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Bellevue, Washington 98008

RE: Summary and Conclusions from Whole-Sediment Bioassay Testing for the Baxter "Grey Zone" Sediments

Dear Martha:

This letter summarizes the available data collected during the whole-sediment bioassays recently performed for the J.H. Baxter site in Renton. These bioassays were performed as part of the Final Feasibility Study and Final Cleanup Action Plan for the site. Specifically, the tests are being used to evaluate whether the portion of wood waste "grey zone" previously defined at the Baxter site will require remediation under SMS regulations and current Ecology policies.

We have received the raw data from the current study and have completed the analysis of the results using Biostat2 statistical software. At this time, we are missing only the final data packages from the laboratories. Those packages will include the laboratory bench sheets, water quality monitoring data and operating procedure documentation. This additional information is not anticipated to impact the final results or conclusions of the study. This letter summarizes all available data for the site, including both the current bioassay study, as well as the results of the work performed previously in 1997.

1. Site Background

This section summarizes background information relevant to the bioassay testing.

Previous Grey Zone Delineation

The location and size of the grey zone was described in the draft Feasibility Study for the Baxter site prepared by ThermoRetec. The grey zone was defined during 1996 and 1997 sediment investigations performed for the Port Quendall project using a combination of 1) measurements of the volumetric percentage of wood waste within the sediment bioactive zone, and 2) measurements of the thickness of the apparent redox potential discontinuity (RPD).

The total area of grey zone currently identified at the Baxter site is approximately 92,000 square feet (approximately 10,000 square yards). The grey zone at the Baxter site is located predominantly (90%) on fee-owned aquatic lands owned by J.H. Baxter Company. A small portion of the grey zone (approximately 1,000 square yards) extends onto state-owned aquatic lands managed by the Department of Natural Resources.

Previous Bioassay Testing

Bioassay testing was performed during Phase 2 of the 1997 Port Quendall sediments investigation. That testing included one location within the Baxter grey zone (sample JB-4) and an off-site reference sample (JB-9). Those samples were tested using the following bioassays:

- *Chironomus tentans* 10-day acute bioassay
- *Hyalella azteca* 10-day acute bioassay (screening-level methodology)
- *Hyalella azteca* 28/42-day chronic bioassay

Table 4-3 (see Section 4 below) summarizes the previous data relevant to the Baxter grey zone. After reviewing the test results from these bioassays, Ecology determined that additional information would be required prior to finalizing grey zone remedial decisions. The data from the *Chironomus* assay were accepted, but the data from both of the *Hyalella* tests were rejected. The chronic *Hyalella* tests were rejected due to low survivals in the control and reference samples. The *Hyalella* acute assays were rejected due to the lack of a sufficient number of replicates for full evaluation.

After extensive discussion, Ecology concluded that additional testing would be required to resolve the status of the grey zone. Ecology provided draft interpretive criteria for use with the *Chironomus* and *Hyalella* tests in a June 24, 1997 memorandum. No further bioassay testing was performed at the Baxter site until the current study was initiated.

2. Sampling Locations and Methodology

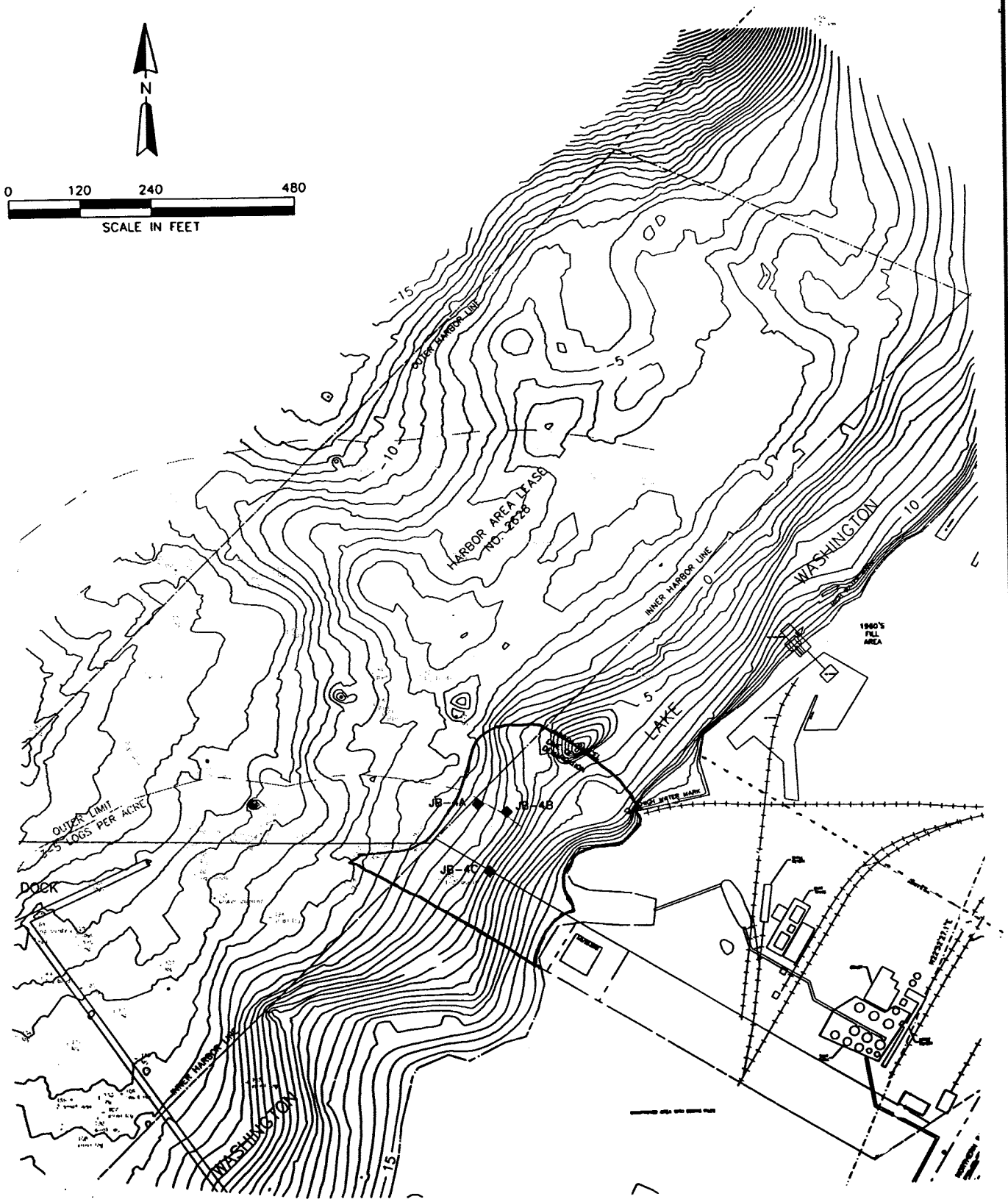
Sampling Locations

The current study includes three test samples and a reference sediment sample. The three test samples were collected from the Baxter portion of the grey zone. Figure 2-1 shows the sampling locations, and Table 2-1 lists the sampling coordinates. Samples from the grey zone were designated JB-4A, JB-4B, JB-4C. These samples were collected near the same location (JB-4) used during the 1997 study.

One reference sample was also collected. That sample (JB-9A) was collected from an area offshore of Newcastle Beach park. A sample collected in this same location during the 1997 study was free of chemical contamination, and had similar grain size characteristics to the test samples. The reference station is required by method interpretive criteria (Table 3-2).

Dissolved Oxygen Testing

During field sampling, the dissolved oxygen content of the overlying water was measured using a calibrated dissolved oxygen meter. The dissolved oxygen was measured and reported to the nearest 0.1 mg/L. The oxygen data is summarized in Table 2-1. All of the measurements demonstrated abundant dissolved oxygen.



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BAXTER			GRAY ZONE BIOASSAY SAMPLE LOCATIONS
JAGCO-02438-840			
DATE: 3/14/00	DRWN: N.S.	FILE: 14651S009	FIGURE 2-1

Collection and Handling of Sediment Samples

The bioassay samples were collected on February 28th and March 2nd using a hydraulic Van Veen sampler. Sample horizontal control was provided using DGPS. Samples were collected from the 0-10 centimeter bioactive zone. A total of 7-8 liters of sediment was collected from each sample location. The sediment for bioassay testing was packed in pre-cleaned glass sample containers with Teflon-lined lids. Samples were packed with zero headspace. No preservatives were used for the bioassay samples.

Table 2-1. Sampling Locations and Dissolved Oxygen Data

Sample Location (Water Depth)	Collection Date	Sample Coordinates (NAD 83 North) (ft)		Dissolved Oxygen in Water Column (mg/L)
		Northing	Easting	
Test Samples (Baxter Grey Zone)				
♦ JB-4A (9.5 ft)	Feb 28, 2000	198,183	1,302,400	Surface –1ft: 11.5 Mid-Column: 11.4 Mud-Line +1ft: 11.2
♦ JB-4B (10.5 ft)	Feb 28, 2000	198,169	1,302,448	Surface –1ft: 11.2 Mid-Column: 11.1 Mud-Line +1ft: 11.0
♦ JB-4C (7.2 ft)	March 2, 2000	198,069	1,302,417	Surface –1ft: 12.1 Mid-Column: 12.0 Mud-Line +1ft: 12.4
Reference Station (Newcastle Beach Park)				
♦ JB-9A (18.5 ft)	Feb 28, 2000	208,658	1,304,803	Surface –1ft: 11.8 Mid-Column: 11.8 Mud-Line +1ft: 11.4

Samples were stored at 4°C prior to analysis. All bioassays were initiated within three weeks of sample collection.

Chemical parameters measured during 1997 were not retested. However, additional samples were collected for measurement of initial sediment sulfide and ammonia concentrations. These data are summarized in Section 4 below. Ammonia and total sulfide concentrations are being analyzed by Analytical Resources Inc. (Seattle) using EPA Method 350.1 and EPA method 376.2, respectively. Sulfide samples were collected using separate sample containers preserved with zinc acetate.

3. Bioassay Test Methods and Interpretive Criteria

Bioassay testing was performed by Ogden Environmental and Energy Labs in San Diego, California and ABC Labs in Columbia, Missouri. The Ogden project manager is Ms. Marilyn Schwartz. The ABC Labs project manager is Scott Ward.

Four whole-sediment bioassays were performed. These include the three acute and one chronic bioassay tests shown in Table 3-1.

Table 3-1. Bioassay Tests Performed During Current Study

Bioassay	Test Endpoints	Method Reference	No. of Replicates, Organisms	QA/QC Samples
Acute Toxicity Assays				
Hyallela azteca (Ogden Labs)	10-day survival	ASTM E 1383-94	5 replicates 20 organisms per replicate	Negative control Reference toxicant Reference sediment
Chironomus tentans (Ogden Labs)	10-day survival 10-day growth	ASTM E 1383-94	5 replicates 20 organisms per replicate	Negative control Reference toxicant Reference sediment
Daphnia pulex (Ogden Labs)	96-hr survival	EPA 600/4-90-027, 1991; EPA 600/4-90-027F, 1993; ASTM E 1383-94	10 replicates 5 organisms per replicate	Negative control Reference toxicant Reference sediment
Chronic Toxicity Assays				
Chironomus tentans (ABC Labs)	20-day survival 20-day growth	Draft EPA protocol, modified from EPA 600/R-94/024	8 replicates 12 organisms per replicate	Negative control Reference toxicant Reference sediment

Bioassay Interpretive Criteria

Prior to initiating the bioassay tests, interpretive criteria were developed in conjunction with Ecology. Table 3-2 summarizes the project-specific interpretive criteria for the four bioassays as they were developed with Ecology. The criteria for the acute bioassays are based on Port Quendall project recommendations made by Ecology and the other resource agencies during 1997, and are roughly equivalent to the interpretive criteria established in the Dredged Material Evaluation Framework developed for the Lower Columbia River Management Area. The interpretive criteria for the chronic bioassays are based on the 1997 Ecology recommendations for the Port Quendall project. In each case, the tests use a negative control sample, a reference toxicant, and a clean reference sediment. Performance criteria are provided in Table 3-2 for both the control and the reference sediments.

Three samples were collected from the Baxter grey zone as part of the current study to permit completion of a cluster analysis of the test data. The cluster analysis protocols include completion of tests at three or more stations within an area of interest. The results of the analysis are then averaged within the cluster. Further action under SMS is required if the average results for any parameters tested exceed the cleanup screening level (CSL).

Table 3-2. Evaluation Guidelines for Baxter Freshwater Sediment Bioassay Testing - Spring 2000

Bioassay and Endpoint	Control Sediment Criterion	Reference Sediment Criterion	Statistical Testing	Numerical Guidelines Defining Bioassay "Hit"	
				SQS	CSL
ACUTE BIOASSAYS					
***Hyalella azteca*, 10-day exposure**					
Mortality Endpoint	< 20% absolute mean mortality	< 30% absolute mean mortality	t-test ($p \leq 0.05$)	Mean mortality ≥ 15% absolute; and 10% higher than reference, and statistically significant	Mean mortality ≥ 35% absolute; and 15% higher than reference, and statistically significant
***Chironomus tentans*, 10-day exposure**					
Mortality Endpoint	< 30% absolute mean mortality, and mean weight per surviving organisms of 0.6 mg	< 35% absolute mean mortality	t-test ($p \leq 0.05$)	Mean mortality ≥ 25% absolute; and 10% higher than reference, and statistically significant	Mean mortality ≥ 40% absolute, and 20% higher than reference, and statistically significant
Biomass Reduction Endpoint	< 30% absolute mean mortality, and mean weight per surviving organisms of 0.6 mg	< 35% absolute mean mortality	t-test ($p \leq 0.05$) with appropriate adjustments	Growth 20% less than in reference sed., and statistically significant difference with reference sed.	Growth > 40% less than in reference sed., and statistically significant difference with reference sed.
***Daphnia pulex*, 96-hr exposure**					
Mortality Endpoint	< 20% absolute mean mortality	< 30% absolute mean mortality	t-test ($p \leq 0.05$)	Mean mortality ≥ 15% absolute; and 10% higher than reference, and statistically significant	Mean mortality ≥ 35% absolute; and 20% higher than reference, and statistically significant+L1
CHRONIC BIOASSAYS					
***Chironomus tentans*, 20-day exposure**					
Mortality Endpoint	< 30% absolute mean mortality, and mean weight per surviving organisms of 0.6 mg	< 35% absolute mean mortality	t-test ($p \leq 0.05$)	Mean mortality ≥ 25% absolute; and 10% higher than reference, and statistically significant	Mean mortality ≥ 45% absolute; and 20% higher than reference and statistically significant
Growth Endpoint	< 30% absolute mean mortality, and mean weight per surviving organisms ≥ 0.6 mg	< 35% absolute mean mortality	t-test ($p \leq 0.05$) with appropriate adjustments	Growth 30% less than in reference, and statistically significant	Growth 50% less than in reference and statistically significant

Notes:

Statistical significance will be evaluated using the Bioastat bioassay software developed by the Corps of Engineers, following the protocols defined in the November 1998 Dredge Material Evaluation Framework for the Lower Columbia River Management Area.

4. Test Results and Discussion

Testing data from the current study are summarized in Tables 4-1 and 4-2 and 4-4. Data collected during 1997 are also summarized in Tables 4-1 and 4-3 for comparison. As the 1997 data only included a single station within the Baxter grey zone, these older data do not represent a full cluster analysis.

