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An Evaluation of the Toxicity of Los Alamos National Laboratory Sediments to the Larval Insect *Chironomus tentans*

Samples collected June 30, 2005

Prepared For

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1. INTRODUCTION

The Los Alamos National Laboratory (LANL) contracted Pacific EcoRisk (PER) to perform toxicity evaluations of ambient sediment samples collected from watersheds that may have received surface water runoff or groundwater from historical LANL operations. These toxicity evaluations consisted of performing the US EPA 10-day survival and growth sediment toxicity test with the larval insect *Chironomus tentans*. These tests were conducted for 8 sediment samples that were collected on June 30, 2005. In order to assess the sensitivity of the test organisms to toxic stress, reference toxicant testing was also performed. This report describes the performance and results of these tests.

2. TEST PROCEDURES

The methods used in conducting these tests followed the US EPA guidelines, "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates" (EPA/600/R-99/064).

2.1 Receipt and Handling of the Sediment Samples

On June 30, 2005, LANL staff collected grab samples of ~4-L of sediment from each of 8 sites (Table 1) into appropriately-cleaned sample containers. These samples were stored "on ice" until being shipped, via overnight delivery and under chain-of-custody, to the PER testing laboratory in Martinez, CA. The sediment samples were stored at 4°C. The chain-of-custody records for the collection and delivery of these samples are provided in Appendix A.

2.2 Test Organisms

Second-to-third instar *Chironomus tentans* larvae were obtained from a commercial supplier (EC&T, Superior, WI). These larvae were maintained in EPA synthetic moderately hard water at 23°C, and were fed YCT and *Selenastrum capricornutum*, as per EPA guidelines. Immediately prior to the start of the tests, healthy third-instar larvae were collected from these cultures.

2.3 Sediment Toxicity Testing with *Chironomus tentans*

The freshwater sediment toxicity test with *Chironomus tentans* consists of exposing the larval insects to the sediment for 10 days, after which effects on survival and growth are evaluated. The specific procedures used in this test are described below.

Each of the site sediments was tested at the 100% concentration only. The primary Control treatment sediment consisted of the same reference soil that is used as the routine control sediment by the National Biological Survey (Columbia, MO) in their freshwater sediment toxicity tests; this soil has been continuously incubated in a tank of freshwater at 23°C for several months. There were 8 replicates for each test treatment. Each replicate container consisted of a 300 mL tall-form glass beaker with a 3 cm ribbon of 540 μm mesh NITEX attached to the top of the beaker with silicone sealant. Each of the sediment samples was homogenized immediately prior to introduction of the sediments into the test replicates. Approximately 100 mL of sediment was loaded into each of the test replicate containers. Each of the test replicates was then carefully filled with overlying water, consisting of EPA synthetic moderately-hard water, modified for use with *Chironomus* as per the EPA test guidelines. The replicates with sediments and clean overlying water were established in

temperature-controlled water baths at 23°C under cool-white fluorescent lighting on a 16:8 L:D photoperiod ~24 hrs prior to the introduction of the larval insects.

After this initial ~24 hr period, the overlying water in each replicate was flushed with 2 volumes of the overlying water using a modified Zumwalt delivery system (Zumwalt et al. 1994). A small aliquot of the renewed overlying water in each of the 8 replicates per treatment was then collected and composited for measurement of "initial" water quality characteristics (pH, D.O., conductivity, alkalinity, hardness, and total ammonia). Then 10 third-instar *Chironomus* were randomly allocated into each replicate, followed by the addition of 1.0 mL of YCT food. The test replicates were then returned to the water baths.

Each day, for the following 9 days, the test replicates were pulled from the water bath, and each replicate was examined for the presence of any dead *Chironomus* or the presence of pupal exuvia. A small aliquot of the overlying water in each of the 8 replicates was then collected and composited as before for measurement of "old" D.O., after which each replicate was flushed with 2 volumes of fresh overlying water. Another small aliquot of the overlying water in each of the 8 replicates was then collected and composited as before for measurement of "new" D.O., after which each replicate was fed 1.0 mL of YCT, and then replaced within the water bath.

After 10 days exposure, each replicate container was examined for the presence of pupal exuvia. Then, an aliquot of overlying water was collected from each replicate and composited for analysis of the test treatment "final" water quality characteristics. The sediments in each replicate container were then carefully washed out and sieved using a #40 (425 μm mesh) stainless steel sieve, and the number of surviving *Chironomus* determined; animals were identified as either larvae, pupae, or adult (each pupal exuvia was counted as a surviving adult). The surviving larval *Chironomus* from each replicate were then rinsed with de-ionized water, and transferred to a pre-dried and pre-tared weighing pan. These were then dried at 100°C for 24 hrs and re-weighed to determine the mean "dry" weight per individual *Chironomus*. Each replicate pan was then placed into a muffle furnace and ashed at 550°C for 2 hrs, after which the pans were placed within a desiccator. After the pans had cooled, they were each re-weighed to determine the mean ash-free dry wt (= mean final "dry" weight minus the mean "ashed" weight, divided by the number of organisms in the pan). The data for each sediment treatment were analyzed and compared to the Lab Control treatment to determine whether or not any statistically significant reductions in survival and/or growth were observed. All statistical analyses were performed using the CETIS® statistical software (Version 1.1.1revE, TidePool Scientific, McKinleyville, CA).

2.3.1 Reference Toxicant Testing of the *Chironomus tentans*

In order to assess the sensitivity of the test organisms to toxic stress, reference toxicant testing was performed. The reference toxicant test consists of an acute 48 hour static toxicity test with copper (as $CuSO_4$), at concentrations of 0, 200, 400, 800, 1600, and 3200 μg/L. There were 2 replicates at each treatment, each replicate consisting of 400 mL of test media in a 600 mL glass beaker. The test was initiated by randomly allocating 10 chironomids into each of the replicate beakers. The beakers were placed in a temperature-controlled water bath at 23°C under continual darkness.

The resulting test response data were statistically analyzed to determine key dose-response point estimates (e.g., EC_{50}); all statistical analyses were made using the CETIS® software. These response endpoints were then compared to the typical response range established by the mean ± 2 SD of the point estimates generated by the 20 most recent previous reference toxicant tests performed by this lab.

3. RESULTS

3.1 Effects of Los Alamos National Laboratory Sediment Samples on *Chironomus tentans*

The survival and growth results of this test are summarized below in Table 1. These test results indicate that none of the Los Alamos sediment samples resulted in any significant reductions in larval insect survival (relative to the Control) in the following site sediments; however, with the exception of sediment sample CAMO-05-61175, there were significant reductions in the mean ash-free dry weights in each of the site sediments.

The test data & summary of statistical analyses for this test are presented in Appendix B.

Table 1. Effects of Los Alamos sediment samples on *Chironomus tentans* survival and growth

Sample ID	Mean % Survival	Mean Growth (mg, ash-free dry wt)
Lab Control	76.2	0.77
CAMO-05-61165*	77.5	**0.64***
CAMO-05-61169	91.2	**0.64***
CAMO-05-61171*	87.5	**0.64***
CAMO-05-61173*	81.2	**0.52***
CAMO-05-61175*	76.7	0.81
CAMO-05-61177*	81.2	**0.63***
CAMO-05-61179*	85	**0.65***
CAMO-05-61181*	73.8	**0.46***

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

3.1.1 Reference Toxicant Toxicity to *Chironomus tentans*

The results of the reference toxicant evaluation of the *Chironomus* used in these tests are presented in Table 2. There was 87% survival at the Lab Control treatment. The EC_{50} was 105 μg/L Cu.

These results are consistent with reference toxicant tests previously performed in this laboratory, indicating that the *Chironomus* used in these tests were responding to toxic stress in a typical fashion. However, it should be noted that the response of these test organisms was at the 'more sensitive' end of the test response spectrum, suggesting that the test organisms may have been somewhat sensitive to toxic stress.

The test data sheets and the summary of statistical analyses for this test are presented in Appendix C.

Table 2. Reference toxicant testing: Effects of copper on survival of *Chironomus tentans*.

Copper Treatment (μg/L)	Overall Mean % Survival
Lab Control	87%
EC_{50} =	105 μg/L Cu

* - Survival at this treatment level was significantly less than the Lab Control at $p < 0.05$.

4. SUMMARY AND CONCLUSIONS

4.1 Toxicity of Los Alamos National Laboratory Sediment Samples to *Chironomus tentans*

These test results indicate that none of the Los Alamos sediment samples resulted in any significant reductions in larval insect survival (relative to the Control); however, with the exception of sediment sample CAMO-05-61175, there were significant reductions in the mean ash-free dry weights of the larval insects in each of the site sediments.

4.2 QA/QC SUMMARY

Test Conditions - Test conditions (pH, D.O., temperature, etc.) for the reported tests were within acceptable limits for these test organisms. All such analyses were performed according the laboratory Standard Operating Procedures.

The initial tests of these sediments were initiated on July 4, 2005. Due to apparent oxygen demand of the sediments, the overlying water dissolved oxygen (D.O.) levels were measured at <2.5 mg/L for several of the test treatments within the first 24 hrs, and there were numerous dead organisms observed at the surface of the sediments. These initial tests were terminated at that time.

The tests were re-initiated on July 12 with accelerated frequency of monitoring of the D.O. levels. Low D.O. levels were again observed within the first 24 hrs of the tests, and aeration of the overlying test waters was implemented. It is the results of this second set of tests (that had adequate D.O. levels throughout the test period) that are reported here.

