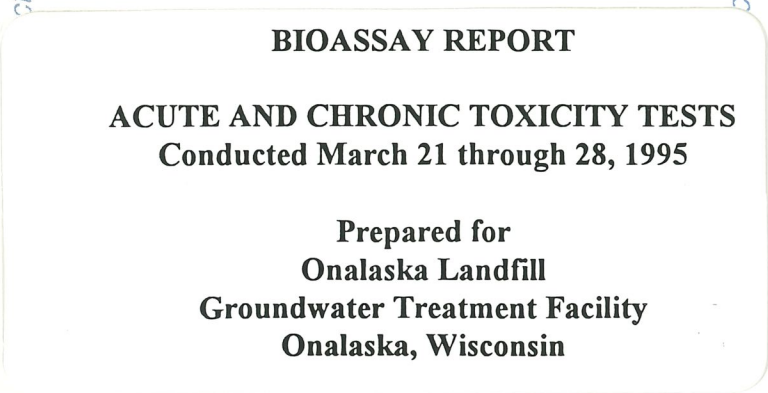


BIOASSAY REPORT

ACUTE AND CHRONIC TOXICITY TESTS
Conducted March 21 through 28, 1995

Prepared for
Onalaska Landfill
Groundwater Treatment Facility
Onalaska, Wisconsin



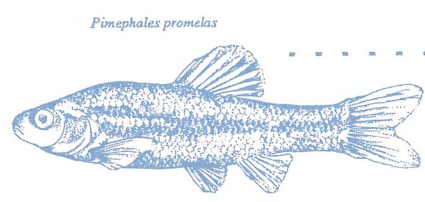
EC50
ACUTE

EC50
ACUTE



TRE

EC50
ACUTE



EC50
ACUTE

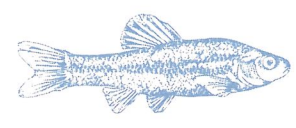
Chronic LC50

Chronic LC50

ACUTE



growth and reproduction

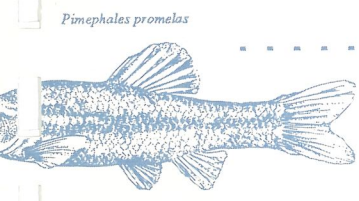


ACUTE

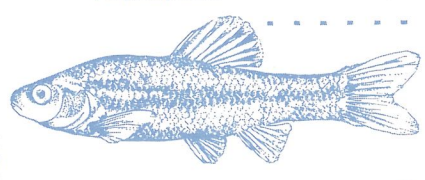


TRE

TRE

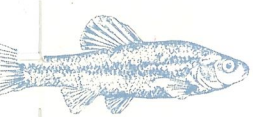


EC50
ACUTE



Chronic LC50

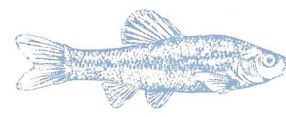
Chronic LC50



ACUTE



growth and reproduction



ACUTE

Pimephales promelas

TRE

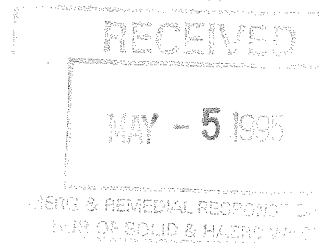
Pimephales promelas

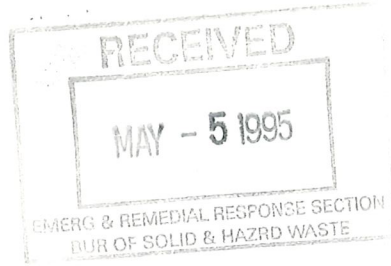
BIOASSAY REPORT
ACUTE AND CHRONIC TOXICITY TESTS
Conducted March 21 through 28, 1995

Prepared for
Onalaska Landfill
Groundwater Treatment Facility
Onalaska, Wisconsin

Prepared by
CH2M HILL
Bioassay Laboratory
15779 West Ryerson Road
New Berlin, Wisconsin 53151

Lab I.D. No. 636
April 1995





May 2, 1995

GLE65672.RA.11

Mr. Larry Lester
Wisconsin DNR
101 South Webster
Madison, WI 53707-7921

Dear Mr. Lester:

Subject: Onalaska Municipal Landfill Long Term Remedial Action
WA 79-5HL5; Contract No. 68-W8-0400

Enclosed is one copy of the bioassay test report for the most recent quarterly whole effluent toxicity testing for the Onalaska Municipal Landfill groundwater treatment facility. Results of the test indicate the effluent passed acute and chronic toxicity tests for samples collected in March of this year. The next test period is scheduled for sometime in June.

If you have questions on this matter please contact me or Jim Fisher at 414-272-2426.

Sincerely,

CH2M HILL

Steve Keith, P.E.
Site Manager

MKE10015D11.WP5

Enclosure

cc: Kevin Adler/WAM/U.S. EPA Region 5
David Hantz/WDNR/Madison
Charlie Cameron/WDNR/LaCrosse (w/out attachments)
Stephen Nathan/PO/U.S. EPA Region 5 (w/out attachments)
Brigitte Manzke/CO/U.S. EPA Region 5 (w/out attachments)
Alpheus Sloan III/PM/Milwaukee (w/out attachments)
Ike Johnson/APM-OPNS/Milwaukee (w/out attachments)
John Fleissner/QAM/Milwaukee (w/out attachments)
Cherie Wilson/AA/Milwaukee

Summary

CH2M HILL conducted acute and chronic toxicity tests on effluent samples provided by the Onalaska Landfill Groundwater Treatment Facility (LGTF), Onalaska, Wisconsin. The bioassays were conducted from March 21 through 28, 1995, as part of compliance biomonitoring for the State of Wisconsin. *Ceriodaphnia dubia*, *Daphnia magna*, and fathead minnows were used as the test organisms. The following is a summary of the test results:

Acute Toxicity

Test Media	<i>Ceriodaphnia dubia</i>	<i>Daphnia magna</i>	Fathead Minnow
Black River Control	Pass	Pass	Pass
100% Effluent	Pass	Pass	Pass
Laboratory Control	Pass	Pass	Pass

Chronic Toxicity

Test Media	<i>Ceriodaphnia dubia</i>		Fathead Minnow	
	Mean % Survival	Mean No. of Offspring	Mean % Survival	Mean Growth (mg)
Black River Control	100	31.1	74.5*	0.506
3.7% Effluent (IWC)	100	30.5	67.5	0.416
5% Effluent	100	32.1	78.8	0.563
10% Effluent	100	34.4	80.8	0.566
20% Effluent	90	28.3	80	0.558
40% Effluent	90	28.2	90	0.603
80% Effluent	90	26.7	90	0.613
IC ₂₅		>80%		> 80%
Laboratory Control	100	31.7	86.7	0.720
3.7% IWC (diluted with laboratory water)	100	33.5	87	0.661

* Indicates data did not meet acceptability criteria for use as a control.

For NPDES compliance purposes, the test results show that:

- The effluent samples were not acutely toxic to *Ceriodaphnia dubia*, *Daphnia magna*, or fathead minnows at 100 percent concentrations using the 50 percent lethality criteria.
- Black River water data did not meet the acceptable survival criterion of 80% for use as a control in the fathead minnow test. However, the greater survival of organisms in the higher effluent concentrations indicates that the effluent was not toxic. This was also substantiated by non-toxic results from the 37 percent IWC (diluted with laboratory water).
- The effluent samples were not chronically toxic to either *Ceriodaphnia dubia* or fathead minnows at the 3.7 percent IWC. The concentration of effluent that was estimated to be chronically toxic to both test organisms, based on the IC₂₅ analysis, was greater than 80 percent.
- Black River water met test acceptability criteria in all acute tests and *Ceriodaphnia* chronic test.
- Laboratory water data met test acceptability criteria in all acute and chronic bioassays.

Introduction

This report presents the results of the laboratory acute and chronic toxicity tests conducted by CH2M HILL on effluent samples provided by the Onalaska LGTF, Onalaska, Wisconsin. The bioassays used *Ceriodaphnia dubia*, *Daphnia magna*, and fathead minnows as the test organisms and were performed from March 21 through 28, 1995, as part of compliance biomonitoring for the State of Wisconsin.

Methods

All laboratory methods, including organism culture, sample handling, test procedures, and data analyses, were in accordance with the recommendations of the U.S. Environmental Protection Agency (EPA) [1, 2, 3, 4], the CH2M HILL Milwaukee Bioassay Laboratory's Standard Operating Procedures, and the Wisconsin Department of Natural Resources (DNR) biomonitoring requirements.

Sample Collection and Handling

Photocopies of the chain-of-custody forms are included in Appendix B. Three 24-hour composite effluent samples and one receiving water grab sample were used as follows:

Description	Sample No.	Date Collected	Date Tested
Black River	636.01	3/19	3/21-28
Stripping Tower Effluent	636.02	3/19-20	3/21-23
Stripping Tower Effluent	636.03	3/21-22	3/23-25
Stripping Tower Effluent	636.04	3/23-24	3/25-28

All samples were collected by Onalaska LGTF personnel and shipped or delivered on ice to the CH2M HILL Milwaukee Bioassay Laboratory. Upon arrival, samples were logged in and physicochemical characterizations were conducted. Samples not immediately prepared for testing were refrigerated (4°C) for later use.

Test Organisms

All test organisms were cultured at the CH2M HILL Milwaukee Bioassay Laboratory.

Test Procedures

Bioassays

Bioassay test conditions are summarized in Tables 1 through 5.

Table 1
Summary of Test Conditions for the
***Ceriodaphnia* Acute Bioassay**
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
March 21 through 23, 1995

1. Test organism	<i>Ceriodaphnia dubia</i> (Crustacea: Cladocera).
2. Test type	Static renewal.
3. Age of test organisms	Less than 24 hours.
4. Test chamber size	30 mL
5. Test solution volume	25 mL
6. Renewal of test solutions	Daily.
7. Replicate chambers per treatment	4
8. Test organisms per chamber	5
9. Primary control/dilution water	Receiving water: Black River.
10. Internal control water	Laboratory culture medium.
11. Effluent concentrations	6.25, 12.5, 25, 50, and 100%
12. Temperature	$20 \pm 1^{\circ}\text{C}$
13. Feeding regime	None.
14. Aeration	None.
15. Test duration	48 hours.
16. Sampling scheme	One 24-hour composite effluent sample. Maximum holding time of 48 hours between completion of collection and initial test use. One receiving water grab sample collected within 48 hours of test initiation. Laboratory water used was collected daily.
17. Effects measured	Survival.
18. Test acceptability	90% or greater mean survival in the laboratory or receiving water control.

Table 2
Summary of Test Conditions for the
***Daphnia* Acute Bioassay**
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
March 21 through 23, 1995

1.	Test organism	<i>Daphnia magna</i> (Crustacea: Cladocera).
2.	Test type	Static renewal.
3.	Age of test organisms	Less than 24 hours.
4.	Test chamber size	30 mL
5.	Test solution volume	25 mL
6.	Renewal of test solutions	Daily.
7.	Replicate chambers per treatment	4
8.	Test organisms per chamber	5
9.	Primary control/dilution water	Receiving water: Black River.
10.	Internal control water	Laboratory culture medium.
11.	Effluent concentrations	6.25, 12.5, 25, 50, and 100%
12.	Temperature	$20 \pm 1^{\circ}\text{C}$
13.	Feeding regime	None.
14.	Aeration	None.
15.	Test duration	48 hours.
16.	Sampling scheme	One 24-hour composite effluent sample. Maximum holding time of 48 hours between completion of collection and initial test use. One receiving water grab sample collected within 48 hours of test initiation. Laboratory water used was collected daily.
17.	Effects measured	Survival.
18.	Test acceptability	90% or greater mean survival in the laboratory or receiving water control.

