



**Whole Effluent Toxicity Test Report:  
City of Everett**

**October 2024**

Report date: November 21, 2024

Submitted to:

**City of Everett**  
3200 Cedar Street  
Everett, WA 98201

*Rainier Environmental*  
5013 Pacific Hwy East  
Suite 20  
Tacoma, WA 98424

## 1.0 INTRODUCTION

Acute toxicity tests were conducted using effluent samples collected from City of Everett's Port Gardner TF/SC System (SCE) and Lagoon System (FEN). Testing was conducted in October 2024 using the test organism *Ceriodaphnia dubia*. Testing was performed at Rainier Environmental Laboratory.

## 2.0 METHODS

### 2.1 Sample Collection and Transport

Effluent samples were collected into LDPE cubitainers by City of Everett personnel. The samples were packed in coolers containing ice and transported to Rainier Environmental the day of collection. Appropriate chain-of-custody procedures were employed during collection and transport.

### 2.2 Sample Receipt

Upon arrival at the laboratory, coolers were opened, samples inspected, and the contents verified against information provided on the chain-of-custody forms. Receipt temperature was measured and recorded on the chain-of-custody form for each sample. Standard water quality parameters were measured and recorded on a sample check-in sheet (Appendix B). Samples were stored at 4°C in the dark until used for testing.

### 2.3 Test Methods

Acute toxicity tests were conducted using *C. dubia* according to procedures presented by USEPA (2002) and summarized in Table 1.

**Table 1. Summary of conditions for the 48h *C. dubia* acute survival tests.**

Test initiation date and time	FEN: 10/30/2024; 1400h SCE: 10/30/2024; 1430h
Test termination date and time	FEN: 11/1/2024; 1400h SCE: 11/1/2024; 1415h
Test organism	<i>Ceriodaphnia dubia</i>
Test organism source	In-house cultures
Test organism age	< 24 hours
Test duration	48 hours
Feeding	YTC:algal suspension during org. holding time. No feeding during test.
Test chamber and test solution volume	30 mL plastic cup, 25 mL
Test temperature	20 ± 1°C
Dilution water	Moderately Hard Synthetic Water
Test concentrations (% sample)	FEN: 100, 50, 25, 15.6, 6.25, laboratory control SCE: 100, 30, 10, 3.0, 0.64, laboratory control
Number of organisms/chamber	5
Number of replicates	4
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	EPA-821-R-02-012
Test acceptability criterion for controls	≥ 90% survival
Reference toxicant	Copper sulfate

### 3.0 RESULTS

Details of standard water quality measurements conducted upon receipt of samples are provided in Table 2.

**Table 2. Sample information.**

Sample ID	FEN	SCE
Rainier Log-In No.	24-147	24-148
Collection date and time	10/30/2024; 0700h	10/30/2024; 0700h
Receipt date and time	10/30/2024; 1320h	10/30/2024; 1320h
Receipt temperature (°C)	2.4	2.2
Dissolved oxygen (mg/L)	8.4	6.6
pH	7.68	7.29
Conductivity (µS/cm)	930	792
Hardness (mg/L CaCO <sub>3</sub> )	116	112
Alkalinity (mg/L CaCO <sub>3</sub> )	192	136
Total Chlorine (mg/L)	<0.03	<0.03
Total Ammonia (mg/L)	22.3	17.4

Survival was evaluated in the acute toxicity tests after 48 hours of exposure. Results are summarized in Table 3. Mean survival in the 100 percent effluent concentration for sample FEN was 40 percent. Mean survival in the 100 percent effluent concentration for sample SCE was 100 percent. There was no significant difference between the controls and the acute critical effluent concentration (ACEC) of 15.6 percent effluent and 0.64 percent effluent for FEN and SCE, respectively.

**Table 3. Summary of results**

Species	Concentration (%)	Survival (%)	NOEC <sup>a</sup> (% effluent)	LOEC <sup>b</sup> (% effluent)
<b><u>Sample ID: FEN</u></b>				
<i>Ceriodaphnia dubia</i>	0.0	100	50	100
	6.25	100		
	15.6	100		
	25	100		
	50	100		
	100	40		
<b><u>Sample ID: SCE</u></b>				
<i>Ceriodaphnia dubia</i>	0.0	100	100	>100
	0.64	100		
	3.0	100		
	10	100		
	30	100		
	100	100		

<sup>a</sup> No Observed Effect Concentration, <sup>b</sup> Lowest Observed Effect Concentration

Individual statistical summaries for all tests and copies of the laboratory bench sheets, sample check-in sheets and chain of custody forms are provided in Appendices A through C.

#### 4.0 QA/QC

All samples were received in good condition and within the temperature range specified by WDOE (2016). The toxicity tests met all acceptability criteria for performance of control organisms. All water quality parameters remained within the ranges specified in the corresponding test methods throughout the tests.

