
AND GROWTH  
SHORT-TERM TOXICITY TEST**



Lab No.: A-07071701-002

Start Date: 07/17/2007

Dish No.	Sample Conc.	Total Number Counted	Number Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					A	B	C	D	E	F	G	H	I	J
1	10	100	86	14	7	6	5	5	7	8	8	4	9	7
2	C	103	88	15	6	7	7	8	7	4	8	8	7	6
3	B	101	80	21	7	6	7	5	5	7	6	6	7	5
4	32	106	77	29	7	5	7	4	4	6	6	5	4	4
5	56	107	53	54	4	3	3	4	2	2	3	4	4	3
6	56	104	90	14	8	8	7	5	7	6	6	7	7	6
7	18	102	84	18	5	7	5	7	8	7	7	8	6	6
8	B	103	89	14	8	7	6	7	8	5	8	4	8	7
9	18	101	81	20	8	8	7	6	6	5	7	7	7	6
10	56	102	84	18	7	4	5	8	7	7	6	7	8	7
11	56	108	66	42	4	6	3	3	5	7	4	3	5	4
12	C	103	84	19	8	7	7	5	7	6	6	7	5	6
13	32	103	72	31	6	7	5	5	6	4	4	3	4	5
14	10	102	88	14	7	7	8	7	6	5	7	7	8	8
15	B	103	83	20	6	7	6	5	7	7	8	7	6	5
16	56	110	62	48	2	4	2	3	3	4	5	4	3	3
17	10	103	88	15	8	7	6	7	7	8	6	5	5	7
18	C	102	83	19	7	8	5	6	7	7	7	7	5	8
19	32	102	78	24	3	7	4	3	4	4	5	6	6	5
20	18	103	88	15	6	5	7	7	8	7	6	7	7	8

Comments:

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

# GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST



Lab No.: A-07071701-002

Start Date: 07/17/2007

Dish No.	Sample Conc.	Total Number Counted	Number Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					A	B	C	D	E	F	G	H	I	J
21	5.6	101	90	11	8	7	7	6	7	6	5	7	8	7
22	5.6	109	48	61	2	4	2	3	4	2	2	3	4	3
23	C	103	87	16	7	6	7	5	5	8	7	4	7	7
24	10	101	86	15	5	7	6	5	4	8	8	8	7	6
25	B	103	83	20	6	8	7	7	5	7	6	7	7	6
26	32	101	81	20	5	6	7	4	4	5	6	6	6	4
27	5.6	103	88	15	5	7	6	7	8	7	7	7	6	6
28	18	101	85	16	7	7	6	7	8	7	6	6	7	5
29	B	102	87	15	8	7	7	5	7	8	4	7	6	6
30	5.6	103	32	71	2	2	4	2	3	3	2	4	2	3
31	32	102	79	23	5	7	5	4	6	5	6	5	7	4
32	18	102	81	21	5	6	5	7	6	5	5	4	8	8
33	C	102	82	20	8	7	7	6	7	5	7	7	7	7
34	10	101	85	16	6	7	8	7	7	7	6	7	5	6
35	5.6	103	89	14	4	8	7	5	6	6	7	7	6	7
36														
37														
38														
39														
40														

Comments:

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



# GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST



Lab No.: A-07071701-002  
Client ID: MRS - Morro Bay Effluent

Start Date: 07/17/2007

## 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	15.1	7.4	8.2	34	15.6	7.0	8.1	34
Brine Control	15.5	7.2	8.2	34	14.8	7.0	8.1	34
5.6%	15.4	7.5	8.2	34	14.7	7.0	8.1	34
10%	15.5	7.5	8.2	34	15.4	6.8	8.1	34
18%	15.6	7.3	8.2	34	15.5	6.8	8.2	34
32%	15.1	7.4	8.2	34	15.0	6.7	8.2	34
56%	15.4	7.2	8.1	34	15.3	6.6	8.2	34

Sample as received: Chlorine: 0.0 mg/l; pH: 7.3; Salinity: 0 ppt; Temp: 2°C;  
DO: 7.5 mg/l; NH<sub>3</sub>-N: 44 mg/l..

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

Initial readings: Analyst: [Signature] Date: 7-17-7 Time: 1400

Final readings: Analyst: [Signature] Date: 7-19-7 Time: 1400

**QA/QC REPORTS & CHAINS OF CUSTODY**

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 Ventura, CA 93003-3238

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

Reported: 07/23/2007 14:19

## Water Analysis (General Chemistry)

### Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits	
										RPD	Percent Recovery Lab Quals
Total Cyanide	BQG0205	Duplicate	0707477-02	ND	ND		mg/L			10	
		Matrix Spike	0707477-02	ND	0.093961	0.10000	mg/L		94.0		90 - 110
		Matrix Spike Duplicate	0707477-02	ND	0.092202	0.10000	mg/L	1.9	92.2	20	90 - 110
Ammonia as N (Distilled)	BQG0372	Duplicate	0707462-01	0.39994	0.37528		mg/L	6.4		20	
		Matrix Spike	0707462-01	0.39994	0.75144	0.40000	mg/L		87.9		80 - 120
		Matrix Spike Duplicate	0707462-01	0.39994	0.66264	0.40000	mg/L	28.9	65.7	20	80 - 120 Q02,Q03

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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 Type	Source Sample ID	Source Result	Spike Result	Spike Added	Units	RPD	Percent Recovery	Control Limits	
										RPD	Percent Recovery Lab Quals
Total Mercury	BQG0166	Duplicate	0707489-01	ND	ND		ug/L			20	
		Matrix Spike	0707489-01	ND	0.94500	1.0000	ug/L		94.5		70 - 130
		Matrix Spike Duplicate	0707489-01	ND	0.96000	1.0000	ug/L	1.6	96.0	20	70 - 130
Total Antimony	BQG0248	Duplicate	0707581-03	51.907	48.724		ug/L	6.3		20	J
		Matrix Spike	0707581-03	51.907	430.25	400.00	ug/L		94.6		75 - 125
		Matrix Spike Duplicate	0707581-03	51.907	439.91	400.00	ug/L	2.5	97.0	20	75 - 125
Total Beryllium	BQG0248	Duplicate	0707581-03	ND	ND		ug/L			20	
		Matrix Spike	0707581-03	ND	214.30	200.00	ug/L		107		75 - 125
		Matrix Spike Duplicate	0707581-03	ND	214.32	200.00	ug/L	0	107	20	75 - 125
Total Cadmium	BQG0248	Duplicate	0707581-03	ND	ND		ug/L			20	
		Matrix Spike	0707581-03	ND	205.99	200.00	ug/L		103		75 - 125
		Matrix Spike Duplicate	0707581-03	ND	209.32	200.00	ug/L	1.9	105	20	75 - 125
Total Chromium	BQG0248	Duplicate	0707581-03	2.0904	1.9000		ug/L	9.5		20	J
		Matrix Spike	0707581-03	2.0904	193.03	200.00	ug/L		95.5		75 - 125
		Matrix Spike Duplicate	0707581-03	2.0904	197.16	200.00	ug/L	2.1	97.5	20	75 - 125
Total Copper	BQG0248	Duplicate	0707581-03	5.8479	6.0394		ug/L	3.2		20	J
		Matrix Spike	0707581-03	5.8479	205.28	200.00	ug/L		99.7		75 - 125
		Matrix Spike Duplicate	0707581-03	5.8479	206.07	200.00	ug/L	0.3	100	20	75 - 125
Total Nickel	BQG0248	Duplicate	0707581-03	3.8491	4.5315		ug/L	16.3		20	J
		Matrix Spike	0707581-03	3.8491	403.37	400.00	ug/L		99.9		75 - 125
		Matrix Spike Duplicate	0707581-03	3.8491	408.31	400.00	ug/L	1.1	101	20	75 - 125
Total Silver	BQG0248	Duplicate	0707581-03	ND	ND		ug/L			20	
		Matrix Spike	0707581-03	ND	101.83	100.00	ug/L		102		75 - 125
		Matrix Spike Duplicate	0707581-03	ND	102.09	100.00	ug/L	0	102	20	75 - 125
Total Zinc	BQG0248	Duplicate	0707581-03	26.101	29.670		ug/L	12.8		20	J
		Matrix Spike	0707581-03	26.101	245.85	200.00	ug/L		110		75 - 125
		Matrix Spike Duplicate	0707581-03	26.101	248.20	200.00	ug/L	0.9	111	20	75 - 125

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 Project Manager: Doug Coats

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## Water Analysis (Metals)

### Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Source Result	Spike Added	Units	RPD	Percent Recovery	Control Limits	
										RPD	Percent Recovery Lab Quas
Total Recoverable Arsenic	BQG0250	Duplicate	0707542-01	3.3150	3.4140		ug/L	2.9		20	
		Matrix Spike	0707542-01	3.3150	51.920	50.000	ug/L		97.2		70 - 130
		Matrix Spike Duplicate	0707542-01	3.3150	52.501	50.000	ug/L	1.2	98.4	20	70 - 130
Total Recoverable Lead	BQG0250	Duplicate	0707542-01	0.25400	0.25800		ug/L	1.6		20	J
		Matrix Spike	0707542-01	0.25400	47.628	50.000	ug/L		94.7		70 - 130
		Matrix Spike Duplicate	0707542-01	0.25400	49.011	50.000	ug/L	2.9	97.5	20	70 - 130
Total Recoverable Selenium	BQG0250	Duplicate	0707542-01	ND	ND		ug/L			20	
		Matrix Spike	0707542-01	ND	48.463	50.000	ug/L		96.9		70 - 130
		Matrix Spike Duplicate	0707542-01	ND	49.261	50.000	ug/L	1.6	98.5	20	70 - 130
Total Recoverable Thallium	BQG0250	Duplicate	0707542-01	0.40300	ND		ug/L			20	
		Matrix Spike	0707542-01	0.40300	19.362	20.000	ug/L		94.8		70 - 130
		Matrix Spike Duplicate	0707542-01	0.40300	20.351	20.000	ug/L	5.0	99.7	20	70 - 130

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 Project Number: [none]  
 Project Manager: Doug Coats

Reported: 07/23/2007 14:19

## Organochlorine Pesticides and PCB's (EPA Method 608)

### Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Source Result	Spike Added	Units	RPD	Percent Recovery	Control Limits	
										RPD	Percent Recovery Lab Quals
Aldrin	BQG0227	Matrix Spike	0703711-41	ND	0.29587	0.25000	ug/L		118		67 - 136
		Matrix Spike Duplicate	0703711-41	ND	0.29216	0.25000	ug/L	0.9	117	21	67 - 136
gamma-BHC (Lindane)	BQG0227	Matrix Spike	0703711-41	ND	0.26014	0.25000	ug/L		104		47 - 132
		Matrix Spike Duplicate	0703711-41	ND	0.28288	0.25000	ug/L	1.0	105	20	47 - 132
4,4'-DDT	BQG0227	Matrix Spike	0703711-41	ND	0.28933	0.25000	ug/L		116		52 - 127
		Matrix Spike Duplicate	0703711-41	ND	0.29298	0.25000	ug/L	0.9	117	24	52 - 127
Dieldrin	BQG0227	Matrix Spike	0703711-41	ND	0.29804	0.25000	ug/L		119		66 - 140
		Matrix Spike Duplicate	0703711-41	ND	0.30197	0.25000	ug/L	1.7	121	20	66 - 140
Endrin	BQG0227	Matrix Spike	0703711-41	ND	0.31121	0.25000	ug/L		124		63 - 141
		Matrix Spike Duplicate	0703711-41	ND	0.30596	0.25000	ug/L	1.6	122	20	63 - 141
Heptachlor	BQG0227	Matrix Spike	0703711-41	ND	0.28697	0.25000	ug/L		115		68 - 134
		Matrix Spike Duplicate	0703711-41	ND	0.28686	0.25000	ug/L	0	115	20	68 - 134
TCMX (Surrogate)	BQG0227	Matrix Spike	0703711-41	ND	0.33287	0.30000	ug/L		111		55 - 123
		Matrix Spike Duplicate	0703711-41	ND	0.33771	0.30000	ug/L		113		55 - 123
Dibutyl chlorodate (Surrogate)	BQG0227	Matrix Spike	0703711-41	ND	0.84689	0.75000	ug/L		113		48 - 149
		Matrix Spike Duplicate	0703711-41	ND	0.83109	0.75000	ug/L		111		48 - 149

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 Project Number: [none]  
 Project Manager: Doug Coats

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## Volatile Organic Analysis (EPA Method 624)

### Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Control Limits		
									Percent Recovery	RPD	Percent Recovery Lab Quals
Benzene	BQG0086	Matrix Spike	0707506-01	ND	25.040	25.000	ug/L		100		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	25.650	25.000	ug/L	3.0	103	20	70 - 130
Bromodichloromethane	BQG0086	Matrix Spike	0707506-01	ND	24.610	25.000	ug/L		98.4		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	24.940	25.000	ug/L	1.4	99.8	20	70 - 130
Bromoform	BQG0086	Matrix Spike	0707506-01	ND	25.170	25.000	ug/L		101		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	25.710	25.000	ug/L	2.0	103	20	70 - 130
Bromomethane	BQG0086	Matrix Spike	0707506-01	ND	27.330	25.000	ug/L		109		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	28.270	25.000	ug/L	3.6	113	20	70 - 130
Carbon tetrachloride	BQG0086	Matrix Spike	0707506-01	ND	26.820	25.000	ug/L		107		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	27.070	25.000	ug/L	0.9	108	20	70 - 130
Chlorobenzene	BQG0086	Matrix Spike	0707506-01	ND	25.820	25.000	ug/L		103		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.820	25.000	ug/L	3.8	107	20	70 - 130
Chloroethane	BQG0086	Matrix Spike	0707506-01	ND	26.710	25.000	ug/L		107		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.790	25.000	ug/L	0	107	20	70 - 130
Chloroform	BQG0086	Matrix Spike	0707506-01	ND	24.560	25.000	ug/L		98.2		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	25.350	25.000	ug/L	2.8	101	20	70 - 130
Chloromethane	BQG0086	Matrix Spike	0707506-01	ND	21.810	25.000	ug/L		87.2		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	22.850	25.000	ug/L	4.7	91.4	20	70 - 130
Dibromochloromethane	BQG0086	Matrix Spike	0707506-01	ND	26.260	25.000	ug/L		105		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.200	25.000	ug/L	0	105	20	70 - 130
1,2-Dichlorobenzene	BQG0086	Matrix Spike	0707506-01	ND	23.650	25.000	ug/L		94.6		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	24.660	25.000	ug/L	4.1	98.6	20	70 - 130
1,3-Dichlorobenzene	BQG0086	Matrix Spike	0707506-01	ND	24.100	25.000	ug/L		96.4		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	25.110	25.000	ug/L	3.7	100	20	70 - 130
1,4-Dichlorobenzene	BQG0086	Matrix Spike	0707506-01	ND	24.180	25.000	ug/L		96.7		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	25.090	25.000	ug/L	3.4	100	20	70 - 130

