

REVIEW OF TOXICITY BIOMONITORING REPORT

Environmental Toxicology, NPDES Permitting Program/OWQ

Biomonitoring Review Report: <u>IDEM/100/29/334/126-A/2024</u>	Document Date:	03/27/2024
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Discharger: Speedway WWTP NPDES No. IN0032972
 City: Speedway County: Marion State: IN Zip 46222

I. Background Information: (To be completed by the testing lab)

A. Test Material:

Effluent/W. Water: Whole Effluent Outfall No(s): 001
 Grab/Composite: 24-hr Composite Date(s) Effluent Collected: 03/04/2024 03/06/2024 03/08/2024
 Concentrations Used: Control, 11.4%, 22.7%, 45.5%, 90.9%, 100% Dilution Factor: 0.5
 Dilution Water: Receiving Water Reconstituted Perrier
 Name of Receiving Water Body: Eagle Creek Test Date(s): 03/05/2024 – 03/12/2024
03/05/2024 – 03/12/2024

B. Testing Laboratory: BIOMONITOR INC., 8802 W. Washington St.
 City: Indianapolis State IN Zip 46231

Responsible Person(s):

Study Director/Manager: Michael Britten
 Technical Staff: Initials
 Phone No. 317-297-7713

C. Toxicity Test Conducted:

Acute Test:

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | 1. <i>Ceriodaphnia dubia / reticulata</i> |
| <input type="checkbox"/> | 2. <i>Daphnia magna</i> or <i>Daphnia pulex</i> |
| <input checked="" type="checkbox"/> | 3. <i>Pimephales promelas</i> (Fathead Minnow) |
| <input type="checkbox"/> | 4. Other: _____ |

Short-Term Chronic Test:

- | | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | 1. <i>Ceriodaphnia dubia / reticulata</i>
Survival & Reproduction test |
| <input checked="" type="checkbox"/> | 2. <i>Pimephales promelas</i> (Fathead Minnow)
Larval Survival & Growth test |
| <input type="checkbox"/> | 3. <i>Selenastrum capricornutum</i> Growth |
| <input type="checkbox"/> | 4. Other: _____ |

D. Chemical Analyses Checklist:

Parameter	Day							Comment
	1	2	3	4	5	6	7	
1. Control:								
D.O. Initial	✓	✓	✓	✓	✓	✓	✓	_____
Final	✓	✓	✓	✓	✓	✓	✓	_____
pH Initial	✓	✓	✓	✓	✓	✓	✓	_____
Final	✓	✓	✓	✓	✓	✓	✓	_____
Alkalinity:	✓	—	✓	—	✓	—	—	_____
Hardness:	✓	—	✓	—	✓	—	—	_____
Conductivity:	✓	—	✓	—	✓	—	—	_____
Chlorine:	—	—	—	—	—	—	—	_____
2. Test Sample:								
D.O. Initial	✓	✓	✓	✓	✓	✓	✓	_____
Final	✓	✓	✓	✓	✓	✓	✓	_____
pH Initial	✓	✓	✓	✓	✓	✓	✓	_____
Final	✓	✓	✓	✓	✓	✓	✓	_____
Alkalinity:	✓	—	✓	—	✓	—	—	_____
Hardness:	✓	—	✓	—	✓	—	—	_____
Conductivity:	✓	—	✓	—	✓	—	—	_____
Chlorine:	N. D.	—	N. D.	—	N. D.	—	—	100% Only

II. *Daphnia* or *Ceriodaphnia* Toxicity Test Information
(To be completed by the testing lab)

A. Data Analyses:

Statistical Test	Method Used	Comment
Normality test:	<u>Chi-Square Test</u>	<u>Passed. Indicates Normal Distribution for Reprod.</u>
Homogeneity test:	<u>Hartley Test</u>	<u>Passed. Indicates Equal Variances for Reprod.</u>
Significance test:		
1. Parametric:	<u>Dunnett's test</u>	<u>Failed. Significant Difference for Reprod. At 90.9%.</u>
2. Non-Parametric:	<u>Fishers Exact Test</u>	<u>Passed. No Significant Difference for Survival.</u>
3. Are the Critical Values of Significance Provided?	<u>Yes.</u>	
4. Other:	<u>No calculation for acute endpoint was necessary.</u>	

B. Toxicity Test Results:

1. Acute:

LC₅₀ (48-hr): > 100% Effluent (<1 TU_a)