Results for the reference toxicant test used to monitor laboratory performance and test organism sensitivity are summarized in Table 4. Results for the reference toxicant test fell within the acceptable range of mean  $\pm$  two standard deviations of historical test results, indicating that the test organisms were of an appropriate degree of sensitivity. The coefficient of variation (CV) for the test is also shown in the table.

**Table 4. Reference toxicant test results.**

Species	Date initiated	Endpoint	LC <sub>50</sub> (µg/L copper)	Acceptable Range (µg/L copper)	CV (%)
<i>Ceriodaphnia dubia</i>	10/17/2024	96h survival	24.2	6.18 – 36.6	56.0

#### REFERENCES

- Tidepool Scientific Software. 2000-2011. CETIS Comprehensive Environmental Toxicity Information System Software, Version 1.8.4.6.
- USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition. EPA-821-R-02-012, pg. 53-54.
- WDOE. 2016. Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Washington State Department of Ecology. Water Quality Program. Publication number: WQ-R-95-80, Revised June 2016.

**Appendix A**  
*Ceriodaphnia dubia* Acute Toxicity Test  
**Statistical Summaries and Raw Bench Sheets**

## **FEN - Lagoon System**

# CETIS Summary Report

Report Date: 21 Nov-24 14:23 (p 1 of 1)  
 Test Code: 2410-079 | 09-2133-5762

## Ceriodaphnia 48-h Acute Survival Test

Rainier Environmental Laboratory

Batch ID: 06-3714-4663	Test Type: Survival (48h)	Analyst: Eric Tollefson
Start Date: 30 Oct-24 14:00	Protocol: EPA/821/R-02-012 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 01 Nov-24 14:00	Species: Ceriodaphnia dubia	Brine:
Duration: 48h	Source: In-House Culture	Age: <24h
Sample ID: 18-6357-4045	Code: 24-147	Client: Everett
Sample Date: 30 Oct-24 07:00	Material: POTW Effluent	Project:
Receive Date: 30 Oct-24 13:20	Source: Everett (WA0024490)	
Sample Age: 7h (2.2 °C)	Station: FEN Outfall 015	

## Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
17-1258-9099	48h Survival Rate	50	100	70.71	18.3%	2	Steel Many-One Rank Sum Test

## Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
16-6631-7426	48h Survival Rate	LC50	89.09	72.15	110	1.122	Trimmed Spearman-Kärber

## Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
16-6631-7426	48h Survival Rate	Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria
17-1258-9099	48h Survival Rate	Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria

## 48h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	0	0	0.0%	0.0%
6.25		4	1	1	1	1	1	0	0	0.0%	0.0%
15.6		4	1	1	1	1	1	0	0	0.0%	0.0%
25		4	1	1	1	1	1	0	0	0.0%	0.0%
50		4	1	1	1	1	1	0	0	0.0%	0.0%
100		4	0.4	0.2944	0.5056	0	0.6	0.1414	0.2828	70.71%	60.0%

## 48h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
6.25		1	1	1	1
15.6		1	1	1	1
25		1	1	1	1
50		1	1	1	1
100		0.4	0.6	0.6	0

## 48h Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5
15.6		5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5
100		2/5	3/5	3/5	0/5



# Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Everett  
 Sample ID: FEN  
 Test #: 2410-079  
 Log-In #: 24-147

Start Date & Time: 10/30/2024 1400  
 End Date & Time: 11/11/2024 1400  
 Test Organism: Ceriodaphnia dubia

Rep. #	Conc. or Cont. #	Number of Live Organisms			Dissolved Oxygen (mg/L)			pH (units)			Cond (uohm-cm)			Temperature (°C)			Mean Percent Survival
		0	24	48	0	24	48	0	24	48	0	24	48	0	24	48	
1	CON	12	5	5	7.9	8.0	7.7	8.0	7.92	7.85	330	307	311	19.9	20.0	19.8	
2		6	5	5													
3		3	5	5													
4		17	5	5													
1	6.25	13	5	5	7.1	7.9	7.9	8.00	7.95	7.97	313	315	321	19.9	20.1	19.7	
2		2	5	5													
3		18	5	5													
4		7	5	5													
1	15.6	22	5	5	7.2	8.0	7.9	7.91	7.91	7.92	353	331	363	19.9	20.1	19.8	
2		5	5	5													
3		16	5	5													
4		14	5	5													
1	25	23	5	5	7.6	7.7	7.9	7.91	7.90	7.92	341	329	402	20.0	20.0	19.8	
2		4	5	5													
3		19	5	5													
4		8	5	5													
1	50	11	5	5	7.9	8.0	7.8	7.85	7.84	7.88	498	502	499	20.1	20.1	19.8	
2		15	5	5													
3		20	5	5													
4		9	5	5													
1	100	21	5	5	8.3	8.0	7.8	7.96	7.87	7.85	692	695	690	20.1	20.0	19.9	
2		24	5	5													
3		1	5	5													
4		10	5	5													