Negative Control - The biological responses for the test organisms at the Lab Control treatment were within acceptable limits.

Positive Control - The results for the concurrent reference toxicant test were consistent with the reference toxicant test database, indicating that these test organisms were responding to toxic stress in a typical fashion.

Appendix A

Chain-of-Custody Record for the Los Alamos National Laboratory Sediment Samples

Friday, July 1, 2005

CHAIN OF CUSTODY DOCUMENT NUMBER: 3450SC

Los Alamos
NATIONAL LABORATORY

REQUEST NUMBER: 3450S

ANALYSIS TYPE: OTHER

ATTN: Scott Olge
Pacific Ecorisk Laboratories
835 Arnold Dr., Suite 104
Martinez, CA 94553

SAMPLE ID	CONT ID	CONTAINER DESCRIPTION	ORDER TEMPLATE CODE	PRESERVATIVE	MATRIX
CAMO-05-61165	7	1 GAL POLY	Bioassay	NONE	S
CAMO-05-61169	7	1 GAL POLY	Bioassay	NONE	S
CAMO-05-61171	7	1 GAL POLY	Bioassay	NONE	S
CAMO-05-61173	7	1 GAL POLY	Bioassay	NONE	S
CAMO-05-61175	7	1 GAL POLY	Bioassay	NONE	S
CAMO-05-61177	7	1 GAL POLY	Bioassay	NONE	S
CAMO-05-61179	7	1 GAL POLY	Bioassay	NONE	S

Final Page of CHAIN OF CUSTODY DOCUMENT FOR REQUEST NUMBER 3450S

Relinquished By:	Date	Time	Received By:	Date	Time
PRINTED NAME SIGNATURE	7/1/05	2:30	Raffaele Permatta PRINTED NAME SIGNATURE	7/2/05	9:45
PRINTED NAME SIGNATURE			PRINTED NAME SIGNATURE		
PRINTED NAME SIGNATURE			PRINTED NAME SIGNATURE		

Received for DISPOSAL By:	Date	Time	Remarks:
PRINTED NAME SIGNATURE			

Friday, July 1, 2005

REQUEST NUMBER: 3450S

ANALYSIS TYPE: OTHER

Los Alamos
NATIONAL LABORATORY

ATTN: Scott Olge
Pacific Ecorisk Laboratories
835 Arnold Dr., Suite 104
Martinez, CA 94553

Please analyze the enclosed samples according to the schedule indicated:

SHIP DATE: 07/01/2005
REPORT DUE: 07/31/2005
TURN AROUND REQ'D: 30

RAD SCREENING: NOT REQ
COMMENTS:

These samples are on:

LANL Request Number: 3450S
Per Agreement Number:
Project Cost Code: MRAA0110DT00

LANL ER SMO CONTACT:
Signature:

METHOD CODE	SAMPLE ID	CONT ID	SAMPLE MATRIX	DATE SAMPLED	COMMENTS
EPA:100.2	CAMO-05-61165	7	S	06/30/2005	
EPA:100.2	CAMO-05-61169	7	S	06/29/2005	
EPA:100.2	CAMO-05-61171	7	S	06/30/2005	
EPA:100.2	CAMO-05-61173	7	S	06/30/2005	
EPA:100.2	CAMO-05-61175	7	S	06/30/2005	
EPA:100.2	CAMO-05-61177	7	S	06/30/2005	
EPA:100.2	CAMO-05-61179	7	S	06/30/2005	

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Friday, July 1, 2005

REQUEST NUMBER: 3452S

ANALYSIS TYPE: OTHER

Los Alamos
NATIONAL LABORATORY

ATTN: Scott Olge
Pacific Ecorisk Laboratories
835 Arnold Dr., Suite 104
Martinez, CA 94553

Please analyze the enclosed samples according to the schedule indicated:

SHIP DATE: 07/01/2005
REPORT DUE: 07/31/2005
TURN AROUND REQ'D: 30

RAD SCREENING: NOT REQ
COMMENTS:

These samples are on:

LANL Request Number: 3452S
Per Agreement Number:
Project Cost Code: MRAA0110DT00

LANL ER SMO CONTACT:
Signature:

METHOD CODE	SAMPLE ID	CONT ID	SAMPLE MATRIX	DATE SAMPLED	COMMENTS
EPA:100.2	CALA-05-61181	7	S	06/30/2005	

Final Page of REQUEST NUMBER 3452S

Appendix B

Test Data and Summary of Statistics for the Evaluation of Los Alamos National Laboratory Sediment Toxicity to *Chironomus tentans*

CETIS Test Summary

Report Date: 29 Sep-05 11:40 AM
Test Link: 09-8235-7683/13689

Chironomus 10-d Survival and Growth Sediment Test — Pacific EcoRisk

Test No:	14-2079-6122	**Test Type:**	Survival-AF Growth	**Duration:**	10d 0h
Start Date:	12 Jul-05	**Protocol:**	USEPA Freshwater Sediment (2000)	**Species:**	Chironomus tentans
Ending Date:	22 Jul-05	**Dil Water:**	Not Applicable	**Source:**	Environmental Consult & Test
Setup Date:	12 Jul-05 12:00 AM	**Brine:**	Not Applicable		

Sample No:	02-6466-2418	**Material:**	Freshwater Sediment	**Client:**	Los Alamos National Laboratory
Sample Date:	30 Jun-05	**Code:**	10343	**Project:**	
Receive Date:	02 Jul-05 09:45 AM	**Source:**	Los Alamos National Laboratory		
Sample Age:	12d 0h (2.3 °C)	**Station:**	CAMO-05-61165		

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
07-5075-2500	Mean AF Weight-mg	< 100	100	N/A	11.57%	Equal Variance t Two-Sample
08-3620-1328	Mean Dry Weight (mg)	100	> 100	N/A	20.35%	Equal Variance t Two-Sample
07-8397-2121	Proportion Survived	100	> 100	N/A	19.19%	Equal Variance t Two-Sample

Mean AF Weight-mg Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.77246	0.61200	0.89333	0.03825	0.10818	14.00%
100		8	0.63576	0.47300	0.74000	0.03332	0.09425	14.82%

Mean Dry Weight (mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	1.15991	0.92778	1.41429	0.06843	0.19355	16.69%
100		8	1.26161	1.00111	2.00000	0.11522	0.32590	25.83%

Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.76250	0.50000	1.00000	0.05650	0.15980	20.96%
100		8	0.77500	0.50000	1.00000	0.05901	0.16690	21.54%

Mean AF Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.69000	0.89333	0.61200	0.72125	0.71625	0.66222	0.83750	0.84714
100		0.74000	0.56667	0.47300	0.56250	0.68200	0.70000	0.63444	0.72750

Mean Dry Weight (mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	1.25800	1.24500	1.03300	1.05375	0.95125	0.92778	1.39625	1.41429
100		1.28000	1.08556	1.01400	1.09125	1.26600	2.00000	1.00111	1.35500

Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.50000	0.60000	1.00000	0.80000	0.80000	0.90000	0.80000	0.70000
100		0.70000	0.90000	1.00000	0.80000	0.50000	0.60000	0.90000	0.80000

Chironomus tentans 10-Day Freshwater Sediment Toxicity Test Data

Client: **Los Alamos** Test ID#: JS ~~13524~~ 13689 Date (Day 0): 7/12/05

DAY	Date	Temp. (°C)	CONTROL D.O. (OLD)	CONTROL D.O. (NEW)	CAMO-05-61165 D.O. (OLD)	CAMO-05-61165 D.O. (NEW)	SIGN-OFF
0	7/12/05	22.9	~~5~~ 6.3	7.4	6.9	7.5	[illegible]
1	7/13/05	22.0	5.0	6.2	4.3	6.5	DL
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
2	7/14/05	22.1	5.4	6.3	5.6	7.5	RS 7-02
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
3	7.15.05	22.1	7.7	7.9	7.6	7.8	SL
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
4	7/16/05	22.3	8.2	8.1	8.1	8.2	MW
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
5	7/17/05	22.4	8.4	8.3	8.4	8.4	DL
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
6	7-18-05	22.4	7.8	7.9	8.0	8.1	MC
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
7	7-19-05	22.2	7.3	7.4	7.4	7.4	NT
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
8	7-20-05	22.6	8.2	8.1	8.2	8.1	DL NT
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
9	7-21-05	22.3	7.8	7.8	7.9	8.0	RT
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
10	7-22-05	22.3	8.8		8.1		NT RS
			# Live Organisms/replicate		# Live Organisms/replicate		
			A ~~5~~ 7 B ~~6~~ 9 C ~~10~~ 10 D ~~8~~ 8		A 7 B 9 C 10 D 8		
			E ~~8~~ 8 F ~~6~~ 9 G ~~9~~ 10 H ~~7~~ 7		E 5 F 6 G 9 H 8		JS
			RS RS RS				

Chironomus tentans Sediment Toxicity Test Weight Data

Client: Los Alamos
Sample ID: CAMO-05 61165
Test ID#: 13689 Test Date: 7/12/05

Pan Wt Date: 7-22-05 Sign-Off: mc
Dry Wt. Date: 7-27-05 Sign-Off: [illegible]
Ashed Wt. Date: 7-28-05 Sign-Off: [illegible]