Acute Bioassays

As summarized in Tables 4-1 and 4-2, no exceedences of the SQS or CSL interpretive criteria were detected for any of the acute bioassays. In all cases, the QA/QC samples were within criteria established in Table 3-2.

The acute bioassay data are consistent with the limited acute bioassay data from 1997. The valid *Chironomus tentans* bioassay data from 1997 included a single station from the Baxter grey zone. No toxicity was detected in that sample (Table 4-3).

Chronic Bioassay Data

The data from the *Chironomus tentans* 20-day chronic bioassay test are summarized in Tables 4-1, 4-2 and 4-4. As noted in the tables, survival was high in all of the test samples and in the reference sample collected from Lake Washington. None of the samples exceeded SQS interpretive criteria for this endpoint.

The survival in the laboratory control sample was only 41 percent at the 20-day endpoint. This is well below the control survival criterion of 70 percent. The cause of the low control survival has not been conclusively determined. According to the laboratory, the control sample used for testing was collected from an on-site pond located near the testing laboratory. The pond sediment had been used extensively in the past for testing by this and by other bioassays without similar problems. Because of the low control survival in the chronic bioassay, the control sample was NOT used as part of the interpretation of any of the test sample data. Test samples were compared directly to the reference sample which performed within the established QA/QC limits of the test.

The chronic bioassay also includes a weight reduction endpoint. Results for this endpoint were mixed. Relative to the reference sample, the weight reduction in the test samples varied from 18.5 to 66.7 percent. Using the interpretive criteria in Table 4-1, this results in one passing sample (JB-4B), one SQS exceedence (JB-4C) and one CSL exceedence (JB-4A). As part of a cluster analysis, these data do not represent an exceedence of the CSL and do not trigger a need for further action under SMS.

The distribution of the weight reduction data suggest a possible feeding-related artifact. The greatest weight reduction was noted in the test samples with the highest survival. All final weights were well above the minimum final weight established in the ASTM and Inland Testing Manual protocols (0.6 mg/organism) for the bioassay.

Tables 4-1 and 4-3 include the 1997 *Hyalella* chronic bioassay data. As noted in Section 1 above, the control and reference samples from that 28-day test had unacceptably

Table 4-1
Synopsis of Whole-Sediment Bioassay Data
Baxter Grey Zone

	QA Samples		Test Samples			Conclusions of Grey Zone Cluster Analysis
	Control	Reference	JB-4A	JB-4B	JB-4C	
CURRENT STUDY						
Acute Bioassays						
Daphnia pulex (96-hr survival)	Pass	Pass	Pass	Pass	Pass	**Pass**
Hyalella azteca (10-day survival)	Pass	Pass	Pass	Pass	Pass	**Pass**
Chironomus tentans						
(10-day survival)	Pass	Pass	Pass	Pass	Pass	**Pass**
(10-day weight reduction)	Pass	Pass	Pass	Pass	Pass	**Pass**
Chronic Bioassay						
Chironomus tentans						
(20-day survival)	Fail [1]	Pass	Pass	Pass	Pass	**Pass**
(20-day weight reduction)	Fail [1]	Pass	CSL [2]	Pass [2]	SQS [2]	**Pass**
Analytical Data						
Preserved Total Solids (%)	na	71.4	22	22.3	16.1	**na**
Total Sulfide (mg/kg)	na	16	220	200	490	**na**
Total Ammonia (mg/kg)	na	7.2	46	38	32	**na**
1997 STUDY						
Acute Bioassays						
Chironomus tentans						
(10-day survival)	Pass	Pass	Pass			**Pass [4]**
(10-day weight reduction)	Pass	Pass	Pass			**Pass [4]**
Chronic Bioassay						
Hyalella azteca						
(28-day survival)	Fail [3]	Fail [3]	Pass			**Pass [4]**
Analytical Data						
Total Sulfide (mg/kg)	na	4	200			**na**
Total Ammonia (mg/kg)	na	19	87			**na**

Notes:

1. The survival in the laboratory control samples for the 20-day Chironomus tentans bioassay was low (41%). The cause of this low survival has not been determined. The performance of the reference sample for this test was within limits. The test samples were interpreted relative to the reference without correction for the control sample.
2. The final weights in the 20-day Chironomus tentans bioassay were approximately the inverse of the survival (i.e., lowest weights in the samples with the highest survival. This observation suggests that the growth data may be subject to a survival or feeding-related artifact. All final weights were well above the 0.6 mg/organism value used as the threshold for test acceptability in the ASTM protocols and Inland Testing Manual.
3. In the 1997 study, low survival was measured in both the laboratory control sample and in the reference sample. Therefore, neither of these samples could be used for test sample comparisons. Test sample JB-4A had an absolute survival of 85.8%, such that the test sample would have passed even if the control and reference survival were 100%.
4. A cluster analysis requires at least three samples within the area being evaluated. A full cluster analysis is not possible using the 1997 data, because only one sample was analyzed from within the Baxter grey zone. Conclusions shown here are based on the one available sample and the two endpoints presented above. An additional acute test (H. azteca 10-day survival) was performed during 1997, but that test was rejected due to the low number of replicates used. Those data are not shown here (survival in sample JB-4A was also high at 95% in that rejected test).

Table 4-2
Summary of Whole-Sediment Bioassay Data
Baxter Grey Zone

Test and Endpoint	QA Criteria	Test Data		Test Conclusions	Notes
D. pulex Acute (96-hr Survival)					
	% Survival QA Criteria	% Survival	Signif. Diff.	Test Conclusions	
Lab Control	> 80%	94%		Control OK	An SQS exceedence for the Daphnia bioassay requires 1) less than 85% absolute survival in the test samples, 2) greater than a 10% difference in survival between the reference and the test sample, and 3) a statistically significant difference in survival between the reference and the test sample. None of the test samples were registerred as SQS exceedences.
Reference Sample (JB-9)	> 70%	92%		Reference OK	
Test Samples					
JB-4A		**98%**	**NO**	**Pass**	
JB-4B		**98%**	**NO**	**Pass**	
JB-4C		**96%**	**NO**	**Pass**	
H. azteca Acute (10-day Survival)					
	% Survival QA Criteria	% Survival	Signif. Diff.	Test Conclusions	
Lab Control	> 80%	95%		Control OK	An SQS exceedence for the Hyalella acute bioassay requires 1) less than 85% absolute survival in the test samples, 2) greater than a 10% difference in survival between the reference and the test sample, and 3) a statistically significant difference in survival between the reference and the test sample. None of the test samples were registerred as SQS exceedences.
Reference Sample (JB-9)	> 70%	97%		Reference OK	
Test Samples					
JB-4A		**93%**	**NO**	**Pass**	
JB-4B		**96%**	**NO**	**Pass**	
Lab Control (Set 2)	> 80%	91%		Control for Set 2 OK	
Reference Sample (Set 2)	> 70%	75%		Reference for Set 2 OK	
Test Samples (Set 2)					
JB-4C		**90%**	**NO**	**Pass**	

Table 4-2 (Cont'd)
Summary of Whole-Sediment Bioassay Data
Baxter Grey Zone

Test and Endpoint	QA Criteria	Test Data			Test Conclusions	Notes
C. tentans Acute (10-day Survival)	% Survival QA Criteria	% Survival	Signif. Diff.		Test Conclusions	An SQS exceedence for the Chironomus acute survival bioassay requires 1) less than 75% absolute survival in the test samples, 2) greater than a 10% difference in survival between the reference and the test sample, and 3) a statistically significant difference in survival between the reference and the test sample. None of the test samples were registerred as SQS exceedences.
Lab Control	> 70%	87%			Control OK	
Reference Sample (JB-9)	> 65%	91%			Reference OK	
Test Samples						
JB-4A		**91%**	**NO**		**Pass**	
JB-4B		**83%**	**NO**		**Pass**	
Lab Control (Set 2)	> 70%	92%			Control for Set 2 OK	
Reference Sample (JB-9, Set 2)	> 65%	82%			Reference for Set 2 OK	
Test Samples (Set 2)						
JB-4C		**91%**	**NO**		**Pass**	
C. tentans Acute (10-day Weight Reduction)						
	Min. Final wt. (mg)	Final wt. (mg)	Signif. Diff.	% Weight Reduction	Test Conclusions	An SQS exceedence for the Chironomus acute weight reduction bioassay requires 1) greater than 20% weight reduction in test samples relative to the reference sediment, and 2) a statistically significant difference in final weights between the reference sample and the test sample. None of the test samples were registerred as SQS exceedences.
Lab Control	> 0.60	0.69			Control OK	
Reference Sample (JB-9)	> 0.60	1.27			Reference OK	
Test Samples						
JB-4A		**1.03**	**NO**	**18.9%**	**Pass**	
JB-4B		**1.20**	**NO**	**5.5%**	**Pass**	
Lab Control (Set 2)	> 0.60	1.18			Control for Set 2 OK	
Reference Sample (JB-9, Set 2)	> 0.60	1.34			Reference for Set 2 OK	
Test Samples (Set 2)						
JB-4C		**1.75**	**na**	**na**	**Pass**	

Table 4-2 (Cont'd)
Summary of Whole-Sediment Bioassay Data
Baxter Grey Zone

Test and Endpoint	QA Criteria	Test Data			Test Conclusions	Notes
C. tentans Chronic (20-day Survival)	% Survival QA Criteria	% Survival	Signif. Diff.		Test Conclusions	An SQS exceedence for the Chironomus chronic survival bioassay requires 1) less than 75% absolute survival in the test samples, 2) greater than a 10% difference in survival between the reference and the test sample, and 3) a statistically significant difference in survival between the reference and the test sample. Sample JB-4C exceeded the first two criteria, but not the third. None of the test samples were registerred as SQS exceedences.
Lab Control	> 70%	41%			**Low Survival in Control	
Reference Sample	> 65%	76%			Reference OK	
Test Samples						
JB-4A		**92%**	**NO**		**Pass**	
JB-4B		**88%**	**NO**		**Pass**	
JB-4C		**66%**	**NO**		**Pass**	
C. tentans Chronic (20-day Weight Reduction)	Final wt. (mg)	Final wt. (mg)	Signif. Diff.	% Weight Reduction	Test Conclusions	An SQS/CSL exceedence for the Chironomus chronic weight reduction bioassay requires 1) greater than 30% weight reduction in test samples relative to the reference sediment (>50% for CSL), and 2) a statistically significant difference in final weights between the reference sample and the test sample. Sample JB-4C exceeded the SQS criteria. Sample JB-4A exceeded the CSL criteria. Weight change data were the inverse of survival suggesting possible artifact.
Lab Control	> 0.60	2.00			**Low Survival in Control	
Reference Sample	> 0.60	2.44			Reference OK	
Test Samples						
JB-4A		**0.81**	**YES**	**66.7%**	**CSL**	
JB-4B		**1.99**	**YES**	**18.5%**	**Pass**	
JB-4C		**1.44**	**YES**	**41.0%**	**SQS**	

Notes:

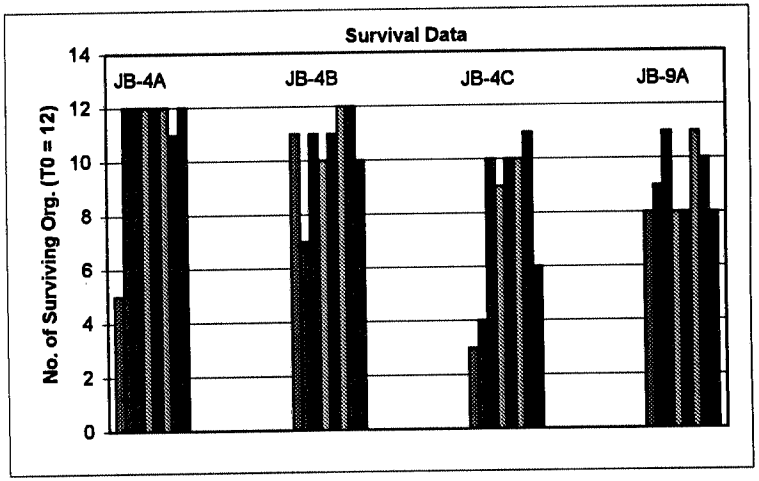
** The survival in the control sample for the Chironomus tentans 20-day bioassay was below criteria. The test samples were interpreted using the reference sample.

Table 4-3
Summary of Previous Whole-Sediment Bioassay Data
Baxter Grey Zone -- 1997 Study

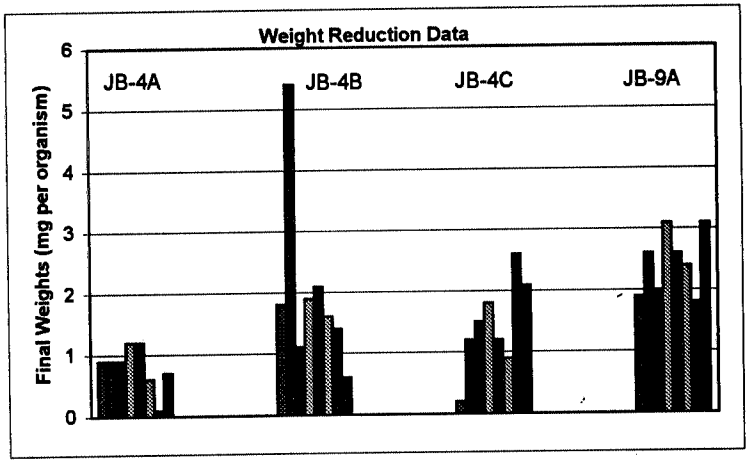
Test and Endpoint	QA Criteria	Test Data			Test Conclusions	Notes
C. tentans Acute (10-day Survival)	% Survival QA Criteria	% Survival	Signif. Diff.		Test Conclusions	Test data accepted by Ecology in 1997.
Lab Control	> 70%	91.3%			Control OK	
Reference Sample (JB-9)	> 65%	82.5%			Reference OK	
Test Samples						
JB-4A		**100.0%**	**NO**		**Pass**	
C. tentans Acute (10-day Weight Reduction)						
	Min. Final wt. (mg)	Final wt. (mg)	Signif. Diff.	% Weight Reduction	Test Conclusions	Test data accepted by Ecology in 1997.
Lab Control	> 0.60	1.000			Control OK	
Reference Sample (JB-9)	> 0.60	0.820			Reference OK	
Test Samples						
JB-4A		**0.998**	**NO**	**na**	**Pass**	
H. azteca (28-day Survival)	% Survival QA Criteria	% Survival	Signif. Diff.		Test Conclusions	Interpretation of sample data using reference correction rejected by Ecology due to low survival in control and reference samples. High survival in sample JB-4A allows interpretation against absolute survival criteria. This sample passes per these criteria.
Lab Control	> 70%	32.5%			Low Survival in Control	
Reference Sample	> 65%	49.2%			Low Survival in Reference	
Test Samples						
JB-4A		**85.8%**	**na**		**Pass**	

TABLE 4-4
YEAR 2000 CHRONIC BIOASSAY DATA
CHIRONOMUS TENTANS 20-DAY SURVIVAL AND WEIGHT REDUCTION

SURVIVAL DATA	JB-4A (test sample)	JB-4B (test sample)	JB-4C (test sample)	JB-9A (reference)
	5	11	3	8
	12	7	4	9
	12	11	10	11
	12	10	9	8
	12	11	10	8
	12	12	10	11
	11	12	11	10
	12	10	6	8
Total Survival	88	84	63	73
Percent Survival	91.7%	87.5%	65.6%	76.0%
Percent Difference from Reference	na	na	10.4%	na
Statistically Significant (Biostat2)	na	na	No	na
Interpretive Conclusions	**Pass**	**Pass**	**Pass**	



WEIGHT CHANGE DATA	JB-4A (test sample)	JB-4B (test sample)	JB-4C (test sample)	JB-9A (reference)
	0.9	1.8	0.2	1.9
	0.9	5.4	1.2	2.6
	0.9	1.1	1.5	2
	1.2	1.9	1.8	3.1
	1.2	2.1	1.2	2.6
	0.6	1.6	0.9	2.4
	0.1	1.4	2.6	1.8
	0.7	0.6	2.1	3.1
Mean Final Organism Weight (mg)	0.813	1.988	1.438	2.438
Percent Difference from Reference	66.7%	18.5%	41.0%	na
Statistically Significant (Biostat2)	Yes	Yes	Yes	na
Interpretive Conclusions	**CSL**	**Pass**	**SQS**	



Notes:

Statistical analyses were performed using Biostat2 software obtained from the U.S. Army Corps of Engineers.

low rates of survival. The cause of the low survival was not determined, but was generally attributed to poor laboratory technique or culture viability. Because the control and reference survival was low, these samples could not be used for interpreting the results of the bioassay. For most of the samples collected in that study, this prevented any use of the data. But because sample JB-4 from that test had very high rates of survival (85.8% survival at 28 days) the data for that sample remain qualitatively useful. Even with a very high rate of survival in reference samples (e.g., 100%), the survival measured in JB-4 during the 1997 study would not have represented an SQS exceedence.