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Reported: 07/23/2007 14:19

## Volatile Organic Analysis (EPA Method 624)

### Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Source Result	Spike Added	Units	RPD	Percent Recovery	Control Limits	
										RPD	Percent Recovery Lab Quals
1,1-Dichloroethane	BQG0086	Matrix Spike	0707506-01	ND	25.590	25.000	ug/L		102		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	25.960	25.000	ug/L	1.9	104	20	70 - 130
1,2-Dichloroethane	BQG0086	Matrix Spike	0707506-01	ND	26.120	25.000	ug/L		104		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.600	25.000	ug/L	1.9	106	20	70 - 130
1,1-Dichloroethene	BQG0086	Matrix Spike	0707506-01	ND	25.880	25.000	ug/L		104		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.640	25.000	ug/L	2.8	107	20	70 - 130
trans-1,2-Dichloroethene	BQG0086	Matrix Spike	0707506-01	ND	25.480	25.000	ug/L		102		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.460	25.000	ug/L	3.8	106	20	70 - 130
1,2-Dichloropropane	BQG0086	Matrix Spike	0707506-01	ND	26.160	25.000	ug/L		105		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.230	25.000	ug/L	0	105	20	70 - 130
cis-1,3-Dichloropropene	BQG0086	Matrix Spike	0707506-01	ND	24.580	25.000	ug/L		98.3		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	24.740	25.000	ug/L	0.7	99.0	20	70 - 130
trans-1,3-Dichloropropene	BQG0086	Matrix Spike	0707506-01	ND	24.130	25.000	ug/L		96.5		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	24.120	25.000	ug/L	0	96.5	20	70 - 130
Ethylbenzene	BQG0086	Matrix Spike	0707506-01	ND	25.130	25.000	ug/L		101		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.020	25.000	ug/L	2.9	104	20	70 - 130
Methylene chloride	BQG0086	Matrix Spike	0707506-01	ND	24.220	25.000	ug/L		96.9		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	24.660	25.000	ug/L	1.7	98.6	20	70 - 130
Methyl t-butyl ether	BQG0086	Matrix Spike	0707506-01	ND	23.300	25.000	ug/L		93.2		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	23.810	25.000	ug/L	2.1	95.2	20	70 - 130
1,1,2,2-Tetrachloroethane	BQG0086	Matrix Spike	0707506-01	ND	24.850	25.000	ug/L		99.4		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	25.470	25.000	ug/L	2.6	102	20	70 - 130
Tetrachloroethene	BQG0086	Matrix Spike	0707506-01	ND	24.960	25.000	ug/L		99.8		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	25.320	25.000	ug/L	1.2	101	20	70 - 130
Toluene	BQG0086	Matrix Spike	0707506-01	ND	25.660	25.000	ug/L		103		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.120	25.000	ug/L	1.0	104	20	70 - 130

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 Project Number: [none]  
 Project Manager: Doug Coats

Reported: 07/23/2007 14:19

## Volatile Organic Analysis (EPA Method 624)

### Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Source Result	Spike Added	Units	RPD	Percent Recovery	Control Limits	
										RPD	Percent Recovery Lab Quals
1,1,1-Trichloroethane	BQG0086	Matrix Spike	0707506-01	ND	25.320	25.000	ug/L		101		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.250	25.000	ug/L	3.9	105	20	70 - 130
1,1,2-Trichloroethane	BQG0086	Matrix Spike	0707506-01	ND	26.130	25.000	ug/L		105		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.240	25.000	ug/L	0	105	20	70 - 130
Trichloroethene	BQG0086	Matrix Spike	0707506-01	ND	26.500	25.000	ug/L		106		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.890	25.000	ug/L	1.9	108	20	70 - 130
Trichlorofluoromethane	BQG0086	Matrix Spike	0707506-01	ND	26.440	25.000	ug/L		106		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	26.800	25.000	ug/L	0.9	107	20	70 - 130
1,1,2-Trichloro-1,2,2-trifluoroethane	BQG0086	Matrix Spike	0707506-01	ND	27.110	25.000	ug/L		108		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	27.160	25.000	ug/L	0.9	109	20	70 - 130
Vinyl chloride	BQG0086	Matrix Spike	0707506-01	ND	24.590	25.000	ug/L		98.4		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	25.470	25.000	ug/L	3.6	102	20	70 - 130
Total Xylenes	BQG0086	Matrix Spike	0707506-01	ND	76.190	75.000	ug/L		102		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	78.660	75.000	ug/L	2.9	105	20	70 - 130
p- & m-Xylenes	BQG0086	Matrix Spike	0707506-01	ND	51.500	50.000	ug/L		103		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	53.110	50.000	ug/L	2.9	106	20	70 - 130
o-Xylene	BQG0086	Matrix Spike	0707506-01	ND	24.890	25.000	ug/L		98.8		70 - 130
		Matrix Spike Duplicate	0707506-01	ND	25.550	25.000	ug/L	3.2	102	20	70 - 130
1,2-Dichloromethane-d4 (Surrogate)	BQG0086	Matrix Spike	0707506-01	ND	9.9000	10.000	ug/L		99.0		76 - 114
		Matrix Spike Duplicate	0707506-01	ND	9.9300	10.000	ug/L		99.3		76 - 114
Toluene-d8 (Surrogate)	BQG0086	Matrix Spike	0707506-01	ND	10.150	10.000	ug/L		102		88 - 110
		Matrix Spike Duplicate	0707506-01	ND	9.9400	10.000	ug/L		99.4		88 - 110
4-Bromofluorobenzene (Surrogate)	BQG0086	Matrix Spike	0707506-01	ND	9.6200	10.000	ug/L		96.2		86 - 115
		Matrix Spike Duplicate	0707506-01	ND	9.8000	10.000	ug/L		98.0		86 - 115

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## Base Neutral and Acid Extractables Organic Analysis (EPA Method 625) Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits	
										RPD	Percent Recovery Lab Quals
Acenaphthene	BQG0229	Matrix Spike	0703711-82	ND	85.021	80.000	ug/L		106		38 - 147
		Matrix Spike Duplicate	0703711-82	ND	83.596	80.000	ug/L	1.9	104	19	38 - 147
1,4-Dichlorobenzene	BQG0229	Matrix Spike	0703711-82	ND	72.591	80.000	ug/L		90.7		40 - 129
		Matrix Spike Duplicate	0703711-82	ND	71.477	80.000	ug/L	1.6	89.3	22	40 - 129
2,4-Dinitrotoluene	BQG0229	Matrix Spike	0703711-82	ND	85.800	80.000	ug/L		107		45 - 141
		Matrix Spike Duplicate	0703711-82	ND	85.741	80.000	ug/L	0	107	24	45 - 141
Hexachlorobenzene	BQG0229	Matrix Spike	0703711-82	ND	84.436	80.000	ug/L		106		57 - 149
		Matrix Spike Duplicate	0703711-82	ND	81.862	80.000	ug/L	3.8	102	19	57 - 149
Hexachlorobutadiene	BQG0229	Matrix Spike	0703711-82	ND	62.993	80.000	ug/L		78.7		37 - 113
		Matrix Spike Duplicate	0703711-82	ND	63.784	80.000	ug/L	1.3	79.7	24	37 - 113
Hexachloroethane	BQG0229	Matrix Spike	0703711-82	ND	69.335	80.000	ug/L		86.7		31 - 127
		Matrix Spike Duplicate	0703711-82	ND	70.556	80.000	ug/L	1.7	88.2	23	31 - 127
Nitrobenzene	BQG0229	Matrix Spike	0703711-82	ND	72.877	80.000	ug/L		91.1		33 - 147
		Matrix Spike Duplicate	0703711-82	ND	76.308	80.000	ug/L	4.6	95.4	25	33 - 147
N-Nitrosodi-N-propylamine	BQG0229	Matrix Spike	0703711-82	ND	71.268	80.000	ug/L		89.1		33 - 132
		Matrix Spike Duplicate	0703711-82	ND	70.977	80.000	ug/L	0.4	88.7	24	33 - 132
Pyrene	BQG0229	Matrix Spike	0703711-82	ND	78.129	80.000	ug/L		97.7		44 - 169
		Matrix Spike Duplicate	0703711-82	ND	78.793	80.000	ug/L	0.8	98.5	19	44 - 169
1,2,4-Trichlorobenzene	BQG0229	Matrix Spike	0703711-82	ND	69.580	80.000	ug/L		87.0		44 - 128
		Matrix Spike Duplicate	0703711-82	ND	72.289	80.000	ug/L	3.8	90.4	22	44 - 128
4-Chloro-3-methylphenol	BQG0229	Matrix Spike	0703711-82	ND	76.046	80.000	ug/L		95.1		44 - 140
		Matrix Spike Duplicate	0703711-82	ND	78.368	80.000	ug/L	3.0	98.0	21	44 - 140
2-Chlorophenol	BQG0229	Matrix Spike	0703711-82	ND	73.708	80.000	ug/L		92.1		33 - 114
		Matrix Spike Duplicate	0703711-82	ND	72.885	80.000	ug/L	1.1	91.1	22	33 - 114
2-Methylphenol	BQG0229	Matrix Spike	0703711-82	ND	67.328	80.000	ug/L		84.2		37 - 110
		Matrix Spike Duplicate	0703711-82	ND	70.706	80.000	ug/L	4.9	88.4	21	37 - 110

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

### Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits		Lab Quals
										RPD	Percent Recovery	
3- & 4-Methylphenol	BQG0229	Matrix Spike	0703711-82	ND	121.96	80.000	ug/L		152		67 - 182	
		Matrix Spike Duplicate	0703711-82	ND	123.76	80.000	ug/L	2.0	155	21	67 - 182	
4-Nitrophenol	BQG0229	Matrix Spike	0703711-82	ND	38.713	80.000	ug/L		48.4		22 - 72	
		Matrix Spike Duplicate	0703711-82	ND	36.491	80.000	ug/L	6.0	45.6	30	22 - 72	
Pentachlorophenol	BQG0229	Matrix Spike	0703711-82	ND	75.142	80.000	ug/L		93.9		30 - 154	
		Matrix Spike Duplicate	0703711-82	ND	72.336	80.000	ug/L	3.8	90.4	28	30 - 154	
Phenol	BQG0229	Matrix Spike	0703711-82	ND	34.557	80.000	ug/L		43.2		6 - 71	
		Matrix Spike Duplicate	0703711-82	ND	36.019	80.000	ug/L	4.1	45.0	19	6 - 71	
2,4,6-Trichlorophenol	BQG0229	Matrix Spike	0703711-82	ND	76.006	80.000	ug/L		95.0		36 - 131	
		Matrix Spike Duplicate	0703711-82	ND	77.788	80.000	ug/L	2.3	97.2	24	36 - 131	
2-Fluorophenol (Surrogate)	BQG0229	Matrix Spike	0703711-82	ND	58.160	80.000	ug/L		72.7		31 - 116	
		Matrix Spike Duplicate	0703711-82	ND	59.480	80.000	ug/L		74.4		31 - 116	
Phenol-d5 (Surrogate)	BQG0229	Matrix Spike	0703711-82	ND	40.120	80.000	ug/L		50.2		24 - 77	
		Matrix Spike Duplicate	0703711-82	ND	40.290	80.000	ug/L		50.4		24 - 77	
Nitrobenzene-d5 (Surrogate)	BQG0229	Matrix Spike	0703711-82	ND	85.950	80.000	ug/L		107		38 - 148	
		Matrix Spike Duplicate	0703711-82	ND	85.190	80.000	ug/L		106		38 - 148	
2-Fluorobiphenyl (Surrogate)	BQG0229	Matrix Spike	0703711-82	ND	80.820	80.000	ug/L		101		39 - 149	
		Matrix Spike Duplicate	0703711-82	ND	80.280	80.000	ug/L		100		39 - 149	
2,4,6-Tribromophenol (Surrogate)	BQG0229	Matrix Spike	0703711-82	ND	92.240	80.000	ug/L		115		49 - 187	
		Matrix Spike Duplicate	0703711-82	ND	87.740	80.000	ug/L		110		49 - 187	
p-Terphenyl-d14 (Surrogate)	BQG0229	Matrix Spike	0703711-82	ND	45.010	40.000	ug/L		113		35 - 192	
		Matrix Spike Duplicate	0703711-82	ND	44.070	40.000	ug/L		110		35 - 192	

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## Organo-Phosphorus Pesticide Analysis (EPA Method 8140)

### Quality Control Report - Precision & Accuracy

Constituent	Batch ID	QC Sample Type	Source Sample ID	Source Result	Result	Spike Added	Units	RPD	Percent Recovery	Control Limits	
										RPD	Percent Recovery Lab Quals
Bolstar	BQG0226	Matrix Spike	0703711-76	ND	0.57000	1.0000	ug/L		57.0		48 - 117
		Matrix Spike Duplicate	0703711-76	ND	0.25000	1.0000	ug/L	78.0	25.0	30	48 - 117 003
Chlorpyrifos	BQG0226	Matrix Spike	0703711-76	ND	0.70500	1.0000	ug/L		70.5		30 - 141
		Matrix Spike Duplicate	0703711-76	ND	0.73500	1.0000	ug/L	4.2	73.5	30	30 - 141
Diazinon	BQG0226	Matrix Spike	0703711-76	ND	0.78500	1.0000	ug/L		78.5		53 - 138
		Matrix Spike Duplicate	0703711-76	ND	0.78500	1.0000	ug/L	0	78.5	27	53 - 138
Methyl parathion	BQG0226	Matrix Spike	0703711-76	ND	0.62000	1.0000	ug/L		62.0		43 - 136
		Matrix Spike Duplicate	0703711-76	ND	0.67000	1.0000	ug/L	7.8	67.0	30	43 - 136
Mevinphos	BQG0226	Matrix Spike	0703711-76	ND	0.79500	1.0000	ug/L		79.5		54 - 148
		Matrix Spike Duplicate	0703711-76	ND	0.81000	1.0000	ug/L	1.9	81.0	30	54 - 148
Ronnal (Fenchlorphos)	BQG0226	Matrix Spike	0703711-76	ND	0.56500	1.0000	ug/L		56.5		20 - 150
		Matrix Spike Duplicate	0703711-76	ND	0.58000	1.0000	ug/L	2.6	58.0	30	20 - 150
Sirophos (Tetrachlorvinphos)	BQG0226	Matrix Spike	0703711-76	ND	0.82500	1.0000	ug/L		82.5		51 - 151
		Matrix Spike Duplicate	0703711-76	ND	0.95500	1.0000	ug/L	14.6	95.5	30	51 - 151
Triphenylphosphate (Surrogate)	BQG0226	Matrix Spike	0703711-76	ND	2.2300	2.5000	ug/L		89.2		55 - 132
		Matrix Spike Duplicate	0703711-76	ND	2.3850	2.5000	ug/L		95.4		55 - 132

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## 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		Lab Quals
										Percent Recovery	RPD	
Ammonia as N (Distilled)	BQG0372	BQG0372-BS1	LCS	0.71444	0.80000	0.050	mg/L	89.3		85 - 115		

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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	Control Limits		Lab Quals
									RPD	Percent Recovery	
Total Mercury	BQG0166	BQG0166-BS1	LCS	1.0325	1.0000	0.20	ug/L	103		85 - 115	
Total Antimony	BQG0248	BQG0248-BS1	LCS	392.11	400.00	100	ug/L	98.0		85 - 115	
Total Beryllium	BQG0248	BQG0248-BS1	LCS	217.95	200.00	10	ug/L	109		85 - 115	
Total Cadmium	BQG0248	BQG0248-BS1	LCS	214.98	200.00	10	ug/L	107		85 - 115	
Total Chromium	BQG0248	BQG0248-BS1	LCS	189.31	200.00	10	ug/L	94.7		85 - 115	
Total Copper	BQG0248	BQG0248-BS1	LCS	182.52	200.00	10	ug/L	91.3		85 - 115	
Total Nickel	BQG0248	BQG0248-BS1	LCS	398.85	400.00	10	ug/L	99.7		85 - 115	
Total Silver	BQG0248	BQG0248-BS1	LCS	97.962	100.00	10	ug/L	98.0		85 - 115	
Total Zinc	BQG0248	BQG0248-BS1	LCS	229.47	200.00	50	ug/L	115		85 - 115	
Total Recoverable Arsenic	BQG0250	BQG0250-BS1	LCS	47.395	50.000	2.0	ug/L	94.8		85 - 115	
Total Recoverable Lead	BQG0250	BQG0250-BS1	LCS	47.283	50.000	1.0	ug/L	94.6		85 - 115	
Total Recoverable Selenium	BQG0250	BQG0250-BS1	LCS	47.049	50.000	2.0	ug/L	94.1		85 - 115	
Total Recoverable Thallium	BQG0250	BQG0250-BS1	LCS	19.202	20.000	1.0	ug/L	96.0		85 - 115	

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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	Control Limits		Lab Quals
									RPD	Percent Recovery	
Aldrin	BQG0227	BQG0227-BS1	LCS	0.31011	0.25000	0.0050	ug/L	124		65 - 140	
gamma-BHC (Lindane)	BQG0227	BQG0227-BS1	LCS	0.27059	0.25000	0.0050	ug/L	108		32 - 153	
4,4'-DDT	BQG0227	BQG0227-BS1	LCS	0.30229	0.25000	0.0050	ug/L	121		52 - 127	
Dieldrin	BQG0227	BQG0227-BS1	LCS	0.31395	0.25000	0.0050	ug/L	126		69 - 134	
Endrin	BQG0227	BQG0227-BS1	LCS	0.31192	0.25000	0.0050	ug/L	125		63 - 140	
Heptachlor	BQG0227	BQG0227-BS1	LCS	0.30274	0.25000	0.0050	ug/L	121		65 - 141	
TCMX (Surrogate)	BQG0227	BQG0227-BS1	LCS	0.34301	0.30000		ug/L	114		49 - 132	
Dibutyl chlorendate (Surrogate)	BQG0227	BQG0227-BS1	LCS	0.89089	0.75000		ug/L	119		57 - 137	