Dry Weight Calculations

Pan ID	Concentration/ Replicate		Initial Ashed Pan Wt. (mg)	Dry Pan + Larvae Wt. (mg)	# of Live Organisms			Mean Dry Larvae Weight (mg)
					Larvae	Pupae	Adult	
1	Control	A	67.83	74.12	5			1.258
2		B	64.80	73.27	6			1.412
3		C	65.05	75.38	10			1.033
4		D	64.14	72.57	8			1.054
5		E	70.42	78.03	8			0.951
6		F	69.46	77.81	9			0.925
7		G	67.74	78.41	8			1.396
8		H	68.40	78.30	7			1.414
9		A	68.48	77.44	7			[illegible]
10		B	66.92	76.69	9			1.086
11		C	63.72	73.86	10			1.014
12		D	68.82	77.55	8			1.091
13		E	~~68.79~~ 68.70	75.03	5			1.266
14		F	69.00	81.00	6			2.000
15		G	62.89	71.90	9			1.001
16		H	64.89	75.73	8			1.355
QA 1			28.21	28.23				
QA 2			28.48	29.01				

Ash Free Dry Weight Calculations

Pan ID	Concentration/ Replicate		Dry Pan + Larvae Wt. (mg)	Ashed Pan + Larvae Wt. (mg)	Total Ash Free Dry Wt. of Larvae (mg)	# of Larvae	Mean Ash Free Dry Wt. of Larvae (mg)
1	Control	A	74.12	69.67	4.45	5	0.890
2		B	73.27	67.91	5.36	6	0.893
3		C	75.78	69.26	6.12	10	0.612
4		D	72.57	66.56	5.77	8	0.721
5		E	78.03	72.30	5.73	8	0.716
6		F	77.81	71.85	5.96	9	0.662
7		G	78.41	72.21	6.20	8	0.775
8		H	78.30	72.37	5.93	7	0.847
9		A	77.44	72.26	5.18	7	0.740
10		B	76.69	71.59	5.10	9	0.567
11		C	73.86	69.13	4.73	10	0.473
12		D	77.55	73.05	4.50	8	0.563
13		E	75.03	71.62	3.41	5	0.682
14		F	81.00	76.80	4.20	6	0.700
15		G	71.90	66.19	5.71	9	0.634
16		H	75.73	69.91	5.82	8	0.728
QA 1			28.23				
QA 2			29.01				

CETIS Test Summary

Report Date: 29 Sep-05 11:43 AM
Test Link: 12-2150-8263

Chironomus 10-d Survival and Growth Sediment Test — Pacific Ecc Risk

Test No:	14-2079-6122	**Test Type:**	Survival-AF Growth	**Duration:**	10d 0h
Start Date:	12 Jul-05	**Protocol:**	USEPA Freshwater Sediment (2000)	**Species:**	Chironomus tentans
Ending Date:	22 Jul-05	**Dil Water:**	Not Applicable	**Source:**	Environmental Consult & Test
Setup Date:	12 Jul-05 12:00 AM	**Brine:**	Not Applicable		

Sample No:	07-9962-7554	**Material:**	Freshwater Sediment	**Client:**	Los Alamos National Laboratory
Sample Date:	29 Jun-05	**Code:**	10343	**Project:**	
Receive Date:	02 Jul-05 09:45 AM	**Source:**	Los Alamos National Laboratory		
Sample Age:	13d 0h (2.3 °C)	**Station:**	CAMO-05-61169		

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
04-9624-2433	Mean AF Weight-mg	< 100	100	N/A	11.79%	Equal Variance t Two-Sample
11-1509-7109	Mean Dry Weight (mg)	100	> 100	N/A	14.80%	Equal Variance t Two-Sample
03-7779-3085	Proportion Survived	100	> 100	N/A	15.22%	Equal Variance t Two-Sample

Mean AF Weight-mg Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.77246	0.61200	0.89333	0.03825	0.10818	14.00%
100		8	0.64352	0.54125	0.82500	0.03480	0.09844	15.30%

Mean Dry Weight (mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	1.15991	0.92778	1.41429	0.06843	0.19355	16.69%
100		8	1.04002	0.81889	1.33375	0.06945	0.19642	18.89%

Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.76250	0.50000	1.00000	0.05650	0.15980	20.96%
100		8	0.91250	0.80000	1.00000	0.02950	0.08345	9.15%

Mean AF Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.89000	0.89333	0.61200	0.72125	0.71625	0.66222	0.83750	0.84714
100		0.57900	0.54556	0.71778	0.61555	0.82500	0.70500	0.54125	0.61900

Mean Dry Weight (mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	1.25800	1.24500	1.03300	1.05375	0.95125	0.92778	1.39625	1.41429
100		0.92900	0.81889	1.15556	0.94000	1.33375	1.30300	0.89500	0.94500

Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.50000	0.60000	1.00000	0.80000	0.80000	0.90000	0.80000	0.70000
100		1.00000	0.90000	0.90000	0.90000	0.80000	1.00000	0.80000	1.00000

Chironomus tentans 10-Day Freshwater Sediment Toxicity Test Data

Client: **Los Alamos** Test ID#: SS ~~13525~~ 13690 Date (Day 0): 7/12/05

DAY	Date	Temp. (°C)	CONTROL D.O. (OLD)	CONTROL D.O. (NEW)	LAMO-05-61169 D.O. (OLD)	LAMO-05-61169 D.O. (NEW)	SIGN-OFF
0	7/12/05	22.9	6.3	7.4	7.1	7.4	
1	7/13/05	22.0	5.0 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.2	4.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.6	DC
2	7/14/05	22.1	5.9 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.3	5.6 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.8	RP 9.02
3	7/15/05	22.1	7.7 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.2	7.5 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.7	SC
4	7/16/05	22.3	8.2 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.1	8.0 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.0	MW
5	7/17/05	22.4	8.4 ~~8.3~~ DC A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.3	8.3 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.2	DC
6	7-18-05	22.4	7.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.9	7.9 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.9	MC
7	7-19-05	22.2	7.3 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.4	7.3 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.3	NT
8	7-20-05	22.6	8.2 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.1	8.5 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.2	DL NT
9	7/21/05	22.5	7.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.8	8.1 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.1	RP
10	7-22-05	22.8	8.8 # Live Organisms/replicate A ~~8~~ 5 ~~10~~ B ~~10~~ 6 C 10 D 8 E 8 5 F ~~10~~ 6 G 8 ~~9~~ H ~~8~~ 7 RJ RJ RJ RJ		8.2 # Live Organisms/replicate A 10 B 9 C 9 D 9 E 8 F 10 G 8 H 10		NT SS

Chironomus tentans Sediment Toxicity Test Weight Data

Client: Los Alamos Pan Wt Date: 7-22-05 Sign-Off: NA
Sample ID: CAMO-05-61169 Dry Wt. Date: 7-27-05 Sign-Off: [illegible]
Test ID#: 13690 Test Date: 7-12-05 Ashed Wt. Date: 7-28-05 Sign-Off: [illegible]

Dry Weight Calculations

Pan ID	Concentration/ Replicate		Initial Ashed Pan Wt (mg)	Dry Pan + Larvae Wt. (mg)	# of Live Organisms			Mean Dry Larvae Weight (mg)
					Larvae	Pupae	Adult	
1	Control	A	67.83	74.12	5			1.258
2		B	64.80	73.27	6			1.412
3		C	65.05	75.38	10			1.033
4		D	64.14	72.57	8			1.054
5		E	70.42	78.03	8			0.951
6		F	69.46	77.81	9			0.928
7		G	67.74	78.91	8			1.396
8		H	68.40	78.30	7			1.414
17		A	65.45	74.74	10			0.929
18		B	63.27	70.64	7			0.814
19		C	66.08	76.48	9			1.156
20		D	63.38	71.84	9			0.940
21		E	61.06	71.73	8			1.334
22		F	64.40	77.43	10			1.303
23		G	66.18	73.34	8			0.895
24		H	62.00	72.45	10			0.945
QA 1			28.21	28.23				
QA 2			28.98	29.01				

Ash Free Dry Weight Calculations

Pan ID	Concentration/ Replicate		Dry Pan + Larvae Wt. (mg)	Ashed Pan + Larvae Wt. (mg)	Total Ash Free Dry Wt. of Larvae (mg)	# of Larvae	Mean Ash Free Dry Wt. of Larvae (mg)
1	Control	A	74.12	69.67	4.45	5	0.890
2		B	73.27	67.91	5.36	6	0.893
3		C	75.38	69.26	6.12	10	0.612
4		D	72.57	66.80	5.77	8	0.721
5		E	78.03	72.30	5.73	8	0.716
6		F	77.81	71.85	5.96	9	0.662
7		G	78.91	72.21	6.70	8	0.838
8		H	78.30	72.37	5.93	7	0.847
17		A	74.74	68.95	5.79	10	0.579
18		B	70.64	65.73	4.91	9	0.546
19		C	76.48	70.02	6.46	9	0.718
20		D	71.84	66.30	5.54	9	0.616
21		E	71.73	65.13	6.60	8	0.825
22		F	77.43	70.38	7.05	10	0.705
23		G	73.34	69.01	4.33	8	0.541
24		H	72.45	66.26	6.19	10	0.619
QA 1			28.23	28.23			
QA 2			29.01	29.01			

CETIS Test Summary

Report Date: 29 Sep-05 11:46 AM
Test Link: 12-6592-0144/13691

Chironomus 10-d Survival and Growth Sediment Test — Pacific EcoRisk

Test No:	14-2079-6122	**Test Type:**	Survival-AF Growth	**Duration:**	10d 0h
Start Date:	12 Jul-05	**Protocol:**	USEPA Freshwater Sediment (2000)	**Species:**	Chironomus tentans
Ending Date:	22 Jul-05	**Dil Water:**	Not Applicable	**Source:**	Environmental Consult & Test
Setup Date:	12 Jul-05 12:00 AM	**Brine:**	Not Applicable		