Table 3
Summary of Test Conditions for the
Fathead Minnow Acute Bioassay
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
March 21 through 25, 1995

1. Test organism	<i>Pimephales promelas</i> (Osteichthyes: Cyprinidae).
2. Test type	Static renewal.
3. Age of test organisms	26 days old.
4. Test chamber size	500 mL
5. Test solution volume	400 mL
6. Renewal of test solutions	Daily.
7. Number of replicate chambers per treatment	2
8. Number of test organisms per chamber	10
9. Primary control/dilution water	Receiving water: Black River.
10. Internal control water	Laboratory culture medium.
11. Effluent concentrations	6.25, 12.5, 25, 50, and 100%
12. Temperature	$20 \pm 1^{\circ}\text{C}$
13. Feeding regime	None.
14. Aeration	None, unless DO concentration falls below 40% saturation (then, continuous at rate not exceeding 100 bubbles/minute).
15. Test duration	96 hours.
16. Loading rate	Less than 0.65 g/L.
17. Sampling scheme	Two separate 24-hour composite effluent samples, each used for a 48-hour exposure. Maximum holding time of 48 hours between completion of collection and initial test use for each sample. One grab sample of receiving water collected within 48 hours of test initiation. Laboratory water used was collected daily.
18. Effects measured	Survival.
19. Test acceptability	90% or greater mean survival in the laboratory or receiving water control.

Table 4
Summary of Test Conditions for the
***Ceriodaphnia* Chronic Bioassay**
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
March 21 through 28, 1995

1.	Test organism	<i>Ceriodaphnia dubia</i> (Crustacea: Cladocera).
2.	Test type	Static renewal.
3.	Age of test organisms	Less than 24 hours, all released within an 8-hour period (same generation from even-aged parents).
4.	Test chamber size	30 mL
5.	Test solution volume	15 mL
6.	Renewal of test solutions	Daily.
7.	Number of replicate chambers per treatment	10
8.	Number of test organisms per chamber	1
9.	Primary control/dilution water	Receiving water: Black River.
10.	Secondary control water	Laboratory culture medium.
11.	Effluent concentrations	3.7, 5, 10, 20, 40%, and 80%; additional 3.7% using laboratory water for dilution.
12.	Temperature	$25 \pm 1^{\circ}\text{C}$
13.	Feeding regime	0.1 mL each of YCT culture food and algae per test chamber daily.
14.	Aeration	None.
15.	Test duration	7 days.
16.	Sampling scheme	Three 24-hour composite effluent samples, each used for a minimum of 48 consecutive exposure hours. Maximum holding time of 48 hours between completion of collection and initial test use of each sample. One grab sample of receiving water collected within 48 hours of test initiation. Laboratory water used was collected as one batch.
17.	Effects measured	Survival and reproduction.
18.	Test acceptability	Laboratory or receiving water control with 80% or greater mean survival, an average of 15 or more young per surviving female, and at least 60% producing three broods.

Table 5
Summary of Test Conditions for the
Fathead Minnow Chronic Bioassay
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
March 21 through 28, 1995

1.	Test organism	<i>Pimephales promelas</i> (Osteichthyes: Cyprinidae).
2.	Test type	Static renewal.
3.	Age of test organisms	Larval, less than 24 hours.
4.	Test chamber size	500 mL
5.	Test solution volume	300 mL
6.	Renewal of test solutions	Daily.
7.	Replicate chambers per treatment	4
8.	Number of test organisms per chamber	10
9.	Primary control/dilution water	Receiving water: Black River.
10.	Secondary control water	Laboratory culture medium.
11.	Effluent concentrations	3.7, 5, 10, 20, 40%, and 80%; additional 3.7% using laboratory water for dilution.
12.	Temperature	$25 \pm 1^{\circ}\text{C}$
13.	Feeding regime	0.15 mL brine shrimp nauplii (less than 24 hours old) twice daily.
14.	Aeration	None, unless DO concentration falls below 40% saturation (then, continuous at rate not exceeding 100 bubbles/min).
15.	Cleaning	Siphon daily, immediately before test solution renewal.
16.	Test duration	7 days.
17.	Sampling scheme	Three 24-hour composite effluent samples, each used for a minimum of 48 consecutive exposure hours. Maximum holding time of 48 hours between completion of collection and initial test use of each sample. One grab sample of receiving water collected within 48 hours of test initiation. Laboratory water used was collected daily.
18.	Effects measured	Survival and growth (biomass).
19.	Test acceptability	Laboratory or receiving water control with 80% or greater mean survival, and surviving fish with at least 0.25 mg average dry weight.

Physicochemical Monitoring

Total alkalinity, hardness, and total ammonia were measured initially on each new sample. Total residual chlorine was measured initially on each effluent sample. Total alkalinity and hardness were measured once in the laboratory control media.

Dissolved oxygen (DO), pH, and conductivity were measured initially and daily thereafter in all test treatment renewals. DO and pH were measured in one test chamber or composite of each 24-hour-old test solution.

Bioassay incubator temperature was electronically monitored hourly by thermocouple and data logger, and a 24-hour summary of mean values was recorded.

Data Analysis

Pass/fail criteria were applied to acute toxicity data. A modified EPA mathematical analysis was used to estimate an IC₂₅ (the concentration that is inhibited 25 percent from the control data) on chronic toxicity data. The IC₂₅ value generated is the linear interpolation estimate.

Toxicity was defined according to the following DNR criteria:

Acute Toxicity

- Less than 50 percent survival of test organisms in 100 percent effluent at test termination (48 hours for *Ceriodaphnia dubia* and *Daphnia magna*, and 96 hours for fathead minnow).

Chronic Toxicity

- IC₂₅ value for *Ceriodaphnia dubia* reproduction or fathead minnow biomass less than the 3.7 percent instream wastewater concentration (IWC) after a nominal 7-day exposure.

Quality Assurance

Part of the quality assurance and quality control (QA/QC) program at the CH2M HILL Milwaukee Bioassay Laboratory includes the performance of organisms concurrently tested in laboratory media. Tables 1 through 5 present the test acceptability criteria for laboratory control data. The results of the laboratory control tests are listed in Tables 6 and 7.

In addition, other QA/QC procedures include performing monthly reference toxicant tests using reagent-grade sodium chloride. The results of reference toxicant tests conducted during the past 12 months on the appropriate test organisms are summarized in Appendix C.

Results

Photocopies of the laboratory data and computer printouts of the statistical analyses are found in Appendix A. There were no excursions from the protocols and all test conditions were within the limits required by the EPA and the DNR. The test results are summarized below.

Acute Bioassays

Table 6 presents the acute bioassay results. No acute toxicity was demonstrated to *Ceriodaphnia dubia*, *Daphnia magna*, or fathead minnows in the 100 percent effluent concentration. Black River and laboratory control data were acceptable in all tests.

Table 6
Summary of Results of Acute Bioassays
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
March 21 through 25, 1995

Test Media	Mean Percent Survival		
	<i>Ceriodaphnia dubia</i>	<i>Daphnia magna</i>	Fathead Minnow
Black River Control	100	100	100
6.25% Effluent	100	100	100
12.5% Effluent	100	100	100
25% Effluent	100	100	100
50% Effluent	100	100	100
100% Effluent	100	100	100
Laboratory Control	100	100	100

Chronic Bioassays

Table 7 presents the chronic bioassay results. No chronic toxicity was indicated to *Ceriodaphnia dubia* at the 3.7 percent IWC using the IC₂₅ criteria. The IC₂₅ value for reproduction was greater than 80 percent.

Black River water data did not meet the test acceptability criterion of 80% for use as a control in the fathead minnow test. However, the greater survival of organisms as effluent concentrations increase indicates that the effluent was not toxic. In addition, the 37 percent IWC diluted with laboratory water demonstrated no toxicity.

Black River water data were acceptable in the *Ceriodaphnia* bioassay, and laboratory control water data were acceptable in both bioassays .

Table 7
Summary of Results of Chronic Bioassays
Conducted for the Onalaska LGTF
Onalaska, Wisconsin
March 21 through 28, 1995

Test Media	<i>Ceriodaphnia dubia</i>		Fathead Minnow	
	Mean % Survival	Mean No. of Offspring	Mean % Survival	Mean Growth (mg)
Black River Control	100	31.1	74.5*	0.506
3.7% Effluent (IWC)	100	30.5	67.5	0.416
5% Effluent	100	32.1	78.8	0.563
10% Effluent	100	34.4	80.8	0.566
20% Effluent	90	28.3	80	0.558
40% Effluent	90	28.2	90	0.603
80% Effluent	90	26.7	90	0.613
IC ₂₅		>80%		> 80%
Laboratory Control	100	31.7	86.7	0.720
3.7% IWC (diluted with laboratory water)	100	33.5	87	0.661

* Indicates data did not meet acceptability criteria for use as a control.

Physicochemical Data

All physicochemical parameters measured satisfied the bioassay requirements (see Appendix A).

Conclusions

The results of the laboratory bioassays conducted on effluent samples collected by the Onalaska LGTF on March 20, 22, and 24, 1995, show:

- The effluent samples were not acutely toxic to *Ceriodaphnia dubia*, *Daphnia magna*, or fathead minnows at 100 percent concentrations using the 50 percent lethality criteria.
- Black River water data did not meet the acceptable survival criterion of 80% for use as a control in the fathead minnow test. However, the greater survival of organisms in the higher effluent concentrations indicates that the effluent was not toxic. This was also substantiated by non-toxic results from the 37 percent IWC (diluted with laboratory water). 3.7%
- The effluent samples were not chronically toxic to either *Ceriodaphnia dubia* or fathead minnows at the 3.7 percent IWC. The concentration of effluent that was estimated to be chronically toxic to both test organisms, based on the IC₂₅ analysis, was greater than 80 percent.
- Black River water met test acceptability criteria in all acute tests and *Ceriodaphnia* chronic test.
- Laboratory water data met test acceptability criteria in all acute and chronic bioassays.

References

1. Weber, C. I. (ed.). 1993. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms* (Fourth Edition). EPA/600/4-90/027F. U.S. EPA, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. 293 p.
2. Denny, J. S. 1987. *Guidelines for the Culture of Fathead Minnows, *Pimephales promelas*, for Use in Toxicity Tests*. EPA/600/3-87/001. U.S. EPA, Environmental Research Laboratory, Duluth, Minnesota. 42 p.
3. Weber, C. I., et al. 1989. *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (Second Edition). EPA/600/4-89/001. U.S. EPA, Environmental Monitoring Systems Laboratory, Cincinnati, Ohio. 249 p.
4. Weber, C. I., et al. 1989. *Supplement to Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (Revision 1). EPA/600/4-89/001a. U.S. EPA, Environmental Monitoring Systems Laboratory, Cincinnati, Ohio. 42 p.

APPENDIX A
LABORATORY DATA SHEETS
AND STATISTICAL ANALYSES

CH2M HILL MILWAUKEE BIOASSAY LABORATORY

CLIENT: Analaska Landfill

TEST DATE: 3-20-95

To the best of our knowledge, the laboratory data reported is true and accurate.