5. Summary and Conclusions

Taken together, the bioassay data from the current study and from the work performed in 1997 demonstrate that the sediments within the Baxter grey zone are not significantly toxic to sediment biota and do not require further action under SMS or MTCA regulations. Specific observations in support of this conclusion include the following:

- No acute toxicity was measured during the current study in any of the three different bioassays performed at any of the three sampling stations within the Baxter grey zone. Results for three samples and three different tests performed in the current study were consistent with the results from the one valid test and the one location performed in 1997.

- Survival in the chronic *Chironomus tentans* bioassay was very high for all three samples tested during the current study. All of the samples passed the interpretive criteria established for use during the project.

- The high survival measured during the current study was consistent with the results from 1997. Those data demonstrated high rates of survival in a sample collected from the Baxter grey zone during a 28-day chronic *Hyalella azteca* bioassay.

- Some impact to the growth endpoint was detected during the chronic *Chironomus tentans* bioassay in the current study. However, that impact does not trigger requirements for further investigation or action when analyzed as part of an SMS cluster analysis.

Pending your final decision regarding the Baxter grey zone, the Cleanup Action Plan for the site carries forward two remedial alternatives. The first alternative is No Action. The second alternative is removal by dredging with upland reuse or disposal of the sediments. These two alternatives are also being carried forward in permit applications submitted to the Army Corps of Engineers. Based on the data summarized herein, we recommend that the No Action alternative be selected for the Baxter grey zone, as the area is in compliance with the sediment cleanup levels established for use on the project.

Thank you for your technical assistance on this project. As always it is a pleasure working with you.

Copies of lab bench sheets, water quality monitoring data and copies of the laboratory standard operating procedures will be provided as soon as the final packages are received from the laboratories. All data available from the current round of testing are attached to this letter for your review.

Sincerely,
THERMORETEC CONSULTING CORPORATION

Mark Larsen
Environmental Scientist

Agency Distribution:
Stephanie Stirling / U.S. Army Corps of Engineers
Glen St. Amant / Muckleshoot Tribe
Dave Bortz / Department of Natural Resources
Tim Goodman / Department of Natural Resources
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Pete Adolophson / Department of Ecology

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Chuck Wolfe / Foster Pepper & Shefelman
Jim Hanken / Schwabe Williamson & Wyatt
Bill Joyce / Ogden Murphey & Wallace
Lawrence McCrone / Exponent

Attachments
- Attachment A: Biostat2 Statistical Analysis Reports (All bioassays)
- Attachment B: Ogden Bioassay Reports (Acute Bioassays)
- Attachment C: ABC Labs Bioassay Reports (Chronic Bioassays)
- Attachment D: ARI Laboratory Deliverables (Ammonia and Sulfide Analysis)

ATTACHMENT A
BIOSTAT2 STATISTICAL ANALYSIS REPORTS FOR ALL BIOASSAYS

Project Name: Baxter - D. pulex 96-hr Survival 3/31/00

Sample ID: JB-4A		**Replicates:**	10
Alias: Test Sample A			
Mean:	0.980	**Transform Mean:**	0.184
SD:	0.063	**Transform SD:**	0.470

Reference ID: JB-9A		**Replicates:**	10
Alias: Reference			
Mean:	0.920	**Transform Mean:**	-0.184
SD:	0.139	**Transform SD:**	0.855

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.0250
SS:	0.0119
K:	10.0000
b:	0.0921
Alpha Level:	0.01
Calculated Value:	0.7133
Critical Value:	<= 0.868
Normally Distributed:	No
Override Option:	Not Invoked

Levene's Results:

Test Residual Mean:	0.2675
Test Residual SD:	0.3760
Reference Residual Mean:	0.7241
Reference Residual SD:	0.3856
Degrees of Freedom:	18
Alpha Level:	0.05
Calculated Value:	2.6809
Critical Value:	>= 2.101
Variances Homogeneous:	No

Test Results:

Statistic:	Approximate T
Balanced Design:	Yes
Transformation:	Rankits
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	-1.1945
Critical Value:	>= 1.761
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	1.0000	0.3329	0.6000	-1.8670	0.1486	1.6826		-1.8670	-0.0780
2	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		-1.1533	-0.0411
3	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		-1.1533	-0.0269
4	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		-1.1533	-0.0269
5	1.0000	0.3329	0.8000	-1.1533	0.1486	0.9690		0.3329	0.0045
6	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		0.3329	0.0045
7	1.0000	0.3329	0.8000	-1.1533	0.1486	0.9690		0.3329	0.0045
8	0.8000	-1.1533	1.0000	0.3329	1.3376	0.5172		0.3329	0.0045
9	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		0.3329	0.0045
10	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		0.3329	0.0045
11								0.3329	0.0045
12								0.3329	0.0045
13								0.3329	0.0045
14								0.3329	0.0188
15								0.3329	0.0188
16								0.3329	0.0188
17								0.3329	0.0188
18								0.3329	0.0188
19								0.3329	0.0188
20								0.3329	0.0188

Project Name: Baxter - D. pulex 96-hr Survival 3/31/00

Sample ID: JB-4B		**Replicates:**	10
Alias: Test Sample B			
Mean:	0.980	**Transform Mean:**	0.184
SD:	0.063	**Transform SD:**	0.470

Reference ID: JB-9A		**Replicates:**	10
Alias: Reference			
Mean:	0.920	**Transform Mean:**	-0.184
SD:	0.139	**Transform SD:**	0.855

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.1056
SS:	0.2120
K:	10.0000
b:	0.3900
Alpha Level:	0.01
Calculated Value:	0.7176
Critical Value:	<= 0.868
Normally Distributed:	No
Override Option:	Not Invoked

Levene's Results:

Test Residual Mean:	0.2675
Test Residual SD:	0.3760
Reference Residual Mean:	0.7241
Reference Residual SD:	0.3856
Degrees of Freedom:	18
Alpha Level:	0.05
Calculated Value:	2.6809
Critical Value:	>= 2.101
Variances Homogeneous:	No

Test Results:

Statistic:	Approximate T
Balanced Design:	Yes
Transformation:	Rankits
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	-1.1945
Critical Value:	>= 1.761
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.8000	-1.1533	0.6000	-1.8670	1.3376	1.6826		-1.8670	-0.3200
2	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		-1.1533	-0.1800
3	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		-1.1533	-0.1200
4	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		-1.1533	-0.1200
5	1.0000	0.3329	0.8000	-1.1533	0.1486	0.9690		0.3329	0.0200
6	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		0.3329	0.0200
7	1.0000	0.3329	0.8000	-1.1533	0.1486	0.9690		0.3329	0.0200
8	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		0.3329	0.0200
9	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		0.3329	0.0200
10	1.0000	0.3329	1.0000	0.3329	0.1486	0.5172		0.3329	0.0200
11								0.3329	0.0200
12								0.3329	0.0200
13								0.3329	0.0200
14								0.3329	0.0800
15								0.3329	0.0800
16								0.3329	0.0800
17								0.3329	0.0800
18								0.3329	0.0800
19								0.3329	0.0800
20								0.3329	0.0800

Project Name: Baxter - D. pulex 96-hr Survival 3/31/00

Sample ID: JB-4C			**Replicates:** 10	**Reference ID:** JB-9A			**Replicates:** 10
Alias: Test Sample C				**Alias:** Reference			
Mean:	0.960	**Transform Mean:**	0.960	**Mean:**	0.920	**Transform Mean:**	0.920
SD:	0.084	**Transform SD:**	0.084	**SD:**	0.139	**Transform SD:**	0.139

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.1123
SS:	0.2400
K:	10.0000
b:	0.4127
Alpha Level:	0.01
Calculated Value:	0.7099
Critical Value:	<= 0.868
Normally Distributed:	No
Override Option:	

Levene's Results:

Test Residual Mean:	0.0640
Test Residual SD:	0.0505
Reference Residual Mean:	0.1120
Reference Residual SD:	0.0749
Degrees of Freedom:	18
Alpha Level:	0.05
Calculated Value:	1.6785
Critical Value:	>= 2.101
Variances Homogeneous:	Yes

Test Results:

Statistic:	Mann-Whitney
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	10,10
Degrees of Freedom:	
Experimental Alpha Level:	0.05
Calculated Value:	44.0000
Critical Value:	>= 73.0
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	1.0000	13.0000	0.6000	1.0000	0.0400	0.3200	1.0000		-0.3200
2	1.0000	13.0000	1.0000	13.0000	0.0400	0.0800	3.5000		-0.1600
3	1.0000	13.0000	1.0000	13.0000	0.0400	0.0800	3.5000		-0.1600
4	1.0000	13.0000	1.0000	13.0000	0.0400	0.0800	3.5000		-0.1200
5	1.0000	13.0000	0.8000	3.5000	0.0400	0.1200	3.5000		-0.1200
6	1.0000	13.0000	1.0000	13.0000	0.0400	0.0800	13.0000		0.0400
7	0.8000	3.5000	0.8000	3.5000	0.1600	0.1200	13.0000		0.0400
8	1.0000	13.0000	1.0000	13.0000	0.0400	0.0800	13.0000		0.0400
9	1.0000	13.0000	1.0000	13.0000	0.0400	0.0800	13.0000		0.0400
10	0.8000	3.5000	1.0000	13.0000	0.1600	0.0800	13.0000		0.0400
11							13.0000		0.0400
12							13.0000		0.0400
13							13.0000		0.0400
14							13.0000		0.0800
15							13.0000		0.0800
16							13.0000		0.0800
17							13.0000		0.0800
18							13.0000		0.0800
19							13.0000		0.0800
20							13.0000		0.0800

Project Name: Baxter - H. azteca 10-day Survival 3/31/00

Sample ID: JB-4A		**Replicates:**	5
Alias: Test Sample A			
Mean:	0.930	**Transform Mean:**	0.930
SD:	0.103	**Transform SD:**	0.103

Reference ID: JB-9A		**Replicates:**	5
Alias: Reference			
Mean:	0.970	**Transform Mean:**	0.970
SD:	0.044	**Transform SD:**	0.044

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.0518
SS:	0.0509
K:	5.0000
b:	0.2018
Alpha Level:	0.05
Calculated Value:	0.7990
Critical Value:	<= 0.842
Normally Distributed:	No
Override Option:	

Levene's Results:

Test Residual Mean:	0.0719
Test Residual SD:	0.0653
Reference Residual Mean:	0.0359
Reference Residual SD:	0.0194
Degrees of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.1804
Critical Value:	>= 1.86
Variances Homogeneous:	Yes

Test Results:

Statistic:	Mann-Whitney
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	5,5
Degrees of Freedom:	
Experimental Alpha Level:	0.05
Calculated Value:	15.0000
Critical Value:	>= 21.0
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.9500	4.0000	1.0000	8.0000	0.0200	0.0300	1.0000		-0.1800
2	1.0000	8.0000	0.9500	4.0000	0.0700	0.0200	2.0000		-0.0700
3	1.0000	8.0000	1.0000	8.0000	0.0700	0.0300	4.0000		-0.0200
4	0.7500	1.0000	0.9000	2.0000	0.1800	0.0700	4.0000		0.0200
5	0.9500	4.0000	1.0000	8.0000	0.0200	0.0300	4.0000		0.0200
6							8.0000		0.0300
7							8.0000		0.0300
8							8.0000		0.0300
9							8.0000		0.0700
10							8.0000		0.0700
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Project Name: Baxter - H. azteca 10-day Survival 3/31/00

Sample ID: JB-4B			**Replicates:** 5	**Reference ID:** JB-9A			**Replicates:** 5
Alias: Test Sample B				**Alias:** Reference			
Mean:	0.960	**Transform Mean:**	0.960	**Mean:**	0.970	**Transform Mean:**	0.970
SD:	0.041	**Transform SD:**	0.041	**SD:**	0.044	**Transform SD:**	0.044

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.0280
SS:	0.0150
K:	5.0000
b:	0.1132
Alpha Level:	0.05
Calculated Value:	0.8548
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.0320
Test Residual SD:	0.0216
Reference Residual Mean:	0.0359
Reference Residual SD:	0.0194
Degrees of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.3067
Critical Value:	>= 1.86
Variances Homogeneous:	Yes

Test Results:

Statistic: Student T
Balanced Design: Yes
Transformation: No Transformation

Experimental Hypothesis
Null: x1 >= x2
Alternate: x1 < x2

Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	0.3651
Critical Value:	>= 1.86
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	1.0000	1.0000	1.0000	1.0000	0.0400	0.0300			-0.0700
2	0.9500	0.9500	0.9500	0.9500	0.0100	0.0200			-0.0599
3	1.0000	1.0000	1.0000	1.0000	0.0400	0.0300			-0.0200
4	0.9000	0.9000	0.9000	0.9000	0.0599	0.0700			-0.0100
5	0.9500	0.9500	1.0000	1.0000	0.0100	0.0300			-0.0100
6									0.0300
7									0.0300
8									0.0300
9									0.0400
10									0.0400
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Project Name: Baxter - H. azteca 10-day Survival 3/31/00

Sample ID: JB-4C			**Replicates:** 5	**Reference ID:** JB-9A			**Replicates:** 5
Alias: Test Sample C				**Alias:** Reference - Set 2			
Mean:	0.900	**Transform Mean:**	0.900	**Mean:**	0.750	**Transform Mean:**	0.750
SD:	0.035	**Transform SD:**	0.035	**SD:**	0.141	**Transform SD:**	0.141

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.0668
SS:	0.0850
K:	5.0000
b:	0.2819
Alpha Level:	0.05
Calculated Value:	0.9354
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.0200
Test Residual SD:	0.0273
Reference Residual Mean:	0.1200
Reference Residual SD:	0.0447
Degrees of Freedom:	8
Alpha Level:	0.1
Calculated Value:	4.2640
Critical Value:	>= 1.86
Variances Homogeneous:	No

Test Results:

Statistic:	Approximate T
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	4
Experimental Alpha Level:	0.05
Calculated Value:	-2.3008
Critical Value:	>= 2.132
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.9000	0.9000	0.8000	0.8000	0.0000	0.0500			-0.1500
2	0.9000	0.9000	0.6000	0.6000	0.0000	0.1500			-0.1500
3	0.9500	0.9500	0.6000	0.6000	0.0499	0.1500			-0.0500
4	0.9000	0.9000	0.8500	0.8500	0.0000	0.1000			0.0000
5	0.8500	0.8500	0.9000	0.9000	0.0500	0.1500			0.0000
6									0.0000
7									0.0499
8									0.0500
9									0.1000
10									0.1500
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Project Name: Baxter - C. tentans 10-day Survival 3/31/00

Sample ID: JB-4A		**Replicates:** 5	**Reference ID:** JB-9A		**Replicates:** 5
Alias: Test Sample A			**Alias:** Reference		
Mean:	0.910	**Transform Mean:** 0.910	**Mean:**	0.910	**Transform Mean:** 0.910
SD:	0.065	**Transform SD:** 0.065	**SD:**	0.041	**Transform SD:** 0.041

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.0355
SS:	0.0240
K:	5.0000
b:	0.1465
Alpha Level:	0.05
Calculated Value:	0.8945
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.0520
Test Residual SD:	0.0294
Reference Residual Mean:	0.0320
Reference Residual SD:	0.0216
Degrees of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.2216
Critical Value:	>= 1.86
Variances Homogeneous:	Yes

Test Results:

Statistic: Student T
Balanced Design: Yes
Transformation: No Transformation

Experimental Hypothesis
Null: x1 >= x2
Alternate: x1 < x2

Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	0.0000
Critical Value:	>= 1.86
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.9000	0.9000	0.9500	0.9500	0.0100	0.0399			-0.0600
2	0.8500	0.8500	0.9500	0.9500	0.0600	0.0399			-0.0600
3	0.8500	0.8500	0.8500	0.8500	0.0600	0.0600			-0.0600
4	0.9500	0.9500	0.9000	0.9000	0.0399	0.0100			-0.0100
5	1.0000	1.0000	0.9000	0.9000	0.0900	0.0100			-0.0100
6									-0.0100
7									0.0399
8									0.0399
9									0.0399
10									0.0900
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Project Name: Baxter - C. tentans 10-day Survival 3/31/00

Sample ID: JB-4B		**Replicates:**	5
Alias: Test Sample B			
Mean:	0.830	**Transform Mean:**	0.830
SD:	0.135	**Transform SD:**	0.135

Reference ID: JB-9A		**Replicates:**	5
Alias: Reference			
Mean:	0.910	**Transform Mean:**	0.910
SD:	0.041	**Transform SD:**	0.041

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.0648
SS:	0.0800
K:	5.0000
b:	0.2789
Alpha Level:	0.05
Calculated Value:	0.9727
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.1040
Test Residual SD:	0.0687
Reference Residual Mean:	0.0320
Reference Residual SD:	0.0216
Degrees of Freedom:	8
Alpha Level:	0.1
Calculated Value:	2.2326
Critical Value:	>= 1.86
Variances Homogeneous:	No

Test Results:

Statistic:	Approximate T
Balanced Design:	Yes
Transformation:	No Transformation

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	5
Experimental Alpha Level:	0.05
Calculated Value:	1.2649
Critical Value:	>= 2.015
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	1.0000	1.0000	0.9500	0.9500	0.1700	0.0399			-0.1800
2	0.8500	0.8500	0.9500	0.9500	0.0199	0.0399			-0.0800
3	0.7500	0.7500	0.8500	0.8500	0.0800	0.0600			-0.0600
4	0.6500	0.6500	0.9000	0.9000	0.1800	0.0100			-0.0100
5	0.9000	0.9000	0.9000	0.9000	0.0700	0.0100			-0.0100
6									0.0199
7									0.0399
8									0.0399
9									0.0700
10									0.1700
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Project Name: Baxter - C. tentans 10-day Survival 3/31/00

Sample ID: JB-4C			**Replicates:** 5	**Reference ID:** JB-9A			**Replicates:** 5
Alias: Test Sample C				**Alias:** Reference - Set 2			
Mean:	0.910	**Transform Mean:**	0.910	**Mean:**	0.820	**Transform Mean:**	0.820
SD:	0.074	**Transform SD:**	0.074	**SD:**	0.144	**Transform SD:**	0.144

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.0743
SS:	0.1050
K:	5.0000
b:	0.3183
Alpha Level:	0.05
Calculated Value:	0.9653
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.0520
Test Residual SD:	0.0460
Reference Residual Mean:	0.1160
Reference Residual SD:	0.0626
Degrees of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.8398
Critical Value:	>= 1.86
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student T
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	-1.2421
Critical Value:	>= 1.86
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.9000	0.9000	0.7000	0.7000	0.0100	0.1200			-0.1700
2	0.8000	0.8000	0.9000	0.9000	0.1100	0.0800			-0.1200
3	0.9000	0.9000	1.0000	1.0000	0.0100	0.1800			-0.1100
4	1.0000	1.0000	0.8500	0.8500	0.0900	0.0300			-0.0100
5	0.9500	0.9500	0.6500	0.6500	0.0399	0.1700			-0.0100
6									0.0300
7									0.0399
8									0.0800
9									0.0900
10									0.1800
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Project Name: Baxter - C. tentans 10-day Weight Reduction 3/31/00

Sample ID: JB-4A			**Replicates:** 5	**Reference ID:** JB-9A			**Replicates:** 5
Alias: Test Sample A				**Alias:** Reference			
Mean:	1.033	**Transform Mean:**	0.307	**Mean:**	1.265	**Transform Mean:**	0.347
SD:	0.151	**Transform SD:**	0.032	**SD:**	0.522	**Transform SD:**	0.090

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.0443
SS:	0.0373
K:	5.0000
b:	0.1807
Alpha Level:	0.05
Calculated Value:	0.8759
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.0264
Test Residual SD:	0.0133
Reference Residual Mean:	0.0612
Reference Residual SD:	0.0598
Degrees of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.2672
Critical Value:	>= 1.86
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student T
Balanced Design:	Yes
Transformation:	Log10 (x + 1.0)
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	0.9196
Critical Value:	>= 1.86
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	1.0967	0.3215	1.2211	0.3465	0.0142	0.0004			-0.0734
2	1.2300	0.3483	0.9216	0.2836	0.0409	0.0633			-0.0633
3	0.8659	0.2708	0.8776	0.2736	0.0364	0.0734			-0.0364
4	0.8948	0.2775	1.1438	0.3312	0.0297	0.0158			-0.0297
5	1.0810	0.3182	2.1633	0.5001	0.0109	0.1531			-0.0158
6									-0.0004
7									0.0109
8									0.0142
9									0.0409
10									0.1531
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Project Name: Baxter - C. tentans 10-day Weight Reduction 3/31/00

Sample ID: JB-4B		**Replicates:**	5
Alias: Test Sample B			
Mean:	1.197	**Transform Mean:**	1.197
SD:	0.333	**Transform SD:**	0.333

Reference ID: JB-9A		**Replicates:**	5
Alias: Reference			
Mean:	1.265	**Transform Mean:**	1.265
SD:	0.522	**Transform SD:**	0.522

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.2842
SS:	1.5354
K:	5.0000
b:	1.1472
Alpha Level:	0.05
Calculated Value:	0.8571
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.2811
Test Residual SD:	0.1102
Reference Residual Mean:	0.3591
Reference Residual SD:	0.3341
Degrees of Freedom:	8
Alpha Level:	0.1
Calculated Value:	0.4953
Critical Value:	>= 1.86
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student T
Balanced Design:	Yes
Transformation:	No Transformation

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	0.2443
Critical Value:	>= 1.86
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.8385	0.8385	1.2211	1.2211	0.3593	0.0444			-0.3879
2	1.0852	1.0852	0.9216	0.9216	0.1125	0.3439			-0.3593
3	1.5200	1.5200	0.8776	0.8776	0.3222	0.3879			-0.3439
4	1.5785	1.5785	1.1438	1.1438	0.3807	0.1216			-0.2311
5	0.9667	0.9667	2.1633	2.1633	0.2311	0.8978			-0.1216
6									-0.1125
7									-0.0444
8									0.3222
9									0.3807
10									0.8978
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Project Name: Baxter - C. tentans 10-day Weight Reduction 3/31/00

Sample ID: JB-4C		**Replicates:** 5	**Reference ID:** JB-9A		**Replicates:** 5
Alias: Test Sample C			**Alias:** Reference - Set 2		
Mean:	1.754	**Transform Mean:** 1.754	**Mean:**	1.335	**Transform Mean:** 1.335
SD:	0.313	**Transform SD:** 0.313	**SD:**	0.719	**Transform SD:** 0.719

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.3602
SS:	2.4660
K:	5.0000
b:	1.5546
Alpha Level:	0.05
Calculated Value:	0.9801
Critical Value:	<= 0.842
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.2647
Test Residual SD:	0.1035
Reference Residual Mean:	0.5408
Reference Residual SD:	0.3905
Degrees of Freedom:	8
Alpha Level:	0.1
Calculated Value:	1.5273
Critical Value:	>= 1.86
Variances Homogeneous:	Yes

Test Results:

Statistic: Student T
Balanced Design: Yes
Transformation: No Transformation

Experimental Hypothesis
Null: x1 >= x2
Alternate: x1 < x2

Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	8
Experimental Alpha Level:	0.05
Calculated Value:	-1.1903
Critical Value:	>= 1.86
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	2.0400	2.0400	0.8100	0.8100	0.2859	0.5260			-0.8260
2	2.1300	2.1300	2.3400	2.3400	0.3760	1.0040			-0.5260
3	1.6400	1.6400	1.3600	1.3600	0.1140	0.0240			-0.3340
4	1.5400	1.5400	1.6600	1.6600	0.2140	0.3240			-0.2140
5	1.4200	1.4200	0.5100	0.5100	0.3340	0.8260			-0.1140
6									0.0240
7									0.2859
8									0.3240
9									0.3760
10									1.0040
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Project Name: Baxter - C. tentans 20-day Survival 3/31/00

Sample ID: JB-4A		**Replicates:**	8
Alias: Test Sample A			
Mean:	11.000	**Transform Mean:**	11.000
SD:	2.449	**Transform SD:**	2.449

Reference ID: JB-9A		**Replicates:**	8
Alias: Reference			
Mean:	9.125	**Transform Mean:**	9.125
SD:	1.356	**Transform SD:**	1.356

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	1.6994
SS:	54.8750
K:	8.0000
b:	6.3986
Alpha Level:	0.05
Calculated Value:	0.7461
Critical Value:	<= 0.887
Normally Distributed:	No
Override Option:	

Levene's Results:

Test Residual Mean:	1.5000
Test Residual SD:	1.8516
Reference Residual Mean:	1.1562
Reference Residual SD:	0.5580
Degrees of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.5027
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Mann-Whitney
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	8,8
Degrees of Freedom:	
Experimental Alpha Level:	0.05
Calculated Value:	9.0000
Critical Value:	>= 49.0
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	5.0000	1.0000	8.0000	3.5000	6.0000	1.1250	1.0000		-6.0000
2	12.0000	13.5000	9.0000	6.0000	1.0000	0.1250	3.5000		-1.1250
3	12.0000	13.5000	11.0000	9.0000	1.0000	1.8750	3.5000		-1.1250
4	12.0000	13.5000	8.0000	3.5000	1.0000	1.1250	3.5000		-1.1250
5	12.0000	13.5000	8.0000	3.5000	1.0000	1.1250	3.5000		-1.1250
6	12.0000	13.5000	11.0000	9.0000	1.0000	1.8750	6.0000		-0.1250
7	11.0000	9.0000	10.0000	7.0000	0.0000	0.8750	7.0000		0.0000
8	12.0000	13.5000	8.0000	3.5000	1.0000	1.1250	9.0000		0.8750
9							9.0000		1.0000
10							9.0000		1.0000
11							13.5000		1.0000
12							13.5000		1.0000
13							13.5000		1.0000
14							13.5000		1.0000
15							13.5000		1.8750
16							13.5000		1.8750
17									
18									
19									
20									

Project Name: Baxter - C. tentans 20-day Survival 3/31/00

Sample ID: JB-4B		**Replicates:**	8
Alias: Test Sample B			
Mean:	10.500	**Transform Mean:**	10.500
SD:	1.603	**Transform SD:**	1.603

Reference ID: JB-9A		**Replicates:**	8
Alias: Reference			
Mean:	9.125	**Transform Mean:**	9.125
SD:	1.356	**Transform SD:**	1.356

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	1.2747
SS:	30.8750
K:	8.0000
b:	5.3368
Alpha Level:	0.05
Calculated Value:	0.9224
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	1.1250
Test Residual SD:	1.0606
Reference Residual Mean:	1.1562
Reference Residual SD:	0.5580
Degrees of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.0737
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic: Student T
Balanced Design: Yes
Transformation: No Transformation

Experimental Hypothesis
Null: x1 >= x2
Alternate: x1 < x2

Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	-1.8517
Critical Value:	>= 1.761
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	11.0000	11.0000	8.0000	8.0000	0.5000	1.1250			-3.5000
2	7.0000	7.0000	9.0000	9.0000	3.5000	0.1250			-1.1250
3	11.0000	11.0000	11.0000	11.0000	0.5000	1.8750			-1.1250
4	10.0000	10.0000	8.0000	8.0000	0.5000	1.1250			-1.1250
5	11.0000	11.0000	8.0000	8.0000	0.5000	1.1250			-1.1250
6	12.0000	12.0000	11.0000	11.0000	1.5000	1.8750			-0.5000
7	12.0000	12.0000	10.0000	10.0000	1.5000	0.8750			-0.5000
8	10.0000	10.0000	8.0000	8.0000	0.5000	1.1250			-0.1250
9									0.5000
10									0.5000
11									0.5000
12									0.8750
13									1.5000
14									1.5000
15									1.8750
16									1.8750
17									
18									
19									
20									

Project Name: Baxter - C. tentans 20-day Survival 3/31/00

Sample ID: JB-4C		**Replicates:**	8
Alias: Test Sample C			
Mean:	7.875	**Transform Mean:**	7.875
SD:	3.090	**Transform SD:**	3.090

Reference ID: JB-9A		**Replicates:**	8
Alias: Reference			
Mean:	9.125	**Transform Mean:**	9.125
SD:	1.356	**Transform SD:**	1.356

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	2.0487
SS:	79.7500
K:	8.0000
b:	8.5459
Alpha Level:	0.05
Calculated Value:	0.9157
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	2.6562
Test Residual SD:	1.2206
Reference Residual Mean:	1.1562
Reference Residual SD:	0.5580
Degrees of Freedom:	14
Alpha Level:	0.1
Calculated Value:	3.1611
Critical Value:	>= 1.761
Variances Homogeneous:	No

Test Results:

Statistic: Approximate T
Balanced Design: Yes
Transformation: No Transformation

Experimental Hypothesis
Null: x1 >= x2
Alternate: x1 < x2

Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	10
Experimental Alpha Level:	0.05
Calculated Value:	1.0474
Critical Value:	>= 1.812
Failed to Reject Null Hypo:	Yes
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	3.0000	3.0000	8.0000	8.0000	4.8750	1.1250			-4.8750
2	4.0000	4.0000	9.0000	9.0000	3.8750	0.1250			-3.8750
3	10.0000	10.0000	11.0000	11.0000	2.1250	1.8750			-1.8750
4	9.0000	9.0000	8.0000	8.0000	1.1250	1.1250			-1.1250
5	10.0000	10.0000	8.0000	8.0000	2.1250	1.1250			-1.1250
6	10.0000	10.0000	11.0000	11.0000	2.1250	1.8750			-1.1250
7	11.0000	11.0000	10.0000	10.0000	3.1250	0.8750			-1.1250
8	6.0000	6.0000	8.0000	8.0000	1.8750	1.1250			-0.1250
9									0.8750
10									1.1250
11									1.8750
12									1.8750
13									2.1250
14									2.1250
15									2.1250
16									3.1250
17									
18									
19									
20									