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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	Control Limits		Lab Quals
									RPD	Percent Recovery	
Benzene	BQG0086	BQG0086-BS1	LCS	25.290	25.000	0.50	ug/L	101		70 - 130	
Bromodichloromethane	BQG0086	BQG0086-BS1	LCS	24.410	25.000	0.50	ug/L	97.6		70 - 130	
Bromoform	BQG0086	BQG0086-BS1	LCS	25.150	25.000	0.50	ug/L	101		70 - 130	
Bromomethane	BQG0086	BQG0086-BS1	LCS	28.630	25.000	1.0	ug/L	115		70 - 130	
Carbon tetrachloride	BQG0086	BQG0086-BS1	LCS	26.400	25.000	0.50	ug/L	106		70 - 130	
Chlorobenzene	BQG0086	BQG0086-BS1	LCS	26.420	25.000	0.50	ug/L	106		70 - 130	
Chloroethane	BQG0086	BQG0086-BS1	LCS	26.410	25.000	0.50	ug/L	106		70 - 130	
Chloroform	BQG0086	BQG0086-BS1	LCS	24.830	25.000	0.50	ug/L	99.3		70 - 130	
Chloromethane	BQG0086	BQG0086-BS1	LCS	22.890	25.000	0.50	ug/L	91.6		70 - 130	
Dibromochloromethane	BQG0086	BQG0086-BS1	LCS	25.690	25.000	0.50	ug/L	103		70 - 130	
1,2-Dichlorobenzene	BQG0086	BQG0086-BS1	LCS	24.190	25.000	0.50	ug/L	96.8		70 - 130	
1,3-Dichlorobenzene	BQG0086	BQG0086-BS1	LCS	24.640	25.000	0.50	ug/L	98.6		70 - 130	
1,4-Dichlorobenzene	BQG0086	BQG0086-BS1	LCS	24.480	25.000	0.50	ug/L	97.9		70 - 130	
1,1-Dichloroethane	BQG0086	BQG0086-BS1	LCS	25.550	25.000	0.50	ug/L	102		70 - 130	
1,2-Dichloroethane	BQG0086	BQG0086-BS1	LCS	26.000	25.000	0.50	ug/L	104		70 - 130	
1,1-Dichloroethene	BQG0086	BQG0086-BS1	LCS	26.280	25.000	0.50	ug/L	105		70 - 130	
trans-1,2-Dichloroethene	BQG0086	BQG0086-BS1	LCS	25.890	25.000	0.50	ug/L	104		70 - 130	
1,2-Dichloropropane	BQG0086	BQG0086-BS1	LCS	26.350	25.000	0.50	ug/L	105		70 - 130	
cis-1,3-Dichloropropene	BQG0086	BQG0086-BS1	LCS	24.250	25.000	0.50	ug/L	97.0		70 - 130	
trans-1,3-Dichloropropene	BQG0086	BQG0086-BS1	LCS	23.740	25.000	0.50	ug/L	95.0		70 - 130	
Ethylbenzene	BQG0086	BQG0086-BS1	LCS	25.560	25.000	0.50	ug/L	102		70 - 130	
Methylene chloride	BQG0086	BQG0086-BS1	LCS	24.250	25.000	1.0	ug/L	97.0		70 - 130	
Methyl t-butyl ether	BQG0086	BQG0086-BS1	LCS	23.240	25.000	0.50	ug/L	93.0		70 - 130	

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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		Lab Quals
										Percent Recovery	RPD	
1,1,2,2-Tetrachloroethane	BQG0086	BQG0086-BS1	LCS	22.470	25.000	0.50	ug/L	89.9		70 - 130		
Tetrachloroethene	BQG0086	BQG0086-BS1	LCS	25.260	25.000	0.50	ug/L	101		70 - 130		
Toluene	BQG0086	BQG0086-BS1	LCS	25.510	25.000	0.50	ug/L	102		70 - 130		
1,1,1-Trichloroethane	BQG0086	BQG0086-BS1	LCS	25.970	25.000	0.50	ug/L	104		70 - 130		
1,1,2-Trichloroethane	BQG0086	BQG0086-BS1	LCS	26.390	25.000	0.50	ug/L	106		70 - 130		
Trichloroethene	BQG0086	BQG0086-BS1	LCS	28.480	25.000	0.50	ug/L	114		70 - 130		
Trichlorofluoromethane	BQG0086	BQG0086-BS1	LCS	26.580	25.000	0.50	ug/L	106		70 - 130		
1,1,2-Trichloro-1,2,2-trifluoroethane	BQG0086	BQG0086-BS1	LCS	27.230	25.000	0.50	ug/L	109		70 - 130		
Vinyl chloride	BQG0086	BQG0086-BS1	LCS	25.230	25.000	0.50	ug/L	101		70 - 130		
Total Xylenes	BQG0086	BQG0086-BS1	LCS	76.890	75.000	1.0	ug/L	103		70 - 130		
p- & m-Xylenes	BQG0086	BQG0086-BS1	LCS	51.960	50.000	0.50	ug/L	104		70 - 130		
o-Xylene	BQG0086	BQG0086-BS1	LCS	24.930	25.000	0.50	ug/L	99.7		70 - 130		
1,2-Dichloroethane-d4 (Surrogate)	BQG0086	BQG0086-BS1	LCS	9.5500	10.000	0.50	ug/L	95.5		76 - 114		
Toluene-d8 (Surrogate)	BQG0086	BQG0086-BS1	LCS	9.9900	10.000	0.50	ug/L	99.9		88 - 110		
4-Bromofluorobenzene (Surrogate)	BQG0086	BQG0086-BS1	LCS	9.5700	10.000	0.50	ug/L	95.7		86 - 115		

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## 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	Control Limits		Lab Quals
									RPD	Percent Recovery	
Acenaphthene	BQG0229	BQG0229-BS1	LCS	83.800	80.000	2.0	ug/L	105		38 - 146	
1,4-Dichlorobenzene	BQG0229	BQG0229-BS1	LCS	72.991	80.000	2.0	ug/L	91.2		34 - 137	
2,4-Dinitrotoluene	BQG0229	BQG0229-BS1	LCS	85.354	80.000	2.0	ug/L	107		43 - 149	
Hexachlorobenzene	BQG0229	BQG0229-BS1	LCS	83.517	80.000	2.0	ug/L	104		51 - 155	
Hexachlorobutadiene	BQG0229	BQG0229-BS1	LCS	65.834	80.000	2.0	ug/L	82.3		31 - 121	
Hexachloroethane	BQG0229	BQG0229-BS1	LCS	70.978	80.000	2.0	ug/L	88.7		32 - 129	
Nitrobenzene	BQG0229	BQG0229-BS1	LCS	75.316	80.000	2.0	ug/L	94.1		32 - 143	
N-Nitrosodi-N-propylamine	BQG0229	BQG0229-BS1	LCS	71.632	80.000	2.0	ug/L	89.5		33 - 132	
Pyrene	BQG0229	BQG0229-BS1	LCS	80.094	80.000	2.0	ug/L	100		46 - 157	
1,2,4-Trichlorobenzene	BQG0229	BQG0229-BS1	LCS	72.461	80.000	2.0	ug/L	90.6		36 - 137	
4-Chloro-3-methylphenol	BQG0229	BQG0229-BS1	LCS	76.465	80.000	5.0	ug/L	95.6		43 - 133	
2-Chlorophenol	BQG0229	BQG0229-BS1	LCS	74.394	80.000	2.0	ug/L	93.0		39 - 113	
2-Methylphenol	BQG0229	BQG0229-BS1	LCS	66.981	80.000	2.0	ug/L	83.7		38 - 112	
3- & 4-Methylphenol	BQG0229	BQG0229-BS1	LCS	119.44	80.000	2.0	ug/L	149		65 - 185	
4-Nitrophenol	BQG0229	BQG0229-BS1	LCS	36.141	80.000	2.0	ug/L	45.2		26 - 68	
Pentachlorophenol	BQG0229	BQG0229-BS1	LCS	77.749	80.000	10	ug/L	97.2		32 - 156	
Phenol	BQG0229	BQG0229-BS1	LCS	33.838	80.000	2.0	ug/L	42.3		12 - 62	
2,4,6-Trichlorophenol	BQG0229	BQG0229-BS1	LCS	75.925	80.000	5.0	ug/L	94.9		37 - 135	
2-Fluorophenol (Surrogate)	BQG0229	BQG0229-BS1	LCS	58.170	80.000	5.0	ug/L	72.7		31 - 116	
Phenol-d5 (Surrogate)	BQG0229	BQG0229-BS1	LCS	37.890	80.000	5.0	ug/L	47.4		24 - 77	
Nitrobenzene-d5 (Surrogate)	BQG0229	BQG0229-BS1	LCS	85.150	80.000	5.0	ug/L	105		38 - 148	
2-Fluorobiphenyl (Surrogate)	BQG0229	BQG0229-BS1	LCS	79.230	80.000	5.0	ug/L	99.0		39 - 149	
2,4,6-Tribromophenol (Surrogate)	BQG0229	BQG0229-BS1	LCS	85.380	80.000	5.0	ug/L	107		49 - 187	

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## 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		Lab Quals
										Percent Recovery	RPD	
p-Terphenyl-d14 (Surrogate)	BQG0229	BQG0229-BS1	LCS	44.540	40 000	5.0	ug/L	111		35 - 192		

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## Organo-Phosphorus Pesticide Analysis (EPA Method 8140)

### Quality Control Report - Laboratory Control Sample

Constituent	Batch ID	QC Sample ID	QC Type	Result	Spike Level	PQL	Units	Percent Recovery	RPD	Control Limits		Lab Quals
										Percent Recovery	RPD	
Bolstar	BQG0226	BQG0226-BS1	LCS	0.50000	1.0000	0.20	ug/L	50.0		42 - 127		
Chlorpyrifos	BQG0226	BQG0226-BS1	LCS	0.76000	1.0000	0.20	ug/L	76.0		31 - 142		
Diazinon	BQG0226	BQG0226-BS1	LCS	0.84500	1.0000	0.20	ug/L	84.5		53 - 137		
Methyl parathion	BQG0226	BQG0226-BS1	LCS	0.67000	1.0000	0.20	ug/L	67.0		24 - 148		
Mevinphos	BQG0226	BQG0226-BS1	LCS	0.83500	1.0000	0.20	ug/L	83.5		46 - 140		
Ronnel (Fenchlorphos)	BQG0226	BQG0226-BS1	LCS	0.59500	1.0000	0.20	ug/L	59.5		30 - 136		
Strophos (Tetrachlorvinphos)	BQG0226	BQG0226-BS1	LCS	0.90500	1.0000	0.20	ug/L	90.5		36 - 159		
Triphenylphosphate (Surrogate)	BQG0226	BQG0226-BS1	LCS	2.4050	2.5000	0.20	ug/L	96.2		51 - 141		

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## 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	BQG0205	BQG0205-BLK1	ND	mg/L	0.0050	0.0032	
Ammonia as N (Distilled)	BQG0372	BQG0372-BLK1	ND	mg/L	0.050	0.020	

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## Water Analysis (Metals)

### Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Total Mercury	BQG0166	BQG0166-BLK1	ND	ug/L	0.20	0.022	
Total Antimony	BQG0248	BQG0248-BLK1	ND	ug/L	100	16	
Total Beryllium	BQG0248	BQG0248-BLK1	ND	ug/L	10	0.72	
Total Cadmium	BQG0248	BQG0248-BLK1	ND	ug/L	10	3.3	
Total Chromium	BQG0248	BQG0248-BLK1	ND	ug/L	10	0.89	
Total Copper	BQG0248	BQG0248-BLK1	ND	ug/L	10	2.6	
Total Nickel	BQG0248	BQG0248-BLK1	ND	ug/L	10	1.8	
Total Silver	BQG0248	BQG0248-BLK1	ND	ug/L	10	9.4	
Total Zinc	BQG0248	BQG0248-BLK1	ND	ug/L	50	8.2	
Total Recoverable Arsenic	BQG0250	BQG0250-BLK1	ND	ug/L	2.0	0.37	
Total Recoverable Lead	BQG0250	BQG0250-BLK1	ND	ug/L	1.0	0.057	
Total Recoverable Selenium	BQG0250	BQG0250-BLK1	ND	ug/L	2.0	0.47	
Total Recoverable Thallium	BQG0250	BQG0250-BLK1	ND	ug/L	1.0	0.016	



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### Notes And Definitions

- J Estimated Value (CLP Flag)
- MDL Method Detection Limit
- ND Analyte Not Detected at or above the reporting limit
- PQL Practical Quantitation Limit
- RPD Relative Percent Difference
- A01 PQL's and MDL's are raised due to sample dilution.
- Q02 Matrix spike precision is not within the control limits.
- Q03 Matrix spike recovery(s) is(are) not within the control limits.
- V11 The Continuing Calibration Verification (CCV) recovery is not within established control limits.

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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	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0014	
alpha-BHC	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0017	
beta-BHC	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0037	
delta-BHC	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.00090	
gamma-BHC (Lindane)	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0017	
Chlordane (Technical)	BQG0227	BQG0227-BLK1	ND	ug/L	0.50	0.38	
4,4'-DDD	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0024	V11
4,4'-DDE	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0015	V11
4,4'-DDT	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0019	
Dieldrin	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0021	
Endosulfan I	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0016	
Endosulfan II	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0031	
Endosulfan sulfate	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0019	
Endrin	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0022	
Endrin aldehyde	BQG0227	BQG0227-BLK1	ND	ug/L	0.010	0.0022	
Heptachlor	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0044	
Heptachlor epoxide	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0019	
Methoxychlor	BQG0227	BQG0227-BLK1	ND	ug/L	0.0050	0.0036	V11
Toxaphene	BQG0227	BQG0227-BLK1	ND	ug/L	2.0	0.42	
PCB-1016	BQG0227	BQG0227-BLK1	ND	ug/L	0.20	0.048	
PCB-1221	BQG0227	BQG0227-BLK1	ND	ug/L	0.20	0.089	
PCB-1232	BQG0227	BQG0227-BLK1	ND	ug/L	0.20	0.090	
PCB-1242	BQG0227	BQG0227-BLK1	ND	ug/L	0.20	0.095	
PCB-1248	BQG0227	BQG0227-BLK1	ND	ug/L	0.20	0.025	

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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-1254	BQG0227	BQG0227-BLK1	ND	ug/L	0.20	0.042	
PCB-1260	BQG0227	BQG0227-BLK1	ND	ug/L	0.20	0.024	
Total PCB's (Summation)	BQG0227	BQG0227-BLK1	ND	ug/L	0.20	0.10	
TCMX (Surrogate)	BQG0227	BQG0227-BLK1	110	%	58 - 153 (LCL - UCL)		
Dibutyl chlorendate (Surrogate)	BQG0227	BQG0227-BLK1	116	%	56 - 151 (LCL - UCL)		

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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
Bromodichloromethane	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.13	
Carbon tetrachloride	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.089	
Chloroform	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.098	
1,2-Dichlorobenzene	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.13	
1,3-Dichlorobenzene	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.14	
1,4-Dichlorobenzene	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.12	
1,2-Dichloroethane	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.098	
1,1-Dichloroethene	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.12	
trans-1,2-Dichloroethene	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.14	
Ethylbenzene	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.13	
Methylene chloride	BQG0086	BQG0086-BLK1	ND	ug/L	1.0	0.16	
1,1,2,2-Tetrachloroethane	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.22	
Tetrachloroethene	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.11	
Toluene	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.12	
1,1,1-Trichloroethane	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.27	
1,1,2-Trichloroethane	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.12	
Trichloroethene	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.13	
Trichlorofluoromethane	BQG0086	BQG0086-BLK1	ND	ug/L	0.50	0.14	
Acrylonitrile	BQG0086	BQG0086-BLK1	ND	ug/L	5.0	2.0	
1,2-Dichloroethane-d4 (Surrogate)	BQG0086	BQG0086-BLK1	99.0	%	76 - 114 (LCL - UCL)		
Toluene-d8 (Surrogate)	BQG0086	BQG0086-BLK1	98.7	%	88 - 110 (LCL - UCL)		
4-Bromofluorobenzene (Surrogate)	BQG0086	BQG0086-BLK1	95.5	%	86 - 115 (LCL - UCL)		