Report and Data:

Reviewed by:

Mary Wittmann Date: 4-20-95

_____ Date: _____

Approved by:

James Stark Date: 4-20-95

48-HOUR ACUTE TEST INITIAL CHEMICAL DATA*
(1-7 TREATMENTS)

PROJECT No.: ASE 142.32 CLIENT: Oneleaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia LAB MEDIA /No.: Culture media/636.APL
 SAMPLE No.(s): 636.01, 02 CONTROL/DILUENT: BLACK RIVER
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 3-21-95 TIME: 1400 TEST END DATE: 3-23-95 TIME: 1500
 ANALYST(s): J. Trammel CODE: _____

INITIAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HR)		COMMENTS
			0	24	
1	Lab	DO	8.9	8.1	
		pH	8.3	8.0	
		COND	.21	.20	
2	Black River	DO	8.9	8.7	
		pH	8.1	7.9	
		COND	.14	.14	
3	6.25%	DO	8.9	8.6	
		pH	7.8	7.8	
		COND	.15	.15	
4	12.5%	DO	8.8	8.7	
		pH	7.7	7.9	
		COND	.16	.19	
5	25%	DO	8.7	8.8	
		pH	7.8	8.1	
		COND	.19	.20	
6	50%	DO	8.7	8.9	
		pH	8.0	8.2	
		COND	.24	.25	
7	100%	DO	8.9	8.8	
		pH	8.3	8.4	
		COND	.34	.34	
DATE			3-21	3-22	
SAMPLE No.			.02	.02	
DETERMINED BY			JT	JT	

*DO as mg/L COND as mmho

Handwritten initials

48-HOUR ACUTE TEST FINAL CHEMICAL DATA*

(1-7 TREATMENTS)

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia LAB MEDIA /No.: Culture media/636.ADL
 SAMPLE No.(s): 636.01, .02 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 3-21-95 TIME: 1400 TEST END DATE: 3-23-95 TIME: 1500
 ANALYST(s): J. Tigmel CODE: _____

FINAL MEASUREMENT

TREAT NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HRS)		COMMENTS
			24	48	
1	Lab	DO	8.8	8.5	
		pH	8.3	8.3	
2	Black River	DO	8.8	8.5	
		pH	8.2	8.1	
3	6.25%	DO	8.8	8.5	
		pH	8.0	8.0	
4	12.5%	DO	8.7	8.5	
		pH	8.0	8.0	
5	25%	DO	8.7	8.5	
		pH	8.0	8.2	
6	50%	DO	8.8	8.5	
		pH	8.2	8.3	
7	100%	DO	8.8	8.5	
		pH	8.4	8.5	
DATE			3-22	3-23	
DETERMINED BY			JT	JT	

*DO as mg/L COND as mmho

MLL

48-HOUR ACUTE BIOASSAY SURVIVAL DATA

(4 Reps. 1-7 Treatments)

PROJECT No.: ASC 142.32 CLIENT: Alaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia AGE: <24H LOT No.: 381
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 636.01.02
 LAB MEDIA/No.: Culture media/636.ADL CONTROL/DILUENT: Black River
 TEST START DATE: 3-21-95 TIME: 1400 TEST END DATE: 3-23-95 TIME: 1500
 ANALYST(s): J. Trammel CODE: _____

TREAT. NO.	TEST SOLN	REP	FATALITIES PER EXPOSURE PERIOD (Hrs)		TOTAL FATAL	MEAN SURV.	COMMENTS
			24	48			
1	Lab	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
2	Black River	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
3	6.25%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
4	12.5%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
5	25%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
6	50%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
7	100%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
DATE			3-22	3-23			
DETERMINED BY			JT	JT			

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48-HOUR ACUTE TEST INITIAL CHEMICAL DATA*
(1-7 TREATMENTS)

PROJECT No.: ASE 142.32 CLIENT: Alaska Landfill
 TEST ORGANISM: Daphnia magna LAB MEDIA/No.: Culture media/636.ADL
 SAMPLE No.(s): 636.01.02 CONTROL/DILUENT: Black RIVER
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 3-21-95 TIME: 1345 TEST END DATE: 3-23-95 TIME: 1345
 ANALYST(s): J. Trammel CODE: _____

INITIAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HR)		COMMENTS
			0	24	
1	Lab	DO	8.9	8.1	
		pH	8.3	8.0	
		COND	.21	.20	
2	Black River	DO	8.9	8.7	
		pH	8.1	7.9	
		COND	.14	.14	
3	6.25%	DO	8.5	8.6	
		pH	7.8	7.8	
		COND	.15	.15	
4	12.5%	DO	8.8	8.7	
		pH	7.7	7.9	
		COND	.16	.19	
5	25%	DO	8.7	8.8	
		pH	7.8	8.1	
		COND	.19	.20	
6	50%	DO	8.7	8.9	
		pH	8.0	8.2	
		COND	.24	.25	
7	100%	DO	8.9	8.8	
		pH	8.3	8.4	
		COND	.34	.34	
DATE			3-21	3-22	
SAMPLE No.			102	102	
DETERMINED BY			JT	JT	

*DO as mg/L COND as mmho

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48-HOUR ACUTE TEST FINAL CHEMICAL DATA*

(1-7 TREATMENTS)

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Daphnia magna LAB MEDIA /No.: Culture media /ADL
 SAMPLE No.(s): 636.01.02 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 3-21-95 TIME: 1345 TEST END DATE: 3-23-95 TIME: 1345
 ANALYST(s): J. Trimmel CODE: _____

FINAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HRS)		COMMENTS
			24	48	
1	Lab	DO	8.7	8.6	
		pH	8.3	8.3	
2	Black River	DO	8.7	8.6	
		pH	8.1	8.1	
3	6.25%	DO	8.8	8.6	
		pH	8.0	7.9	
4	12.5%	DO	8.7	8.6	
		pH	7.9	8.2	
5	25%	DO	8.7	8.6	
		pH	7.9	8.2	
6	50%	DO	8.7	8.5	
		pH	8.3	8.3	
7	100%	DO	8.7	8.5	
		pH	8.5	8.5	
DATE			3-22	3-23	
DETERMINED BY			JT	JT	

*DO as mg/L COND as mmho

48-HOUR ACUTE BIOASSAY SURVIVAL DATA

(4 Reps. 1-7 Treatments)

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Daphnia magna AGE: 424H LOT No.: 409
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 636.01, .02
 LAB MEDIA/No.: Culture media/ADL CONTROL/DILUENT: Black River
 TEST START DATE: 3-21-95 TIME: 1345 TEST END DATE: 3-23-95 TIME: 1345
 ANALYST(s): J. Trammel CODE: _____

TREAT. NO.	TEST SOLN	REP	FATALITIES PER EXPOSURE PERIOD (Hrs)		TOTAL FATAL.	MEAN SURV.	COMMENTS
			24	48			
1	Lab	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
2	Black River	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
3	6.25%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
4	12.5%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
5	25%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
6	50%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
7	100%	A	0	0	0	100%	
		B	0	0	0		
		C	0	0	0		
		D	0	0	0		
DATE			3-22	3-23			
DETERMINED BY			JT	JT			

msb

96-HOUR ACUTE TEST INITIAL CHEMICAL DATA*

(1-7 TREATMENTS)

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow LAB MEDIA /No.: Culture media/636.AFL
 SAMPLE No.(s): 636.01, 02, 03 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 3-21-95 TIME: 1300 TEST END DATE: 3-25-95 TIME: 1130
 ANALYST(s): J. Trammel CODE: _____

INITIAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HRS)				COMMENTS
			0	24	48	72	
1	Lab	DO	8.8	8.6	8.1	8.7	
		pH	8.3	8.0	7.9	8.0	
		COND	.20	.20	.21	.20	
2	Black River	DO	8.9	8.3	8.1	8.7	
		pH	8.1	7.8	7.7	7.9	
		COND	.14	.14	.15	.14	
3	6.25%	DO	8.5	8.5	8.2	8.6	
		pH	7.8	7.7	7.5	7.8	
		COND	.15	.15	.16	.15	
4	12.5%	DO	8.8	8.5	8.4	8.7	
		pH	7.7	7.7	7.5	7.9	
		COND	.16	.17	.18	.19	
5	25%	DO	8.7	8.5	8.6	8.8	
		pH	7.8	7.8	7.5	8.1	
		COND	.19	.20	.20	.20	
6	50%	DO	8.7	8.5	8.7	8.9	
		pH	8.0	7.8	7.8	8.2	
		COND	.24	.24	.26	.25	
7	100%	DO	8.9	8.6	8.9	8.8	
		pH	8.3	8.0	8.2	8.4	
		COND	.34	.36	.36	.34	
DATE			3-21	3-22	3-23	3-24	
SAMPLE No.			.02	.02	.03	.03	
DETERMINED BY			JT	JT	JT	JT	

*DO as mg/L COND as mmho

WLB

96-HOUR ACUTE TEST FINAL CHEMICAL DATA*
(1-7 TREATMENTS)

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow LAB MEDIA /No.: Culture media/636.AFL
 SAMPLE No.(s): 636.01, 02, 03 CONTROL/DILUENT: BLACK RIVER
 SAMPLE DESCRIPTION: EFFLUENT
 TEST START DATE: 3-21-95 TIME: 1300 TEST END DATE: 3-25-95 TIME: 1130
 ANALYST(s): J. Trammel CODE: _____

FINAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE PERIOD (HRS)				COMMENTS
			24	48	72	96	
1	Lab	DO	7.8	8.3	8.3	8.2	
		pH	7.8	8.0	8.0	8.1	
2	Black River	DO	7.8	8.1	8.2	8.1	
		pH	7.7	7.8	7.8	7.9	
3	6.25%	DO	7.8	8.0	8.2	8.1	
		pH	7.7	7.7	7.8	7.8	
4	12.5%	DO	7.8	8.0	8.2	8.1	
		pH	7.6	7.6	7.7	7.7	
5	25%	DO	7.8	8.0	8.1	8.1	
		pH	7.8	7.8	7.8	7.8	
6	50%	DO	7.8	8.0	8.1	7.9	
		pH	7.8	7.9	7.9	8.0	
7	100%	DO	7.8	8.0	8.1	8.0	
		pH	8.1	8.2	8.2	8.3	
DATE			3-22	3-23	3-24	3-25	
DETERMINED BY			JT	JT	JT	JT	

*DO as mg/L

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96-HOUR ACUTE BIOASSAY SURVIVAL DATA

(1 - 7 Treatments)

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow AGE: 26 D LOT No.: 1680, 1682
 SAMPLE DESCRIPTION: EFFLUENT
 SAMPLE No.(s): 636.01, 02, 03
 LAB MEDIA/No.: Culture media/636.AFL CONTROL/DILUENT: Black River
 TEST START DATE: 3-21-95 TIME: 1300 TEST END DATE: 3-25-95 TIME: 1130
 ANALYST(s): J. Trammel CODE: _____

TREAT. NO.	TEST SOLN	REP	FATALITIES PER EXPOSURE PERIOD (Hrs)				TOTAL FATALITIES	MEAN SURVIVAL
			24	48	72	96		
1	Lab	A	0	0	0	0	0	100%
		B	0	0	0	0	0	
2	Black River	A	0	0	0	0	0	100%
		B	0	0	0	0	0	
3	6.25%	A	0	0	0	0	0	100%
		B	0	0	0	0	0	
4	12.5%	A	0	0	0	0	0	100%
		B	0	0	0	0	0	
5	25%	A	0	0	0	0	0	100%
		B	0	0	0	0	0	
6	50%	A	0	0	0	0	0	100%
		B	0	0	0	0	0	
7	100%	A	0	0	0	0	0	100%
		B	0	0	0	0	0	
DATE			3-22	3-23	3-24	3-25		
DETERMINED BY			JT	JT	JT	JT		

COMMENTS:

MW

CHRONIC TEST
INITIAL CHEMICAL DATA*

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia LAB MEDIA /No.: Culture media/636.CCL
 SAMPLE No.(s): 636.01, 02, 03, 04 CONTROLDILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 3-21-95 TIME: 1600 TEST END DATE: 3-28-95 TIME: 1700
 ANALYST(S): M. Stumm, J. Trammel, J. Stark CODE: _____