Project Name: Baxter - C. tentans 20-day Growth 3/31/00

Sample ID: JB-4A		**Replicates:**	8		
Alias: Test Sample A					
Mean:	0.812	**Transform Mean:**	0.812		
SD:	0.356	**Transform SD:**	0.356		

Reference ID: JB-9A		**Replicates:**	8
Alias: Reference			
Mean:	2.437	**Transform Mean:**	2.437
SD:	0.509	**Transform SD:**	0.509

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.3774
SS:	2.7075
K:	8.0000
b:	1.6053
Alpha Level:	0.05
Calculated Value:	0.9518
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.2593
Test Residual SD:	0.2237
Reference Residual Mean:	0.4125
Reference Residual SD:	0.2556
Degrees of Freedom:	14
Alpha Level:	0.1
Calculated Value:	1.2747
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student T
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	7.3903
Critical Value:	>= 1.761
Failed to Reject Null Hypo:	No
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.9000	0.9000	1.9000	1.9000	0.0875	0.5375			-0.7125
2	0.9000	0.9000	2.6000	2.6000	0.0875	0.1625			-0.6374
3	0.9000	0.9000	2.0000	2.0000	0.0875	0.4375			-0.5375
4	1.2000	1.2000	3.1000	3.1000	0.3875	0.6625			-0.4375
5	1.2000	1.2000	2.6000	2.6000	0.3875	0.1625			-0.2125
6	0.6000	0.6000	2.4000	2.4000	0.2125	0.0375			-0.1125
7	0.1000	0.1000	1.8000	1.8000	0.7125	0.6374			-0.0375
8	0.7000	0.7000	3.1000	3.1000	0.1125	0.6625			0.0875
9									0.0875
10									0.0875
11									0.1625
12									0.1625
13									0.3875
14									0.3875
15									0.6625
16									0.6625
17									
18									
19									
20									

Project Name: Baxter - C. tentans 20-day Growth 3/31/00

Sample ID: JB-4B			**Replicates:** 8	**Reference ID:** JB-9A			**Replicates:** 8
Alias: Test Sample B				**Alias:** Reference			
Mean:	1.987	**Transform Mean:**	1.987	**Mean:**	2.437	**Transform Mean:**	2.437
SD:	1.459	**Transform SD:**	1.459	**SD:**	0.509	**Transform SD:**	0.509

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.9382
SS:	16.7275
K:	8.0000
b:	3.5892
Alpha Level:	0.05
Calculated Value:	0.7701
Critical Value:	<= 0.887
Normally Distributed:	No
Override Option:	

Levene's Results:

Test Residual Mean:	0.8812
Test Residual SD:	1.1145
Reference Residual Mean:	0.4125
Reference Residual SD:	0.2556
Degrees of Freedom:	14
Alpha Level:	0.1
Calculated Value:	1.1594
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Mann-Whitney
Balanced Design:	Yes
Transformation:	No Transformation
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1, N2:	8,8
Degrees of Freedom:	
Experimental Alpha Level:	0.05
Calculated Value:	51.0000
Critical Value:	>= 49.0
Failed to Reject Null Hypo:	No
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	1.8000	5.5000	1.9000	7.5000	0.1875	0.5375	1.0000		-1.3875
2	5.4000	16.0000	2.6000	12.5000	3.4125	0.1625	2.0000		-0.8875
3	1.1000	2.0000	2.0000	9.0000	0.8875	0.4375	3.0000		-0.6374
4	1.9000	7.5000	3.1000	14.5000	0.0874	0.6625	4.0000		-0.5875
5	2.1000	10.0000	2.6000	12.5000	0.1125	0.1625	5.5000		-0.5375
6	1.6000	4.0000	2.4000	11.0000	0.3875	0.0375	5.5000		-0.4375
7	1.4000	3.0000	1.8000	5.5000	0.5875	0.6374	7.5000		-0.3875
8	0.6000	1.0000	3.1000	14.5000	1.3875	0.6625	7.5000		-0.1875
9							9.0000		-0.0874
10							10.0000		-0.0375
11							11.0000		0.1125
12							12.5000		0.1625
13							12.5000		0.1625
14							14.5000		0.6625
15							14.5000		0.6625
16							16.0000		3.4125
17									
18									
19									
20									

Project Name: Baxter - C. tentans 20-day Growth 3/31/00

Sample ID: JB-4C			**Replicates:** 8	**Reference ID:** JB-9A			**Replicates:** 8
Alias: Test Sample C				**Alias:** Reference			
Mean:	1.437	**Transform Mean:**	1.437	**Mean:**	2.437	**Transform Mean:**	2.437
SD:	0.742	**Transform SD:**	0.742	**SD:**	0.509	**Transform SD:**	0.509

Shipiro-Wilk Results:

Residual Mean:	0.0000
Residual SD:	0.5466
SS:	5.6775
K:	8.0000
b:	2.3579
Alpha Level:	0.05
Calculated Value:	0.9793
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.5625
Test Residual SD:	0.4354
Reference Residual Mean:	0.4125
Reference Residual SD:	0.2556
Degrees of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.8401
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic: Student T
Balanced Design: Yes
Transformation: No Transformation

Experimental Hypothesis
Null: x1 >= x2
Alternate: x1 < x2

Mann-Whitney N1, N2:	N/A
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	3.1406
Critical Value:	>= 1.761
Failed to Reject Null Hypo:	No
Power:	
Significant Diff for Power:	

Replicate Number	Test Data	Transformed Test Data	Reference Data	Transformed Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.2000	0.2000	1.9000	1.9000	1.2375	0.5375			-1.2375
2	1.2000	1.2000	2.6000	2.6000	0.2375	0.1625			-0.6374
3	1.5000	1.5000	2.0000	2.0000	0.0625	0.4375			-0.5375
4	1.8000	1.8000	3.1000	3.1000	0.3625	0.6625			-0.5375
5	1.2000	1.2000	2.6000	2.6000	0.2375	0.1625			-0.4375
6	0.9000	0.9000	2.4000	2.4000	0.5375	0.0375			-0.2375
7	2.6000	2.6000	1.8000	1.8000	1.1625	0.6374			-0.2375
8	2.1000	2.1000	3.1000	3.1000	0.6625	0.6625			-0.0375
9									0.0625
10									0.1625
11									0.1625
12									0.3625
13									0.6625
14									0.6625
15									0.6625
16									1.1625
17									
18									
19									
20									

ATTACHMENT B
OGDEN BIOASSAY REPORTS
FOR ACUTE BIOASSAYS

FACSIMILE TRANSMITTAL

OGDEN ENVIRONMENTAL BIOASSAY LABORATORY

5550 MOREHOUSE DRIVE, SUITE B
SAN DIEGO, CA 92121

PHONE: (858) 458-9044
FAX: (858) 587-3961

• WE HAVE 9 PAGES TO SEND, INCLUDING THIS PAGE •

DATE: 21 MARCH 2000
TO: MARK LARSEN
LOCATION: THERMORETEC
FAX NO.: 206-624-2839
FROM: MARILYN SCHWARTZ

Hi Mark,

Here's a more complete summary. Please let me know if you have any questions.

Thanks,

Marilyn.

MARILYN SCHWARTZ
MANAGER, OGDEN BIOASSAY LABS

PHONE: (858) 458-9044 x300
FAX: (858) 587-3961
PAGER: (619) 979-8870
E-MAIL: MJSCHWARTZ@OEES.COM

ThermoRetec Data Summary - March 21, 2000

***Daphnia pulex* Summary Results**

Site	Mean Survival (%)
Control	94
Site 4A	98
Site 4B	98
Site 4C	96
Site 9A	92

***Daphnia pulex* Reference Toxicant Results**

LC50 = 23.2 ug/L CuCl2 (confidence intervals of 19.3 and 27.8)
Mean Control Survival = 90% (in water only matrix)

***Hyalella azteca* Summary Results**

Site	Mean Survival (%)
Control	95
Site 4A	93
Site 4B	96
Site 9A	97

***Hyalella azteca* Reference Toxicant Results**

LC50 = 203.6 ug/L CuCl2
Mean Control Survival = 92.5% (in water only matrix)

***Chironomus tentans* Summary Results**

Site	Mean Survival (%)	Mean Growth (mg)
Control	87	0.69
Site 4A	91	1.03
Site 4B	83	1.20
Site 9A	91	1.27

***Chironomus tentans* Reference Toxicant Results**

LC50 = 0.317 mg/L CuCl2
Mean Control Survival = 70% (in water only matrix)

No statistically significant differences were observed between the control and any test treatment for any species/endpoint/site.

Please see attached statistical summary sheets for specific analyses.

Daphnia Acute Survival Bioassay-96 Hr Survival

Start Date:	03/09/2000	Test ID:	0003-032	Sample ID:	THERMO RETEC
End Date:	03/13/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	SEDF-Freshwater Sediment
Sample Date:		Protocol:	EPAA 91-EPA Acute	Test Species:	DP-Daphnia pulex
Comments:					

Conc-SP	1	2	3	4	5	6	7	8	9	10
Lab Control	1.0000	1.0000	1.0000	1.0000	1.0000	0.8000	0.8000	0.8000	1.0000	1.0000
4A	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.8000	1.0000	1.0000
4B	0.8000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
4C	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.8000	1.0000	1.0000	0.8000
9A	0.6000	1.0000	1.0000	1.0000	0.8000	1.0000	0.8000	1.0000	1.0000	1.0000

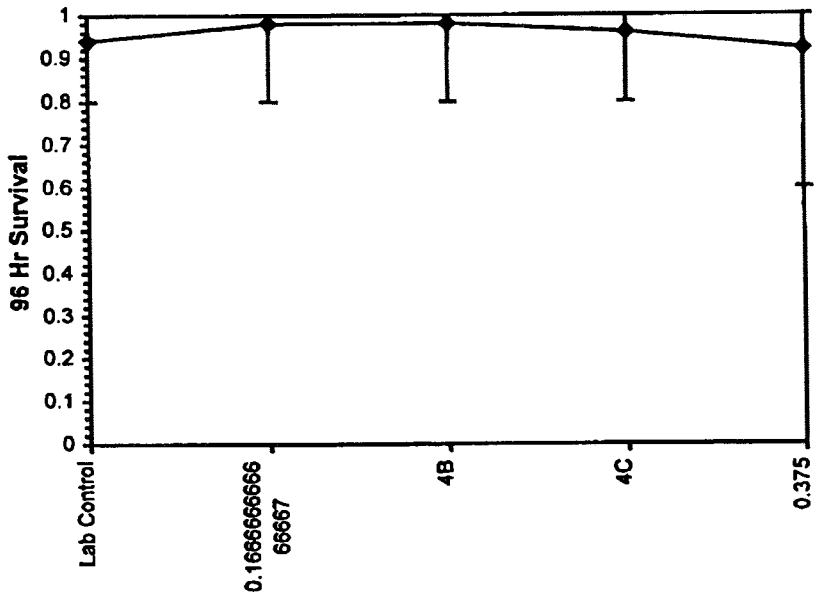
			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-SP	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Lab Control	0.9400	1.0000	1.2738	1.1071	1.3453	9.030	10		
4A	0.9800	1.0426	1.3215	1.1071	1.3453	5.699	10	115.00	76.00
4B	0.9800	1.0426	1.3215	1.1071	1.3453	5.699	10	115.00	76.00
4C	0.9600	1.0213	1.2977	1.1071	1.3453	7.738	10	110.00	76.00
9A	0.9200	0.9787	1.2517	0.8861	1.3453	12.958	10	103.50	76.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.7292	0.93	-1.6678	2.08514
Bartlett's Test indicates equal variances (p = 0.11)	7.49936	13.2767		

Hypothesis Test (1-tail, 0.05)

Steel's Many-One Rank Test indicates no significant differences

Dose-Response Plot



Reviewed by: 3/21/00

Daphnia Acute Survival Bioassay-48 Hr Survival

Start Date:	03/09/2000	Test ID:	000309DPRA	Sample ID:	REF-Ref Toxicant
End Date:	03/11/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	CUCL-Copper chloride
Sample Date:		Protocol:	EPAA 91-EPA Acute	Test Species:	DP-Daphnia pulex
Comments:					

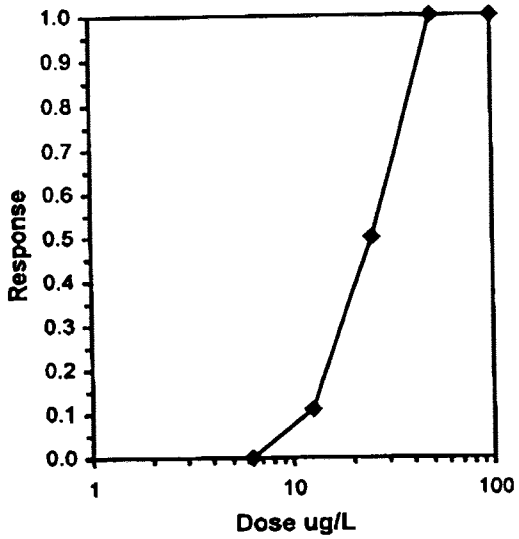
Conc-ug/L	1	2	3	4
Lab Control	1.0000	0.8000	1.0000	0.8000
6.25	1.0000	0.8000	0.8000	1.0000
12.5	0.6000	1.0000	1.0000	0.6000
25	0.0000	0.0000	1.0000	0.8000
50	0.0000	0.0000	0.0000	0.0000
100	0.0000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root					1-Tailed			Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
Lab Control	0.9000	1.0000	1.2262	1.1071	1.3453	11.212	4				2	20
6.25	0.9000	1.0000	1.2262	1.1071	1.3453	11.212	4	0.000	2.290	0.5439	2	20
12.5	0.8000	0.8889	1.1157	0.8861	1.3453	23.763	4	0.465	2.290	0.5439	4	20
25	0.4500	0.5000	0.7259	0.2255	1.3453	80.715	4	2.107	2.290	0.5439	11	20
50	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4				20	20
100	0.0000	0.0000	0.2255	0.2255	0.2255	0.000	4				20	20

Auxiliary Tests					Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)					0.95676		0.844		0.11956	0.03783
Bartlett's Test indicates equal variances (p = 0.05)					7.7288		11.3449			
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test	25	50	35.3553		0.48828	0.55117	0.2257	0.11284	0.1678	3, 12

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	23.147	19.275	27.797
5.0%	23.690	19.454	28.850
10.0%	24.021	19.603	29.434
20.0%	24.268	18.917	31.134
Auto-0.0%	23.147	19.275	27.797



Reviewed by

Amphipod Survival Bioassay-Proportion Alive

Start Date:	03/03/2000	Test ID:	0003-024	Sample ID:	THERMO RET
End Date:	03/13/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	SEDF-Freshwater Sediment
Sample Date:		Protocol:	ASTM 93	Test Species:	HA-Hyalella azteca
Comments:					

Conc-SP	1	2	3	4	5
Lab Control	1.0000	0.9500	0.9500	1.0000	0.8500
4A	0.9500	1.0000	1.0000	0.7500	0.9500
4B	1.0000	0.9500	1.0000	0.9000	0.9500
9	1.0000	0.9500	1.0000	0.9000	1.0000