Sample No:	07-6494-9949	**Material:**	Freshwater Sediment	**Client:**	Los Alamos National Laboratory
Sample Date:	30 Jun-05	**Code:**	10343	**Project:**	
Receive Date:	02 Jul-05 09:43 AM	**Source:**	Los Alamos National Laboratory		
Sample Age:	12d 0h (2.3 °C)	**Station:**	CAMO-05-61171		

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
13-5509-3983	Mean AF Weight-mg	< 100	100	N/A	10.17%	Equal Variance t Two-Sample
07-6468-4752	Mean Dry Weight (mg)	< 100	100	N/A	11.40%	Equal Variance t Two-Sample
05-2019-6918	Proportion Survived	100	> 100	N/A	19.48%	Equal Variance t Two-Sample

Mean AF Weight-mg Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.77246	0.61200	0.89333	0.03825	0.10818	14.00%
100		8	0.63794	0.55444	0.78000	0.02291	0.06480	10.16%

Mean Dry Weight (mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	1.15991	0.92778	1.41429	0.06843	0.19355	16.69%
100		8	0.99890	0.90333	1.19400	0.03088	0.08735	8.74%

Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.76250	0.50000	1.00000	0.05650	0.15980	20.96%
100		8	0.87500	0.50000	1.00000	0.05901	0.16690	19.07%

Mean AF Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.89000	0.89333	0.61200	0.72125	0.71625	0.66222	0.83750	0.84714
100		0.60400	0.55444	0.62667	0.78000	0.65750	0.63889	0.62100	0.62100

Mean Dry Weight (mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	1.25800	1.24500	1.03300	1.05375	0.95125	0.92778	1.39625	1.41429
100		0.97100	0.90333	1.01111	1.19400	1.02500	0.95778	0.94800	0.98100

Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.50000	0.60000	1.00000	0.80000	0.80000	0.90000	0.80000	0.70000
100		1.00000	0.90000	0.90000	0.50000	0.80000	0.90000	1.00000	1.00000

Chironomus tentans 10-Day Freshwater Sediment Toxicity Test Data

Client: **Los Alamos** Test ID#: 13552653 13691 Date (Day 0): 7/12/05

DAY	Date	Temp. (°C)	CONTROL D.O. (OLD)	CONTROL D.O. (NEW)	CAMO-05-61171 D.O. (OLD)	CAMO-05-61171 D.O. (NEW)	SIGN-OFF
0	7/12/05	22.9	6.3	7.4	7.1	7.3	[illegible]
1	7/13/05	22.0	5.0 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.2	4.0 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.1	DL
2	7/14/05	22.1	5.4 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.3	4.4 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.8	RP 9.02
3	7/15/05	22.1	7.7 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.9	7.6 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.7	SC
4	7/16/05	22.3	8.2 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.1	8.1 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.2	MW
5	7/17/05	22.4	8.4 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.3	8.4 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.4	DL
6	7-18-05	22.4	7.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.9	7.6 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.7	MC
7	7-19-05	22.2	7.3 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.4	7.4 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.3	NT
8	7-20-05	22.6	8.2 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.1	7.9 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.0	DL NT
9	7/21/05	22.6	7.9 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.8	7.1 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.0	RP
10	7-22-05	22.3	8.8 # Live Organisms/replicate A 5 B 6 C 10 D 8 E 8 F 9 G 8 H 7		8.3 # Live Organisms/replicate A 10 B 9 C 9 D 5 E 8 F 9 G 10 H 10		NT 55

Chironomus tentans Sediment Toxicity Test Weight Data

Client: Los Alamos | Pan Wt Date: 7-22-05 | Sign-Off: MC
Sample ID: Camo-05 61171 | Dry Wt. Date: 7-27-05 | Sign-Off: [illegible]
Test ID#: 13691 | Test Date: 7/12/05 | Ashed Wt. Date: 7/28/05 | Sign-Off: MC

Dry Weight Calculations

Pan ID	Concentration/ Replicate		Initial Ashed Pan Wt. (mg)	Dry Pan + Larvae Wt. (mg)	# of Live Organisms			Mean Dry Larvae Weight (mg)
					Larvae	Pupae	Adult	
1	Control	A	67.83	74.12	5			1.258
2		B	64.86	73.27	6			1.412
3		C	65.05	75.38	10			1.033
4		D	64.14	72.57	8			1.054
5		E	70.42	78.03	8			0.951
6		F	69.46	77.81	9			0.728
7		G	67.74	78.91	8			1.396
8		H	68.40	78.30	7			1.414
25		A	68.10	35 +0 77.81	10			0.971
26		B	67.79	35 9 75.92	9			0.903
27		C	65.39	35 9 74.49	9			1.011
28		D	70.20	35 5 76.17	5			1.194
29		E	64.72	35 8 72.92	8			1.025
30		F	63.85	35 9 72.47	9			0.958
31		G	65.84	35 10 75.32	10			0.948
32		H	65.49	35 10 75.30	10			0.981
QA 1			28.21	28.23				
QA 3			27.45	27.51				

Ash Free Dry Weight Calculations

Pan ID	Concentration/ Replicate		Dry Pan + Larvae Wt. (mg)	Ashed Pan + Larvae Wt. (mg)	Total Ash Free Dry Wt. of Larvae (mg)	# of Larvae	Mean Ash Free Dry Wt. of Larvae (mg)
1	Control	A	74.12	69.67	4.45	5	0.890
2		B	73.27	67.41	5.36	6	0.893
3		C	75.38	69.26	6.12	10	0.612
4		D	72.57	66.80	5.77	8	0.721
5		E	78.03	72.30	5.73	8	0.716
6		F	77.51	71.85	5.96	9	0.662
7		G	78.91	72.21	6.70	8	0.838
8		H	78.30	72.37	5.93	7	0.847
25		A	77.81	71.77	6.04	10	0.604
26		B	75.92	70.93	4.99	9	0.554
27		C	74.49	68.85	5.64	9	0.627
28		D	76.17	72.27	3.90	5	0.780
29		E	72.92	67.66	5.26	8	0.658
30		F	72.47	66.72	5.75	9	0.639
31		G	75.32	69.11	6.21	10	0.621
32		H	75.30	69.09	6.21	10	0.621
QA 1			28.23	28.23			
QA 3			27.51	27.50			

CETIS Test Summary

Report Date: 29 Sep-05 11 51 AM
Test Link: 04-3469-8607/13692

Chironomus 10-d Survival and Growth Sediment Test — Pacific EcoRisk

Test No:	14-2079-6122	**Test Type:**	Survival-AF Growth	**Duration:**	10d 0h
Start Date:	12 Jul-05	**Protocol:**	USEPA Freshwater Sediment (2000)	**Species:**	Chironomus tentans
Ending Date:	22 Jul-05	**Dil Water:**	Not Applicable	**Source:**	Environmental Consult & Test
Setup Date:	12 Jul-05 12:00 AM	**Brine:**	Not Applicable		

Sample No:	06-5134-9573	**Material:**	Freshwater Sediment	**Client:**	Los Alamos National Laboratory
Sample Date:	30 Jun-05	**Code:**	10343	**Project:**	
Receive Date:	02 Jul-05 09:45 AM	**Source:**	Los Alamos National Laboratory		
Sample Age:	12d 0h (2.3 °C)	**Station:**	CAMO-05-61173		

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
09-3035-7123	Mean AF Weight-mg	< 100	100	N/A	9.94%	Equal Variance t Two-Sample
04-2577-4412	Mean Dry Weight (mg)	< 100	100	N/A	12.55%	Equal Variance t Two-Sample
06-4325-2750	Proportion Survived	100	> 100	N/A	15.68%	Equal Variance t Two-Sample

Mean AF Weight-mg Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.77246	0.61200	0.89333	0.03825	0.10818	14.00%
100		8	0.51563	0.45222	0.64500	0.02094	0.05924	11.49%

Mean Dry Weight (mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	1.15991	0.92778	1.41429	0.06843	0.19355	16.69%
100		8	0.91497	0.78286	1.19500	0.04636	0.13113	14.33%

Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.76250	0.50000	1.00000	0.05650	0.15980	20.96%
100		8	0.81250	0.70000	1.00000	0.03504	0.09910	12.20%

Mean AF Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.89000	0.89333	0.61200	0.72125	0.71625	0.66222	0.83750	0.84714
100		0.45222	0.48143	0.64500	0.52000	0.52375	0.46714	0.52750	0.50800

Mean Dry Weight (mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	1.25800	1.24500	1.03300	1.05375	0.95125	0.92778	1.39625	1.41429
100		0.79222	0.82571	0.94250	1.19500	0.91500	0.78286	0.93750	0.92900

Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.50000	0.60000	1.00000	0.80000	0.80000	0.90000	0.80000	0.70000
100		0.90000	0.70000	0.80000	0.80000	0.80000	0.70000	0.80000	1.00000

Analyst: AH Approval: [illegible]