Technician Initials: gk

Dilution Water Batch #: MHSW112 Sample Description: 1n-house cultures  
 Test Chamber: KM2 Date Received: 11-11-2024 QA Check: u

Comments: 0 hrs:  
 24 hrs:  
 48 hrs:

Rainier Environmental  
 Washington Laboratory  
 5013 Pacific Hwy. E. Suite 20  
 Tacoma, WA 98424

**SCE - TF/SC System**

# CETIS Summary Report

Report Date: 21 Nov-24 14:24 (p 1 of 1)  
 Test Code: 2410-080 | 08-0919-7623

## Ceriodaphnia 48-h Acute Survival Test

Rainier Environmental Laboratory

Batch ID: 08-1980-4575	Test Type: Survival (48h)	Analyst: Eric Tollefson
Start Date: 30 Oct-24 14:30	Protocol: EPA/821/R-02-012 (2002)	Diluent: Mod-Hard Synthetic Water
Ending Date: 01 Nov-24 14:15	Species: Ceriodaphnia dubia	Brine:
Duration: 48h	Source: In-House Culture	Age: <24h
Sample ID: 21-2448-4831	Code: 24-148	Client: Everett
Sample Date: 30 Oct-24 07:00	Material: POTW Effluent	Project:
Receive Date: 30 Oct-24 13:20	Source: Everett (WA0024490)	
Sample Age: 8h (2.2 °C)	Station: SCE Outfall 100	

## Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
03-3757-2487	48h Survival Rate	100	>100	NA	5.0%	1	Steel Many-One Rank Sum Test

## Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
03-3757-2487	48h Survival Rate	Control Resp	1	0.9 - NL	Yes	Passes Acceptability Criteria

## 48h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	0	0	0.0%	0.0%
0.64		4	1	1	1	1	1	0	0	0.0%	0.0%
3		4	1	1	1	1	1	0	0	0.0%	0.0%
10		4	1	1	1	1	1	0	0	0.0%	0.0%
30		4	1	1	1	1	1	0	0	0.0%	0.0%
100		4	1	1	1	1	1	0	0	0.0%	0.0%

## 48h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
0.64		1	1	1	1
3		1	1	1	1
10		1	1	1	1
30		1	1	1	1
100		1	1	1	1

## 48h Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	5/5	5/5	5/5	5/5
0.64		5/5	5/5	5/5	5/5
3		5/5	5/5	5/5	5/5
10		5/5	5/5	5/5	5/5
30		5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5

**Freshwater Acute  
48 Hour Toxicity Test Data Sheet**

Client: Everett  
 Sample ID: SCE  
 Test #: 2410-080  
 Log-In #: 24-148

Start Date & Time: 10/30/2024 1430  
 End Date & Time: 11/1/2024 1415  
 Test Organism: Ceriodaphnia dubia

Rep. #	Conc. or Cont. #	Number of Live Organisms			Dissolved Oxygen (mg/L)			pH (units)			Cond (uohm-cm)			Temperature (°C)			Mean Percent Survival
		0	24	48	0	24	48	0	24	48	0	24	48	0	24	48	
1	CON	5	5	5	7.1	8.0	8.2	8.01	7.92	7.94	356	307	303	19.9	20.1	19.8	
2		5	5	5													
3		5	5	5													
4		5	5	5													
1	0.64	5	5	5	7.5	7.7	8.4	8.01	7.95	7.95	301	305	306	20.1	20.0	19.8	
2		5	5	5													
3		5	5	5													
4		5	5	5													
1	3.0	5	5	5	7.1	7.9	8.1	7.95	7.97	7.92	301	304	310	20.0	20.0	19.8	
2		5	5	5													
3		5	5	5													
4		5	5	5													
1	10	5	5	5	7.1	7.9	8.1	7.85	7.92	7.93	350	355	351	20.0	19.8	19.9	
2		5	5	5													
3		5	5	5													
4		5	5	5													
1	30	5	5	5	7.5	7.9	8.4	7.19	7.84	7.91	401	403	400	20.0	20.1	19.8	
2		5	5	5													
3		5	5	5													
4		5	5	5													
1	100	5	5	5	7.6	7.9	8.2	7.55	7.80	7.84	609	674	658	20.1	20.0	19.9	
2		5	5	5													
3		5	5	5													
4		5	5	5													
Technician Initials		24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	

Dilution Water Batch #: MHSW 112      Animal Source: 1n-house cu      Sample Description: 1n-house cu  
 Test Chamber: KMT2      Date Received: 11/1/2024      QA Check: 24