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## 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	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.35	
Acenaphthylene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.32	
Aldrin	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.47	
Aniline	BQG0229	BQG0229-BLK1	ND	ug/L	5.0	1.8	
Anthracene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.27	
Benzidine	BQG0229	BQG0229-BLK1	ND	ug/L	20	4.7	
Benzo[a]anthracene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.34	
Benzo[b]fluoranthene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.38	
Benzo[k]fluoranthene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.47	
Benzo[a]pyrene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.45	
Benzo[g,h,i]perylene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.56	
Benzoic acid	BQG0229	BQG0229-BLK1	ND	ug/L	10	0.81	
Benzyl alcohol	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.44	
Benzyl butyl phthalate	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.32	
alpha-BHC	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.42	
beta-BHC	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.46	
delta-BHC	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.28	
gamma-BHC (Lindane)	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.35	
bis(2-Chloroethoxy)methane	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	1.6	
bis(2-Chloroethyl) ether	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.49	
bis(2-Chloroisopropyl) ether	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.57	
bis(2-Ethylhexyl)phthalate	BQG0229	BQG0229-BLK1	ND	ug/L	5.0	0.98	
4-Bromophenyl phenyl ether	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.40	
4-Chloroaniline	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.99	

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## 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-Chloronaphthalene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.41	
4-Chlorophenyl phenyl ether	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.33	
Chrysene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.30	
4,4'-DDD	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.38	
4,4'-DDE	BQG0229	BQG0229-BLK1	ND	ug/L	3.0	0.52	
4,4'-DDT	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.36	
Dibenzo[a,h]anthracene	BQG0229	BQG0229-BLK1	ND	ug/L	3.0	0.48	
Dibenzofuran	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.37	
1,2-Dichlorobenzene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.35	
1,3-Dichlorobenzene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.35	
1,4-Dichlorobenzene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.25	
3,3-Dichlorobenzidine	BQG0229	BQG0229-BLK1	ND	ug/L	10	1.5	
Dieldrin	BQG0229	BQG0229-BLK1	ND	ug/L	3.0	0.52	
Diethyl phthalate	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.34	
Dimethyl phthalate	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.32	
Di-n-butyl phthalate	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.40	
2,4-Dinitrotoluene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.39	
2,6-Dinitrotoluene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.48	
Di-n-octyl phthalate	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.41	
1,2-Diphenylhydrazine	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.38	
Endosulfan I	BQG0229	BQG0229-BLK1	ND	ug/L	10	2.3	
Endosulfan II	BQG0229	BQG0229-BLK1	ND	ug/L	10	1.6	
Endosulfan sulfate	BQG0229	BQG0229-BLK1	ND	ug/L	3.0	0.67	
Endrin	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.68	

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## 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
Endrin aldehyde	BQG0229	BQG0229-BLK1	ND	ug/L	10	3.6	
Fluoranthene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.30	
Fluorene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.36	
Heptachlor	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.53	
Heptachlor epoxide	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.24	
Hexachlorobenzene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.35	
Hexachlorobutadiene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.40	
Hexachlorocyclopentadiene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.36	
Hexachloroethane	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.29	
Indeno(1,2,3-cd)pyrene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.47	
Isophorone	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.31	
2-Methylnaphthalene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.27	
Naphthalene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.30	
2-Naphthylamine	BQG0229	BQG0229-BLK1	ND	ug/L	20	5.3	
2-Nitroaniline	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.82	
3-Nitroaniline	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	1.6	
4-Nitroaniline	BQG0229	BQG0229-BLK1	ND	ug/L	5.0	0.44	
Nitrobenzene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.37	
N-Nitrosodimethylamine	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.53	
N-Nitrosodi-N-propylamine	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.88	
N-Nitrosodiphenylamine	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.42	
Phenanthrene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.29	
Pyrene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.29	
1,2,4-Trichlorobenzene	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.26	

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 Project Number: [none]  
 Project Manager: Doug Coats

Reported: 07/23/2007 14:19

## 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-Chloro-3-methylphenol	BQG0229	BQG0229-BLK1	ND	ug/L	5.0	0.39	
2-Chlorophenol	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.39	
2,4-Dichlorophenol	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.37	
2,4-Dimethylphenol	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	1.5	
4,6-Dinitro-2-methylphenol	BQG0229	BQG0229-BLK1	ND	ug/L	10	2.5	
2,4-Dinitrophenol	BQG0229	BQG0229-BLK1	ND	ug/L	10	0.35	
2-Methylphenol	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	1.3	
3- & 4-Methylphenol	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	1.4	
2-Nitrophenol	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.33	
4-Nitrophenol	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.35	
Pentachlorophenol	BQG0229	BQG0229-BLK1	ND	ug/L	10	0.55	
Phenol	BQG0229	BQG0229-BLK1	ND	ug/L	2.0	0.30	
2,4,5-Trichlorophenol	BQG0229	BQG0229-BLK1	ND	ug/L	5.0	0.37	
2,4,6-Trichlorophenol	BQG0229	BQG0229-BLK1	ND	ug/L	5.0	0.47	
2-Fluorophenol (Surrogate)	BQG0229	BQG0229-BLK1	64.4	%	31 - 116 (LCL - UCL)		
Phenol-d5 (Surrogate)	BQG0229	BQG0229-BLK1	46.1	%	24 - 77 (LCL - UCL)		
Nitrobenzene-d5 (Surrogate)	BQG0229	BQG0229-BLK1	102	%	38 - 148 (LCL - UCL)		
2-Fluorobiphenyl (Surrogate)	BQG0229	BQG0229-BLK1	95.9	%	39 - 149 (LCL - UCL)		
2,4,6-Tribromophenol (Surrogate)	BQG0229	BQG0229-BLK1	95.2	%	49 - 187 (LCL - UCL)		
p-Terphenyl-d14 (Surrogate)	BQG0229	BQG0229-BLK1	103	%	35 - 192 (LCL - UCL)		

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Project Number: [none]  
Project Manager: Doug Coats

Reported: 07/23/2007 14:19

## Organo-Phosphorus Pesticide Analysis (EPA Method 8140)

### Quality Control Report - Method Blank Analysis

Constituent	Batch ID	QC Sample ID	MB Result	Units	PQL	MDL	Lab Quals
Azinphos methyl	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.055	
Bolstar	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.055	
Chlorpyrifos	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.024	
Coumaphos	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.054	
Demeton O/S	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.026	
Diazinon	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.044	
Dichlorvos	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.070	
Disulfoton	BQG0226	BQG0226-BLK1	ND	ug/L	0.50	0.039	
Ethoprop	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.025	
Fensulfathion	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.088	
Fenthion	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.033	
Merphos	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.058	
Methyl parathion	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.074	
Mevinphos	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.053	
Naled	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.072	
Phorate	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.041	
Ronnel (Fenclorphos)	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.067	
Stirophos (Tetrachlorvinphos)	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.046	
Tokuthion (Prothiofos)	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.032	
Trichloronate	BQG0226	BQG0226-BLK1	ND	ug/L	0.20	0.038	
Triphenylphosphate (Surrogate)	BQG0226	BQG0226-BLK1	83.4	%	55 - 132 (LCL - UCL)		

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 Project Number: [none]  
 Project Manager: Doug Coats

Reported: 07/23/2007 14:19

## Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 0707489-03		Client Sample Name: TB, 7/2/2007 12:00:00AM											
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru-ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Benzene	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
Bromodichloromethane	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
Bromoform	ND	ug/L	0.50	0.22	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
Bromomethane	ND	ug/L	1.0	0.31	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
Carbon tetrachloride	ND	ug/L	0.50	0.089	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
Chlorobenzene	ND	ug/L	0.50	0.11	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
Chloroethane	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
Chloroform	ND	ug/L	0.50	0.098	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
Chloromethane	ND	ug/L	0.50	0.14	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
Dibromochloromethane	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
1,2-Dichlorobenzene	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
1,3-Dichlorobenzene	ND	ug/L	0.50	0.14	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
1,4-Dichlorobenzene	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
1,1-Dichloroethane	ND	ug/L	0.50	0.11	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
1,2-Dichloroethane	ND	ug/L	0.50	0.098	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
1,1-Dichloroethene	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
trans-1,2-Dichloroethene	ND	ug/L	0.50	0.14	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
1,2-Dichloropropane	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
cis-1,3-Dichloropropene	ND	ug/L	0.50	0.086	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
trans-1,3-Dichloropropene	ND	ug/L	0.50	0.11	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
Ethylbenzene	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
Methylene chloride	0.51	ug/L	1.0	0.16	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	J

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 Project Number: [none]  
 Project Manager: Doug Coats

Reported: 07/23/2007 14:19

## Volatile Organic Analysis (EPA Method 624)

BCL Sample ID: 0707489-03		Client Sample Name: TB, 7/2/2007 12:00:00AM											
Constituent	Result	Units	PQL	MDL	Method	Prep Date	Run Date/Time	Analyst	Instru-ment ID	Dilution	QC Batch ID	MB Bias	Lab Quals
Methyl t-butyl ether	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	0.22	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	V11
Tetrachloroethene	0.16	ug/L	0.50	0.11	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	J
Toluene	0.14	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	J
1,1,1-Trichloroethane	ND	ug/L	0.50	0.27	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
1,1,2-Trichloroethane	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
Trichloroethene	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
Trichlorofluoromethane	ND	ug/L	0.50	0.14	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ug/L	0.50	0.13	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
Vinyl chloride	ND	ug/L	0.50	0.14	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
Total Xylenes	ND	ug/L	1.0	0.33	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
Acrolein	ND	ug/L	20	3.7	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		V11
Acrylonitrile	ND	ug/L	5.0	2.0	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086	ND	
p- & m-Xylenes	ND	ug/L	0.50	0.21	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
o-Xylene	ND	ug/L	0.50	0.12	EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
1,2-Dichloroethane-d4 (Surrogate)	91.5	%	76 - 114 (LCL - UCL)		EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
Toluene-d8 (Surrogate)	100	%	88 - 110 (LCL - UCL)		EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		
4-Bromofluorobenzene (Surrogate)	92.3	%	86 - 115 (LCL - UCL)		EPA-624	07/03/07	07/03/07 22:01	MGC	MS-V7	1	BQG0086		

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 Project Manager: Doug Coats

Reported: 07/23/2007 14:19

## Laboratory / Client Sample Cross Reference

Laboratory	Client Sample Information		Receive Date:	
0707489-01	COC Number: ---	---	07/02/2007 16:41	
	Project Number: ---	---	Sampling Date: 07/02/2007 10:40	
	Sampling Location: ---	---	Sample Depth: ---	
	Sampling Point: COMPOSITE A.R.S. EFF	---	Sample Matrix: Water	
	Sampled By: ---	---		
<hr/>				
0707489-02	COC Number: ---	---	07/02/2007 16:41	
	Project Number: ---	---	Sampling Date: 07/02/2007 11:15	
	Sampling Location: ---	---	Sample Depth: ---	
	Sampling Point: GRAB A.R.S. EFF	---	Sample Matrix: Water	
	Sampled By: ---	---		
<hr/>				
0707489-03	COC Number: ---	---	07/02/2007 16:41	
	Project Number: ---	---	Sampling Date: 07/02/2007 00:00	
	Sampling Location: ---	---	Sample Depth: ---	
	Sampling Point: TB	---	Sample Matrix: Water	
	Sampled By: ---	---		

Analytical Data Package Prepared For

# BC Laboratories, Inc

Radiochemical Analysis By

**TAL Richland**

*2800 G.W. Way, Richland Wa, 99354, (509)-375-3131.*

Assigned Laboratory Code: STL

Data Package Contains 15 Pages

Report No.: 36232

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
35189		0707489-01	J7G090166-1	J2H511AA	9J2H5110	7193582
		0707489-01	J7G090166-1	J2H511AF	9J2H5110	7211168

## Certificate of Analysis

**STL Richland**  
2800 George Washington Way  
Richland, WA 99354

Tel: 509 375 3131 Fax: 509 375 5590  
www.stl-inc.com

August 2, 2007

BC Laboratories, Inc.  
4100 Atlas Court  
Bakersfield, CA 93308

Attention: Tina Green

---

Date Received by Lab	:	July 6, 2007
Sample Number/Matrix	:	One (1) Water
SDG Number	:	35189
Sample Code	:	0707489-01

---

### CASE NARRATIVE

#### I. Introduction

On July 6, 2007, one water sample was received at the STL Richland (STLR) laboratory for radiochemical analysis. Upon receipt, the sample was assigned STLR identification numbers as described on the cover page of the Analytical Data Package. The sample was assigned to Lot Number J7G090166.

#### II. Sample Receipt

The sample was received in good condition and no anomalies were noted during check-in.

#### III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical uncertainties.

The analyses requested were:

Gas Proportional Detectors  
Gross Alpha by method STL RICH-RC-5014 (EPA 900.0)  
Gross Beta by method STL RICH-RC-5014 (EPA 900.0)

**IV. Quality Control**

The analytical result for each analysis performed includes a minimum of one laboratory control sample (LCS), and one reagent blank sample analysis. Any exceptions have been noted in the "Comments" section.

**V. Comments**

The information to complete the State of California form was not provided.

Gross Alpha Analysis:

The LCS, batch blank, matrix spike, sample and sample duplicate results are within acceptance limits.

Gross Beta Analysis:

The LCS, batch blank, sample, matrix spike and sample duplicate results are within acceptance limits.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. The Laboratory Manager or a designee, as verified by the following signature has authorized release of the data contained in this hard copy data package.

Reviewed and approved:



Don Petty  
Project Manager

## Drinking Water Method Cross References

DRINKING WATER ASTM METHOD CROSS REFERENCES		
Referenced Method	Isotope(s)	STL Richland's SOP number
EPA 901.1	Cs-134, I-131	RICH-RC-5017
EPA 900.0	Alpha & Beta	RICH-RC-5014
EPA 903.1	Ra-226	RICH-RC-5005
EPA 904.0	Ra-228	RICH-RC-5005
EPA 905.0	Sr89/90	RICH-RC-5006
ASTM D2460	Total Radium	RICH-RC-5027
Standard Method 7500-U-C & ASTM D5174	Uranium	RICH-RC-5058
EPA 906.0	Tritium	RICH-RC-5007
NOTE:		
The Gross Alpha LCS is prepared with Am-241 (unless otherwise specified in the case narrative)		
The Gross Beta LCS is prepared with Sr/Y-90 (unless otherwise specified in the case narrative)		

## Uncertainty Estimation

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship,  $R = \text{constants} * f(x,y,z,\dots)$ . The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties ( $u_i$ ) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty ( $u_c$ ) multiplied by the coverage factor (1, 2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value ( $S/\sqrt{n}$ ), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

# Sample Results Summary

Date: 02-Aug-07

## TAL Richland STL

Ordered by Method, Batch No., Client Sample ID.

Report No. : 36232

SDG No: 35189

Batch	Client Id Work Order	Parameter	Result +- Uncertainty ( 2s)	Qual	Units	Tracer Yield	MDC or MDA	CRDL	RER2
7193582	RICHRC5014								
	0707489-01								
	J2H511AA	BETA	19.2 +- 3.64		pCi/L	100%	3.62	4.0	
	0707489-01 DUP								
	J2H511AE	BETA	17.6 +- 3.45		pCi/L	100%	3.66	4.0	0.6
7211168	B0S7								
	0707489-01								
	J2H511AF	ALPHA	0.809 +- 0.826	U	pCi/L	100%	1.34	3.0	
	0707489-01 DUP								
	J2H511AH	ALPHA	0.610 +- 0.700	U	pCi/L	100%	1.1	3.0	0.4
No. of Results:		4							

QC Results Summary

Date: 02-Aug-07

TAL Richland STL

Ordered by Method, Batch No, QC Type,.