TREAT NO.	TEST SOLN.	PARAMETER	EXPOSURE DAY							COMMENTS
			0	1	2	3	4	5	6	
1	LAB	DO	8.0	8.1	8.2	8.1	8.4	8.4	7.8	
		pH	8.1	8.1	8.2	8.2	8.2	8.2	8.0	
		COND	0.20	.21	0.20	0.23	.22	0.22	.20	
2	Black River	DO	8.3	8.2	8.2	8.2	8.1	8.1	7.9	
		pH	7.7	7.7	7.9	8.0	8.1	8.1	7.9	
		COND	0.14	.15	0.15	0.16	.15	0.15	.15	
3	3.7%	DO	8.0	8.1	8.1	8.2	8.2	8.2	8.0	
		pH	7.6	7.4	7.8	7.9	8.0	8.0	7.9	
		COND	0.14	.15	0.15	0.15	.16	0.16	.16	
4	5%	DO	7.8	8.0	7.9	8.0	8.2	8.2	8.0	
		pH	7.5	7.6	7.8	7.8	7.9	7.9	7.7	
		COND	0.14	.15	0.16	0.15	.15	0.16	.16	
5	10%	DO	7.8	7.9	7.8	8.1	8.2	8.2	8.0	
		pH	7.5	7.5	7.8	7.8	7.9	7.9	7.7	
		COND	0.16	.16	0.16	0.16	.17	0.17	.16	
6	20%	DO	7.8	7.9	7.8	8.0	8.1	8.1	8.1	
		pH	7.7	7.4	7.9	7.8	7.9	7.8	7.7	
		COND	0.17	.17	0.18	0.18	.20	0.20	.19	
7	40%	DO	7.7	7.9	7.9	8.0	8.0	8.1	8.1	
		pH	7.9	7.9	8.0	8.0	8.3	8.3	7.7	
		COND	0.22	.22	0.23	0.23	.23	0.22	.23	
DATE		3-21-95	3-22	3-23	3-24	3-25	3-26	3-27		
SAMPLE NO.		.02	.02	.03	.03	.04	.04	.04		
DETERMINED BY		MS	MS	MS	MS	J1	JS	JT		

*DO = DISSOLVED OXYGEN (mg/L)

COND = CONDUCTIVITY (mmho)

CHRONIC TEST CHEMICAL DATA*
(1-4 TREATMENTS)

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia LAB MEDIA/No.: Culture media/636.CCL
 SAMPLE No.(s): 636.01, .02, .03, .04 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent +
 TEST START DATE: 3-21-95 TIME: 1600 TEST END DATE: 3-28-95 TIME: 1700
 ANALYST(s): M. Scanaway, J. Tramme/Stark CODE: _____

INITIAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE DAY							COMMENTS
			0	1	2	3	4	5	6	
8	80%	DO	7.7	7.9	8.0	7.9	8.3	8.1	8.1	
		pH	8.2	8.1	8.3	8.2	8.2	8.2	8.2	
		COND	0.31	.72	0.33	0.31	.23	0.33	.29	
9	LAB Inc 3.7%	DO	7.9	7.8	8.0	7.8	8.0	8.0	8.1	
		pH	8.0	8.0	8.4	8.4	8.3	8.3	8.2	
		COND	0.22	.24	0.24	0.26	.23	0.22	.25	
3	X	DO								
		pH								
		COND								
4	X	DO								
		pH								
		COND								
DATE			3-21-95	3-22	3-23	3-24	3-25	3-26	3-27	
SAMPLE No.			.02	.02	.03	.03	.04	.04	.04	
DETERMINED BY			MS	MS	MS	MS	JT	JS	JT	

FINAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE DAY							COMMENTS
			1	2	3	4	5	6	7	
8	80%	DO	8.4	8.3	7.8	8.1	8.3	8.3	8.4	
		pH	8.4	8.4	8.3	8.4	8.3	8.4	8.4	
9	LAB Inc 3.7%	DO	8.3	8.4	7.7	8.1	8.3	8.3	8.4	
		pH	8.6	8.5	8.2	8.4	8.5	8.5	8.4	
3	X	DO								
		pH								
4	X	DO								
		pH								
DATE			3-21	3-22	3-24	3-25	3-26	3-27	3-28	
DETERMINED BY			MS	MS	MS	JT	JT	JT	JT	

*DO = Dissolved Oxygen (mg/L) COND = Conductivity (mmho)

CHRONIC TEST
FINAL CHEMICAL DATA*

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Ceriodaphnia dubia LAB MEDIA /No.: Culture media/636.CCL
 SAMPLE No.(s): 636.01, .02, .03, .04 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 3-21-95 TIME: 1600 TEST END DATE: 3-28-95 TIME: 1700
 ANALYST(s): M. STANAWAY, J. Trammel CODE: _____

TREAT NO	TEST SOLN	PARA-METER	EXPOSURE DAY						
			1	2	3	4	5	6	7
1	LAB	DO	8.6	8.7	8.5	8.2	8.4	8.1	8.8
		pH	8.4	8.4	8.2	8.5	8.2	8.2	8.5
2	Black River	DO	8.6	8.7	8.3	8.2	8.4	8.1	8.5
		pH	8.3	8.3	8.1	8.3	8.1	7.8	8.4
3	3.7%	DO	8.5	8.5	8.4	8.2	8.3	8.2	8.5
		pH	8.2	8.2	8.0	8.1	8.0	7.8	8.2
4	5%	DO	8.3	8.5	8.3	8.2	8.3	8.2	8.5
		pH	8.1	8.1	7.9	8.0	8.0	7.8	8.2
5	10%	DO	8.3	8.5	8.3	8.2	8.2	8.1	8.8
		pH	8.1	8.1	7.9	8.0	8.0	7.9	8.3
6	20%	DO	8.3	8.4	8.0	8.1	8.2	8.1	8.4
		pH	8.1	8.1	7.9	8.0	8.0	7.9	8.2
7	40%	DO	8.2	8.3	7.9	8.1	8.3	8.2	8.3
		pH	8.2	8.2	7.8	8.2	8.1	8.0	8.3
DATE			3-22	3-23	3-24	3-25	3-26	3-27	3-28
DETERMINED BY			MS	MS	MS	JT	JT	JT	JT

*DO = Dissolved Oxygen (mg/L) COND = Conductivity (mmho)

COMMENTS:

CHRONIC BIOASSAY REPRODUCTION AND SURVIVAL DATA

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Caridodaphnia dubia AGE: 224H LOT No.: 614
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 636.01, 02, 03, 04
 LAB MEDIA/No.: Culture media / 636.CCL CONTROL/DILUENT: Black River
 TEST START DATE: 3-21-95 TIME: 1600 TEST END DATE: 3-28-95 TIME: 1700
 ANALYST(S): M. STANAWAY, J. Trammel CODE: _____ PAGE 1 OF 5

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS		
			1	2	3	4	5	6	7	8	9	10			
1	LAB	1	OK												
		2	OK												
		3	G												
		4	5	6	5	5	6	5	5	6	6	5			
		5	12	0	0	10	9	8	0	8	9	0			
		6	80	8	8	0	0	1	11	0	0	9			
		7	15	17	19	16	19	18	19	17	16	14			
												SUMMARY			
												TOTAL	MEAN		
NO. of YOUNG												317	31.7		
NO. of BROODS												30	3		
ADULT FATALITIES												0	% SURVIVAL: 100		
2	Black River	1	OK												
		2	OK												
		3	G												
		4	4	4	5	5	4	3	5	4	4	4			
		5	8	8	7	12	9	7	10	10	8	12			
		6	0	0	0	0	0	0	0	0	0	0			
		7	16	15	20	18	18	17	19	18	20	17			
												SUMMARY			
												TOTAL	MEAN		
NO. of YOUNG												311	31.1		
NO. of BROODS															
ADULT FATALITIES												0	% SURVIVAL: 100		
EXPOSURE DAY		0	1	2	3	4	5	6	7						
DATE		3-21	3-22	3-23	3-24	3-25	3-26	3-27	3-28						
DETERMINED / FED BY		ms	ms	ms	ms	JT	JT	JT	JT						

G = GRAVID E = EYED R = RELEASING YOUNG AD = ADULT DEAD YD = YOUNG DEAD

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CHRONIC BIOASSAY REPRODUCTION AND SURVIVAL DATA

PROJECT No.: ASE 14232 CLIENT: Onalaska Landfill
 TEST ORGANISM: Caridodaphnia dubia AGE: L244 LOT No.: 614
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 636.01, .02, .03, .04
 LAB MEDIA/No.: Culture media / 636.CCL CONTROL/DILUENT: Black River
 TEST START DATE: 3-21-95 TIME: 1600 TEST END DATE: 3-28-95 TIME: 1700
 ANALYST(s): M. Stanaway, J. Trammel CODE: _____ PAGE 2 OF 5

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS			
			1	2	3	4	5	6	7	8	9	10				
3	3.7%	1	OK													
		2	OK													
		3	G													
		4	4	5	4	4	5	5	5	4	3	4				
		5	10	10	9	8	9	6	7	8	10	9				
		6	0	0	0	0	0	0	0	0	0	0				
		7	18	18	16	15	17	17	16	21	19	19				
												SUMMARY				
												TOTAL	MEAN			
NO. of YOUNG												305	30.5			
NO. of BROODS																
ADULT FATALITIES												0	% SURVIVAL 100			
4	5%	1	OK													
		2	OK													
		3	OK													
		4	4	4	4	4	4	2	2	4	3	0				
		5	8	10	8	8	0	9	9	8	7	8				
		6	0*	0	0	0	12	0	0	0	0	12				
		7	1	22	18	18	15	19	20	22	18	19				
												SUMMARY				
												TOTAL	MEAN			
NO. of YOUNG												307	30.7			
NO. of BROODS												289	32.1			
ADULT FATALITIES												0	% SURVIVAL 100			
EXPOSURE DAY																
DATE																
DETERMINED / FED BY																

* ADULT LOST DURING TRANSFER. JT

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G = GRAVID E = EYED R = RELEASING YOUNG AD = ADULT DEAD YD = YOUNG DEAD

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CHRONIC BIOASSAY REPRODUCTION AND SURVIVAL DATA

PROJECT No.: ASE 14232 CLIENT: Onalaska Landfill
 TEST ORGANISM: Caridodaphnia dubia AGE: L244 LOT No.: 614
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 636.01, 02, 03, 04
 LAB MEDIA/No.: Culture media / 636. CCL CONTROL/DILUENT: Black River
 TEST START DATE: 3-21-95 TIME: 1600 TEST END DATE: 3-28-95 TIME: 1200
 ANALYST(s): M. STANAWAY, J. Trammel CODE: _____ PAGE 3 OF 5

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS	
			1	2	3	4	5	6	7	8	9	10		
5	10%	1	OK											
		2	OK											
		3	OK											
		4	4	5	5	5	6	4	5	6	6	5		
		5	10	9	10	10	9	9	0	10	10	9		
		6	0	0	0	0	0	0	13	0	0	0		
		7	21	20	17	17	17	20	20	17	24	21		
												SUMMARY		
												TOTAL	MEAN	
NO. of YOUNG			35	34	32	32	32	33	34	33	40	35	344	
NO. of BROODS														
ADULT FATALITIES			0	0	0	0	0	0	0	0	0	0	% SURVIVAL 100	
6	20%	1	OK											
		2	OK											
		3	OK											
		4	5	6	4	5	5	4	5	4	5	0		
		5	9	10	12	0	9	9	10	11	10	0		
		6	0	0	0	9	0	0	0	0	0	AD		
		7	19	19	18	19	16	14	13	18	15	1		
												SUMMARY		
												TOTAL	MEAN	
NO. of YOUNG			33	35	34	33	30	27	28	33	30	0	283	28.3
NO. of BROODS														
ADULT FATALITIES			0	0	0	0	0	0	0	0	0	0	% SURVIVAL 90	
EXPOSURE DAY			0	1	2	3	4	5	6	7				
DATE			3-21	3-22	3-23	3-24	3-25	3-26	3-27	3-28				
DETERMINED / FED BY			ms	MS	MS	MS	JT	JT	JT	JT				