Chironomus tentans 10-Day Freshwater Sediment Toxicity Test Data

Client: **Los Alamos** Test ID#: ~~13527~~ SS 13692 Date (Day 0): 7/12/05

DAY	Date	Temp. (°C)	CONTROL D.O. (OLD)	CONTROL D.O. (NEW)	CAMO-05-61173 D.O. (OLD)	CAMO-05-61173 D.O. (NEW)	SIGN-OFF
0	7/12/05	22.9	6.3	7.4	7.4	7.4	SC
1	7/13/05	22.0	5.0 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.2	4.7 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.4	DC
2	7/14/05	22.1	5.4 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.3	5.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.8	RP 9.02
3	7/15/05	22.1	7.7 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.9	7.7 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.7	SC
4	7/16/05	22.3	8.2 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.1	8.4 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.4	MM
5	7/17/05	22.4	8.4 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.3	8.5 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.3	DC
6	7-18-05	22.4	7.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.9	7.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.8	MC
7	7-19-05	22.2	7.3 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.4	7.4 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.4	NT
8	7-20-05	22.6	8.2 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.1	8.1 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.1	DC NT
9	7/21/05	22.6	7.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.8	8.3 ~~8.3~~ RP A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.3	RP
10	7-22-05	22.3	8.8 # Live Organisms/replicate A 5 B 6 C 10 D 8 E 8 F 9 G 8 H 7		8.6 # Live Organisms/replicate A 9 B 7 C 8 D 8 E 8 F 7 G 8 H 10		NT PH LW

Chironomus tentans Sediment Toxicity Test Weight Data

Client: Los Alamos | Pan Wt Date: 7-22-05 | Sign-Off: MLC
Sample ID: CAMO-05-61173 | Dry Wt. Date: 7-27-05 | Sign-Off: [illegible]
Test ID#: 13692 | Test Date: 7/12/05 | Ashed Wt. Date: 7/28/05 | Sign-Off: MLC

Dry Weight Calculations

Pan ID	Concentration/ Replicate		Initial Ashed Pan Wt. (mg)	Dry Pan + Larvae Wt. (mg)	# of Live Organisms			Mean Dry Larvae Weight (mg)
					Larvae	Pupae	Adult	
1	Control	A	67.83	74.12	5			1.258
2		B	64.80	73.27	6			1.412
3		C	65.05	75.38	10			1.033
4		D	64.14	72.57	8			1.054
5		E	70.42	78.53	8			0.951
6		F	69.46	77.81	9			0.928
7		G	67.74	78.91	8			1.396
8		H	68.40	78.30	7			1.414
33		A	64.31	71.44	9			0.792
34		B	67.42	73.20	7			0.826
35		C	63.28	70.82	8			0.943
36		D	68.50	78.06	8			1.195
37		E	64.76	72.08	8			0.915
38		F	73.40	78.88	7			0.783
39		G	66.04	73.54	8			0.938
40		H	63.73	73.02	10			0.929
QA 1			28.21	28.23				
QA 4			30.71	30.72				

Ash Free Dry Weight Calculations

Pan ID	Concentration/ Replicate		Dry Pan + Larvae Wt. (mg)	Ashed Pan + Larvae Wt. (mg)	Total Ash Free Dry Wt. of Larvae (mg)	# of Larvae	Mean Ash Free Dry Wt. of Larvae (mg)
1	Control	A	74.12	69.67	4.45	5	0.890
2		B	73.27	67.91	5.36	6	0.893
3		C	75.38	69.26	6.12	10	0.612
4		D	72.57	66.86	5.71	8	0.721
5		E	78.53	72.36	5.73	8	0.716
6		F	77.81	71.85	5.96	9	0.662
7		G	78.91	72.21	6.70	8	0.838
8		H	78.30	72.87	5.43	7	0.847
33		A	71.44	67.37	4.07	9	0.452
34		B	73.20	69.83	3.37	7	0.481
35		C	70.82	65.66	5.16	8	0.645
36		D	78.06	73.90	4.16	8	0.520
37		E	72.08	67.89	4.19	8	0.524
38		F	78.88	75.61	3.27	7	0.467
39		G	73.54	69.32	4.22	8	0.528
40		H	73.02	67.94	5.08	10	0.508
QA 1			28.23	28.23			
QA 4			30.72	30.74			

CETIS Test Summary

Report Date: 30 Sep-05 2:15 PM
Test Link: 16-5420-9556/13693

Chironomus 10-d Survival and Growth Sediment Test — Pacific EcoRisk

Test No:	14-2079-6122	**Test Type:**	Survival-AF Growth	**Duration:**	10d 0h
Start Date:	12 Jul-05	**Protocol:**	USEPA Freshwater Sediment (2000)	**Species:**	Chironomus tentans
Ending Date:	22 Jul-05	**Dil Water:**	Not Applicable	**Source:**	Environmental Consult & Test
Setup Date:	12 Jul-05 12:00 AM	**Brine:**	Not Applicable		

Sample No:	01-9768-1912	**Material:**	Freshwater Sediment	**Client:**	Los Alamos National Laboratory
Sample Date:	30 Jun-05	**Code:**	10343	**Project:**	
Receive Date:	02 Jul-05 09:45 AM	**Source:**	Los Alamos National Laboratory		
Sample Age:	12d 0h (2.3 °C)	**Station:**	CAMO-05-61175		

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
16-2723-4598	Mean AF Weight-mg	100	> 100	N/A	16.13%	Equal Variance t Two-Sample
09-3237-9527	Mean Dry Weight (mg)	100	> 100	N/A	21.59%	Equal Variance t Two-Sample
11-2959-0437	Proportion Survived	100	> 100	N/A	21.93%	Equal Variance t Two-Sample

Mean AF Weight-mg Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.77246	0.61200	0.89333	0.03825	0.10818	14.00%
100		6	0.81376	0.69375	1.10400	0.06301	0.15435	18.97%

Mean Dry Weight (mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	1.15991	0.92778	1.41429	0.06843	0.19355	16.69%
100		6	1.55955	1.27000	2.19400	0.13536	0.33157	21.26%

Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.76250	0.50000	1.00000	0.05650	0.15980	20.96%
100		6	0.76667	0.50000	1.00000	0.07149	0.17512	22.84%

Mean AF Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.89000	0.89333	0.61200	0.72125	0.71625	0.66222	0.83750	0.84714
100		0.74100	0.69375	0.72667	0.74714	1.10400	0.87000		

Mean Dry Weight (mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	1.25800	1.24500	1.03300	1.05375	0.95125	0.92778	1.39625	1.41429
100		1.39600	1.48875	1.27000	1.39143	2.19400	1.61714		

Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.50000	0.60000	1.00000	0.80000	0.80000	0.90000	0.80000	0.70000
100		1.00000	0.80000	0.90000	0.70000	0.50000	0.70000		

Chironomus tentans 10-Day Freshwater Sediment Toxicity Test Data

Client: **Los Alamos** Test ID#: ~~13528~~ JS 13693 Date (Day 0): 7/12/05

DAY	Date	Temp. (°C)	CONTROL D.O. (OLD)	CONTROL D.O. (NEW)	CAMO-05-6175 D.O. (OLD)	CAMO-05-6175 D.O. (NEW)	SIGN-OFF
0	7/12/05	22.9	6.3	7.4	5.7	7.2	DB
1	7/13/05	22.0	5.0	6.2	4.1	6.0	DL
2	7/14/05	22.1	5.4	6.2	5.6	6.9	RP 9.02
3	7/15/05	22.1	7.7	7.9	7.7	7.8	SC
4	7/16/05	22.3	8.2	8.1	8.3	8.3	MW
5	7/17/05	22.4	8.4	8.3	8.4	8.4	DC
6	7-18-05	22.4	7.8	7.9	7.6	7.7	MC
7	7-19-05	22.2	7.3	~~7.5~~ NT 7.4	7.4	7.4	NT
8	7-20-05	22.6	8.2	8.1	8.0	8.1	DL NT
9	7/21/05	22.6	7.8	7.8	7.7	7.8	RP
10	7-22-05	22.3	8.8		8.0		NT CJC LW

	CONTROL				CAMO-05-6175			
	A	B	C	D	A	B	C	D
1	0	0	0	0	0	0	0	0
	E	F	G	H	E	F	G	H
	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0

	CONTROL				CAMO-05-6175			
	# Live Organisms/replicate				# Live Organisms/replicate			
	A	B	C	D	A	B	C	D
10	5	6	10	8	10	8	~~0~~ *	9
	E	F	G	H	E	F	G	H
	8	9	8	7	~~0~~ *	7	5	7

* test vessel not sampled

Chironomus tentans Sediment Toxicity Test Weight Data

Client: Los Alamos
Sample ID: CAMO-05-61175
Test ID#: 13693 Test Date: 7/12/05

Pan Wt Date: 7-22-05 Sign-Off: MC
Dry Wt. Date: 7-27-05 Sign-Off: [illegible]
Ashed Wt. Date: 7/28/05 Sign-Off: MC

Dry Weight Calculations

Pan ID	Concentration/ Replicate		Initial Ashed Pan Wt. (mg)	Dry Pan + Larvae Wt. (mg)	# of Live Organisms			Mean Dry Larvae Weight (mg)
					Larvae	Pupae	Adult	
1	Control	A	67.83	74.12	5			1.258
2		B	64.80	73.27	6			1.412
3		C	65.05	75.38	10			1.033
4		D	64.14	72.57	8			1.054
5		E	70.42	78.03	3			0.951
6		F	69.46	77.81	9			0.928
7		G	67.74	78.91	8			1.396
8		H	68.40	78.30	7			1.414
41		A	66.67	80.63	10			1.396
42		B	71.86	83.77	8			1.489
43		C	66.39	—	0			—
44		D	68.16	79.59	9			1.270
45		E	68.46	—	0			—
46		F	65.70	75.44	7			1.391
47		G	69.05	80.02	5			2.194
48		H	~~28.21~~ 67.57	78.89	7			1.617
QA 1			~~28.21~~ 28.21	28.23				
QA 4			30.71	30.72				