Report No. : 36232

SDG No.: 35189

Batch	Work Order	Parameter	Result +- Uncertainty ( 2s)	Qual	Units	Tracer Yield	LCS Recovery	Bias	MDC MDA
RICHRC5014									
7193582	MATRIX SPIKE, 0707489-01								
	J2H511AD	BETA	196.0 +- 28.9		pCi/L	100%	94%	-0.1	3.8
7193582	BLANK QC,								
	J2RWN1AA	BETA	-0.0461 +- 0.843	U	pCi/L	100%			1.72
7193582	LCS,								
	J2RWN1AC	BETA	36.1 +- 5.37		pCi/L	100%	91%	-0.1	1.65
B0S7									
7211168	MATRIX SPIKE, 0707489-01								
	J2H511AG	ALPHA	51.0 +- 13.0		pCi/L	100%	76%	-0.2	1.1
7211168	BLANK QC,								
	J3T3E1AA	ALPHA	0.886 +- 0.761	U	pCi/L	100%			0.976
7211168	LCS,								
	J3T3E1AC	ALPHA	39.5 +- 10.2		pCi/L	100%	100%	0.0	1.01
No. of Results: 6									

FORM II

Date: 02-Aug-07

DUPLICATE RESULTS

Lab Name: TA Richland

SDG: 35189

Collection Date: 7/2/2007 10:40:00 AM

Lot-Sample No.: J7G090166-1

Report No.: 36232

Received Date: 7/6/2007 3:00:00 PM

Client Sample ID: 0707489-01 DUP

COC No.:

Matrix: WATER

Parameter	Result, Orig Rst	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Action Lev	Rpt Unit, CRDL	Yield	Rst MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Allquot Size	Primary Detector
Batch: 7193582	RICHR5014				Work Order: J2H511AE		Report DB ID: J2H511ER		Orig Sa DB ID: 9J2H5110			
BETA	17.6		2.6	3.4	3.66	pCi/L	100%	(4.8)	7/29/07 09:58 a		0.1088	GPC27C
	19.2		RER2 0.6			4.0		(10.2)			L	
Batch: 7211168	B0S7				Work Order: J2H511AH		Report DB ID: J2H511HR		Orig Sa DB ID: 9J2H5110			
ALPHA	0.610	U	0.69	0.70	1.1	pCi/L	100%	0.55	7/31/07 02:37 p		0.1984	GPC10D
	0.809	U	RER2 0.4			3.0		(1.7)			L	

101  
No. of Results: 2    Comments:

TAL Richland    RER2 - Replicate Error Ratio = (S-D)/[sqrt((sq(TPUs)+sq(TP(d))))] as defined by ICPT BOA.  
 rptSTLRchDupV5.1    MDC|MDA,Lc - Detection, Decision Level based on Instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.  
 .3 A2002    U Qual - Analyzed for but not detected above limiting criteria. Limit criteria is less than the Mdc/Mda or Total Uncert or not identified by gamma scan software.

FORM II  
BLANK RESULTS

Date: 02-Aug-07

Lab Name: TA Richland

SDG: 35164

Matrix: WATER

Report No. : 36232

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA, Lc	Rpt Unit, CRDL	Yield	Rs MDC, Rs TotUcert	Analysis, Prep Date	Total Sa Size	Allquot Size	Primary Detector
Batch: 7211168	BOS7											
ALPHA	0.886	U	0.73	0.76	0.976	pCi/L	100%	0.91	7/31/07 02:37 p		0.2055	GPC10F
					0.314	3.0		(2.3)			L	
Batch: 7193582	RICHRC5014											
BETA	-0.0461	U	0.84	0.84	1.72	pCi/L	100%	-0.03	7/29/07 09:58 a		0.2054	GPC27D
					0.831	4.0		-0.11			L	

No. of Results: 2      Comments:

1

FORM II  
LCS RESULTS

Date: 02-Aug-07

Lab Name: TA Richland  
Matrix: WATER

SDG: 35164  
Report No. : 36232

Parameter	Result	Qual	Count Error ( 2 s)	Total Uncert( 2 s)	MDC MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Primary Detector
Batch: 7211168	B0S7							Work Order: J3T3E1AC		Report DB ID: J3T3E1CS			
ALPHA	39.5		4.5	10.0	1.01	pCi/L	100%	39.5	1.2	100%	7/31/07 03:51 p	0.2065	GPC10A
								Rec Limits: 75	125	0.0		L	
Batch: 7193582	RICHRC5014							Work Order: J2RWN1AC		Report DB ID: J2RWN1CS			
BETA	36.1		2.0	5.4	1.65	pCi/L	100%	39.6	0.79	91%	7/29/07 09:58 a	0.2044	GPC28B
								Rec Limits: 75	125	-0.1		L	

No. of Results: 2      Comments:

12

FORM II  
MATRIX SPIKE RESULTS

Date: 02-Aug-07

Lab Name: TA Richland

SDG: 35189

Lot-Sample No.: J7G090166-1, 0707489-01

Report No.: 36232

Matrix: WATER

Parameter	SpikeResult, Orig Rst	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA	Rpt Unit, CRDL	Yield	Rec- overy	Exp- ected	Exp Uncert	Analysis, Prep Date	Allquot Size	Analy Method, Primary Detector
Batch: 7193582	Work Order: J2H511AD		Report DB ID: J2H511DW		Orig Sa DB ID: 9J2H5110								
BETA	196.0		6.8	29.0	3.8	pCi/L	100%	93.64%	209.0	2.4	7/29/07 09:58 a	0.1084	RICHRC5014
	19.2											L	GPC27B
Batch: 7211168	Work Order: J2H511AG		Report DB ID: J2H511GW		Orig Sa DB ID: 9J2H5110								
ALPHA	51.0		5.6	13.0	1.1	pCi/L	100%	75.94%	67.1	2.1	7/31/07 02:37 p	0.2013	B0S7
	0.809											L	GPC10B

Number of Results: 2

Comments:

1  
6

## Report Definitions

Action Lev	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
Batch	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
Bias	Defined by the equation $(\text{Result}/\text{Expected}) - 1$ as defined by ANSI N13.30.
COC No	Chain of Custody Number assigned by the Client or STL Richland.
Count Error (#s)	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
Total Uncert (#s) <i>u<sub>c</sub> - Combined Uncertainty.</i>	All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, <i>u<sub>c</sub>, the combined uncertainty.</i> The uncertainty is absolute and in the same units as the result.
(#s), Coverage Factor	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
CRDL (RL)	Contractual Required Detection Limit as defined in the Client's Statement Of Work or STL Richland "default" nominal detection limit. Often referred to the reporting level (RL)
Lc	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. $Lc = (1.645 * \text{Sqrt}(2 * (\text{BkgndCnt}/\text{BkgndCntMin})/\text{SCntMin})) * (\text{ConvFcu}/(\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol})) * \text{IngrFct}$ . For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
Lot-Sample No	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
MDC MDA	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. $MDC = (4.65 * \text{Sqrt}((\text{BkgndCnt}/\text{BkgndCntMin})/\text{SCntMin}) + 2.71/\text{SCntMin}) * (\text{ConvFcu}/(\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol})) * \text{IngrFct}$ . For LSC methods the batch blank is used as a measure of the background variability.
Primary Detector	The instrument identifier associated with the analysis of the sample aliquot.
Ratio U-234/U-238	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
Rst/MDC	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Rst/TotUcert	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Report DB No	Sample Identifier used by the report system. The number is based upon the first five digits of the Work Order Number.
RER	The equation Replicate Error Ratio = $(S - D)/(\text{sqrt}(\text{TPUs}^2 + \text{TPUd}^2))$ as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample.
SDG	Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt.
Sum Rpt Alpha Spec Rst(s)	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
Work Order	The LIMS software assign test specific identifier.
Yield	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

**Section I: Sample Inventory Report**

**Date Received: 7/6/2007**

<u>Vista Lab. ID</u>	<u>Client Sample ID</u>
29160-001	COMP EFF #1
29160-002	COMP INF #1
29160-003	TRAVEL BLANK

Method Blank						EPA Method 1613			
Matrix:	Effluent	QC Batch No.:	9178	Lab Sample:	0-MB001				
Sample Size:	1.00 L	Date Extracted:	12-Jul-07	Date Analyzed DB-5:	13-Jul-07	Date Analyzed DB-225:	NA		
Analyte	Conc. (pg/L)	DL <sup>a</sup>	EMPC <sup>b</sup>	MDL <sup>c</sup>	Qualifiers	Labeled Standard	%R	LCL-UCL <sup>d</sup>	Qualifiers
2,3,7,8-TCDD	ND	1.05		0.560		<b>IS</b> 13C-2,3,7,8-TCDD	82.6	25 - 164	
1,2,3,7,8-PeCDD	ND	0.829		0.860		13C-1,2,3,7,8-PeCDD	88.8	25 - 181	
1,2,3,4,7,8-HxCDD	ND	1.12		1.02		13C-1,2,3,4,7,8-HxCDD	81.4	32 - 141	
1,2,3,6,7,8-HxCDD	ND	1.21		0.910		13C-1,2,3,6,7,8-HxCDD	73.0	28 - 130	
1,2,3,7,8,9-HxCDD	ND	1.17		0.870		13C-1,2,3,4,6,7,8-HpCDD	79.6	23 - 140	
1,2,3,4,6,7,8-HpCDD	ND	1.29		1.19		13C-OCDD	75.8	17 - 157	
OCDD	ND		1.94	1.87		13C-2,3,7,8-TCDF	84.4	24 - 169	
2,3,7,8-TCDF	ND	0.907		0.470		13C-1,2,3,7,8-PeCDF	93.1	24 - 185	
1,2,3,7,8-PeCDF	ND	1.58		0.870		13C-2,3,4,7,8-PeCDF	94.4	21 - 178	
2,3,4,7,8-PeCDF	ND	1.41		0.710		13C-1,2,3,4,7,8-HxCDF	86.6	26 - 152	
1,2,3,4,7,8-HxCDF	ND	0.456		0.660		13C-1,2,3,6,7,8-HxCDF	77.3	26 - 123	
1,2,3,6,7,8-HxCDF	ND	0.440		0.840		13C-2,3,4,6,7,8-HxCDF	78.2	28 - 136	
2,3,4,6,7,8-HxCDF	ND	0.509		0.990		13C-1,2,3,7,8,9-HxCDF	79.2	29 - 147	
1,2,3,7,8,9-HxCDF	ND	0.760		1.30		13C-1,2,3,4,6,7,8-HpCDF	76.2	28 - 143	
1,2,3,4,6,7,8-HpCDF	ND	0.848		0.600		13C-1,2,3,4,7,8,9-HpCDF	75.1	26 - 138	
1,2,3,4,7,8,9-HpCDF	ND	0.895		0.560		13C-OCDF	79.9	17 - 157	
OCDF	ND	1.66		4.20		<b>CRS</b> 37Cl-2,3,7,8-TCDD	90.3	35 - 197	
<b>Totals</b>						<b>Toxic Equivalent Quotient (TEQ) Data<sup>e</sup></b>			
Total TCDD	ND	1.05				<b>TEQ (Min):</b>	<b>0</b>		
Total PeCDD	ND	0.829				a. Sample specific estimated detection limit.			
Total HxCDD	ND	1.17				b. Estimated maximum possible concentration.			
Total HpCDD	ND	1.29				c. Method detection limit.			
Total TCDF	ND	0.907				d. Lower control limit - upper control limit.			
Total PeCDF	ND	1.49				e. TEQ based on (1997) World Health Organization Toxic Equivalent Factors.(WHO)			
Total HxCDF	ND	0.526							
Total HpCDF	ND	0.869							

Analyst: DMS

Approved By: Martha M. Maier 17-Jul-2007 07:10

OPR Results				EPA Method 1613			
Matrix:	Effluent	QC Batch No.:	9178	Lab Sample:	0-OPR001		
Sample Size:	1.00 L	Date Extracted:	12-Jul-07	Date Analyzed DB-5:	13-Jul-07	Date Analyzed DB-225:	NA
Analyte	Spike Conc.	Conc. (ng/mL)	OPR Limits	Labeled Standard	%R	LCL-UCL	Qualifier
2,3,7,8-TCDD	10.0	10.3	6.7 - 15.8	<u>IS</u> 13C-2,3,7,8-TCDD	59.6	25 - 164	
1,2,3,7,8-PeCDD	50.0	54.8	35 - 71	13C-1,2,3,7,8-PeCDD	61.3	25 - 181	
1,2,3,4,7,8-HxCDD	50.0	53.0	35 - 82	13C-1,2,3,4,7,8-HxCDD	58.9	32 - 141	
1,2,3,6,7,8-HxCDD	50.0	54.7	38 - 67	13C-1,2,3,6,7,8-HxCDD	53.4	28 - 130	
1,2,3,7,8,9-HxCDD	50.0	54.4	32 - 81	13C-1,2,3,4,6,7,8-HpCDD	72.9	23 - 140	
1,2,3,4,6,7,8-HpCDD	50.0	52.9	35 - 70	13C-OCDD	56.1	17 - 157	
OCDD	100	115	78 - 144	13C-2,3,7,8-TCDF	62.2	24 - 169	
2,3,7,8-TCDF	10.0	10.6	7.5 - 15.8	13C-1,2,3,7,8-PeCDF	62.8	24 - 185	
1,2,3,7,8-PeCDF	50.0	53.4	40 - 67	13C-2,3,4,7,8-PeCDF	64.9	21 - 178	
2,3,4,7,8-PeCDF	50.0	54.8	34 - 80	13C-1,2,3,4,7,8-HxCDF	65.1	26 - 152	
1,2,3,4,7,8-HxCDF	50.0	54.8	36 - 67	13C-1,2,3,6,7,8-HxCDF	57.4	26 - 123	
1,2,3,6,7,8-HxCDF	50.0	54.9	42 - 65	13C-2,3,4,6,7,8-HxCDF	58.0	28 - 136	
2,3,4,6,7,8-HxCDF	50.0	54.9	35 - 78	13C-1,2,3,7,8,9-HxCDF	57.0	29 - 147	
1,2,3,7,8,9-HxCDF	50.0	56.3	39 - 65	13C-1,2,3,4,6,7,8-HpCDF	60.0	28 - 143	
1,2,3,4,6,7,8-HpCDF	50.0	54.9	41 - 61	13C-1,2,3,4,7,8,9-HpCDF	73.6	26 - 138	
1,2,3,4,7,8,9-HpCDF	50.0	54.9	39 - 69	13C-OCDF	60.0	17 - 157	
OCDF	100	103	63 - 170	<u>CRS</u> 37CI-2,3,7,8-TCDD	97.2	35 - 197	

Analyst: DMS

Approved By: Martha M. Maier 17-Jul-2007 07:10

## DATA QUALIFIERS & ABBREVIATIONS

<b>B</b>	<b>This compound was also detected in the method blank.</b>
<b>D</b>	<b>Dilution</b>
<b>P</b>	<b>The amount reported is the maximum possible concentration due to possible chlorinated diphenylether interference.</b>
<b>H</b>	<b>The signal-to-noise ratio is greater than 10:1.</b>
<b>I</b>	<b>Chemical Interference</b>
<b>J</b>	<b>The amount detected is below the Lower Calibration Limit of the instrument.</b>
<b>*</b>	<b>See Cover Letter</b>
<b>Conc.</b>	<b>Concentration</b>
<b>DL</b>	<b>Sample-specific estimated detection limit</b>
<b>MDL</b>	<b>The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero in the matrix tested.</b>
<b>EMPC</b>	<b>Estimated Maximum Possible Concentration</b>
<b>NA</b>	<b>Not applicable</b>
<b>RL</b>	<b>Reporting Limit – concentrations that correspond to low calibration point</b>
<b>ND</b>	<b>Not Detected</b>
<b>TEQ</b>	<b>Toxic Equivalency</b>

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

**CERTIFICATIONS**

<b>Accrediting Authority</b>	<b>Certificate Number</b>
State of Alaska, DEC	CA413-02
State of Arizona	AZ0639
State of Arkansas, DEQ	05-013-0
State of Arkansas, DOH	Reciprocity through CA
State of California – NELAP Primary AA	02102CA
State of Colorado	
State of Connecticut	PH-0182
State of Florida, DEP	E87777
Commonwealth of Kentucky	90063
State of Louisiana, Health and Hospitals	LA050001
State of Louisiana, DEQ	01977
State of Maine	CA0413
State of Michigan	81178087
State of Mississippi	Reciprocity through CA
Naval Facilities Engineering Service Center	
State of Nevada	CA413
State of New Jersey	CA003
State of New Mexico	Reciprocity through CA
State of New York, DOH	11411
State of North Carolina	06700
State of North Dakota, DOH	R-078
State of Oklahoma	D9919
State of Oregon	CA200001-002
State of Pennsylvania	68-00490
State of South Carolina	87002001
State of Tennessee	02996
State of Texas	TX247-2005A
U.S. Army Corps of Engineers	
State of Utah	9169330940
Commonwealth of Virginia	00013
State of Washington	C1285
State of Wisconsin	998036160
State of Wyoming	8TMS-Q

# 07 07489

**Analysis Effluent Samples to be collected from the Morro Bay  
Wastewater Treatment Plant on ~~Wednesday~~, July 2, 2007**

*Monday*

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
<b>13 Metals:</b>		
Ag Silver	Composite	EPA 200.7
As Arsenic	Composite	EPA 200.8
Be Beryllium	Composite	EPA 200.7
Cd Cadmium	Composite	EPA 200.7
Cr Chromium	Composite	EPA 200.7
Cu Copper	Composite	EPA 200.7
Hg Mercury	Composite	EPA 245.1
Ni Nickel	Composite	EPA 200.7
Pb Lead	Composite	EPA 200.8
Sb Antimony	Composite	EPA 200.7
Se Selenium	Composite	EPA 200.8
Tl Thallium	Composite	EPA 200.8
Zn Zinc	Composite	EPA 200.7
Volatile Organics - Low Level Including Acrolein, Acrylonitrile, and 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
Organophosphorus Pesticides	Composite	EPA 814/8140
Radioactivity: Gross Alpha and Beta	Composite	SM 7110C & EPA 900.0
Asbestos	Composite	EPA 600/R-94/134-(100.2)

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

***CHAIN  
OF  
CUSTODY***



Date of Report: 07/23/2007

Doug Coats

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

RE: Semi-annual eff  
BC Work Order: 0707489

Enclosed are the results of analyses for samples received by the laboratory on 07/02/2007 16:41. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Tina Green".