G = GRAVID E = EYED R = RELEASING YOUNG AD = ADULT DEAD YD = YOUNG DEAD

ms

CHRONIC BIOASSAY REPRODUCTION AND SURVIVAL DATA

PROJECT No.: ASE 14232 CLIENT: Onalaska Landfill
 TEST ORGANISM: Caridophnia dubia AGE: 2244 LOT No.: 614
 SAMPLE DESCRIPTION: Ephemera
 SAMPLE No.(s): 636.01, 02, 03, 04
 LAB MEDIA/No.: Culture media / 636.01-04 CONTROL/DILUENT: Black River
 TEST START DATE: 3-21-95 TIME: 1600 TEST END DATE: 4-28-95 TIME: 1700
 ANALYST(s): M. Scanaway, J. Trammel CODE: _____ PAGE 4 OF 5

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS		
			1	2	3	4	5	6	7	8	9	10			
7	40%	1	OK												
		2	OK	AD	OK										
		3	OK		OK										
		4	4		4	5	4	5	5	5	6	5			
		5	10		12	12	10	10	11	9	8	10			
		6	0		0	0	0	0	0	0	0	0			
		7	17		16	19	13	16	17	16	13	20			

SUMMARY												
TOTAL												MEAN
NO. of YOUNG	31	0	32	36	27	31	33	30	27	35	292	28.2
NO. of BROODS												
ADULT FATALITIES	0	1	0	0	0	0	0	0	0	0	1	% SURVIVAL 90

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS	
			1	2	3	4	5	6	7	8	9	10		
8	60%	1	OK											
		2	OK											
		3	OK											
		4	5	0	4	5	5	4	4	5	4	3		
		5	0	8	7	10	9	12/AD	0	7	10	8		
		6	8	0	0	0	0		9	0	0	0		
		7	16	15	15	15	16		17	15	16	15		

SUMMARY												
TOTAL												MEAN
NO. of YOUNG	29	23	26	30	30	16	30	27	30	26	267	26.7
NO. of BROODS												
ADULT FATALITIES	0	0	0	0	0	0	0	0	0	0	1	% SURVIVAL 90

EXPOSURE DAY	0	1	2	3	4	5	6	7				
DATE	3-21	3-22	3-23	3-24	3-25	3-26	3-27	3-28				
DETERMINED / FED BY	ms	MS	MS	MS	JT	JT	JT	JT				

G = GRAVID E = EYED R = RELEASING YOUNG AD = ADULT DEAD YD = YOUNG DEAD

ms

CHRONIC BIOASSAY REPRODUCTION AND SURVIVAL DATA

PROJECT No.: ASE 14232 CLIENT: Onalaska Landfill
 TEST ORGANISM: Caridophnia dubia AGE: 2244 LOT No.: 614
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 636.01, .02, .03, .04
 LAB MEDIA/No.: Culture media / 636. CCL CONTROL/DILUENT: Black River
 TEST START DATE: 3-21-95 TIME: 1600 TEST END DATE: 3-28-95 TIME: 1700
 ANALYST(s): M. Stanaway, J. Trammel CODE: _____ PAGE 5 OF 5

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS		
			1	2	3	4	5	6	7	8	9	10			
9	Lab IWC 3.7%	1	OK												
		2	OK												
		3													
		4	0	5	0	5	5	6	6	6	5	5			
		5	7	0	5	0	0	0	0	0	0	0			
		6	12	9	9	9	13	12	12	12	9	10			
		7	21	23	18	19	18	20	18	20	17	DE			

												SUMMARY		
												TOTAL	MEAN	
NO. of YOUNG			40	36	32	33	36	38	36	38	31	15	335	33.5
NO. of BROODS														
ADULT FATALITIES			0	0	0	0	0	0	0	0	0	0	0	% SURVIVAL 100

TREAT. NO.	TEST SOLN	DAY	OFFSPRING PER REPLICATE										COMMENTS	
			1	2	3	4	5	6	7	8	9	10		
 	 	1												
		2												
		3												
		4												
		5												
		6												
		7												

												SUMMARY		
												TOTAL	MEAN	
NO. of YOUNG														
NO. of BROODS														
ADULT FATALITIES														% SURVIVAL

EXPOSURE DAY	0	1	2	3	4	5	6	7
DATE	3-21	3-22	3-23	3-24	3-25	3-26	3-27	3-28
DETERMINED / FED BY	ms	ms	ms	ms	JT	JT	JT	JT

G = GRAVID E = EYED R = RELEASING YOUNG AD = ADULT DEAD YD = YOUNG DEAD

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EEE

Inhibition Concentration
Calculation
(ICx)

CH2M Hill
July 1991

Client: Onalaska Landfill
Project Number: ASE142.32
Test Solution: Effluent
Test Date: March 21, 1995
Test Organism: Ceriodaphnia dubia
Response Measured: Reproduction

Concentration (%)	Mean Response	Smoothed Mean Response
Control	31.100	32.028
3.70	30.500	32.028
5.00	32.111	32.028
10.00	34.400	32.028
20.00	28.300	28.300
40.00	28.200	28.200
80.00	26.700	26.700

IC25 (%) Toxic Units
Linear Interpolation Estimate > 80.00

CHRONIC TEST
INITIAL CHEMICAL DATA*

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow LAB MEDIA /No.: Culture media / 636 CFL
 SAMPLE No.(s): 63601, 02, 03, 04 CONTROLDILUENT: Black River
 SAMPLE DESCRIPTION: Effluent +
 TEST START DATE: 3-21-95 TIME: 1130 TEST END DATE: 3-28-95 TIME: 1230
 ANALYST(S): M. Stanaway, J. Trammell, J. Stark CODE: _____

TREAT NO.	TEST SOLN.	PARAMETER	EXPOSURE DAY							COMMENTS
			0	1	2	3	4	5	6	
1	LAB	DO	8.2	8.3	8.2	8.2	8.1	8.1	8.3	
		pH	8.1	8.2	8.2	8.2	8.3	8.3	8.3	
		COND	0.19	.19	0.21	0.21	.22	0.22	.21	
2	Black River	DO	8.3	8.2	8.2	8.2	8.1	8.1	8.3	
		pH	7.7	7.7	7.9	8.0	8.1	8.1	8.0	
		COND	0.14	.15	0.15	0.16	.15	0.15	.16	
3	3.7%	DO	8.0	8.1	8.1	8.2	8.2	8.2	8.2	
		pH	7.6	7.6	7.8	7.9	8.0	8.0	7.9	
		COND	0.14	.15	0.15	0.15	.16	0.16	.17	
4	5%	DO	7.8	8.0	7.9	8.0	8.2	8.2	8.2	
		pH	7.5	7.6	7.8	7.8	7.9	7.9	7.9	
		COND	0.14	.15	0.16	0.15	.15	0.16	.18	
5	10%	DO	7.8	7.9	7.8	8.1	8.2	8.2	8.2	
		pH	7.5	7.5	7.8	7.8	7.9	7.9	7.8	
		COND	0.16	.16	0.16	0.16	.17	0.17	.19	
6	20%	DO	7.8	7.9	7.8	8.0	8.1	8.1	8.2	
		pH	7.7	7.6	7.9	7.8	7.8	7.8	7.8	
		COND	0.17	.17	0.18	0.18	.20	0.20	.21	
7	40%	DO	7.7	7.9	7.9	8.0	8.0	8.1	8.2	
		pH	7.9	7.9	8.0	8.0	8.3	8.3	8.1	
		COND	0.22	.22	0.23	0.23	.23	0.23	.24	
DATE			3-21-95	3-22	3-23	3-24	3-25	3-26	3-27	
SAMPLE NOS			02	02	.03	.03	04	04	.04	
DETERMINED BY			MS	MS	MS	MS	JT	JT	JT	

*DO = DISSOLVED OXYGEN (mg/L) COND = CONDUCTIVITY (mmho)

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CHRONIC TEST
FINAL CHEMICAL DATA*

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fothead minnow LAB MEDIA / No.: Culture media / 636.cfl
 SAMPLE No.(s): 636.01, .02, .03, .04 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent
 TEST START DATE: 3-21-95 TIME: 1130 TEST END DATE: 3-28-95 TIME: 1230
 ANALYST(s): M. STANAWA, J. Trammel CODE: _____

TREAT NO.	TEST SOLN	PARA METER	EXPOSURE DAY						
			1	2	3	4	5	6	7
1	LAB	DO	7.6	8.2	8.7	8.1	7.4	7.4	7.0
		pH	8.1	8.1	8.4	8.1	8.1	8.1	7.9
2	Black River	DO	7.2	8.1	8.3	7.5	7.4	7.4	7.1
		pH	7.9	7.9	8.1	8.0	8.0	8.0	7.9
3	3.7%	DO	7.3	7.9	8.0	7.5	7.3	7.4	7.1
		pH	7.8	7.8	7.9	7.8	7.7	8.0	7.9
4	5%	DO	7.3	8.0	7.8	7.4	7.2	7.2	7.1
		pH	7.7	7.7	7.9	7.8	7.7	8.0	7.7
5	10%	DO	7.2	7.9	7.7	7.3	7.2	7.2	7.0
		pH	7.7	7.7	7.8	7.7	7.7	7.8	7.6
6	20%	DO	7.2	7.8	7.6	7.3	7.2	7.0	6.8
		pH	7.7	7.7	7.8	7.8	7.7	7.7	7.6
7	40%	DO	7.2	7.6	7.6	7.3	7.1	6.7	6.9
		pH	7.7	7.8	7.9	7.9	7.7	7.7	7.6
DATE			3-22-95	3-23	3-24	3-25	3-26	3-27	3-28
DETERMINED BY			MS	MS	MS	JT	JT	JT	JT

*DO = Dissolved Oxygen (mg/L) COND = Conductivity (mmho)

COMMENTS:

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CHRONIC TEST CHEMICAL DATA* (1-4 TREATMENTS)

PROJECT No.: ASE 14232 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow LAB MEDIA /No.: Culture media / 636. CFL
 SAMPLE No.(s): 636.01, .02, .03, .04 CONTROL/DILUENT: Black River
 SAMPLE DESCRIPTION: Effluent +
 TEST START DATE: 3-21-95 TIME: 1130 TEST END DATE: 3-28-95 TIME: 1230
 ANALYST(s): M. Stanaway, J. Trammel, J. Stark CODE: _____

INITIAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE DAY							COMMENTS
			0	1	2	3	4	5	6	
8	80%	DO	7.7	7.9	8.0	7.9	8.1	8.1	8.2	
		pH	8.2	8.1	8.3	8.2	8.2	8.2	8.3	
		COND	0.31	.32	0.33	0.31	.33	0.33	.31	
9	LAB IWC 3.7%	DO	7.6	7.9	8.0	8.0	8.4	8.4	8.2	
		pH	8.1	8.2	8.3	8.3	8.3	8.3	8.3	
		COND	0.24	.22	0.23	0.23	.23	0.23	.25	
3	X	DO								
		pH								
		COND								
4	X	DO								
		pH								
		COND								
DATE			3-21	3-22	3-23	3-24	3-25	3-26	3-27	
SAMPLE No.			.02	.02	.03	.03	.04	.04	.04	
DETERMINED BY			MS	MS	JT	JT	JT	JS	JT	