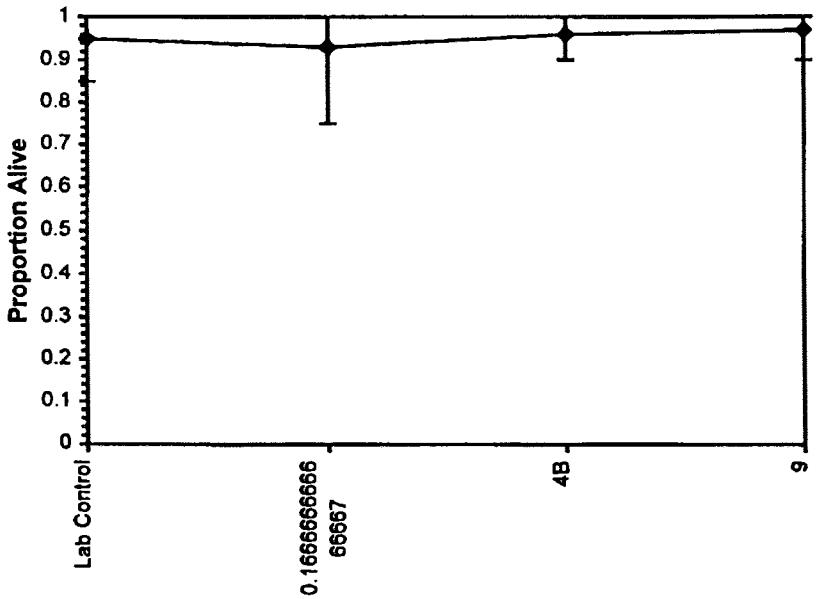
			Transform: Untransformed					Rank	1-Tailed
Conc-SP	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Lab Control	0.9500	1.0000	0.9500	0.8500	1.0000	6.446	5		
4A	0.9300	0.9789	0.9300	0.7500	1.0000	11.149	5	27.00	17.00
4B	0.9600	1.0105	0.9600	0.9000	1.0000	4.358	5	28.00	17.00
9	0.9700	1.0211	0.9700	0.9000	1.0000	4.610	5	30.00	17.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.86226	0.868	-1.5323	2.60382
Bartlett's Test indicates equal variances (p = 0.25)	4.06482	11.3449		

Hypothesis Test (1-tail, 0.05)

Steel's Many-One Rank Test indicates no significant differences

Dose-Response Plot



Amphipod Survival Bioassay-96 Hr Survival

Start Date:	03/03/2000	Test ID:	000303HARA	Sample ID:	REF-Ref Toxicant
End Date:	03/07/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	CUCL-Copper chloride
Sample Date:		Protocol:	ASTM 93	Test Species:	HA-Hyalella azteca
Comments:					

Conc-ug/L	1	2	3	4
Lab Control	0.9000	1.0000	1.0000	0.8000
100	0.7000	0.8000	0.5000	0.6000
200	0.7000	0.5000	0.6000	0.4000
400	0.3000	0.1000	0.3000	0.0000
800	0.2000	0.2000	0.0000	0.1000
1600	0.0000	0.0000	0.0000	0.0000

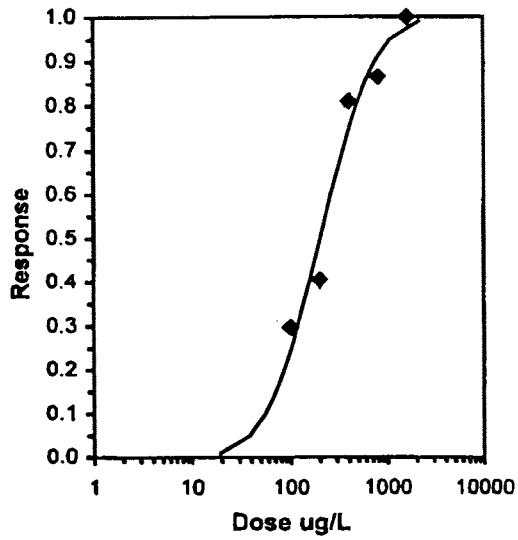
			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-ug/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
Lab Control	0.9250	1.0000	1.2951	1.1071	1.4120	11.347	4				3	40
*100	0.6500	0.7027	0.9424	0.7854	1.1071	14.670	4	3.193	2.360	0.2606	14	40
*200	0.5500	0.5946	0.8368	0.6847	0.9912	15.736	4	4.150	2.360	0.2606	18	40
*400	0.1750	0.1892	0.4100	0.1588	0.5796	50.476	4	8.016	2.360	0.2606	33	40
*800	0.1250	0.1351	0.3520	0.1588	0.4636	41.232	4	8.541	2.360	0.2606	35	40
1600	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	4				40	40

Auxiliary Tests					Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)					0.91206		0.868		-0.3081	-1.297
Bartlett's Test indicates equal variances (p = 0.94)					0.76677		13.2767			
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test	<100	100			0.18698	0.20195	0.61425	0.02439	1.7E-06	4, 15

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	2.2706	0.34226	1.59978	2.94142	0.075	4.09828	7.81472	0.25	2.30869	0.44041	4
Intercept	-0.2421	0.85495	-1.9178	1.43359							
TSCR	0.0791	0.04242	-0.004	0.16224							

Point	Probits	ug/L	95% Fiducial Limits	
EC01	2.674	19.2369	5.67284	38.0408
EC05	3.355	38.3949	14.9507	65.6252
EC10	3.718	55.4979	24.9786	88.0589
EC15	3.964	71.1589	35.2362	107.623
EC20	4.158	86.7016	46.2299	126.467
EC25	4.326	102.715	58.2508	145.509
EC40	4.747	157.438	103.045	209.696
EC50	5.000	203.558	143.239	264.882
EC60	5.253	263.187	195.706	340.413
EC75	5.674	403.405	311.981	544.388
EC80	5.842	477.912	368.569	668.051
EC85	6.036	582.298	443.024	856.853
EC90	6.282	746.618	552.07	1185.48
EC95	6.645	1079.2	753.774	1946.5
EC99	7.326	2153.97	1320.64	5051.18



Midge Fly Larvae Bioassay-Survival

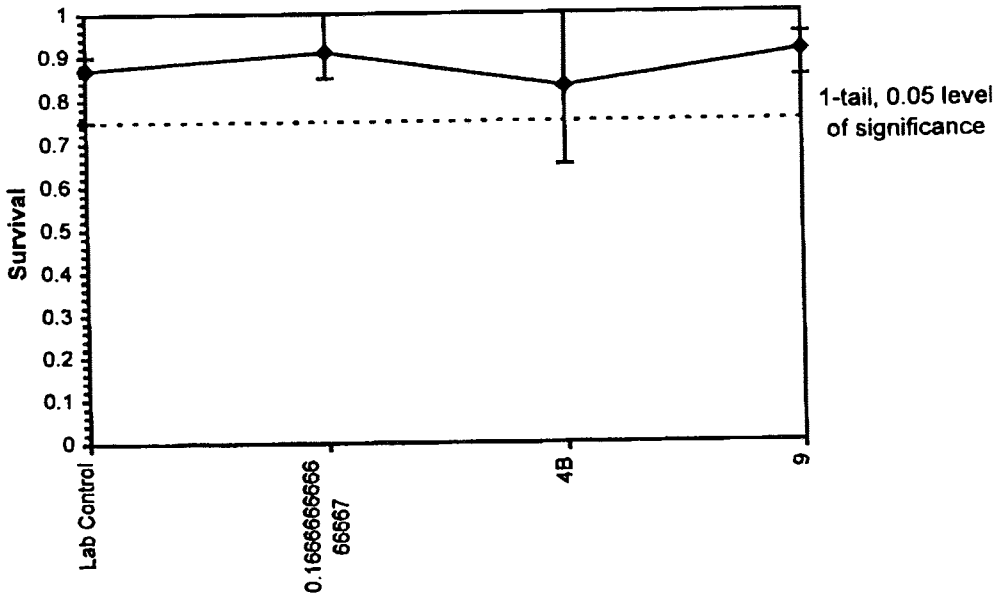
Start Date:	03/03/2000	Test ID:	0003-028	Sample ID:	THERMO RET
End Date:	03/13/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	SEDF-Freshwater Sediment
Sample Date:		Protocol:	ASTM 93	Test Species:	CT-Chironomus tentans
Comments:					

Conc-SP	1	2	3	4	5
Lab Control	0.7500	0.9000	0.9000	0.9000	0.9000
4A	0.9000	0.8500	0.8500	0.9500	1.0000
4B	1.0000	0.8500	0.7500	0.6500	0.9000
9	0.9500	0.9500	0.8500	0.9000	0.9000

			Transform: Untransformed					1-Tailed		
Conc-SP	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Lab Control	0.8700	1.0000	0.8700	0.7500	0.9000	7.711	5			
4A	0.9100	1.0460	0.9100	0.8500	1.0000	7.164	5	-0.746	2.230	0.1196
4B	0.8300	0.9540	0.8300	0.6500	1.0000	16.276	5	0.746	2.230	0.1196
9	0.9100	1.0460	0.9100	0.8500	0.9500	4.597	5	-0.746	2.230	0.1196

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95484		0.868		-0.3018	0.94273
Bartlett's Test indicates equal variances (p = 0.15)	5.34193		11.3449			
Hypothesis Test (1-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test indicates no significant differences	0.11957	0.13744	0.00733	0.00719	0.40973	3, 16

Dose-Response Plot



ToxCalc v5.0

Reviewed by: 3/4/00

Midge Fly Larvae Bioassay-Growth

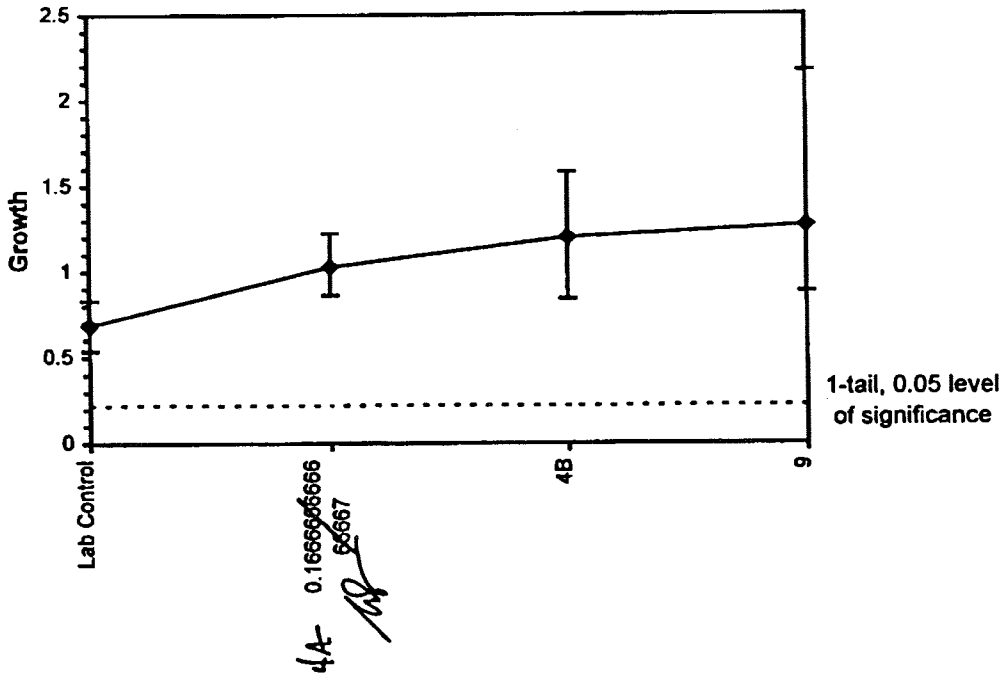
Start Date:	03/03/2000	Test ID:	0003-028	Sample ID:	THERMO RET
End Date:	03/13/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	SEDF-Freshwater Sediment
Sample Date:		Protocol:	ASTM 93	Test Species:	CT-Chironomus tentans
Comments:					

Conc-SP	1	2	3	4	5
Lab Control	0.8333	0.8106	0.5378	0.6139	0.6300
4A	1.0967	1.2300	0.8659	0.8948	1.0810
4B	0.8385	1.0853	1.5200	1.5785	0.9667
9	1.2211	0.9216	0.8776	1.1439	2.1633

			Transform: Untransformed					1-Tailed		
Conc-SP	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Lab Control	0.6851	1.0000	0.6851	0.5378	0.8333	18.964	5			
4A	1.0337	1.5088	1.0337	0.8659	1.2300	14.687	5	-1.693	2.230	0.4591
4B	1.1978	1.7483	1.1978	0.8385	1.5785	27.812	5	-2.490	2.230	0.4591
9	1.2655	1.8471	1.2655	0.8776	2.1633	41.280	5	-2.819	2.230	0.4591

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.89458		0.868		1.43364	3.19448
Bartlett's Test indicates equal variances (p = 0.04)	8.58454		11.3449			
Hypothesis Test (1-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test indicates no significant differences	0.45908	0.67007	0.33602	0.10595	0.05299	3, 16

Dose-Response Plot



Reviewed by

Midge Fly Larvae Bioassay-96 Hr Survival

Start Date:	03/03/2000	Test ID:	000303CTRA	Sample ID:	REF-Ref Toxicant
End Date:	03/07/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	CUCL-Copper chloride
Sample Date:		Protocol:	EPAA 91-EPA Acute	Test Species:	CT-Chironomus tentens
Comments:					

Conc-mg/L	1	2	3	4
Lab Control	0.6000	0.8000	0.9000	0.5000
0.187	0.8000	0.8000	0.4000	0.7000
0.375	0.2000	0.3000	0.3000	0.1000
0.75	0.1000	0.0000	0.1000	0.0000
1.5	0.2000	0.0000	0.0000	0.1000
3	0.1000	0.0000	0.0000	0.0000

			Transform: Arcsin Square Root						1-Tailed		Number	Total
Conc-mg/L	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Resp	Number
Lab Control	0.7000	1.0000	1.0069	0.7854	1.2490	20.859	4				12	40
0.187	0.6750	0.9643	0.9725	0.6847	1.1071	20.515	4	0.323	2.410	0.2566	13	40
*0.375	0.2250	0.3214	0.4862	0.3218	0.5796	25.196	4	4.891	2.410	0.2566	31	40
*0.75	0.0500	0.0714	0.2403	0.1588	0.3218	39.161	4	7.201	2.410	0.2566	38	40
*1.5	0.0750	0.1071	0.2757	0.1588	0.4636	53.294	4	6.868	2.410	0.2566	37	40
*3	0.0250	0.0357	0.1995	0.1588	0.3218	40.840	4	7.584	2.410	0.2566	39	40

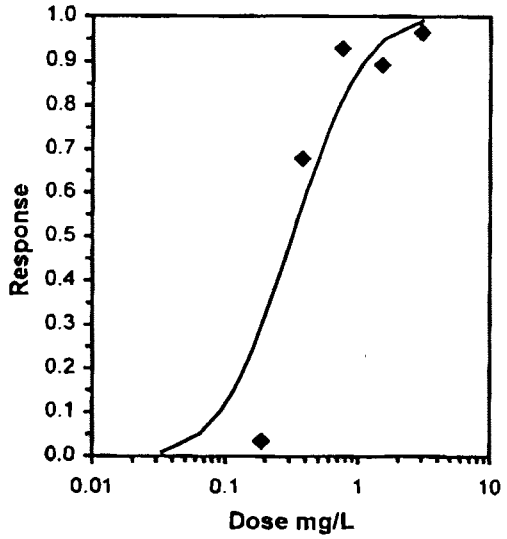
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97437	0.884	-0.2822	-0.4579
Bartlett's Test indicates equal variances (p = 0.59)	3.71945	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	0.187	0.375	0.26481		0.24938	0.3491	0.54642	0.02267	2.2E-07	5, 18

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	2.3742	0.91641	-0.5422	5.29061	0.3	10.8961	7.81472	0.01	-0.4993	0.42119	3
Intercept	6.18553	0.43016	4.81656	7.5545							
TSCR	0.26164	0.13663	-0.1732	0.69646							

Point	Probits	mg/L	95% Fiducial Limits
EC01	2.674	0.03318	
EC05	3.355	0.06425	
EC10	3.718	0.09139	
EC15	3.964	0.11591	
EC20	4.158	0.14001	
EC25	4.326	0.16465	
EC40	4.747	0.24771	
EC50	5.000	0.31671	
EC60	5.253	0.40492	
EC75	5.674	0.60919	
EC80	5.842	0.71639	
EC85	6.036	0.86537	
EC90	6.282	1.0976	
EC95	6.645	1.56122	
EC99	7.326	3.02348	



FACSIMILE TRANSMITTAL

OGDEN ENVIRONMENTAL BIOASSAY LABORATORY

5550 MOREHOUSE DRIVE, SUITE B
SAN DIEGO, CA 92121

PHONE: (858) 458-9044
FAX: (858) 587-3961

• WE HAVE 5 PAGES TO SEND, INCLUDING THIS PAGE •

DATE:	28 MARCH 2000
TO:	MARK LARSEN
LOCATION:	THERMORETEC
FAX NO.:	206-624-2839
FROM:	MARILYN SCHWARTZ

Hi Mark,

Here are the stats to go with the emails.