Contact Person: Tina Green  
Client Services Manager

A handwritten signature in black ink, which is stylized and difficult to read.

Authorized Signature





Submission #: 07-07489

Project Code:

TB Batch #

SHIPPING INFORMATION

Federal Express  UPS  Hand Delivery  BC Lab Field Service  Other  (Specify)

SHIPPING CONTAINER

Ice Chest  None  Box  Other  (Specify)

Refrigerant: Ice  Blue Ice  None  Other  Comments:

Custody Seals Ice Chest  Containers  None  Comments:

Intact? Yes  No

Intact? Yes  No

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: 19°C Thermometer ID: HUS

Emissivity Container 95 QAM

Date/Time 7/21/04

Analyst Init KJ 10:50

SAMPLE CONTAINERS	SAMPLE NUMBERS									
	1	2	3	4	5	6	7	8	9	10
QT GENERAL MINERAL/ GENERAL PHYSICAL	D, E, F									
PT PE UNPRESERVED										
QT INORGANIC CHEMICAL METALS										
PT INORGANIC CHEMICAL METALS	C									
PT CYANIDE	B									
PT NITROGEN FORMS		A								
PT TOTAL SULFIDE										
2oz. NITRATE / NITRITE										
100ml TOTAL ORGANIC CARBON										
QT TOX										
PT CHEMICAL OXYGEN DEMAND										
PIA PHENOLICS										
40ml VOA VIAL TRAVEL BLANK			AU							
40ml VOA VIAL	A, B	( )	( )	( )	( )	( )	( )	( )	( )	( )
QT EPA 413.1, 413.2, 418.1										
PT ODOR										
RADIOLOGICAL										
BACTERIOLOGICAL										
40 ml VOA VIAL- 504										
QT EPA 508/608/8080										
QT EPA 515.1/8150										
QT EPA 525										
QT EPA 525 TRAVEL BLANK										
100ml EPA 547										
100ml EPA 531.1										
QT EPA 548										
QT EPA 549										
QT EPA 632										
QT EPA 8015M										
QT QA/QC										
QT AMBER	G, H, I, B									
1 OZ. JAR										
32 OZ. JAR										
SOIL SLEEVE										
2CB VIAL										
PLASTIC BAG										
TERROUS IRON										
ENCORE										

Comments: Sample Numbering Completed By: [Signature] Date/Time: 7/21/04 2:00

SUBCONTRACT ORDER

BC Laboratories  
0707489

90703273

SENDING LABORATORY:

BC Laboratories  
4100 Atlas Ct  
Bakersfield, CA 93308  
Phone: 661-327-4911  
Fax: 661-327-1918  
Project Manager: Tina Green

RECEIVING LABORATORY:

EMSL \$EMSLA  
2235 Polvorsa Ave, Suite 230  
San Leandro, CA 94577  
Phone : (888) 455-3675  
Fax: (510) 895-3680

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: 0707489-01	Water	Sampled: 07/02/07 10:40		
oil 00.2w Asbestos EMSLA	07/17/07 17:00	07/04/07 10:40		
Containers Supplied: Quart PE				

Released By: Christina Lawrence Date: 7/31/07 14:15 Received By: [Signature] Date: 7/31/07 12:48 PM  
Conc.

Released By: \_\_\_\_\_ Date: \_\_\_\_\_ Received By: \_\_\_\_\_ Date: \_\_\_\_\_  
3°C upn Page 1 of 2  
A.W.A.

SUBCONTRACT ORDER

BC Laboratories

0707489

J76-090166

35189

Due 08-03-07

SENDING LABORATORY:

BC Laboratories  
4100 Atlas Ct  
Bakersfield, CA 93308  
Phone: 661-327-4911  
Fax: 661-327-1918  
Project Manager: Tina Green

RECEIVING LABORATORY:

Severn Trent Laboratories \$SVRNA  
2800 George Washington Way  
Richland, WA 99352  
Phone :(509) 375-3131  
Fax: \*

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: 0707489-01	Water	Sampled:07/02/07 10:40		
om900.0w Gross Beta SVRNA	07/17/07 17:00	12/30/07 10:40		
om900.0w Gross Alpha SVRNA	07/17/07 17:00	12/30/07 10:40		
Containers Supplied: Quart PE (2)				

Released By Wendy Lawrence Date 7/31/07 14:36 Received By [Signature] Date TAR 070607 1500

Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_

Sample Check-in List

Date/Time Received: 070607 1500

Client: BC LABS SDG #: 35189 NA  SAF #: \_\_\_\_\_ NA

Work Order Number: J76090166 Chain of Custody # 0707489

Shipping Container ID: \_\_\_\_\_ Air Bill # \_\_\_\_\_

1. Custody Seals on shipping container intact? NA  Yes  No
2. Custody Seals dated and signed? NA  Yes  No
3. Chain of Custody record present? Yes  No
4. Cooler temperature: \_\_\_\_\_ NA  5. Vermiculite/packing materials is NA  Wet  Dry
6. Number of samples in shipping container: 1 (2-ILP)
7. Sample holding times exceeded? NA  Yes  No
8. Samples have:
  - \_\_\_\_\_ tape \_\_\_\_\_ hazard labels
  - \_\_\_\_\_ custody seals  appropriate sample labels
9. Samples are:
  - in good condition \_\_\_\_\_ leaking
  - \_\_\_\_\_ broken \_\_\_\_\_ have air bubbles
 (Only for samples requiring head space)
10. Sample pH taken? NA  pH < 2  pH > 2  pH > 9  HAD TO ADJUST PH
11. Sample Location, Sample Collector Listed? \* Yes  No   
\*For documentation only. No corrective action needed.
12. Were any anomalies identified in sample receipt? Yes  No
13. Description of anomalies (include sample numbers): \_\_\_\_\_

Sample Custodian: [Signature] Date: 070607

Client Sample ID	Analysis Requested	Condition	Comments/Action

Client Informed on \_\_\_\_\_ by \_\_\_\_\_ Person contacted \_\_\_\_\_

No action necessary; process as is.

Project Manager \_\_\_\_\_ Date \_\_\_\_\_



SAMPLE LOG-IN CHECKLIST



Vista Project #: 29160 TAT unspecified

Samples Arrival:	Date/Time 7/6/07 0834	Initials: FEB	Location: WR-2
			Shelf/Rack: N/A
Logged In:	Date/Time 7/6/07 0934	Initials: YBSB	Location: WR-2
			Shelf/Rack: B-3
Delivered By:	<u>FedEx</u>	UPS	Cal
		DHL	Hand Delivered
		Other	
Preservation:	<u>Ice</u>	Blue Ice	Dry Ice
		None	
Temp °C	4.9°C	Time:	0837
		Thermometer ID:	IR-1

	YES	NO	NA
Adequate Sample Volume Received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airbill	Trk # 8526 8705 7810		
Sample Container Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC Anomaly/Sample Acceptance Form completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> Preservation Documented?	COC	Sample Container	<u>None</u>
Shipping Container	Vista	<u>Client</u>	Retain <u>Return</u> Dispose

Comments:

Label ID  
DI H<sub>2</sub>O  
Comp Influent  
Comp Eff

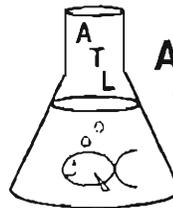
COC ID  
Travel Blank  
Comp INF #1  
Comp EFF #1



***CHAIN  
OF  
CUSTODY***

# CHAIN OF CUSTODY

Client: City of Morro Bay  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Address: Wastewater Treatment Plant  
 \_\_\_\_\_  
160 Atascadero Road  
 \_\_\_\_\_  
Morro Bay, CA 93442  
 \_\_\_\_\_  
 Project Manager: Doug Coats - MRS  
 \_\_\_\_\_  
 Phone: (805) 644-1180  
 \_\_\_\_\_  
 Fax: (805) 289-3935  
 \_\_\_\_\_  
 Purchase Order No: \_\_\_\_\_



**Aquatic  
Testing  
Laboratories**

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

Sample ID	Sample Date	Sample Time	Sample Type *	Chlorine (TRC)**	Number of Containers	Testing Requested
Grab Eff. ARS	7/16/07	0820	E	⊖	1 (one gallon)	FHM Acute daily renewal
Comp EFF	7/16/07	1030	E	⊖	(one gallon)	Giant Kelp Chronic

**Special Instructions:**

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

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

## CUSTODY TRANSFERS

Relinquished by (signature)	Received by (signature)	Date (mm/dd/yy)	Time (hh:mm)	Seals Intact? (Yes, No, NA)	Temperature Received (°C)
<del>George A. Helms</del>	Fed Ex	7/16/07	—	—	—
Fed Ex	JDM	7/17/07	0930	NA	2°C

# CHAIN OF CUSTODY

Client: City of Morro Bay

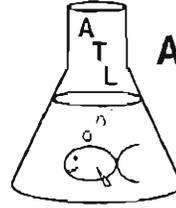
Address: Wastewater Treatment Plant  
160 Atascadero Road  
Morro Bay, CA 93442

Project Manager: Doug Coats - MRS

Phone: (805) 644-1180

Fax: (805) 289-3935

Purchase Order No:



**Aquatic  
Testing  
Laboratories**

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

Sample ID	Sample Date	Sample Time	Sample Type *	Chlorine (TRC)**	Number of Containers	Testing Requested
Grab Eff. ARS	7/17/07	0815	E	⊕	1 (one gallon)	FHM Acute daily renewal

**Special Instructions:**

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

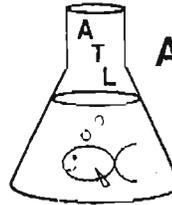
\* L - Liquid, S - Solid, SS - Semi-Solid/sludge, RW - Receiving Water, GW - Ground Water, E - Effluent

## CUSTODY TRANSFERS

Relinquished by (signature)	Received by (signature)	Date (mm/dd/yy)	Time (hh:mm)	Seals Intact? (Yes, No, NA)	Temperature Received (°C)
<i>[Signature]</i>	<i>[Signature]</i>	7-12-07	—	—	—
<i>[Signature]</i>	<i>[Signature]</i>	7-18-07	10:00	NA	2°C

# CHAIN OF CUSTODY

Client: City of Morro Bay  
 Address: Wastewater Treatment Plant  
 160 Atascadero Road  
 Morro Bay, CA 93442  
 Project Manager: Doug Coats - MRS  
 Phone: (805) 644-1180  
 Fax: (805) 289-3935  
 Purchase Order No:



**Aquatic  
 Testing  
 Laboratories**

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

Sample ID	Sample Date	Sample Time	Sample Type *	Chlorine (TRC)**	Number of Containers	Testing Requested
Grab Eff. ARS	18 July 07	0830	E		1 (one gallon)	FHM Acute daily renewal

**Special Instructions:**

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

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

## CUSTODY TRANSFERS

Relinquished by (signature)	Received by (signature)	Date (mm/dd/yy)	Time (hh:mm)	Seals Intact? (Yes, No, NA)	Temperature Received (°C)
		18 July 07	1425	—	—
		7-19-7	0930	NA	2°C

# CHAIN OF CUSTODY

Client: City of Morro Bay

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Address: Wastewater Treatment Plant

---

160 Atascadero Road

---

Morro Bay, CA 93442

---

Project Manager: Doug Coats - MRS

---

Phone: (805) 644-1180

---

Fax: (805) 289-3935

---

Purchase Order No:



**Aquatic  
Testing  
Laboratories**

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

Sample ID	Sample Date	Sample Time	Sample Type *	Chlorine (TRC)**	Number of Containers	Testing Requested
Grab Eff. ARS	19 July 07	0820	E		1 (one gallon)	FHM Acute daily renewal

Special Instructions:

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

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

## CUSTODY TRANSFERS

Relinquished by (signature)	Received by (signature)	Date (mm/dd/yy)	Time (hh:mm)	Seals Intact? (Yes, No, NA)	Temperature Received (°C)
		19 July 07	14:30	—	—
		7-20-7	0920	NA	2°C



***REFERENCE  
TOXICANT  
DATA***



***Fathead Minnow  
Reference  
Toxicant  
Data***

**FATHEAD MINNOW ACUTE**  
**Method 2000.0**  
**Reference Toxicant - SDS**



QA/QC Batch No.: RT-070717

**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**

Date/Time:	INITIAL			24 Hr						48 Hr				
	<u>7-17-07 1130</u>			<u>7-18-07 1130</u>						<u>7-19-07 1100</u>				
	<u>Ln</u>			<u>Ln</u>						<u>Ln</u>				
	°C	DO	pH	°C	DO	pH	# Dead		°C	DO	pH	# Dead		
A							B	A				B		
Control	<u>19.6</u>	<u>8.9</u>	<u>7.9</u>	<u>19.5</u>	<u>7.1</u>	<u>7.0</u>	<u>0</u>	<u>0</u>	<u>19.4</u>	<u>7.0</u>	<u>7.4</u>	<u>0</u>	<u>0</u>	
1.0 mg/l	<u>19.6</u>	<u>8.9</u>	<u>7.9</u>	<u>19.5</u>	<u>6.8</u>	<u>7.5</u>	<u>0</u>	<u>0</u>	<u>19.4</u>	<u>6.8</u>	<u>7.3</u>	<u>0</u>	<u>0</u>	
2.0 mg/l	<u>19.6</u>	<u>9.0</u>	<u>7.9</u>	<u>19.5</u>	<u>6.7</u>	<u>7.4</u>	<u>0</u>	<u>0</u>	<u>19.4</u>	<u>6.5</u>	<u>7.3</u>	<u>0</u>	<u>0</u>	
4.0 mg/l	<u>19.6</u>	<u>9.0</u>	<u>7.9</u>	<u>19.6</u>	<u>6.6</u>	<u>7.3</u>	<u>1</u>	<u>0</u>	<u>19.5</u>	<u>6.1</u>	<u>7.2</u>	<u>0</u>	<u>1</u>	
8.0 mg/l	<u>19.6</u>	<u>9.1</u>	<u>7.9</u>	<u>19.7</u>	<u>6.0</u>	<u>7.3</u>	<u>10</u>	<u>10</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	

Date/Time:	RENEWAL			72 Hr						96 Hr				
	<u>7-19-07 1100</u>			<u>7-20-07 1130</u>						<u>7-21-07 1130</u>				
	<u>Ln</u>			<u>Ln</u>						<u>Ln</u>				
	°C	DO	pH	°C	DO	pH	# Dead		°C	DO	pH	# Dead		
A							B	A				B		
Control	<u>19.6</u>	<u>8.9</u>	<u>7.8</u>	<u>19.0</u>	<u>7.7</u>	<u>7.6</u>	<u>0</u>	<u>0</u>	<u>19.8</u>	<u>7.9</u>	<u>7.4</u>	<u>0</u>	<u>0</u>	
1.0 mg/l	<u>19.6</u>	<u>8.8</u>	<u>7.8</u>	<u>19.0</u>	<u>7.4</u>	<u>7.5</u>	<u>0</u>	<u>0</u>	<u>19.8</u>	<u>7.5</u>	<u>7.4</u>	<u>0</u>	<u>0</u>	
2.0 mg/l	<u>19.6</u>	<u>8.9</u>	<u>7.8</u>	<u>19.0</u>	<u>7.0</u>	<u>7.4</u>	<u>0</u>	<u>0</u>	<u>19.8</u>	<u>7.4</u>	<u>7.3</u>	<u>0</u>	<u>0</u>	
4.0 mg/l	<u>19.6</u>	<u>9.0</u>	<u>7.8</u>	<u>19.1</u>	<u>6.2</u>	<u>7.3</u>	<u>0</u>	<u>0</u>	<u>19.8</u>	<u>7.3</u>	<u>7.3</u>	<u>0</u>	<u>0</u>	
8.0 mg/l	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	

Comments: Control: Alkalinity: 56 mg/l; Hardness: 89 mg/l; Conductivity: 320 umho.  
 SDS: Alkalinity: 56 mg/l; Hardness: 90 mg/l; Conductivity: 315 umho.