FINAL CHEMICAL MEASUREMENT

TREAT. NO.	TEST SOLN	PARAMETER	EXPOSURE DAY							COMMENTS
			1	2	3	4	5	6	7	
8	80%	DO	7.0	7.5	7.6	7.2	7.0	6.8	6.8	
		pH	8.2	8.0	8.1	8.1	7.9	7.8	7.9	
9	LAB IWC 3.7%	DO	7.3	7.3	7.7	7.1	6.9	6.7	6.8	
		pH	8.2	8.0	8.1	8.1	8.0	7.9	7.9	
3	X	DO								
		pH								
4	X	DO								
		pH								
DATE			3-22	3-23	3-24	3-25	3-26	3-27	3-28	
DETERMINED BY			MS	MS	MS	JT	BT	BT	JT	

*DO = Dissolved Oxygen (mg/L) COND = Conductivity (mmho)

MAN

CHRONIC BIOASSAY SURVIVAL DATA

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow AGE: 24H LOT No.: 1707
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No. (s): 63601, 02, 03, 04
 LAB MEDIA/No.: Culture media/636 CFL CONTROL/DILUENT: Black River
 TEST START DATE: 3-21-95 TIME: 1130 TEST END DATE: 3-28-95 TIME: 1230
 ANALYST(s): M. Stanaway J. Trammel CODE: _____

TREAT. NO.	TEST SOLUTION	REP.	NUMBER OF FATALITIES PER DAY							TOTAL NUMBER		% SURVIVAL	MEAN SURVIVAL	COMMENTS	
			1	2	3	4	5	6	7	SURVIVORS	FATALITIES				
1	LAB	A	0	0	0	0	0	0	0	0	9	1	90	86.7% 87.8% 87.8% 87.8%	a. NINE FISH SET. JT
		B	0	0	0	1	0	0	0	0	9	1	90		
		C	0	0	1	0	0	0	0	0	8 ^{a.}	1	87.8		
		D	0	0	1	0	0	1	0	0	7 ^{a.}	2	77.8		
2	Black River	A	0	0	1	2	0	0	0	0	7	3	70	74.5%	
		B	0	0	0	1	0	0	0	0	9	1	90		
		C	0	0	2	0	0	0	0	0	7 ^{a.}	2	77.8		
		D	0	0	2	2	0	0	0	0	6	4	60		
3	3.7%	A	0	0	0	2	3	0	0	0	5	5	50	67.5%	
		B	0	0	1	1	2	1	0	0	5	5	50		
		C	0	0	0	0	0	0	0	0	10	0	100		
		D	0	0	0	2	1	0	0	0	7	3	70		
4	5%	A	0	0	2	1	0	0	0	0	6 ^{a.}	3	66.7	78.8%	
		B	0	0	0	0	0	0	0	2	7 ^{a.}	2	77.8		
		C	0	1	0	0	0	0	0	0	9	1	90		
		D	0	0	2	0	0	0	0	0	8	2	80		
5	10%	A	0	0	1	0	0	0	0	0	9	1	90	80.8%	b. ELEVEN FISH SET. JT
		B	0	0	1	2	0	0	0	0	8 ^{b.}	3	72.7		
		C	0	0	0	0	0	0	0	0	10	0	100		
		D	0	1	0	3	0	0	0	0	6	4	60		
6	20%	A	0	0	1	1	0	0	0	0	8	2	80	82.0%	80%
		B	0	2	1	0	0	0	0	0	7	3	70		
		C	0	0	1	0	0	0	0	0	9	1	90		
		D	0	0	0	2	0	0	0	0	8	2	80		
7	40%	A	0	0	0	0	0	0	0	0	9 ^{a.}	0	100	90.0%	
		B	0	0	2	0	0	0	0	0	8	2	80		
		C	0	0	2	0	0	0	0	0	8	2	80		
		D	0	0	0	0	0	0	0	0	10	0	100		
DATE			3-22	3-23	3-24	3-25	3-26	3-27	3-28						
DETERMINED BY			MS	MS	MS	JT	JT	JT	JT						
FEEDING	DAY														
	AM	✓	✓	✓	✓	✓	✓	✓	✓						
	PM	✓	✓	✓	✓	✓	✓	✓	✓						

CHRONIC BIOASSAY SURVIVAL DATA

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow AGE: C-24H LOT No.: 1707
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No. (s): 63601, 02, 03, 04
 LAB MEDIA No.: Culture media 636 CFL CONTROL/DILUENT: Black River
 TEST START DATE: 3-21-95 TIME: 12:11:30 TEST END DATE: 3-28-95 TIME: 12:30
 ANALYST (s): M. Scanaway, J. Trammel CODE:

TREAT. NO.	TEST SOLUTION	REP.	NUMBER OF FATALITIES PER DAY							TOTAL NUMBER		% SURVIVAL	MEAN SURVIVAL	COMMENTS
			1	2	3	4	5	6	7	SURVIVORS	FATALITIES			
8	80%	A	0	0	2	0	0	0	0	8	2	80	90.0%	a. ONE FISH LOST UPON TERMINATION. (SEVEN FISH REMAIN)
		B	1	0	0	0	0	0	0	9	1	90		
		C	0	0	0	0	0	0	0	10	0	100		
		D	0	0	0	1	0	0	0	9	1	90		
9	LAB IWL 3.7%	A	0	0	1	1	0	0	0	8	2	78.75	87.0	
		B	0	0	2	0	0	0	0	8	2	80		
		C	0	0	1	0	0	0	0	9	1	90		
		D	0	0	0	0	0	0	0	10	0	100		
3		A												
B														
C														
D														
4		A												
B														
C														
D														
5		A												
B														
C														
D														
6		A												
B														
C														
D														
7		A												
B														
C														
D														
DATE			3-22	3-23	3-24	3-25	3-26	3-27	3-28					
DETERMINED BY			MS	MS	MS	JT	JT	JT	JT					
FEEDING	DAY													
	AM	✓	✓	✓	✓	✓	✓	✓	✓					
	PM	✓	✓	✓	✓	✓	✓	✓	✓					

CHRONIC BIOASSAY GROWTH DATA

PROJECT No.: ASE 142.32 CLIENT: Onalaska Landfill
 TEST ORGANISM: Fathead minnow AGE: < 24 H LOT No.: 1707
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 636.01, 02, 03, 04
 LAB MEDIA No.: Culture media / 631.CFL CONTROL/DILUENT: Black River
 TEST START DATE: 3-21-95 TIME: 1130 TEST END DATE: 3-28-95 TIME: 1230
 ANALYST(s): J. Trammel, M. Stanaway CODE: _____

TEST SOLN	TREAT REP	TARE (mg)	TARE + DRY WT (mg)	TOTAL WT (mg)	Signif. Difference Test		1025 Test	
					No. Surv.	Organism Wt.	No. Exposed	Organism Wt.
LAB	1A	1089.27	1095.60	6.33			10	0.633
	1B	1113.10	1120.78	7.68			10	0.768
	1C	1112.81	1120.19	7.38			9	0.820
	1D	1118.71	1124.62	5.91			9	0.657
Black River	2A	1095.22	1100.29	5.07			10	0.507
	2B	1094.64	1100.56	5.65			10	0.565
	2C	1099.86	1105.09	5.23			9	0.581
	2D	1097.82	1101.52	3.70			10	0.370
3.7%	3A	1091.66	1095.05	3.39			10	0.339
	3B	1089.54	1092.85	2.51			10	0.251
	3C	1089.64	1095.22	5.58			10	0.558
	3D	1095.97	1101.12	5.15			10	0.515
5%	4A	1096.76	1100.98	4.22			9	0.469
	4B	1097.20	1102.66	5.46			9	0.607
	4C	1094.33	1100.22	5.89			10	0.589
	4D	1096.82	1102.69	5.87			10	0.587
10%	5A	1096.40	1102.81	6.41			10	0.641
	5B	1101.96	1107.83	5.87			11	0.534
	5C	1092.85	1099.66	6.81			10	0.681
	5D	1094.02	1098.09	4.07			10	0.407
20%	6A	1092.62	1098.53	5.91			10	0.591
	6B	1091.25	1096.70	5.45			10	0.545
	6C	1088.11	1094.10	5.99			10	0.599
	6D	1099.94	1104.89	4.95			10	0.495
40%	7A	1091.07	1097.12	6.05			9	0.672
	7B	1101.20	1106.48	5.28			10	0.528
	7C	1091.55	1097.26	5.71			10	0.571
	7D	1099.67	1106.08	6.41			10	0.641

COMMENTS:

Mean 1 =	Mean 1 = 0.720
Mean 2 =	Mean 2 = 0.506
Mean 3 =	Mean 3 = 0.416
Mean 4 =	Mean 4 = 0.563
Mean 5 =	Mean 5 = 0.566
Mean 6 =	Mean 6 = 0.558
Mean 7 =	Mean 7 = 0.603

CHRONIC BIOASSAY GROWTH DATA

PROJECT No.: ASE 142.32 CLIENT: Onalaska
 TEST ORGANISM: Fathead minnow AGE: <24H LOT No.: 1707
 SAMPLE DESCRIPTION: Effluent
 SAMPLE No.(s): 63601, 02, 03, 04
 LAB MEDIA/No.: Culture media/631, CFL CONTROL/DILUENT: _____
 TEST START DATE: 3-21-95 TIME: 1130 TEST END DATE: 3-28-95 TIME: 1230
 ANALYST(s): M. Scanaway, J. Trammel CODE: _____

TEST SOLN	TREAT REP	TARE (mg)	TARE + DRY WT (mg)	TOTAL WT (mg)	Signif. Difference Test		1025 Test	
					No. Surv.	Organism Wt.	No. Exposed	Organism Wt.
80%	8A	1094.40	1101.07	6.67			10	0.667
	8B	1088.70	1094.32	5.62			10	0.562
	8C	1090.19	1096.17	5.98			10	0.598
	8D	1096.60	1102.85	6.25			10	0.625
LAB Inw 3.7%	9A	1093.66	1099.23	5.57			9	0.619
	9B	1096.84	1102.95	6.11			10	0.611
	9C	1099.04	1105.48	6.44			10	0.644
	9D	1092.32	1100.03	7.71			10	0.771
	3A							
	3B							
	3C							
	3D							
	4A							
	4B							
	4C							
	4D							
	5A							
	5B							
	5C							
	5D							
	6A							
	6B							
	6C							
	6D							
	7A							
	7B							
	7C							
	7D							

COMMENTS:

Mean 1 =	Mean 8 = 0.613
Mean 2 =	Mean 9 = 0.661
Mean 3 =	Mean 3 =
Mean 4 =	Mean 4 =
Mean 5 =	Mean 5 =
Mean 6 =	Mean 6 =
Mean 7 =	Mean 7 =

Inhibition Concentration
Calculation
(ICx)

CH2M Hill
July 1991

Client: Onalaska Landfill
Project Number: ASE142.32
Test Solution: Effluent
Test Date: March 21, 1995
Test Organism: Fathead Minnow
Response Measured: Growth (Biomass)

Concentration (%)	Mean Response	Smoothed Mean Response
Control	0.506	0.546
3.70	0.416	0.546
5.00	0.563	0.546
10.00	0.566	0.546
20.00	0.557	0.546
40.00	0.603	0.546
80.00	0.613	0.546