Thanks,

Marilyn.

MARILYN SCHWARTZ
MANAGER, OGDEN BIOASSAY LABS

PHONE: (858) 458-9044 X300
FAX: (858) 587-3961
PAGER: (619) 979-8870
E-MAIL: MJSCHWARTZ@OEES.COM

ThermoRetec Interim Data Summary - for analyses conducted 3/17/00 through 3/27/00

Hyalella azteca
10-day Survival Assay

Site	Replicate	Random Number	Number Survived	Percent Survival	Mean Survival (%)
Control	A	14	19	95	
	B	11	18	90	
	C	12	18	90	
	D	15	18	90	
	E	1	18	90	91.0
Site 4C	A	4	18	90	
	B	10	18	90	
	C	13	19	95	
	D	6	18	90	
	E	7	17	85	90.0
Site 9*	A	8	16	80	
	B	2	12	60	
	C	3	12	60	
	D	9	17	85	
	E	5	18	90	75.0

*Site 9 is statistically significantly different from control; please see statistical summaries.

Chironomus tentans
10-day Survival and Growth Assay

Site	Replicate	Random Number	Number Survived	Percent Survival	Mean Survival (%)	Total Wgt (g)	Tare Wgt (g)	Net Wgt (mg)	Weight per Org. (mg)	Mean Wgt per Org (mg)
Control	A	11	17	85		0.03629	0.02419	12.1	0.71	
Control	B	9	19	95		0.04665	0.02389	22.76	1.20	
Control	C	4	18	90		0.04496	0.02412	20.84	1.16	
Control	D	10	20	100		0.05879	0.02585	32.94	1.65	
Control	E	5	18	90	92	0.04572	0.02416	21.56	1.20	1.18
Site 4C	A	1	18	90		0.06066	0.02396	36.7	2.04	
Site 4C	B	6	16	80		0.05999	0.02598	34.01	2.13	
Site 4C	C	12	18	90		0.05928	0.02983	29.45	1.64	
Site 4C	D	2	20	100		0.05774	0.02698	30.76	1.54	
Site 4C	E	7	19	95	91	0.0519	0.02498	26.92	1.42	1.75
Site 9	A	8	14	70		0.03635	0.02498	11.37	0.81	
Site 9	B	13	18	90		0.07257	0.03039	42.18	2.34	
Site 9	C	15	20	100		0.05621	0.02909	27.12	1.36	
Site 9	D	14	17	85		0.0593	0.03103	28.27	1.66	
Site 9	E	3	13	65	82	0.0327	0.02608	6.62	0.51	1.34

No statistical differences were observed between the control and either site for either surival or growth; please see statistical summaric sheets for details.

Midge Fly Larvae Bioassay-Survival

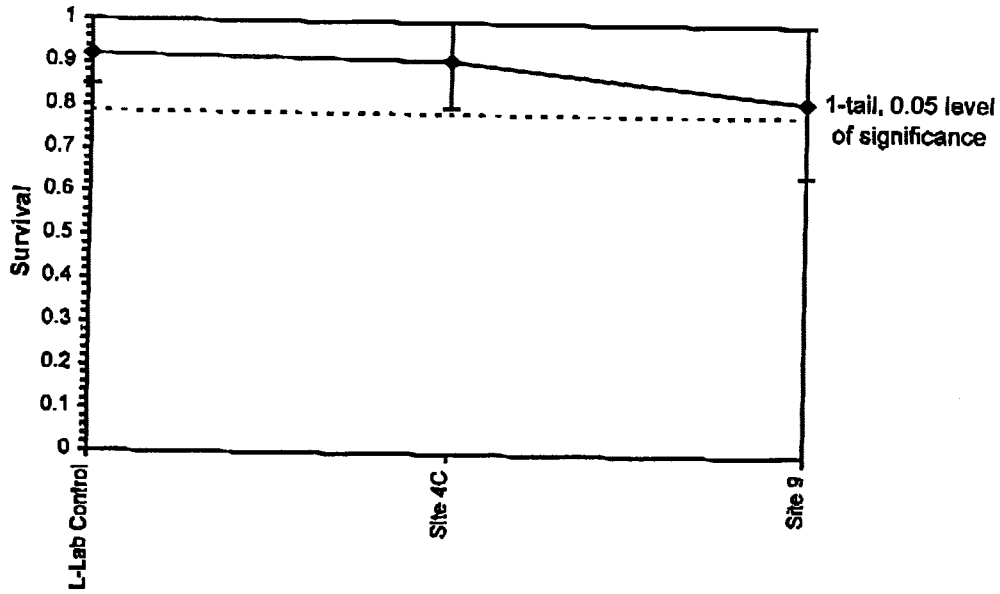
Start Date:	03/17/2000	Test ID:	0003-097	Sample ID:	THERMO RET
End Date:	03/27/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	SEDF-Freshwater Sediment
Sample Date:		Protocol:	ASTM 93	Test Species:	CT-Chironomus tentans
Comments:					

Conc-SP	1	2	3	4	5
L-Lab Control	0.8500	0.9500	0.9000	1.0000	0.9000
Site 4C	0.9000	0.8000	0.9000	1.0000	0.9500
Site 9	0.7000	0.9000	1.0000	0.8500	0.6500

			Transform: Untransformed					1-Tailed		
Conc-SP	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
L-Lab Control	0.9200	1.0000	0.9200	0.8500	1.0000	6.197	5			
Site 4C	0.9100	0.9891	0.9100	0.8000	1.0000	8.150	5	0.159	2.110	0.1323
Site 9	0.8200	0.8913	0.8200	0.6500	1.0000	17.567	5	1.594	2.110	0.1323

Auxiliary Tests	Statistic		Critical		Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97679		0.835		-0.0671	-0.0339
Bartlett's Test indicates equal variances (p = 0.18)	3.38898		9.21035			
Hypothesis Test (1-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test indicates no significant differences	0.13233	0.14384	0.01517	0.00983	0.25343	2, 12

Dose-Response Plot



ToxCalc v5.0

Reviewed by 3/28/00

Midge Fly Larvae Bioassay-Growth

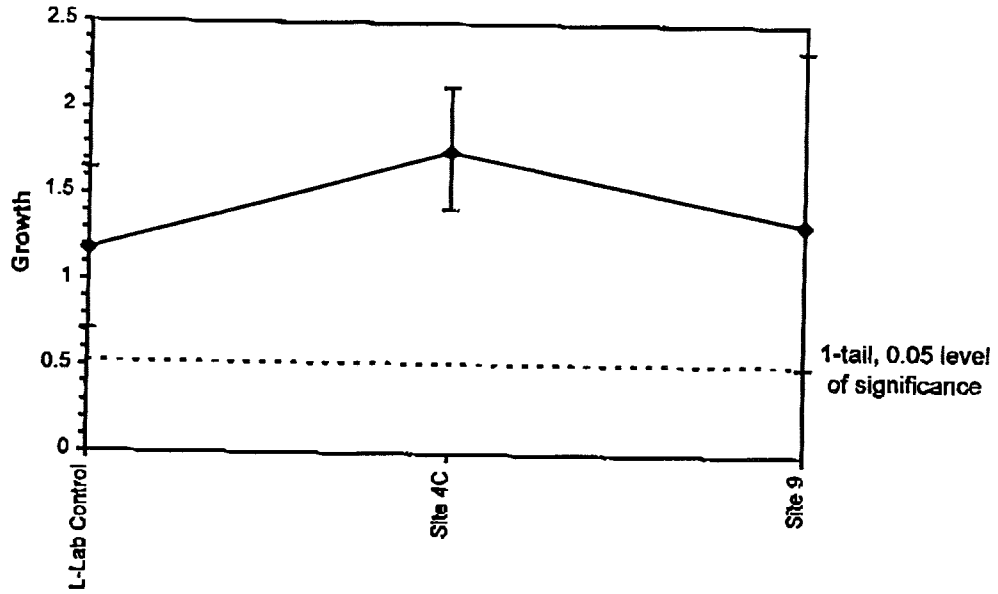
Start Date:	03/17/2000	Test ID:	0003-097	Sample ID:	THERMO RET
End Date:	03/27/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	SEDF-Freshwater Sediment
Sample Date:		Protocol:	ASTM 93	Test Species:	CT-Chironomus tentans
Comments:					

Conc-SP	1	2	3	4	5
L-Lab Control	0.7118	1.1979	1.1578	1.6470	1.1978
Site 4C	2.0389	2.1256	1.6361	1.5380	1.4168
Site 9	0.8121	2.3433	1.3560	1.6629	0.5092

			Transform: Untransformed						1-Tailed	
Conc-SP	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
L-Lab Control	1.1824	1.0000	1.1824	0.7118	1.6470	27.999	5			
Site 4C	1.7511	1.4809	1.7511	1.4168	2.1256	17.910	5	-1.825	2.110	0.6574
Site 9	1.3367	1.1305	1.3367	0.5092	2.3433	53.946	5	-0.495	2.110	0.6574

Auxiliary Tests	Statistic	Critical			Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97831	0.835			0.31929	0.59875
Bartlett's Test indicates equal variances (p = 0.19)	3.3679	9.21035				
Hypothesis Test (1-tail, 0.05)	**MSDu**	**MSDp**	**MSB**	**MSE**	**F-Prob**	**df**
Dunnett's Test indicates no significant differences	0.65737	0.55594	0.43239	0.24266	0.21008	2, 12

Dose-Response Plot



ToxCalc v5.0

Reviewed by 3/28/00

Amphipod Survival Bioassay-Proportion Alive

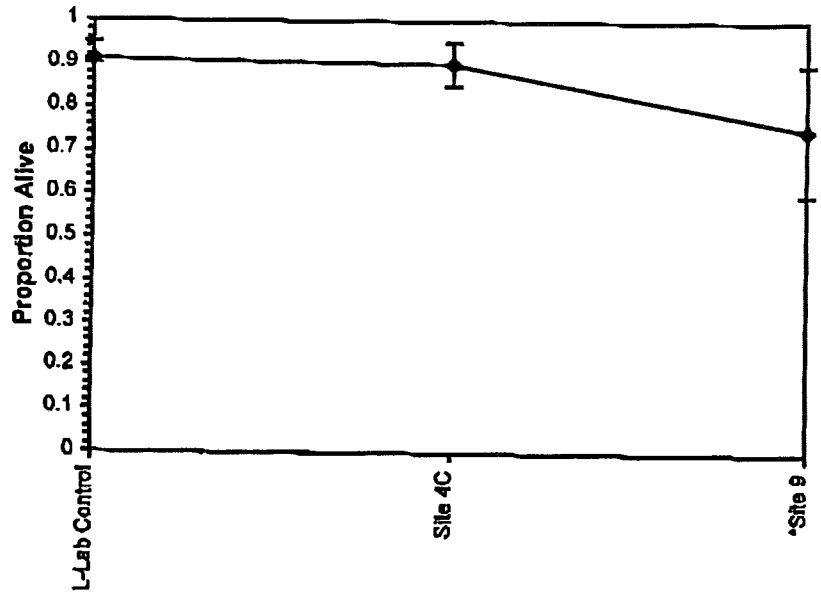
Start Date:	03/17/2000	Test ID:	0003-095	Sample ID:	THERMO RET
End Date:	03/27/2000	Lab ID:	CAOEE-Ogden Bioassay	Sample Type:	SEDF-Freshwater Sediment
Sample Date:		Protocol:	ASTM 93	Test Species:	HA-Hyalella azteca
Comments:					

Conc-SP	1	2	3	4	5
L-Lab Control	0.9500	0.9000	0.9000	0.9000	0.9000
Site 4C	0.9000	0.9000	0.9500	0.9000	0.8500
Site 9	0.8000	0.6000	0.6000	0.8500	0.9000

			Transform: Untransformed					Rank	1-Tailed
Conc-SP	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
L-Lab Control	0.9100	1.0000	0.9100	0.9000	0.9500	2.457	5		
Site 4C	0.9000	0.9890	0.9000	0.8500	0.9500	3.928	5	25.50	16.00
*Site 9	0.7500	0.8242	0.7500	0.6000	0.9000	18.856	5	17.00	16.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.91048	0.835	-0.3684	0.89786
Bartlett's Test indicates unequal variances (p = 2.13E-03)	12.3022	9.21035		
Hypothesis Test (1-tail, 0.05)				
Steel's Many-One Rank Test indicates significant differences				

Dose-Response Plot



ToxCalc v5.0

Reviewed by: 3/28/00

ATTACHMENT C
ABC LABS BIOASSAY REPORTS
FOR CHRONIC BIOASSAY

LABORATORIES ®
Analytical Bio-Chemistry Laboratories, Inc.

March 29, 2000

FAX NO.: 206-624-2839 Page 1 of 2

TO: ThermoRetec
ATTN.: Mark Larsen

From: Ryan Warbritton
ABC Laboratories, Inc. Fax No.: 573-443-9089

Subject: DAY 20 MIDGE RESULTS

Mark,

The following is an updated table for the dry weight data. One of the tare weights on sample JB-4A was off so it was re-weighed and this number utilized in the dry weight calculations and statistics. I will let you know the statistical analysis results when they are available. The numbers that were changed are highlighted. I will use the reference site (JB-9A) for all statistical comparisons.

Thank you for your patience.