Ash Free Dry Weight Calculations

Pan ID	Concentration/ Replicate		Dry Pan + Larvae Wt. (mg)	Ashed Pan + Larvae Wt. (mg)	Total Ash Free Dry Wt. of Larvae (mg)	# of Larvae	Mean Ash Free Dry Wt. of Larvae (mg)
1	Control	A	74.12	69.67	4.45	5	0.890
2		B	73.27	67.91	5.36	6	0.893
3		C	75.38	69.26	6.12	10	0.612
4		D	72.57	66.80	5.77	8	0.721
5		E	78.03	72.30	5.73	8	0.716
6		F	77.81	71.85	5.96	9	0.662
7		G	78.91	72.21	6.70	8	0.838
8		H	78.30	72.37	5.93	7	0.847
41		A	80.63	73.22	7.41	10	0.741
42		B	83.77	78.22	5.55	8	0.694
43		C	—	—	—	0	—
44		D	79.59	73.05	6.54	9	0.727
45		E	—	—	—	0	—
46		F	75.44	70.21	5.23	7	0.747
47		G	80.02	74.50	5.52	5	1.104
48		H	78.89	72.80	6.09	7	0.870
QA 1			28.23	28.23			
QA 4			30.72	30.74			

CETIS Test Summary

Report Date: 30 Sep-05 2:: 7 PM
Test Link: 13-0384-2455/13694

Chironomus 10-d Survival and Growth Sediment Test — Pacific EcoRisk

Test No:	14-2079-6122	**Test Type:**	Survival-AF Growth	**Duration:**	10d 0h
Start Date:	12 Jul-05	**Protocol:**	USEPA Freshwater Sediment (2000)	**Species:**	Chironomus tentans
Ending Date:	22 Jul-05	**Dil Water:**	Not Applicable	**Source:**	Environmental Consult & Test
Setup Date:	12 Jul-05 12:00 AM	**Brine:**	Not Applicable		

Sample No:	08-4774-9303	**Material:**	Freshwater Sediment	**Client:**	Los Alamos National Laboratory
Sample Date:	30 Jun-05	**Code:**	10343	**Project:**	
Receive Date:	02 Jul-05 09:45 AM	**Source:**	Los Alamos National Laboratory		
Sample Age:	12d 0h (0 °C)	**Station:**	CAMO-05-61177		

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
05-2882-4303	Mean AF Weight-mg	< 100	100	N/A	14.95%	Equal Variance t Two-Sample
11-1834-0824	Mean Dry Weight (mg)	< 100	100	N/A	12.07%	Equal Variance t Two-Sample
07-1236-3817	Proportion Survived	100	> 100	N/A	16.88%	Equal Variance t Two-Sample

Mean AF Weight-mg Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.77246	0.61200	0.89333	0.03825	0.10818	14.00%
100		8	0.62285	0.46625	0.94556	0.05327	0.15067	24.19%

Mean Dry Weight (mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	1.15991	0.92778	1.41429	0.06843	0.19355	16.69%
100		8	0.94167	0.77111	1.07833	0.04041	0.11430	12.14%

Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.76250	0.50000	1.00000	0.05650	0.15980	20.96%
100		8	0.81250	0.60000	1.00000	0.04407	0.12464	15.34%

Mean AF Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.89000	0.89333	0.61200	0.72125	0.71625	0.66222	0.83750	0.84714
100		0.59833	0.94556	0.57857	0.67750	0.49111	0.46625	0.67250	0.55300

Mean Dry Weight (mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	1.25800	1.24500	1.03300	1.05375	0.95125	0.92778	1.39625	1.41429
100		1.07833	0.87111	0.95857	1.04875	0.77111	0.84250	1.06500	0.89800

Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.50000	0.60000	1.00000	0.80000	0.80000	0.90000	0.80000	0.70000
100		0.60000	0.90000	0.70000	0.80000	0.90000	0.80000	0.80000	1.00000

Analyst: AP Approval: [illegible]

Chironomus tentans 10-Day Freshwater Sediment Toxicity Test Data

Client: **Los Alamos** Test ID#: 13529 JS 13694 Date (Day 0): 7/12/05

DAY	Date	Temp. (°C)	CONTROL D.O. (OLD)	CONTROL D.O. (NEW)	CAMO-05-61177 D.O. (OLD)	CAMO-05-61177 D.O. (NEW)	SIGN-OFF
0	7/12/05	22.9	6.3	7.4	7.5	7.4	DE
1	7/13/05	22.0	5.0	6.2	4.9	6.3	DC
2	7/14/05	22.1	5.4	6.3	5.6	7.5	RP
3	7/15/05	22.1	7.7	7.9	7.6	7.7	[illegible]
4	7/16/05	22.3	8.2	8.1	8.2	8.3	MC
5	7/17/05	22.4	8.4	8.3	8.3	8.3	DC
6	7-18-05	22.4	7.8	7.9	7.7	7.8	MC
7	7-19-05	22.2	7.3	7.4	7.4	7.4	NT
8	7-20-05	22.6	8.2	8.1	8.1	8.1	DL NT
9	7/21/05	22.6	7.8	7.8	8.2	8.2	RP
10	7-22-05	22.3	8.8		8.4		NT BA LW

	CONTROL				CAMO-05-61177			
	A	B	C	D	A	B	C	D
1	0	0	0	0	0	0	0	0
	E	F	G	H	E	F	G	H
	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0

	# Live Organisms/replicate				# Live Organisms/replicate			
	A	B	C	D	A	B	C	D
10	5	6	10	8	6	9	7	8
	E	F	G	H	E	F	G	H
	8	9	8	7	9	8	8	10

Chironomus tentans Sediment Toxicity Test Weight Data

Client: Los Alamos Pan Wt Date: 7-22-05 Sign-Off: JLC
Sample ID: CAMO-05-61177 Dry Wt. Date: 7-27-05 Sign-Off: [illegible]
Test ID#: 13694 Test Date: 7/12/05 Ashed Wt. Date: 7/28/05 Sign-Off: JLC

Dry Weight Calculations

Pan ID	Concentration/ Replicate		Initial Ashed Pan Wt. (mg)	Dry Pan + Larvae Wt. (mg)	# of Live Organisms			Mean Dry Larvae Weight (mg)
					Larvae	Pupae	Adult	
1	Control	A	67.83	74.12	5			1.258
2		B	64.80	73.27	6			1.412
3		C	65.05	75.38	10			1.033
4		D	64.14	72.57	8			1.054
5		E	70.42	78.03	8			0.951
6		F	69.46	77.81	9			0.928
7		G	67.74	78.91	8			1.396
8		H	68.40	78.30	7			1.414
49		A	67.75	74.22	6			1.078
50		B	65.41	73.25	9			0.871
51		C	68.70	75.41	7			0.959
52		D	~~69.39~~ 64.59	72.98	8			1.049
53		E	69.40	76.34	9			0.771
54		F	69.96	76.70	8			0.843
55		G	66.18	74.70	8			1.065
56		H	67.86	76.84	10			0.898
QA 1			28.21	28.23				
QA 5			28.89	28.85				

Ash Free Dry Weight Calculations

Pan ID	Concentration/ Replicate		Dry Pan + Larvae Wt. (mg)	Ashed Pan + Larvae Wt. (mg)	Total Ash Free Dry Wt. of Larvae (mg)	# of Larvae	Mean Ash Free Dry Wt. of Larvae (mg)
1	Control	A	74.12	69.67	4.45	5	0.890
2		B	73.27	67.91	5.36	6	0.893
3		C	75.38	69.26	6.12	10	0.612
4		D	72.57	66.80	5.77	8	0.721
5		E	78.03	72.30	5.73	8	0.716
6		F	77.81	71.85	5.96	9	0.662
7		G	78.91	72.21	6.70	8	0.838
8		H	78.30	72.37	5.93	7	0.847
49		A	74.22	70.63	3.59	4	0.898
50		B	73.25	69.74	3.51	9	0.946
51		C	75.41	71.36	4.05	7	0.579
52		D	72.98	67.56	5.42	8	0.678
53		E	76.34	71.92	4.42	9	0.491
54		F	76.70	72.97	3.73	8	0.466
55		G	74.70	69.32	5.38	8	0.673
56		H	76.84	71.31	5.53	10	0.553
QA 1			28.23	28.23			
QA 5			28.85	28.87			

CETIS Test Summary

Report Date: 29 Sep-05 12:03 PM
Test Link: 09-1239-0610/13695

Chironomus 10-d Survival and Growth Sediment Test — Pacific EcoRisk

Test No:	14-2079-6122	**Test Type:**	Survival-AF Growth	**Duration:**	10d 0h
Start Date:	12 Jul-05	**Protocol:**	USEPA Freshwater Sediment (2000)	**Species:**	Chironomus tentans
Ending Date:	22 Jul-05	**Dil Water:**	Not Applicable	**Source:**	Environmental Consult & Test
Setup Date:	12 Jul-05 12:00 AM	**Brine:**	Not Applicable		