IC25 (%) Toxic Units
Linear Interpolation Estimate > 80.00

BIOASSAY SAMPLE RECEIPT CHARACTERIZATION

CLIENT Onalaska Landfill

DATE RECVD	SAMPLE NO. DESCRIPTION	TEMP (C)	DO (mg/L)	pH	COND (mmho)	INITIALS
3-19-95	636.01 Black River	9°	9.0	8.6.9	.11	JT
SIEVED <input checked="" type="checkbox"/> DECHLORINATE _____ USE: IMMEDIATE _____ STORE (4 C) <input checked="" type="checkbox"/> ALIQUOTS HOMOGENIZED _____ CONTAINER TYPE (G/P) <u>Y</u> ODOR _____ APPEARANCE: CLEAR <input checked="" type="checkbox"/> CLOUDY _____ SOLIDS _____ COLOR <u>TAN</u> ALIQUOT FOR: HARDNESS _____ ALKALINITY _____ COMMENTS:						
3-21-95	636.02 Effluent #1	5°	11.2	8.2	.31	JT
SIEVED <input checked="" type="checkbox"/> DECHLORINATE _____ USE: IMMEDIATE <input checked="" type="checkbox"/> STORE (4 C) _____ ALIQUOTS HOMOGENIZED <input checked="" type="checkbox"/> CONTAINER TYPE (G/P) <u>P</u> ODOR _____ APPEARANCE: CLEAR <input checked="" type="checkbox"/> CLOUDY _____ SOLIDS _____ COLOR <u>GOLD/YELLOW</u> ALIQUOT FOR: HARDNESS _____ ALKALINITY _____ COMMENTS:						
3/23/95	636.03 Effluent	4°	11.1	8.3	.34	JA
SIEVED <input checked="" type="checkbox"/> DECHLORINATE _____ USE: IMMEDIATE <input checked="" type="checkbox"/> STORE (4 C) _____ ALIQUOTS HOMOGENIZED <input checked="" type="checkbox"/> CONTAINER TYPE (G/P) <u>P</u> ODOR _____ APPEARANCE: CLEAR <input checked="" type="checkbox"/> CLOUDY _____ SOLIDS _____ COLOR _____ ALIQUOT FOR: HARDNESS _____ ALKALINITY _____ COMMENTS:						
3-25	636.04 Effluent	40	10.9	8.4	.31	JT
SIEVED <input checked="" type="checkbox"/> DECHLORINATE _____ USE: IMMEDIATE <input checked="" type="checkbox"/> STORE (4 C) _____ ALIQUOTS HOMOGENIZED <input checked="" type="checkbox"/> CONTAINER TYPE (G/P) <u>P</u> ODOR _____ APPEARANCE: CLEAR <input checked="" type="checkbox"/> CLOUDY _____ SOLIDS _____ COLOR _____ ALIQUOT FOR: HARDNESS _____ ALKALINITY _____ COMMENTS:						

SUPPLEMENTAL CHEMICAL DATA SUMMARY

PROJECT NO. ASE 142.32
 TEST DATE 3-21-95

CLIENT Onalaska Landfill
 SUMMARIZED BY J. Trammel, M. Coleman

LABORATORY CONTROL	CONTROL I.D.			
	636. ADL	636. AFL	636. CCL	636. CFL
3.24				
TOTAL ALKALINITY mg/L CaCO ₃	98	100	94	92
HARDNESS mg/L CaCO ₃	110	110	105	110

SAMPLE DESCRIPTION	SAMPLE NO.			
	Black River	636.01		
TOTAL ALKALINITY mg/L CaCO ₃	36			
HARDNESS mg/L CaCO ₃	50			
TOTAL RESIDUAL CHLORINE mg/L	NA			
TOTAL AMMONIA mg/L	.72			

SAMPLE DESCRIPTION	SAMPLE NO.			
	Effluent	636.02	636.03	636.04
TOTAL ALKALINITY mg/L CaCO ₃	196	212	214	
HARDNESS mg/L CaCO ₃	160	165	160	
TOTAL RESIDUAL CHLORINE mg/L	0	0	0	
TOTAL AMMONIA mg/L	1.7	2.9	3.8	

SAMPLE DESCRIPTION	SAMPLE NO.			
TOTAL ALKALINITY mg/L CaCO ₃				
HARDNESS mg/L CaCO ₃				
TOTAL RESIDUAL CHLORINE mg/L				
TOTAL AMMONIA mg/L				

NA = Not Analyzed
 * = Duplicate for QA

TEST TEMPERATURE SUMMARY

PROJECT No.: ASE 142.32 CLIENT: Ohaaska Landfill

ACUTE TEST TEMPERATURE

	DATE								
	3-21	3-22	3-23	3-24	3-25				
AVG	20.7	20.7	20.6	20.6	20.6				
MAX									
MIN									
SUM. BY:	JT	JT	JT	JT	JT				

CHRONIC TEST TEMPERATURE

	DATE								
	3-21	3-22	3-23	3-24	3-25	3-26	3-27	3-28	
AVG	25.3	25.2	25.2	25.2	25.5	25.3	25.3	24.9	
MAX									
MIN									
SUM. BY:	JT	JT	JT	JT	JT	JT	JT	JT	

COMMENTS:

APPENDIX B
CHAIN-OF-CUSTODY FORMS



CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client Name		Client Shipping Address				NPDES Number			
Sample Kit Tracking Information		Method of Shipment (Check One)		Prepared by/Date:		Ship Samples to: CH2M HILL Bioassay Laboratory 15779 W. Ryerson Road New Berlin, WI 53151 Phone: (414) 784-0448 Fax: (414) 784-0353			
No. of Cooler <u>1</u> of <u>2</u>	<input checked="" type="checkbox"/> Fed X	<input type="checkbox"/> Pickup	<u>3-20-95</u>						
Total No. of Bottles <u>2</u>	<input type="checkbox"/> UPS	<input type="checkbox"/> Other	<u>3-20-95</u>						
Composite Sample Information			Description of Sampling Site			Sample Container			
Flow Proportional <input type="checkbox"/>	Time Interval <input checked="" type="checkbox"/>	Effluent from Stripping Tower			Plastic <input checked="" type="checkbox"/> Glass <input type="checkbox"/> New <input type="checkbox"/> Used <input type="checkbox"/>				
Samples/Hour <u>4</u>	Volume/Sample <u>200 ml</u>				Refrigerant Used For Shipping				
Total Hours <u>24</u>	Total Volume <u>3 gal PLUS</u>				Wet Ice <input checked="" type="checkbox"/> Blue Ice <input type="checkbox"/> Other <input type="checkbox"/>				
Initiated: Date <u>3-19-95</u> Time _____	Ended: Date <u>3-20-95</u> Time _____				Sample(s) Shipped Via				
Chilled During Collection Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			UPS <input type="checkbox"/> Fed X <input checked="" type="checkbox"/> Other <input type="checkbox"/>			Bioassays Required			
			Acute <input type="checkbox"/> Chronic <input type="checkbox"/> Other <input type="checkbox"/>						
Sample Description	Date	Time	Sample Type Comp	Grab	No. of Containers	Volume	Sampled by (Signature)	Comments	For Lab Use Sample ID No.
Process water	3-20-95	1:30	<input checked="" type="checkbox"/>		2	3 gal	SPM kit / William L Wood		636.12
Relinquished By and Title (Signature)				Date <u>3-20-95</u>		Condition of Seal Upon Receipt by Lab			
<u>William L. Wood / Plant Operator</u>				Time <u>2:00 pm</u>		<input type="checkbox"/> Intact <input type="checkbox"/> Other (Describe) _____			
Received By: (Signature)		Date		Relinquished By: (Signature)		Date		Received By Lab: (Signature)	
								<u>Jon T. Rammel</u>	
								Date <u>3-21-95</u>	
								Time _____	



CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client Name		Client Shipping Address				NPDES Number			
Sample Kit Tracking Information		Method of Shipment (Check One)		Prepared by/Date:		Ship Samples to: CH2M HILL Bioassay Laboratory 15779 W. Ryerson Road New Berlin, WI 53151 Phone: (414) 784-0448 Fax: (414) 784-0353			
No. of Cooler <u>1</u> of <u>1</u> Total No. of Bottles <u>2</u>		<input type="checkbox"/> Fed X <input checked="" type="checkbox"/> Pickup <input type="checkbox"/> UPS <input type="checkbox"/> Other		Shipped by/Date: <u>3-22-95</u> <u>Steve Keith</u>					
Composite Sample Information			Description of Sampling Site			Sample Container			
Flow Proportional <input type="checkbox"/> Time Interval <input checked="" type="checkbox"/> Samples/Hour <u>4</u> Volume/Sample <u>200ml</u> Total Hours <u>24</u> Total Volume <u>3.5 gal</u>			<u>Effluent of stripping tower</u>			Plastic <input checked="" type="checkbox"/> Glass <input type="checkbox"/> New <input type="checkbox"/> Used <input type="checkbox"/>			
Initiated: Date <u>3-21-95</u> Time <u>10:30 am</u> Ended: Date <u>3-22-95</u> Time <u>10:30 am</u>						Refrigerant Used For Shipping Wet Ice <input checked="" type="checkbox"/> Blue Ice <input type="checkbox"/> Other <input type="checkbox"/>			
Chilled During Collection Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			Sample(s) Shipped Via			UPS <input type="checkbox"/> Fed X <input type="checkbox"/> Other <input checked="" type="checkbox"/>			
			Bioassays Required			Acute <input checked="" type="checkbox"/> Chronic <input checked="" type="checkbox"/> Other <input type="checkbox"/>			
Sample Description	Date	Time	Sample Type		No. of Containers	Volume	Sampled by (Signature)	Comments	For Lab Use Sample ID No.
			Comp	Grab					
<u>Process water</u>	<u>3-22-95</u>	<u>10:30 am</u>	<input checked="" type="checkbox"/>		<u>2</u>	<u>3 gal</u>	<u>William L. Wood</u>		<u>636-03</u>
Relinquished By and Title (Signature) <u>Taken To Lab by Steve Keith -</u> <u>William L. Wood Plant Operator</u>				Date <u>3-22-95</u>		Condition of Seal Upon Receipt by Lab			
				Time <u>10:30 am</u>		<input checked="" type="checkbox"/> Intact <input type="checkbox"/> Other (Describe) _____			
Received By: (Signature)		Date <u>3/23/95</u>		Relinquished By: (Signature)		Date		Received By Lab: (Signature)	
<u>[Signature]</u>		Time <u>9:30</u>				Time		<u>[Signature]</u>	
								Date <u>3/23/95</u>	
								Time <u>09:30</u>	



CHAIN OF CUSTODY RECORD FOR NPDES COMPLIANCE BIOMONITORING

Client Name LAND- ONALASKA FILL		Client Shipping Address			NPDES Number				
Sample Kit Tracking Information		Method of Shipment (Check One)		Prepared by/Date: 3-24-95		Ship Samples to: CH2M HILL Bioassay Laboratory 15779 W. Ryerson Road New Berlin, WI 53151 Phone: (414) 784-0448 Fax: (414) 784-0353			
No. of Cooler <u>1</u> of <u>1</u> Total No. of Bottles <u>1</u>		<input checked="" type="checkbox"/> Fed X <input type="checkbox"/> Pickup <input type="checkbox"/> UPS <input type="checkbox"/> Other		Shipped by/Date: 3-24-95					
Composite Sample Information			Description of Sampling Site			Sample Container			
Flow Proportional <input type="checkbox"/> Time Interval <input checked="" type="checkbox"/> Samples/Hour <u>4</u> Volume/Sample <u>200ml</u> Total Hours <u>24</u> Total Volume <u>3200ml</u>						Plastic <input checked="" type="checkbox"/> Glass <input type="checkbox"/> New <input type="checkbox"/> Used <input type="checkbox"/>			
Initiated: Date <u>3-23</u> Time <u>9:30 am</u> Ended: Date <u>3-24</u> Time <u>8:30 am</u>						Refrigerant Used For Shipping Wet Ice <input checked="" type="checkbox"/> Blue Ice <input type="checkbox"/> Other <input type="checkbox"/>			
Chilled During Collection Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>						Sample(s) Shipped Via UPS <input type="checkbox"/> Fed X <input checked="" type="checkbox"/> Other <input type="checkbox"/>			
						Bioassays Required Acute <input type="checkbox"/> Chronic <input type="checkbox"/> Other <input type="checkbox"/>			
Sample Description	Date	Time	Sample Type		No. of Containers	Volume	Sampled by (Signature)	Comments	For Lab Use Sample ID No.
			Comp	Grab					
<i>Procedurally</i>	<u>3-24-</u>	<u>9:30 am</u>	<input checked="" type="checkbox"/>		<u>1</u>	<u>320ml</u>	<i>William L. Wood</i>	<i>Ice about gone when Sample was through Brought fresh ice 7:30 am 3-24 and Cooled while stopping</i>	<u>636.04</u>
Relinquished By and Title (Signature) <i>William L. Wood</i>				Date <u>3-24-95</u>		Condition of Seal Upon Receipt by Lab <input type="checkbox"/> Intact <input type="checkbox"/> Other (Describe) _____			
Received By: (Signature)		Date		Relinquished By: (Signature)		Date		Received By Lab: (Signature) <i>Jon [Signature]</i>	
		Time				Time		Date <u>3-25-95</u> Time <u>1000</u>	