Concentration-response relationship acceptable? (see attached computer analysis):

Yes (response curve normal)

No (dose interrupted indicated or non-normal)

**Acute Fish Test-96 Hr Survival**

Start Date: 17 Jul-07 11:30    Test ID: RT-070717    Sample ID: REF-Ref Toxicant  
 End Date: 21 Jul-07 11:30    Lab ID: CAATL-Aquatic Testing Labs    Sample Type: SDS-Sodium dodecyl sulfate  
 Sample Date: 17 Jul-07 00:00    Protocol: FWCH 4TH-EPA-821-R-02-0    Test Species: PP-Pimephales promelas

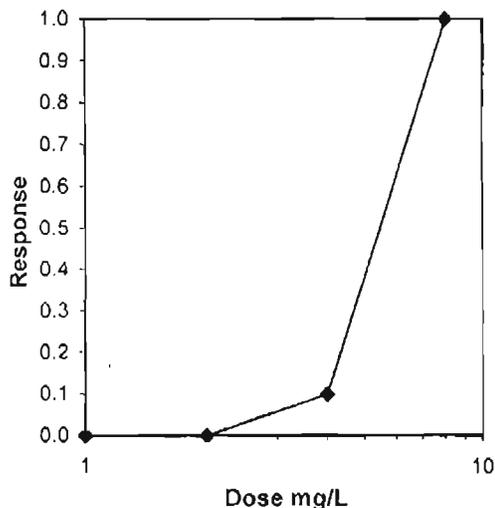
Comments:

Conc-mg/L	1	2
D-Control	1.0000	1.0000
1	1.0000	1.0000
2	1.0000	1.0000
4	0.9000	0.9000
8	0.0000	0.0000

Conc-mg/L	Transform: Arcsin Square Root							Number Resp	Total Number
	Mean	N-Mean	Mean	Min	Max	CV%	N		
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	0.9000	0.9000	1.2490	1.2490	1.2490	0.000	2	2	20
8	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	2	20	20

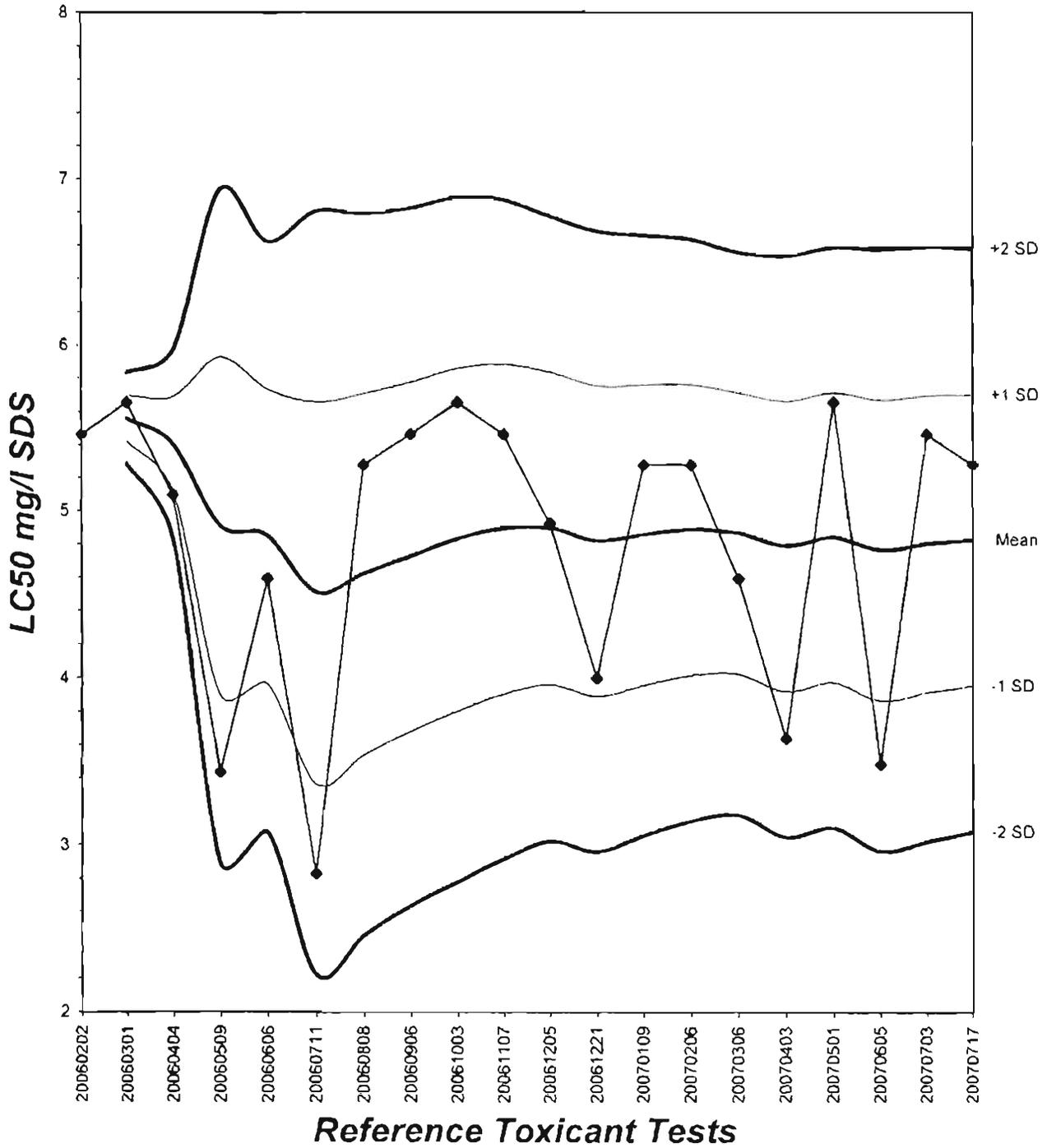
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Normality of the data set cannot be confirmed				
Equality of variance cannot be confirmed				

Trim Level	Trimmed Spearman-Kärber		
	EC50	95% CL	
0.0%	5.2780	4.8093	5.7924
5.0%	5.3968	4.8053	6.0611
10.0%	5.4432	5.1395	5.7648
20.0%	5.4432	5.1395	5.7648
Auto-0.0%	5.2780	4.8093	5.7924



# Fathead Minnow Acute Laboratory Control Chart

CV% = 18.1



# TEST ORGANISM LOG



## FATHEAD MINNOW - LARVAL (*Pimephales promelas*)

QA/QC BATCH NO.: RT-070605

SOURCE: In-Lab Culture

DATE HATCHED: 7-04-07

APPROXIMATE QUANTITY: 400

GENERAL APPEARANCE: good

# MORTALITIES 48 HOURS PRIOR TO  
TO USE IN TESTING: 0

DATE USED IN LAB: 7-17-07

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.: 19.6 °C

pH: 7.9

Ammonia: 0.1 mg/l NH<sub>3</sub>-N

DO: 8.9 mg/l

Alkalinity: 56 mg/l

Hardness: 89 mg/l

READINGS RECORDED BY: \_\_\_\_\_

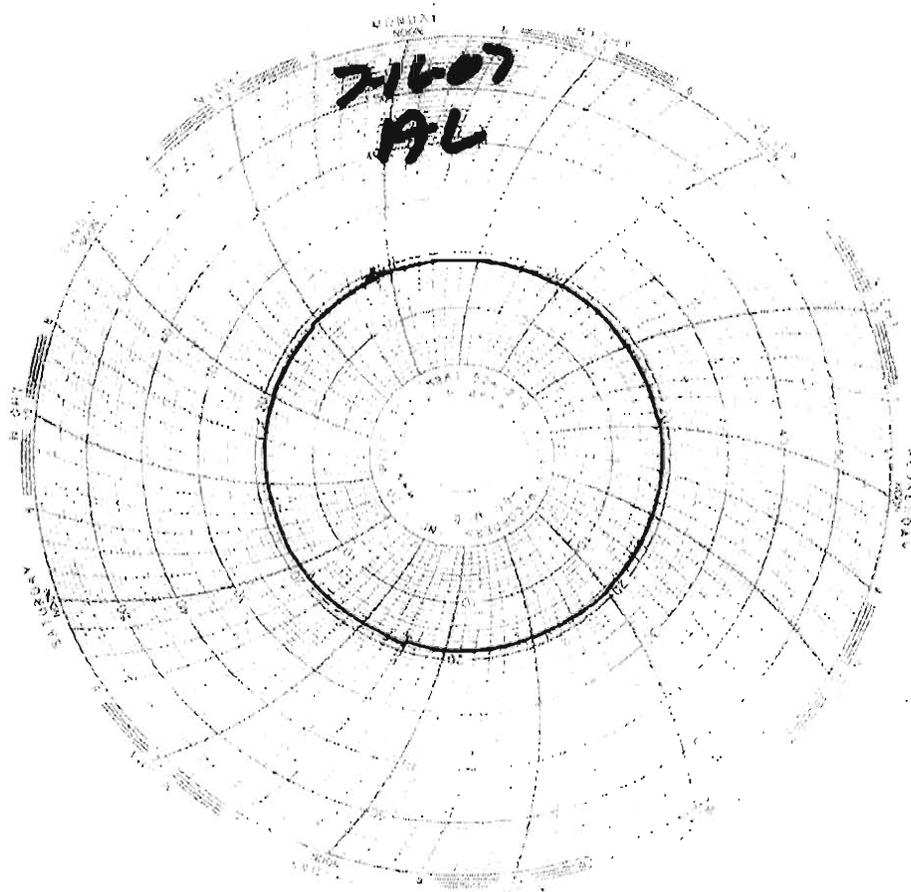
DATE: 7-18-07

# *Laboratory Temperature Chart*

*QA/QC Batch No: RT-070717*

*Date Tested: 07/17/07 to 07/21/07*

*Acceptable Range: 20 $\pm$ 1 $^{\circ}$ C*





# *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



QA/QC Batch No.: RT-070717

Date Tested: 07/17/07 - 07/19/07

## 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	84.5%		16.65	
10 µg/l	84.2%		16.75	
18 µg/l	81.2%		16.65	
32 µg/l	77.1%		14.45	*
56 µg/l	65.4%	*	11.80	*
100 µg/l	47.2%	*	8.80	*
180 µg/l	9.8%	*	5.85	*

\* Statistically significantly less than control at P = 0.05 level

## CHRONIC TOXICITY

Germination NOEC	32 µg/l
Germination IC25	60.84 µg/l
Germ Tube Growth NOEC	18 µg/l
Germ Tube Growth IC25	49.4 µg/l

## QA/QC TEST ACCEPTABILITY

Parameter	Result
Mean control germination ≥ 70%	Yes (84.5%)
Mean control germination tube length > 10 µm	Yes (16.65 µm)
Germination tube growth NOEC < 35 µg/l Copper	Yes (18 µg/l)
%MSD < 20% relative to control (germination & growth)	Yes (germ = 8.8%, growth = 8.1%)

**Macrocystis Germination and Growth Test-Proportion Germinated**

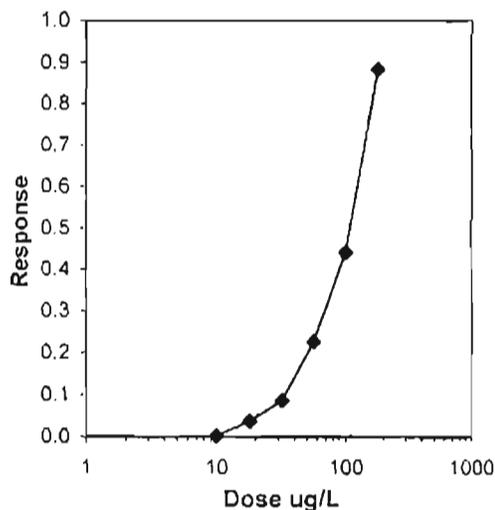
Start Date: 17 Jul-07 14:00 Test ID: R070717k Sample ID: REF-Ref Toxicant  
 End Date: 19 Jul-07 14:00 Lab ID: CAATL-Aquatic Testing Labs Sample Type: CUCL-Copper chloride  
 Sample Date: 17 Jul-07 00:00 Protocol: WCCH-EPA-600-R-95-136 Test Species: MP-Macrocystis pyrifera  
 Comments:

Conc-ug/L	1	2	3	4	5
D-Control	0.8515	0.8515	0.8491	0.8515	0.8200
10	0.8824	0.8119	0.8142	0.8529	0.8505
18	0.7264	0.8350	0.8416	0.8077	0.8515
32	0.7900	0.7547	0.7087	0.7692	0.8317
56	0.6168	0.5926	0.6796	0.6990	0.6796
100	0.4854	0.3486	0.5596	0.5575	0.4078
180	0.0943	0.0385	0.1667	0.1165	0.0734

Conc-ug/L	Mean	N-Mean	Transform: Arcsin Square Root					N	1-Tailed			Isotonic	
			Mean	Min	Max	CV%	t-Stat		Critical	MSD	Mean	N-Mean	
D-Control	0.8447	1.0000	1.1660	1.1326	1.1752	1.604	5				0.8447	1.0000	
10	0.8424	0.9972	1.1638	1.1222	1.2207	3.529	5	0.056	2.409	0.0945	0.8424	0.9972	
18	0.8124	0.9618	1.1253	1.0204	1.1752	5.552	5	1.039	2.409	0.0945	0.8124	0.9618	
32	0.7709	0.9126	1.0732	1.0007	1.1481	5.051	5	2.366	2.409	0.0945	0.7709	0.9126	
*56	0.6535	0.7737	0.9420	0.8785	0.9901	5.121	5	5.710	2.409	0.0945	0.6535	0.7737	
*100	0.4718	0.5585	0.7567	0.6316	0.8452	12.404	5	10.436	2.409	0.0945	0.4718	0.5585	
*180	0.0979	0.1159	0.3106	0.1974	0.4205	26.767	5	21.809	2.409	0.0945	0.0979	0.1159	