Sample No:	03-1981-0945	**Material:**	Freshwater Sediment	**Client:**	Los Alamos National Laboratory
Sample Date:	30 Jun-05	**Code:**	10343	**Project:**	
Receive Date:	02 Jul-05 09:45 AM	**Source:**	Los Alamos National Laboratory		
Sample Age:	12d 0h (0 °C)	**Station:**	CAMO-05-61179		

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
09-5354-6849	Mean AF Weight-mg	< 100	100	N/A	10.05%	Equal Variance t Two-Sample
10-8183-7107	Mean Dry Weight (mg)	100	> 100	N/A	12.07%	Equal Variance t Two-Sample
05-2379-9508	Proportion Survived	100	> 100	N/A	18.94%	Equal Variance t Two-Sample

Mean AF Weight-mg Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.77246	0.61200	0.89333	0.03825	0.10818	14.00%
100		8	0.64666	0.57111	0.75200	0.02190	0.06195	9.58%

Mean Dry Weight (mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	1.15991	0.92778	1.41429	0.06843	0.19355	16.69%
100		8	1.21124	1.05556	1.42200	0.04043	0.11435	9.44%

Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.76250	0.50000	1.00000	0.05650	0.15980	20.96%
100		8	0.85000	0.50000	1.00000	0.05669	0.16036	18.87%

Mean AF Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.89000	0.89333	0.61200	0.72125	0.71625	0.66222	0.83750	0.84714
100		0.61500	0.75200	0.64222	0.71200	0.59250	0.67444	0.61400	0.57111

Mean Dry Weight (mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	1.25800	1.24500	1.03300	1.05375	0.95125	0.92778	1.39625	1.41429
100		1.11562	1.42200	1.16222	1.30500	1.18250	1.25000	1.19700	1.05556

Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.50000	0.60000	1.00000	0.80000	0.80000	0.90000	0.80000	0.70000
100		0.80000	0.50000	0.90000	1.00000	0.80000	0.90000	1.00000	0.90000

Chironomus tentans 10-Day Freshwater Sediment Toxicity Test Data

Client: **Los Alamos** Test ID#: ~~13530~~ JS 13695 Date (Day 0): 7/12/05

DAY	Date	Temp. (°C)	CONTROL D.O. (OLD)	CONTROL D.O. (NEW)	CAMO-05-61179 D.O. (OLD)	CAMO-05-61179 D.O. (NEW)	SIGN-OFF
0	7/12/05	22.4	6.3	7.4	7.2	7.5	AC
1	7/13/05	22.0	5.0	6.2	4.2	5.8	DC
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
2	7/14/05	22.1	5.4	6.3	6.0	6.9	RP 9.02
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
3	7/15/05	22.1	7.7	7.9	7.6	7.7	SC
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
4	7/16/05	22.3	8.2	8.1	8.7	8.6	MM
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
5	~~7/16/05~~ or 7/17/05	22.4	8.4	8.3	8.2	8.3	DC
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
6	7-18-05	22.4	7.8	7.9	7.7	7.8	MC
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
7	7-19-05	22.2	7.3	7.4	7.9	7.8	NT
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
8	7-20-05	22.6	8.2	8.1	8.1	8.1	DL NT
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
9	~~7/21/05~~ 7/20 RT	22.6	7.8	7.9	7.8	8.0	RP
			A 0 B 0 C 0 D 0		A 0 B 0 C 0 D 0		
			E 0 F 0 G 0 H 0		E 0 F 0 G 0 H 0		
10	7-22-05	22.3	8.8		8.3		NT RP JS
			# Live Organisms/replicate		# Live Organisms/replicate		
			A 5 B 6 C 10 D 8		A 8 B 5 C 9 D 10		
			E 8 F 9 G 8 H 7		E 8 F 9 G 10 H 9		

Chironomus tentans Sediment Toxicity Test Weight Data

Client: Los Alamos Pan Wt Date: 7-22-05 Sign-Off: JRC
Sample ID: CAMO-05-61179 Dry Wt. Date: 7-27-05 Sign-Off: [illegible]
Test ID#: 13695 Test Date: 7/12/05 Ashed Wt. Date: 7/28/05 Sign-Off: JRC

Dry Weight Calculations

Pan ID	Concentration/ Replicate		Initial Ashed Pan Wt. (mg)	Dry Pan + Larvae Wt. (mg)	# of Live Organisms			Mean Dry Larvae Weight (mg)
					Larvae	Pupae	Adult	
1	Control	A	67.83	74.12	5			1.258
2		B	64.80	73.27	6			1.412
3		C	65.05	75.38	10			1.033
4		D	64.14	72.57	8			1.054
5		E	70.42	78.03	8			0.951
6		F	69.46	77.31	9			0.928
7		G	67.74	78.91	8			1.396
8		H	68.40	78.30	7			1.414
57		A	65.15	74.34	8			1.149
58		B	69.17	76.28	5			1.422
59		C	65.36	75.82	9			1.162
60		D	68.36	81.41	10			1.305
61		E	65.54	75.00	8			1.183
62		F	67.90	79.15	9			1.250
63		G	61.60	73.57	10			1.197
64		H	66.80	76.30	9			1.056
QA 1			28.21	28.23				
QA 6			29.23	29.23				

Ash Free Dry Weight Calculations

Pan ID	Concentration/ Replicate		Dry Pan + Larvae Wt. (mg)	Ashed Pan + Larvae Wt. (mg)	Total Ash Free Dry Wt. of Larvae (mg)	# of Larvae	Mean Ash Free Dry Wt. of Larvae (mg)
1	Control	A	74.12	69.67	4.45	5	0.890
2		B	73.27	67.91	5.36	6	0.893
3		C	75.38	69.26	6.12	10	0.612
4		D	72.57	66.80	5.77	8	0.721
5		E	78.03	72.30	5.73	8	0.716
6		F	77.31	71.35	5.96	9	0.662
7		G	78.41	72.21	6.70	8	0.838
8		H	78.30	72.37	5.93	7	0.847
57		A	74.34	69.42	4.92	8	0.615
58		B	76.28	72.52	3.76	5	0.752
59		C	75.82	70.04	5.78	9	0.642
60		D	81.41	74.29	7.12	10	0.712
61		E	75.00	70.26	4.74	8	0.593
62		F	79.15	73.08	6.07	9	0.674
63		G	73.57	67.43	6.14	10	0.614
64		H	76.30	71.16	5.14	9	0.571
QA 1			28.23	28.23			
QA 6			29.23	29.26			

CETIS Test Summary

Report Date: 29 Sep-05 12:06 PM
Test Link: 09-3849-6390/13696

Chironomus 10-d Survival and Growth Sediment Test — Pacific EcoRisk

Test No:	14-2079-6122	**Test Type:**	Survival-AF Growth	**Duration:**	10d 0h
Start Date:	12 Jul-05	**Protocol:**	USEPA Freshwater Sediment (2000)	**Species:**	Chironomus tentans
Ending Date:	22 Jul-05	**Dil Water:**	Not Applicable	**Source:**	Environmental Consult & Test
Setup Date:	12 Jul-05 12:00 AM	**Brine:**	Not Applicable		

Sample No:	07-3130-3027	**Material:**	Freshwater Sediment	**Client:**	Los Alamos National Laboratory
Sample Date:	30 Jun-05	**Code:**	10343	**Project:**	
Receive Date:	02 Jul-05 09:45 AM	**Source:**	Los Alamos National Laboratory		
Sample Age:	12d 0h (0 °C)	**Station:**	CALA-05-61181		

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
18-6875-7685	Mean AF Weight-mg	< 100	100	N/A	11.02%	Equal Variance t Two-Sample
04-8994-1571	Mean Dry Weight (mg)	< 100	100	N/A	13.44%	Equal Variance t Two-Sample
07-3727-1993	Proportion Survived	100	> 100	N/A	26.52%	Equal Variance t Two-Sample

Mean AF Weight-mg Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.77246	0.61200	0.89333	0.03825	0.10818	14.00%
100		8	0.45960	0.37667	0.62750	0.02952	0.08351	18.17%

Mean Dry Weight (mg) Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	1.15991	0.92778	1.41429	0.06843	0.19355	16.69%
100		8	0.71397	0.51333	0.98750	0.05610	0.15867	22.22%

Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Control Sed	8	0.76250	0.50000	1.00000	0.05650	0.15980	20.96%
100		8	0.73750	0.30000	1.00000	0.09625	0.27223	36.91%

Mean AF Weight-mg Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.89000	0.89333	0.61200	0.72125	0.71625	0.68222	0.83750	0.84714
100		0.42000	0.40555	0.44375	0.37667	0.62750	0.41900	0.44100	0.54333

Mean Dry Weight (mg) Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	1.25800	1.24500	1.03300	1.05375	0.95125	0.92778	1.39625	1.41429
100		0.61667	0.51333	0.63625	0.65333	0.98750	0.68700	0.70100	0.91667

Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Control Sed	0.50000	0.60000	1.00000	0.80000	0.80000	0.90000	0.80000	0.70000
100		0.30000	0.90000	0.80000	0.80000	0.40000	1.00000	1.00000	0.90000