Best Regards,

Ryan Warbritton
Manager/Scientist
Environmental Fate and Effects

DAY 20 *C. tentans* GROWTH DATA (grams)

ABC CONTROL			JB-4A		JB-4B		JB-4C		JB-9A	
Rep	No.	Mean Weight per Organism Per Rep	No.	Mean Weight per Organism Per Rep	No.	Mean Weight per Organism Per Rep	No.	Mean Weight per Organism Per Rep	No.	Mean Weight per Organism Per Rep
1	0	-	5	0.0009	11	0.0018	3	0.0002	8	0.0019
2	1	0.0002	12	0.0009	7	0.0054	4	0.0012	9	0.0026
3	12	0.0019	12	0.0009	11	0.0011	10	0.0015	11	0.0020
4	2	0.0014	12	0.0012	10	0.0019	9	0.0018	8	0.0031
5	12	0.0023	12	0.0012	11	0.0021	10	0.0012	8	0.0026
6	11	0.0022	12	0.0006	12	0.0016	10	0.0009	11	0.0024
7	0	-	11	0.0001	12	0.0014	11	0.0026	10	0.0018
8	1	0.0017	12	* 0.0007 *	10	0.0006	6	0.0021	8	0.0031
TOTALS NUMBER SURVIVING PER SAMPLE AND MEAN WEIGHT PER ORGANISM PER SAMPLE (grams)										
39		0.0020	88	* 0.0008 *	84	0.0018	63	0.0016 *	73	0.0024

ATTACHMENT D
ARI LABORATORY REPORTS FOR AMMONIA AND SULFIDE ANALYSES

Analytical Resources, Incorporated
Analytical Chemists and Consultants

15 March 2000

Mark Larsen
ThermoRetec, Inc
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134

RE: Client Project: JAGCO-02438-840; Baxter
ARI Project: BI66

Dear Mark:

Please find enclosed the original Chain of Custody (COC) record and the final results for the samples from the project referenced above. Four sediment samples were received in good condition on February 29, 2000. The samples were received intact and there were no discrepancies in the paperwork. The samples were analyzed for sulfide and ammonia as requested.

These analyses proceeded without incident of note.

A copy of these reports will be kept on file with ARI. Should you have any questions or problems please feel free to call me at any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/340-2866, ext. 113
e-mail <mark@arilabs.com>

Enclosures

cc: file BI66

MDH/kg

9303

5.0 **CHAIN OF CUSTODY RECORD**

PROJ. NO.	PROJECT NAME
SAGCO-02438-845	BAXTER

SAMPLERS: Jim Henley / Damon Morris

RECEIVING LABORATORY: ARI

SEND RESULTS TO: MARK LARSON

B166 002505 00-2500

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	MATRIX	NO. OF CONTAINERS	SULFIDE	AMMONIA						REMARKS
	2/28	1400	JB-9A	SEDIMENT	4	X	X						
	2/29	1600	JB-4A	SEDIMENT	2	X	X						
	2/28	1800	JB-PL	SEDIMENT	2	X	X						
	2/28	1850	JB-4B	SEDIMENT	2	X	X						

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Damon Morris	2/29/00 1755				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
			2/29/00 1745

Shipper Information

REMEDIATION TECHNOLOGIES INC

REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

ANALYTICAL RESOURCES INCORPORATED

QA Report - Method Blank Analysis

QC Report No: BI66-ThermoRetec
Matrix: Sediment
Project: Baxter
JAGCO-02438-840
Date Received: NA

Data Release Authorized: MB
Reported: 03/14/00 Dr. M.A. Perkins

METHOD BLANK RESULTS
CONVENTIONALS

Analysis Date & Batch	Constituent	Units	Result
Method Blank 03/01/00 03010#1	Total Solids	mg residue	< 1.00 U
Method Blank 03/06/00 03060#1	N-Ammonia	mg-N/L	< 0.020 U
Method Blank 03/06/00 03060#1	Sulfide	mg/L	< 0.05 U

ANALYTICAL RESOURCES INCORPORATED

Final Report
Laboratory Analysis of Conventional Parameters

Sample No: JB-9A

Lab Sample ID: BI66A
LIMS ID: 00-2585
Matrix: Sediment

QC Report No: BI66-ThermoRetec
Project: Baxter
JAGCO-02438-840
Date Sampled: 02/28/00
Date Received: 03/01/00

Data Release Authorized: MP
Reported: 03/14/00 Dr. M.A. Perkins

Analyte	Analysis Date/Batch	Method	Dilution Factor	RL	Units	Result
Total Solids	03/01/00 03010#1	EPA 160.3 SM 2540 B		0.01	Percent	72.0
Preserved Total Solids	03/01/00 03010#1	EPA 160.3 SM 2540 B		0.01	Percent	71.4
N-Ammonia	03/06/00 03060#1	EPA 350.1 4500 NH3 H		0.27	mg-N/kg	7.2
Sulfide	03/06/00 03060#1	EPA 376.2 SM4500S2-D		1.1	mg/kg	16

Ammonia determined on 2N KCl extracts.

RL Analytical reporting limit
U Undetected at reported detection limit
B Analyte found in method blank above detection

Report for BI66 received 03/01/00

ANALYTICAL RESOURCES INCORPORATED

Final Report
Laboratory Analysis of Conventional Parameters

Sample No: JB-4A

Lab Sample ID: BI66B
LIMS ID: 00-2586
Matrix: Sediment

QC Report No: BI66-ThermoRetec
Project: Baxter
JAGCO-02438-840
Date Sampled: 02/28/00
Date Received: 03/01/00

Data Release Authorized: MP
Reported: 03/14/00 Dr. M.A. Perkins

Analyte	Analysis Date/Batch	Method	Dilution Factor	RL	Units	Result
Total Solids	03/01/00 03010#1	EPA 160.3 SM 2540 B		0.01	Percent	21.2
Preserved Total Solids	03/01/00 03010#1	EPA 160.3 SM 2540 B		0.01	Percent	22.0
N-Ammonia	03/06/00 03060#1	EPA 350.1 4500 NH3 H		0.92	mg-N/kg	46
Sulfide	03/06/00 03060#1	EPA 376.2 SM4500S2-D	5.0	22	mg/kg	220

Ammonia determined on 2N KCl extracts.

RL Analytical reporting limit
U Undetected at reported detection limit
B Analyte found in method blank above detection

Report for BI66 received 03/01/00

ANALYTICAL RESOURCES INCORPORATED

Final Report
Laboratory Analysis of Conventional Parameters

Sample No: JB-PL

Lab Sample ID: BI66C
LIMS ID: 00-2587
Matrix: Sediment

Data Release Authorized: MP
Reported: 03/14/00 Dr. M.A. Perkins

QC Report No: BI66-ThermoRetec
Project: Baxter
JAGCO-02438-840
Date Sampled: 02/28/00
Date Received: 03/01/00

Analyte	Analysis Date/Batch	Method	Dilution Factor	RL	Units	Result
Total Solids	03/01/00 03010#1	EPA 160.3 SM 2540 B		0.01	Percent	19.4
Preserved Total Solids	03/01/00 03010#1	EPA 160.3 SM 2540 B		0.01	Percent	20.8
N-Ammonia	03/06/00 03060#1	EPA 350.1 4500 NH3 H		0.99	mg-N/kg	36
Sulfide	03/06/00 03060#1	EPA 376.2 SM4500S2-D	5.0	24	mg/kg	290

Ammonia determined on 2N KCl extracts.

RL Analytical reporting limit
U Undetected at reported detection limit
B Analyte found in method blank above detection

Report for BI66 received 03/01/00

ANALYTICAL RESOURCES INCORPORATED

Final Report
Laboratory Analysis of Conventional Parameters

Sample No: JB-4B

Lab Sample ID: BI66D
LIMS ID: 00-2588
Matrix: Sediment

QC Report No: BI66-ThermoRetec
Project: Baxter
JAGCO-02438-840
Date Sampled: 02/28/00
Date Received: 03/01/00

Data Release Authorized:
Reported: 03/14/00 Dr. M.A. Perkins

Analyte	Analysis Date/Batch	Method	Dilution Factor	RL	Units	Result
Total Solids	03/01/00 03010#1	EPA 160.3 SM 2540 B		0.01	Percent	21.1
Preserved Total Solids	03/01/00 03010#1	EPA 160.3 SM 2540 B		0.01	Percent	22.3
N-Ammonia	03/06/00 03060#1	EPA 350.1 4500 NH3 H		0.92	mg-N/kg	38
Sulfide	03/06/00 03060#1	EPA 376.2 SM4500S2-D	5.0	21	mg/kg	200

Ammonia determined on 2N KCl extracts.

RL Analytical reporting limit
U Undetected at reported detection limit
B Analyte found in method blank above detection

Report for BI66 received 03/01/00

ANALYTICAL RESOURCES INCORPORATED

QA Report - Replicate Analysis

QC Report No: BI66-ThermoRetec
Matrix: Sediment Project: Baxter
JAGCO-02438-840
Date Received: 03/01/00

Data Release Authorized: MC
Reported: 03/14/00 Dr. M.A. Perkins

REPLICATE ANALYSIS RESULTS
CONVENTIONALS

Constituent	Units	Sample Value	Replicate Value(s)	RPD/RSD
ARI ID: 00-2585, BI66 A	**Client Sample ID: JB-9A**			
Total Solids	Percent	72.0	72.3 72.1	RSD: 0.2%
Preserved Total Solids	Percent	71.4	71.3 71.5	RSD: 0.1%
N-Ammonia	mg-N/kg	7.2	6.5 6.9	RSD: 5.1%
Sulfide	mg/kg	16	16 18	RSD: 6.9%

ANALYTICAL RESOURCES INCORPORATED

QA Report - Matrix Spike/Matrix Spike Duplicate Analysis

QC Report No: BI66-ThermoRetec
Matrix: Sediment Project: Baxter
JAGCO-02438-840
Date Received: 03/01/00

Data Release Authorized: MP
Reported: 03/14/00 Dr. M.A. Perkins

MATRIX SPIKE QA/QC REPORT
CONVENTIONALS

Constituent	Units	Sample Value	Spike Value	Spike Added	Recovery
ARI ID: 00-2585, BI66 A Client Sample ID: JB-9A					
N-Ammonia	mg-N/kg	7.21	128	138	87.8%
Sulfide	mg/kg	15.5	170	187	82.8%

MS/MSD Recovery Limits: 75 - 125 %

ANALYTICAL RESOURCES INCORPORATED

QA Report - Laboratory Control Samples

QC Report No: BI66-ThermoRetec
Project: Baxter
JAGCO-02438-840
Date Received: NA

Data Release Authorized: MC
Reported: 03/14/00 Dr. M.A. Perkins

LABORATORY CONTROL SAMPLES
CONVENTIONALS

Constituent	Units	Measured Value	True Value	Recovery
Laboratory Control Sample				
N-Ammonia	mg-N/L	9.70	10.0	97.0%
Date analyzed: 03/06/00 Batch ID: 03060#1				
Laboratory Control Sample				
Sulfide	mg/L	6.36	7.25	87.7%
Date analyzed: 03/06/00 Batch ID: 03060#1				

Analytical Resources, Incorporated
Analytical Chemists and Consultants

16 March 2000

Mark Larsen
ThermoRetec, Inc.
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134

RE: Client Project: JAGCO-02438-840; Baxter
ARI Project: BJ04

Dear Mark:

Please find enclosed the original chain of custody record and the final results for the sample from the project referenced above. One sediment sample was received in good condition on March 2, 2000. The sample was analyzed ammonia and sulfide as requested.

There were no complications with these analyses.

A copy of these reports and all associated raw data will be kept on file at ARI. Should you have any questions or problems regarding these results, please feel free to call me at any time.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/340-2866, ext. 113
<mark@arilabs.com>

Enclosures

cc: file BJ04

MDH/kg

9276

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
JAGCO-02438-840	BAXTER

SAMPLERS: DAMON MORRIS / JIM HOWLEY

RECEIVING LABORATORY: ARI

SEND RESULTS TO: MARK LARSEN

Cold
00-2760
BJ04

LAB I.D. NO.	DATE	TIME	SAMPLE NO.	MATRIX	NO. OF CONTAINERS	AMENABLE SULFIDE							REMARKS
	3/2/00	1422	JB-4C	SEDIMENT	2	X	X						Sulfide preserved w ZnOAc

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Damon Morris	3/2/00 1620				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
		Anne Lee	3/2/00 1620

Shipper Information

REMEDIATION TECHNOLOGIES INC

REMEDIATION TECHNOLOGIES
1011 S.W. Klickitat Way
Suite 207
Seattle, WA 98134
(206) 624-9349

ANALYTICAL RESOURCES INCORPORATED

QA Report - Method Blank Analysis

QC Report No: BJ04-ThermoRetec
Matrix: Sediment
Project: Baxter
JAGCO-02438-840
Date Received: NA

Data Release Authorized: MP
Reported: 03/15/00 Dr. M.A. Perkins

METHOD BLANK RESULTS
CONVENTIONALS

Analysis Date & Batch	Constituent	Units	Result
Method Blank 03/02/00 03020#1	Total Solids	mg residue	< 1.00 U
Method Blank 03/06/00 03060#1	N-Ammonia	mg-N/L	< 0.020 U
Method Blank 03/06/00 03060#1	Sulfide	mg/L	< 0.05 U

ANALYTICAL RESOURCES INCORPORATED

Final Report
Laboratory Analysis of Conventional Parameters

Sample No: JB-4C

Lab Sample ID: BJ04A
LIMS ID: 00-2760
Matrix: Sediment

QC Report No: BJ04-ThermoRetec
Project: Baxter
JAGCO-02438-840
Date Sampled: 03/02/00
Date Received: 03/02/00

Data Release Authorized: MP
Reported: 03/15/00 Dr. M.A. Perkins

Analyte	Analysis Date/Batch	Method	Dilution Factor	RL	Units	Result
Total Solids	03/02/00 03020#1	EPA 160.3 SM 2540 B		0.01	Percent	16.4
Preserved Total Solids	03/02/00 03020#1	EPA 160.3 SM 2540 B		0.01	Percent	16.1
N-Ammonia	03/06/00 03060#1	EPA 350.1 4500 NH3 H		1.2	mg-N/kg	32
Sulfide	03/06/00 03060#1	EPA 376.2 SM4500S2-D	10	58	mg/kg	490

Ammonia determined on 2N KCl extracts.

RL Analytical reporting limit
U Undetected at reported detection limit
B Analyte found in method blank above detection

Report for BJ04 received 03/02/00

ANALYTICAL RESOURCES INCORPORATED

QA Report - Replicate Analysis

QC Report No: BJ04-ThermoRetec
Matrix: Sediment Project: Baxter
JAGCO-02438-840
Date Received: 03/02/00

Data Release Authorized:
Reported: 03/15/00 Dr. M.A. Perkins

REPLICATE ANALYSIS RESULTS
CONVENTIONALS

Constituent	Units	Sample Value	Replicate Value(s)	RPD/RSD
ARI ID: 00-2760, BJ04 A Client Sample ID: JB-4C				
Total Solids	Percent	16.4	16.6 16.5	RSD: 0.6%
Preserved Total Solids	Percent	16.1	16.0 16.1	RSD: 0.4%

ANALYTICAL RESOURCES INCORPORATED

QA Report - Laboratory Control Samples

QC Report No: BJ04-ThermoRetec
Project: Baxter
JAGCO-02438-840
Date Received: NA

Data Release Authorized:
Reported: 03/15/00 Dr. M.A. Perkins

LABORATORY CONTROL SAMPLES
CONVENTIONALS

Constituent	Units	Measured Value	True Value	Recovery
Laboratory Control Sample				
N-Ammonia	mg-N/L	9.70	10.0	97.0%
Date analyzed: 03/06/00 Batch ID: 03060#1				
Laboratory Control Sample				
Sulfide	mg/L	6.36	7.25	87.7%
Date analyzed: 03/06/00 Batch ID: 03060#1				