Comments: 0 hrs: \_\_\_\_\_  
 24 hrs: \_\_\_\_\_  
 48 hrs: \_\_\_\_\_

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 Washington Laboratory  
 5013 Pacific Hwy. E. Suite 20  
 Tacoma, WA 98424

**Appendix B**  
**Sample Check-In Sheets**

Client: City of Everett

Tests Performed: Cd-a (x2)  
Test ID No(s): 2410-079 ; 2410-080

Sample ID:	FEN	SCE		
Log-in No. (20-xxxx):	24-147	24-148		
Sample Collection Date & Time:	10/30/24 0700	10/30/24 0700		
Sample Receipt Date & Time:	10/30/24 1320	10/30/24 1320		
Check-in Temperature (°C)	2.4	2.2		
Temperature OK?	(Y) N	(Y) N	Y N	Y N
DO (mg/L)	8.4	6.6		
pH (units)	7.68	7.29		
Conductivity (µS/cm)	930	792		
Salinity (ppt)	0.4	0.3		
Tit. Vol / Sam. Vol. / Alkalinity (mg/L)*	4.8 / 25 / 192	3.4 / 25 / 136	1 1	1 1
Tit. Vol. / Sam. Vol. / Hardness (mg/L)* <sup>2</sup>	2.9 / 25 / 116	2.8 / 25 / 112	1 1	1 1
Total Chlorine (mg/L)	<0.03	<0.03		
Total Ammonia Nitrogen (mg/L)	22.3	17.4		
Technician Initials	sf	sf		

\* = mg/L as CaCO<sub>3</sub>, <sup>2</sup> = Measured for freshwater samples only, NA = Not Applicable,

NM = Not Measured

Freshwater Tests:

Control/Dilution Water Source: test type: dh 8.2 (DMW) dh Other: 112 Alkalinity: 60 Hardness: 80

Control/Dilution Water Source: test type: 8.2 (DMW) MH-W Other: Alkalinity: Hardness:

Additional Control? Y N = Alkalinity: Hardness:

Marine Tests:

Control/Dilution Water Source: test type: ART SW NAT SW Alkalinity: Salinity:

Control/Dilution Water Source: test type: ART SW NAT SW Alkalinity: Salinity:

Additional Control? Y N = Alkalinity: Salinity:

Sample Salted w/ artificial salt? Y N If yes, what ppt? test type:

Sample salted w/brine? Y N If yes, what ppt? test type:

Comments: Temperature for grab sample must be 0-20°C if received within 1 hour of collection time, 0-12°C if effluent received within 4 hours of collection time, and 0-6°C for all other samples.

Sample Description:

COC Complete? Y N  
1 Y 2 3

Filtration? Y N  
Pore Size:                       
Organisms or Debris

Aeration? Y N  
Length of Time:                       
Final DO:                       
Final pH:                     

Hardness Adjustment? Y N  
If adjusted, please see worksheet for details.

Sub-samples for additional chemistry:

QC Check: sf

**Appendix C**  
**Chain-of-Custody Form**

Sample Collection By:

Date \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

ANALYSES REQUIRED

Report to:

Invoice To:

Company City of Everett  
Address 3200 Cedar St  
City/State/Zip Everett, WA 98201  
Contact Devel Kerler  
Phone 425-257-6790  
Email Dkerler@everettwa.gov

Company Sawle  
Address \_\_\_\_\_  
City/State/Zip \_\_\_\_\_  
Contact \_\_\_\_\_  
Phone \_\_\_\_\_  
Email \_\_\_\_\_

SAMPLE ID

DATE

TIME

MATRIX

CONTAINER TYPE

NO. OF CONTAINERS

COMMENTS

Receipt Temperature (°C)

1

FEN

10/30/24

0700

WW

10L

1

2

SE

10/30/24

0700

WW

10L

1

3

4

5

6

7

8

9

10

PROJECT INFORMATION

SAMPLE RECEIPT

RELINQUISHED BY (CLIENT)

RELINQUISHED BY (COURIER)

Client:

Total No. of Containers

2

(Signature)

(Time)

1:20

(Signature)

(Time)

1:30

PO No.:

Received Good Condition?

Y

(Printed Name)

Mike Sherman

(Date)

10-30-24

(Printed Name)

(Date)

10/30/24

Shipped Via:

Matches Test Schedule?

Y

(Company)

(Company)

(Company)

(Company)

(Company)

(Company)

SPECIAL INSTRUCTIONS/COMMENTS:

RECEIVED BY (COURIER)

(Time)

(Signature)

(Time)

1:30

(Printed Name)

(Date)

(Date)

(Printed Name)

(Date)

10/30/24

(Company)

(Company)

(Company)

(Company)

(Company)

(Company)

SEE ABOVE