Chironomus tentans 10-Day Freshwater Sediment Toxicity Test Data

Client: **Los Alamos** Test ID#: 13696 Date (Day 0): 7/12/05

DAY	Date	Temp. (°C)	CONTROL D.O. (OLD)	CONTROL D.O. (NEW)	CALA-05-61181 D.O. (OLD)	CALA-05-61181 D.O. (NEW)	SIGN-OFF
0	7/12/05	22.4	6.3	7.4	7.1	7.4	[illegible]
1	7/13/05	22.0	5.0 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.2	4.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.0	DC
2	7/14/05	22.1	5.4 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.3	5.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	6.8	RP 9.02
3	7/15/05	22.1	7.7 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.7	7.5 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.7	SC
4	7/16/05	22.3	8.2 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.1	8.5 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.5	MW
5	7/17/05	22.4	8.4 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.3	8.3 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.2	DC
6	7-18-05	22.4	7.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.9	7.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.8	MC
7	7-19-05 ~~7-18~~ MC	22.2	~~7.8~~ 7.3 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	~~7.9~~ 7.4	7.9 A 0 B 0 C 0 D ~~0~~ 1 E 0 F 0 G 0 H 0	8.0	NT
8	7-20-05	22.6	8.2 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.1	8.2 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.3	PL NT
9	7/21/05	22.6	7.8 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	7.8	8.0 A 0 B 0 C 0 D 0 E 0 F 0 G 0 H 0	8.1	RP
10	7-22-05	22.3	8.8 # Live Organisms/replicate A 5 B 6 C 10 D 8 E 8 F 8 G 8 H 7		8.1 # Live Organisms/replicate A 3 B 9 C 8 D 6 E 4 F 10 G 10 H 9		NT LW

Chironomus tentans Sediment Toxicity Test Weight Data

Client: Los Alamos Pan Wt Date: 7-22-05 Sign-Off: MC
Sample ID: CALA-05-61181 Dry Wt. Date: 7-27-05 Sign-Off: [illegible]
Test ID#: 13696 Test Date: 7/12/05 Ashed Wt. Date: 7/28/05 Sign-Off: MC

Dry Weight Calculations

Pan ID	Concentration/ Replicate		Initial Ashed Pan Wt. (mg)	Dry Pan + Larvae Wt. (mg)	# of Live Organisms			Mean Dry Larvae Weight (mg)
					Larvae	Pupae	Adult	
1	Control	A	67.83	74.12	5			1.258
2		B	64.80	73.27	6			1.412
3		C	65.03	75.38	10			1.033
4		D	64.14	72.57	8			1.054
5		E	70.42	78.03	8			0.951
6		F	69.46	77.81	9			0.928
7		G	67.74	78.91	8			1.396
8		H	68.40	78.30	7			1.414
65		A	69.39	71.24	3			0.617
66		B	63.26	67.88	9			0.513
67		C	67.43	72.52	8			0.636
68		D	66.07	69.99	6			0.653
69		E	65.36	69.31	4			0.988
70		F	73.52	80.39	10			0.687
71		G	68.86	75.87	10			0.701
72		H	69.24	77.49	9			0.917
QA 1			28.21	28.23				
QA 7			30.89	30.90				

Ash Free Dry Weight Calculations

Pan ID	Concentration/ Replicate		Dry Pan + Larvae Wt. (mg)	Ashed Pan + Larvae Wt. (mg)	Total Ash Free Dry Wt. of Larvae (mg)	# of Larvae	Mean Ash Free Dry Wt. of Larvae (mg)
1	Control	A	74.12	69.67	4.45	5	0.896
2		B	73.27	67.91	5.36	6	0.893
3		C	75.38	69.26	6.12	10	0.612
4		D	72.57	66.86	5.71	8	0.721
5		E	78.03	72.32	5.73	3	0.716
6		F	77.81	71.85	5.96	9	0.662
7		G	78.91	72.21	6.70	8	0.838
8		H	78.30	72.37	5.93	7	0.847
65		A	71.24	69.98	1.26	3	0.420
66		B	67.88	64.23	3.65	9	[illegible]
67		C	72.52	68.97	3.55	8	[illegible]
68		D	69.99	67.73	2.26	6	0.377
69		E	69.31	66.80	2.51	4	0.628
70		F	80.39	76.20	4.19	10	0.419
71		G	75.87	71.46	4.41	10	0.441
72		H	77.49	72.60	4.89	9	0.543
QA 1			28.23	28.23			
QA 7			30.90	30.93			

Appendix C

Test Data and Summary of Statistics for the Reference Toxicant Evaluation of the *Chironomus tentans*

CETIS Test Summary

Report Date: 05 Aug-05 9:32 AM
Test Link: 10-3447-3528/13986

Acute Chironomus Test — **Pacific EcoRisk**

Test No:	07-2414-5773	**Test Type:**	Survival (96h)	**Duration:**	94h
Start Date:	12 Jul-05 07:00 PM	**Protocol:**	USEPA Freshwater Sediment (2000)	**Species:**	Chironomus tentans
Ending Date:	16 Jul-05 05:10 PM	**Dil Water:**	Mod-Hard Synthetic Water	**Source:**	Environmental Consult & Test
Setup Date:	12 Jul-05 02:00 PM	**Brine:**	Not Applicable		

Sample No:	10-0441-5604	**Material:**	Copper sulfate	**Client:**	
Sample Date:	12 Jul-05	**Code:**	10380	**Project:**	
Receive Date:		**Source:**	Reference Toxicant		
Sample Age:	14h	**Station:**	In House		

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	PMSD	Method
05-8848-4885	96h Proportion Survived	< 200	200	N/A	20.28%	Dunnett's Multiple Comparison

Point Estimate Summary

Analysis	Endpoint	% Effect	Conc-µg/L	95% LCL	95% UCL	Method
08-5815-4684	96h Proportion Survived	15	36.35309	0.5143778	91.73023	Linear Regression
		20	44.34993	0.9131445	103.9774	
		25	52.59869	1.492783	115.8818	
		40	80.84417	5.122406	153.1222	
		50	104.6999	10.68648	182.2253	

96h Proportion Survived Summary

Conc-µg/L	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	3	0.86667	0.80000	1.00000	0.06667	0.11547	13.32%
200		3	0.23333	0.20000	0.30000	0.03333	0.05774	24.74%
400		3	0.06667	0.00000	0.10000	0.03333	0.05774	86.60%
800		3	0.03333	0.00000	0.10000	0.03333	0.05774	173.21
1600		3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
3200		3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%

96h Proportion Survived Detail

Conc-µg/L	Control Type	Rep 1	Rep 2	Rep 3
0	Lab Water	0.80000	1.00000	0.80000
200		0.30000	0.20000	0.20000
400		0.10000	0.00000	0.10000
800		0.10000	0.00000	0.00000
1600		0.00000	0.00000	0.00000
3200		0.00000	0.00000	0.00000

Analyst: AT Approval: LW

96-Hour Acute *Chironomus tentans* Reference Toxicant Test

Client: **Reference Toxicant**
Test Material: Copper Sulfate
Test ID#: 13986 Project #: 10350
Test Date: 7.12.05 Randomization: 3.1.1
Feeding Ti Time: 1500 Initials: DC

Organism Log #: 2358 Age: 10 d.o
Organism Supplier: ECT
Control/Diluent: EPAMH
Control Water Batch: 782
Feeding T+6hr Time: ____ Initials: ____

Treatment (µg/L)	Temp (°C)	pH	D.O. (mg/L)	Cond (µS/cm)	Alk	Hard	NH_3	# of Live Organisms Rep A	Rep B	Rep C	SIGN-OFF
Control	22.9	8.19	8.0	369	✓	✓	✓	10	10	10	Test Solution Prep: DC
200	22.1	8.14	7.9	336	✓	✓	✓	10	10	10	New WQ: PG
400	22.9	8.09	7.8	329	✓	✓	✓	10	10	10	Initiation Date: 7.12.05
800	22.9	7.99	8.1	330	✓	✓	✓	10	10	10	Initiation Time: [illegible]
1600	22.9	7.93	8.1	327	✓	✓	✓	10	10	10	Initiation Signoff: DC
3200	22.9	7.80	7.8	328	✓	✓	✓	10	10	10	
Control	22.8		7.6					9	10	9	Count Date: 7/13/05
200	22.8		7.6					~~8~~	7	~~8~~	Count Time: 1150
400	22.8		7.6					9	8	9	Count Signoff: DC
800	22.8		7.7					10	10	9	Old WQ: DC
1600	22.8		7.7					10	9	10	
3200	22.8		7.8					7	7	7	
Control	22.0		7.3					LW +2 9	10	9	Count Date: 7.14.05
200	22.0		7.2					4	3	3	Count Time: 1710
400	22.0		7.3					1	1	~~1~~ 2	Count Signoff: LW
800	22.0		7.3					LW +2	1	0	Old WQ: LW
1600	22.0		7.7					0	0	0	
3200	22.0		8.9					0	0	0	
Control	22.7		7.2					9	10	~~9~~ 8	Count Date: 7/15/05
200	22.7		6.8					3	3	~~1~~ 2	Count Time: 1500
400	22.7		6.9					1	0	1	Count Signoff: DC
800	22.7		7.1					1	0	—	Old WQ: CM
1600	22.7		7.9					—	—	—	
3200	22.7		8.1					—	—	—	
Control	22.6	8.19	7.5	372	✓	✓	✓	8	10	8	Termination Date: 7.16.05
200	22.6	8.10	7.1	369	✓	✓	✓	3	2	2	Termination Time: 1710
400	22.6	8.04	7.2	358	✓	✓	✓	1	—	1	Termination Signoff: LW
800	22.6	8.01	7.5	388	✓	✓	✓	1	—	—	Old WQ: LW
1600	22.6	8.12	8.0	359	✓	✓	✓	—	—	—	
3200	22.6	8.13	8.2	365	✓	✓	✓	—	—	—	