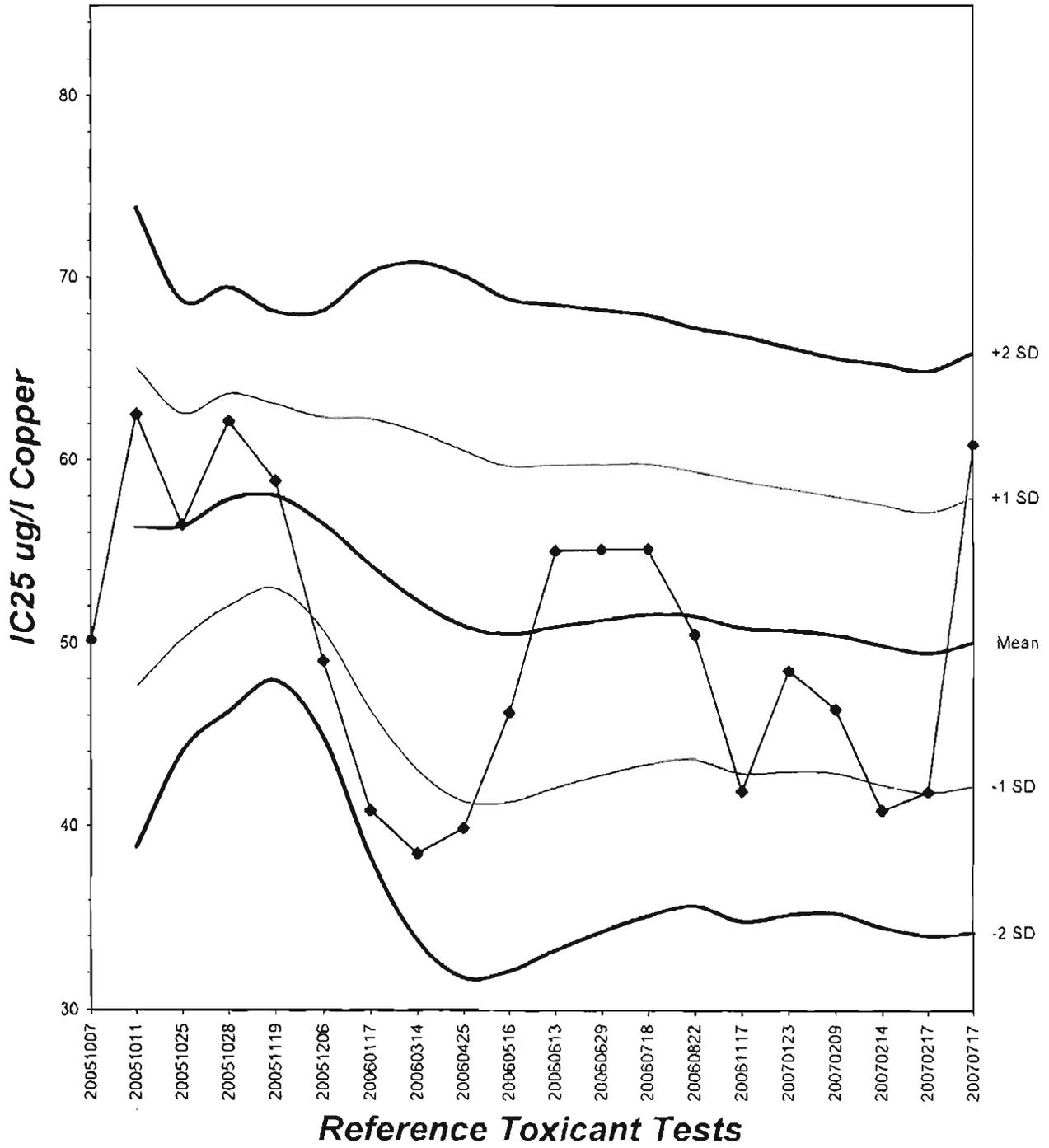
Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97141	0.91	-0.359	-0.0548						
Bartlett's Test indicates equal variances (p = 0.15)	9.36678	16.8119								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSB	MSE	F-Stat	F-Prob	df
Dunnett's Test	32	56	42.332		0.07413	0.48564	0.00385	126.257	6.0E-19	6, 28

Linear Interpolation (80 Resamples)					
Point	ug/L	SE	95% CL(Exp)	Skew	
IC05	21.36	5.21	11.48	38.39	0.3244
IC10	34.18	3.70	24.25	42.22	-0.3262
IC15	42.82	3.26	34.16	53.12	0.3001
IC20	51.45	3.69	43.55	63.91	0.3836
IC25	60.84	4.60	49.05	74.68	0.1985
IC40	91.52	7.58	71.81	112.26	-0.1348
IC50	110.58	7.81	85.86	126.45	-0.5661



# Giant Kelp Germination Laboratory Control Chart

CV% = 15.8



**Macrocystis Germination and Growth Test-Growth-Length**

Start Date: 17 Jul-07 14:00 Test ID: R070717k Sample ID: REF-Ref Toxicant  
 End Date: 19 Jul-07 14:00 Lab ID: CAATL-Aquatic Testing Labs Sample Type: CUCL-Copper chloride  
 Sample Date: 17 Jul-07 00:00 Protocol: WCCH-EPA-600-R-95-136 Test Species: MP-Macrocystis pyrifera

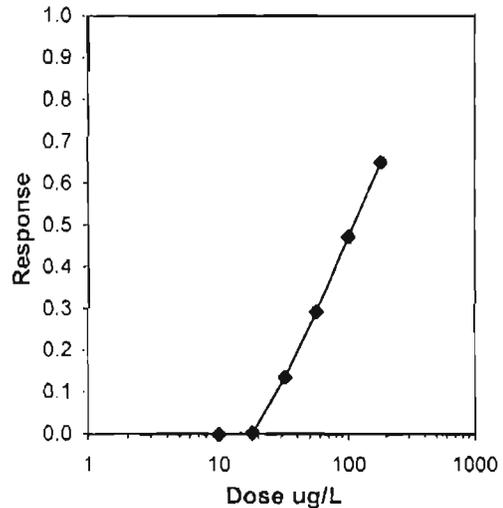
Comments:

Conc-ug/L	1	2	3	4	5
D-Control	17.250	16.000	16.750	17.000	16.250
10	16.750	16.250	17.250	17.250	16.250
18	16.500	16.000	16.750	17.000	17.000
32	14.000	15.500	15.000	12.750	15.000
56	12.750	12.500	13.500	10.250	10.000
100	10.500	8.750	8.750	7.750	8.250
180	6.000	5.500	6.000	5.750	6.000

Conc-ug/L	Transform: Untransformed							1-Tailed			Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
D-Control	16.650	1.0000	16.650	16.000	17.250	3.114	5				16.700	1.0000
10	16.750	1.0060	16.750	16.250	17.250	2.985	5	-0.178	2.409	1.350	16.700	1.0000
18	16.650	1.0000	16.650	16.000	17.000	2.512	5	0.000	2.409	1.350	16.650	0.9970
*32	14.450	0.8679	14.450	12.750	15.500	7.581	5	3.924	2.409	1.350	14.450	0.8653
*56	11.800	0.7087	11.800	10.000	13.500	13.349	5	8.651	2.409	1.350	11.800	0.7066
*100	8.800	0.5285	8.800	7.750	10.500	11.782	5	14.003	2.409	1.350	8.800	0.5269
*180	5.850	0.3514	5.850	5.500	6.000	3.822	5	19.265	2.409	1.350	5.850	0.3503

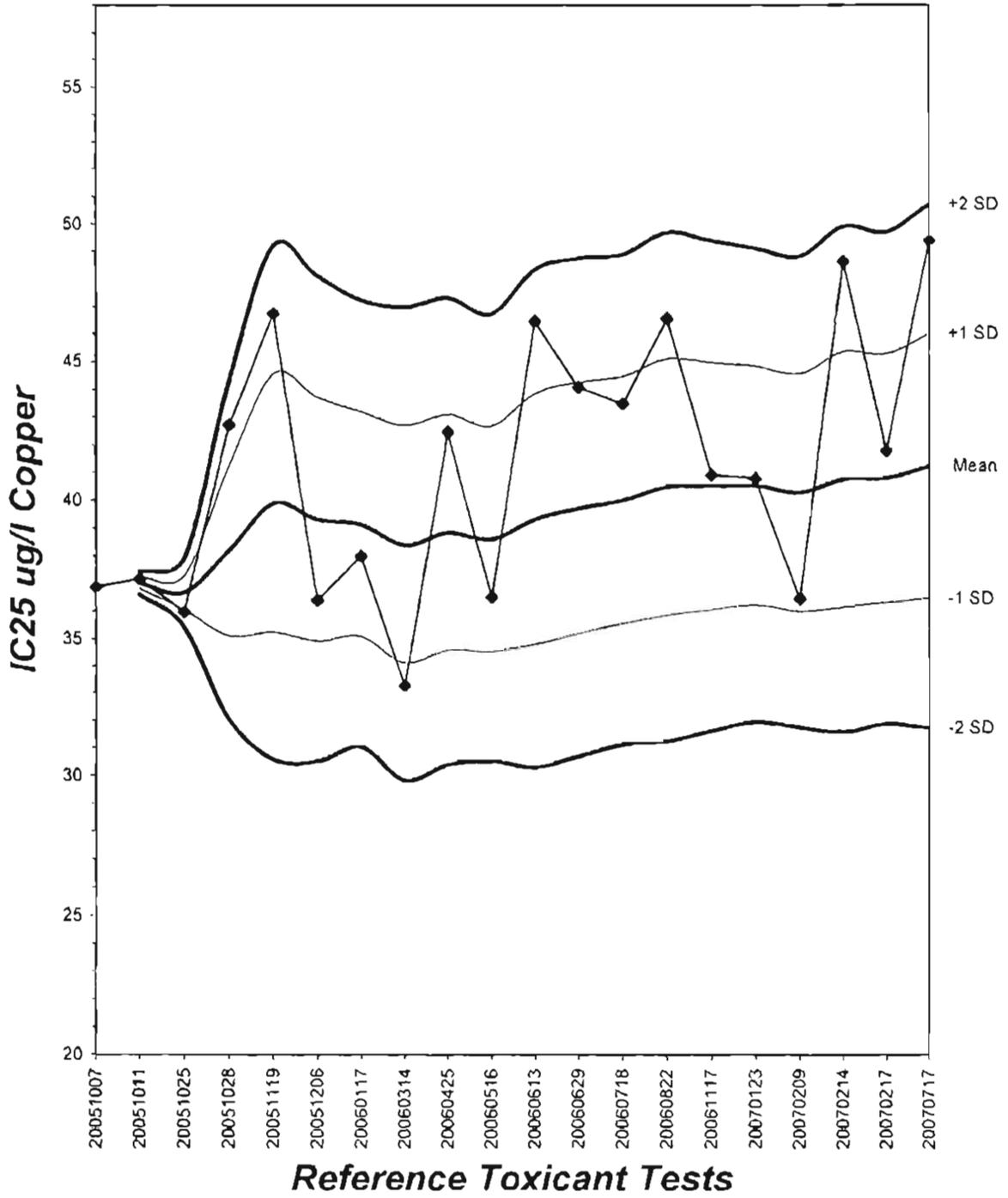
Auxiliary Tests	Statistic	Critical	Skew	Kurt						
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96349	0.91	-0.22	0.56751						
Bartlett's Test Indicates equal variances (p = 0.01)	16.7541	16.8119								
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSB	MSE	F-Stat	F-Prob	df
Dunnett's Test	18	32	24		1.35027	94.1768	0.78571	119.861	1.2E-18	6, 28

Linear Interpolation (80 Resamples)					
Point	ug/L	SE	95% CL(Exp)		Skew
IC05	23.00	1.48	18.89	27.73	1.0973
IC10	28.31	2.25	23.24	35.92	1.0681
IC15	34.31	3.04	26.79	43.66	0.4136
IC20	41.87	3.71	31.58	50.73	0.2789
IC25	49.43	4.83	38.47	66.08	0.6908
IC40	82.11	6.00	62.24	95.97	0.4979
IC50	112.20	8.52	90.40	136.34	0.3568



# Giant Kelp Germ Tube Growth Laboratory Control Chart

CV% = 11.5



# GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST



QA/QC No.: RT-070717

Start Date: 07/17/2007

Dish No.	Sample Conc.	Total Number Counted	Number Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					A	B	C	D	E	F	G	H	I	J
1	56	107	66	41	4	6	5	6	4	4	5	6	6	5
2	10	102	90	12	8	6	8	5	7	7	7	6	8	5
3	32	100	79	21	6	7	5	5	6	7	6	5	4	5
4	100	103	50	53	4	3	4	5	3	4	4	5	6	4
5	18	106	77	29	7	6	5	8	7	6	8	7	4	8
6	180	106	10	96	3	2	3	2	3	3	2	2	2	2
7	6	101	86	15	8	7	7	8	6	4	8	7	7	7
8	56	108	64	44	6	5	4	4	5	4	5	5	6	6
9	32	106	80	26	7	6	5	6	7	7	5	6	6	7
10	100	109	38	71	3	5	2	4	4	3	4	2	4	4
11	18	103	86	17	7	6	6	5	8	7	7	5	7	6
12	180	104	4	100	2	3	2	2	2	2	2	3	2	2
13	10	101	82	19	7	8	8	7	4	6	7	7	6	5
14	6	101	86	15	7	6	6	4	6	7	7	8	6	7
15	18	101	85	16	8	7	6	5	8	7	6	7	7	6
16	56	103	70	33	5	6	6	7	5	4	4	6	7	4
17	100	109	61	48	5	4	4	3	4	4	2	2	3	4
18	32	103	73	30	7	5	6	7	6	6	5	5	7	6
19	180	108	18	90	3	2	4	2	2	3	2	2	2	2
20	10	113	92	21	8	7	8	6	5	7	7	8	7	6

Comments:

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

# GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST



QA/QC No.: RT-070717

Start Date: 07/17/2007

Dish No.	Sample Conc.	Total Number Counted	Number Germin.	Number Non-Germin.	Germ Tube Lengths (micrometer units)									
					A	B	C	D	E	F	G	H	I	J
21	C	106	90	16	7	6	7	8	8	4	8	6	6	7
22	100	113	63	50	4	5	2	3	2	2	4	3	4	2
23	10	102	87	15	8	8	7	6	7	8	7	5	6	7
24	56	103	72	31	5	4	3	4	6	5	4	4	4	2
25	32	104	80	24	6	5	4	3	6	5	5	6	4	2
26	180	103	12	91	2	3	2	2	3	2	2	3	2	2
27	18	104	84	20	6	7	8	8	7	6	6	7	7	6
28	C	101	86	15	8	7	6	7	5	5	7	8	8	7
29	56	103	70	33	6	4	4	5	4	3	2	3	4	3
30	18	101	86	15	8	7	7	6	5	7	8	7	7	6
31	C	100	82	18	7	6	6	7	5	8	7	7	4	8
32	32	101	84	17	7	6	4	5	7	5	6	7	7	6
33	100	103	42	61	2	4	4	3	5	2	2	4	3	4
34	180	109	8	101	3	2	2	2	2	3	4	2	2	2
35	10	107	91	16	2	7	6	7	7	6	5	7	7	6
36														
37														
38														
39														
40														

Comments:

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

# GIANT KELP GERMINATION AND GROWTH SHORT-TERM TOXICITY TEST



QA/QC No.: RT-070717

Start Date: 07/17/2007

## 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	15.3	7.4	8.1	34	15.9	7.2	8.1	34
10 µg/l	15.2	7.3	8.1	34	15.5	7.3	8.1	34
18 µg/l	15.4	7.3	8.2	34	15.4	7.2	8.1	34
32 µg/l	15.7	7.4	8.2	34	14.6	7.2	8.1	34
56 µg/l	15.5	7.3	8.2	34	14.8	7.2	8.1	34
100 µg/l	15.3	7.4	8.7	34	15.0	7.3	8.1	34
180 µg/l	15.1	7.2	8.2	34	14.7	7.1	8.1	34

**Comments:**

Reference toxicant: Copper chloride.

All dilutions made with reference lab seawater.

Illumination (16 hr light / 8 hr dark at  $50 \pm 10 \text{ uE/m}^2/\text{s}$ ) at 5 locations in incubator:  
(four corners and center): 44, 50, 59, 52, 56  $\text{uE/m}^2/\text{s}$ .

Initial readings: Analyst: [Signature] Date: 7-17-7 Time: 1400

Final readings: Analyst: [Signature] Date: 7-19-7 Time: 1400



# *Laboratory Temperature Chart*

*QA/QC Batch No: RT-070717*

*Date Tested: 07/17/07 to 07/19/07*

*Acceptable Range: 15 $\pm$ 1 $^{\circ}$ C*