APPENDIX C
REFERENCE TOXICANT DATA

Table 1. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee, WI
Test Type: Acute
Organism: *Ceriodaphnia dubia*
Age < 24 Hours
of Organisms / Conc.: 20
Test Duration: 48 Hours
Toxicant: Sodium Chloride
Response: Mean % Survival
Calculation: LC50
Reporting Period: April 94 - March 95

Test No	Test Date	Test LC50 (g/L)	12 Month Control Limits			In or Out of Control	Action if Out of Control
			Mean LC50	Mean +2 S.D.	Mean -2 S.D.		
55	4/13/94	2.45	2.47	2.76	2.17	IN	
56	5/31/94	2.67	2.48	2.80	2.17	IN	
57	6/29/94	2.32	2.47	2.80	2.14	IN	
58	7/29/94	2.45	2.48	2.80	2.17	IN	
59	8/31/94	2.52	2.49	2.80	2.17	IN	
60	9/28/94	2.58	2.47	2.73	2.21	IN	
61	10/18/94	2.45	2.47	2.73	2.21	IN	
62	11/28/94	1.54	2.38	2.95	1.80	OUT	a
63	12/14/94	2.60	2.39	2.98	1.80	IN	
64	12/20/94	2.63	2.42	3.02	1.83	IN	
65	12/27/94	2.53	2.43	3.03	1.84	IN	
66	1/24/95	2.32	2.42	3.02	1.82	IN	
67	2/28/95	2.10	2.39	3.02	1.77	IN	
68	3/28/95	2.25	2.36	2.96	1.75	IN	

a = water batch had low hardness (<70 mg/L); Retest 12/14/94

Table 2. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee, WI

Test Type: Acute

Organism: *Daphnia magna*

Age: < 24 Hours

of Organisms / Conc.: 20

Test Duration: 48 Hours

Toxicant: Sodium Chloride

Response: Mean % Survival

Calculation: LC50

Reporting Period: April 94 - March 95

Test No	Test Date	Test LC50 (g/L)	12 Month Control Limits			In or Out of Control	Action if Out of Control
			Mean LC50	Mean +2 S.D.	Mean -2 S.D.		
53	4/13/94	4.90	4.76	5.31	4.21	IN	
54	5/31/94	4.99	4.82	5.28	4.35	IN	
55	6/29/94	4.90	4.87	5.18	4.56	IN	
56	7/29/94	4.90	4.87	5.18	4.56	IN	
57	8/31/94	4.65	4.89	5.06	4.73	OUT	a
58	9/28/94	4.51	4.86	5.14	4.58	OUT	a
59	10/18/94	4.64	4.84	5.14	4.53	IN	
60	11/28/94	3.83	4.75	5.40	4.10	OUT	b
61	12/20/94	4.90	4.74	5.41	4.06	IN	
62	12/27/94	4.90	4.74	5.41	4.06	IN	
63	1/24/95	5.34	4.77	5.53	4.01	IN	
64	2/28/95	3.74	4.66	5.63	3.69	IN	c
65	3/28/95	4.78	4.64	5.60	3.69	IN	

a = The LC50s of tests 57 and 58 were 5% and 7% different, respectively, from the mean LC50. As the variance has been too low (tight) due to many of the previous tests with identical results, no action was taken. This is due to an artifact of the statistical analysis.

b = Lab water hardness decreased below 70 mg/L; Retest when cultures back on-line.

c = New concentrations used.

Table 3. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee, WI

Test Type: Acute

Organism: *Pimephales promelas*

Age: 10 ± 2 Days

of Organisms / Conc.: 20

Test Duration: 96 Hours

Toxicant: Sodium Chloride

Response: Mean % Survival

Calculation: LC50

Reporting Period: April 94 - March 95

Test No	Test Date	Test LC50 (g/L)	12 Month Control Limits			In or Out of Control	Action if Out of Control
			Mean LC50	Mean +2 S.D.	Mean -2 S.D.		
53	4/18/94	8.31	6.95	8.94	4.95	IN	
54	5/16/94	9.53	7.23	9.56	4.90	IN	
55	6/13/94	6.49	7.26	9.54	4.98	IN	
56	7/11/94	5.47	7.17	9.64	4.69	IN	
57	8/8/94	5.41	7.07	9.72	4.42	IN	
58	9/12/94	5.81	6.91	9.60	4.22	IN	
59	10/10/94	5.79	6.85	9.61	4.09	IN	
60	11/7/94	5.76	6.61	9.16	4.06	IN	
61	12/8/94	5.98	6.63	9.16	4.09	IN	
62	1/9/95	5.28	6.58	9.19	3.98	IN	
63	2/6/95	5.28	6.39	8.96	3.81	IN	
64	3/6/95	5.81	6.28	8.82	3.74	IN	

Table 4. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee

Test Type: Chronic

Organism: *Ceriodaphnia dubia*

Age: < 24 Hours

of Organisms / Conc.: 10.00

Test Duration: 7 days

Toxicant: Sodium Chloride

Response: Mean No. of Young per Adult

Calculation: 25% Inhibition Concentration (IC25)

Reporting Period: April 94 - March 95

<u>Test No</u>	<u>Test Date</u>	<u>IC25 (g/L)</u>	<u>Mean IC25</u>	<u>Mean +2 S.D</u>	<u>Mean -2 S.D.</u>	In or Out	
						<u>Control</u>	<u>Action if Out of Control</u>
52	4/5/94	1.06	0.99	1.36	0.61	IN	
53	5/4/94	1.27	1.01	1.42	0.60	IN	
54	5/31/94	1.05	1.01	1.42	0.60	IN	
55	6/18/94	1.12	1.04	1.42	0.66	IN	
56	7/8/94	1.08	1.05	1.42	0.67	IN	
57	8/4/94	1.09	1.05	1.43	0.67	IN	
58	9/16/94	0.95	1.01	1.32	0.70	IN	
59	10/22/94	0.84	0.99	1.30	0.68	IN	
60	11/28/94	0.84	0.97	1.29	0.65	IN	
61	12/29/94	0.96	0.99	1.29	0.69	IN	
62	1/13/95	0.70	0.96	1.30	0.63	IN	
63	2/10/95	1.18	1.00	1.32	0.68	IN	
64	3/3/95	0.93	1.01	1.32	0.69	IN	

Table 5. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee
Test Type: Chronic
Organism: *Ceriodaphnia dubia*
Age: < 24 Hours
of Organisms / Conc.: 10
Test Duration: 7 days
Toxicant: Sodium Chloride
Response: Mean 7- day % Survival and No. of Young per Adult
Calculation: NOEC and LOEC
Reporting Period: April 94- March 95

Test No	Test Date	Survival		Reproduction		Comments
		NOEC (g/L)	LOEC (g/L)	NOEC (g/L)	LOEC (g/L)	
52	4/5/94	1.00	1.50	1.00	1.50	
53	5/4/94	1.50	2.00	1.00	1.50	
54	5/31/94	2.00	4.00	0.50	1.00	
55	6/18/94	2.00	4.00	0.50	1.00	
56	7/8/94	2.00	4.00	0.50	1.00	
57	8/4/94	1.50	2.00	0.50	1.00	
58	9/16/94	1.00	1.50	0.50	1.00	
59	10/22/94	2.00	4.00	1.00	1.50	
60	11/28/94	2.00	4.00	0.50	1.00	
61	12/29/94	2.00	4.00	0.50	1.00	
62	1/13/95	2.00	4.00	0.50	1.00	
63	2/10/95	1.50	2.00	0.50	1.00	
64	3/3/95	1.50	2.00	0.50	1.00	

Test on 3/29/94 failed acceptability criterion for reproduction; Retest 4/5/94
 Test on 5/4/94 for April test requirement

Table 6. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee

Test Type: Chronic

Organism: *Pimephales promelas*

Age: < 24 Hours

of Organisms / Conc.: 40

Test Duration: 7 days

Toxicant: Sodium Chloride

Response: Mean Growth (mg per number of organisms exposed)

Calculation: 25% Inhibition Concentration (IC25)

Reporting Period: April 94 - March 95

Test No	Test Date	IC25 (g/L)	12 Month Control Limits (IC25)			In or Out of Control	Action if Out of Control
			Mean IC25	Mean +2 S.D.	Mean -2 S.D.		
49	4/12/94	0.40	0.54	0.72	0.36	IN	
50	5/16/94	0.59	0.54	0.72	0.36	IN	
51	6/30/94	0.90	0.57	0.85	0.30	OUT	New lab media used - MHRW as diluent.
52	7/25/94	0.54	0.56	0.84	0.29	IN	
53	8/31/94	0.48	0.55	0.83	0.28	IN	
54	9/28/94	0.61	0.55	0.83	0.28	IN	
55	10/18/94	0.60	0.56	0.84	0.28	IN	
56	11/15/94	0.57	0.56	0.84	0.28	IN	
57	12/9/94	0.50	0.55	0.83	0.27	IN	
58	1/9/95	0.56	0.57	0.81	0.33	IN	
59	2/17/95	0.19	0.55	0.87	0.22	OUT	Retest 3/2/95
60	3/2/95	0.49	0.54	0.86	0.21	IN	
61	3/10/95	0.43	0.54	0.86	0.22	IN	

Table 7. Reference Toxicant Summary

Laboratory: CH2M HILL - Milwaukee
 Test Type: Chronic
 Organism: *Pimephales promelas*
 Age: < 24 Hours
 # of Organisms / Conc.: 40
 Test Duration: 7 days
 Toxicant: Sodium Chloride
 Response: Mean % 7 day Survival and Growth (mg)
 Calculation: NOEC and LOEC
 Reporting Period: April 94 - March 95

Test No	Test Date	Survival		Growth		Comments and Action
		NOEC (g/L)	LOEC (g/L)	NOEC (g/L)	LOEC (g/L)	
49a	4/12/94	0.30	0.60	0.30	0.60	a. Different dilution series used
50	5/16/94	0.30	1.50	0.30	1.50	
51	6/30/94	1.50	3.00	0.30	1.50	
52	7/25/94	0.30	1.50	0.30	1.50	
53	8/31/94	0.30	1.50	0.30	1.50	
54	9/28/94	0.30	1.50	0.30	1.50	
55	10/18/94	0.30	1.50	0.30	1.50	
56	11/15/94	0.30	1.50	0.30	1.50	
57	12/9/94	0.30	1.50	0.30	1.50	
58	1/9/95	0.30	1.50	0.30	1.50	
59	2/17/95	0.30	1.50	0.30	1.50	
60	3/2/95	0.30	1.50	0.30	1.50	
61	3/10/95	0.30	1.50	0.30	1.50	