2. Chronic:

NOEL:	Survival	<u>100% (1 TU_c)</u>	Reproduction	<u>90.9% (1.1 TU_c)</u> <u>IC25= 78.5% (1.3 TU_c)</u>	Growth	_____
LOEL:	Survival	_____	Reproduction	_____	Growth	_____
Chronic Value:	Survival	_____	Reproduction	_____	Growth	_____

C. Permit Limits Requirement:

1. Acute:

LC₅₀ (48-hr): 100% Effluent (1 TU_a)

2. Chronic:

NOEL:	Survival	<u>90.9% (1.1 TU_c)</u>	Reproduction	<u>90.9% (1.1 TU_c)</u>	Growth	_____
LOEL:	Survival	_____	Reproduction	_____	Growth	_____

D. Reference Toxicant Data:

- Reference Toxicant:** Copper chloride, Reagent Grade, from Carolina Biological
- Test Date:** February 20 - 27, 2024
- Results:** 48-hr LC₅₀ = 86 µg/L, NOEL (Reprod.) = 40 µg/L, LOEL (Reprod.) = 80 µg/L as Cu.
- Acceptable Range:** Within Laboratory Control Limits.

E. Permit Limits Compliance: (To be completed by IDEM Staff only)

<input checked="" type="checkbox"/>	Pass (LC ₅₀ [48-hr])	<u>(1 TU_a)</u>	<input type="checkbox"/>	Fail (LC ₅₀ [48-hr])	_____
<input checked="" type="checkbox"/>	Pass (NOEL/Survival)	<u>(1 TU_c)</u>	<input type="checkbox"/>	Fail (NOEL/Survival)	_____
<input type="checkbox"/>	Pass (NOEL/Reprod.)	_____	<input checked="" type="checkbox"/>	Fail (NOEL/Reprod.)	<u>90.9% (1.1 TU_c)</u> <u>IC25= 78.5% (1.3 TU_c)</u>
<input type="checkbox"/>	Pass (NOEL/Growth)	_____	<input type="checkbox"/>	Fail (NOEL/Growth)	_____

Is the Test Acceptable? Yes No Reason **Failed for *C. dubia* Reprod.**

III. Fathead Minnow (*Pimephales promelas*) Toxicity Test Information
(To be completed by the testing lab)

A. Data Analyses:

Statistical Test	Method Used	Comment
Normality test:	<u>Chi-Square Test</u>	<u>Passed. Indicates Normal Distribution for Growth.</u>
Homogeneity test:	<u>Hartley Test</u>	<u>Passed. Indicates Equal Variances for Growth.</u>
Significance test:		
1. Parametric:	<u>Dunnett's test</u>	<u>Passed. No Significant Difference for Growth.</u> <u>Passed. No Significant Difference for Survival.</u>
2. Non-Parametric:	<u>Steels Many-One Rank Test</u>	
3. Are the Critical Values of Significance Provided?		<u>Yes.</u>
4. Other:	<u>No calculation for acute endpoint was necessary.</u>	

B. Toxicity Test Results:

1. Acute:

LC₅₀ (96-hr): > 100% Effluent (<1 TUa)

2. Chronic:

NOEL:	Survival	<u>100% (1 TUc)</u>	Reproduction	_____	Growth	<u>100% (1 TUc)</u>
LOEL:	Survival	_____	Reproduction	_____	Growth	_____
Chronic Value:	Survival	_____	Reproduction	_____	Growth	_____

C. Permit Limits Requirement:

1. Acute:

LC₅₀ (96-hr): 100% Effluent (1 TUa)

2. Chronic:

NOEL:	Survival	<u>90.9% (1.1 TUc)</u>	Reproduction	_____	Growth	<u>90.9% (1.1 TUc)</u>
LOEL:	Survival	_____	Reproduction	_____	Growth	_____

D. Reference Toxicant Data:

- Reference Toxicant: Potassium chloride, Reagent Grade, from Sigma Aldrich
- Test Date: February 20 - 27, 2024
- Results: 96-hr LC₅ = 952 mg/L, NOEL (Growth.) = 1000 mg/L, LOEL (Growth.) = 2000 mg/L as KCl
- Acceptable Range: Within Laboratory Control Limits.

E. Permit Limits Compliance: (To be completed by IDEM Staff only)

<input checked="" type="checkbox"/>	Pass (LC ₅₀ [96-hr])	<u>(1 TUa)</u>	<input type="checkbox"/>	Fail (LC ₅₀ [96-hr])	_____
<input checked="" type="checkbox"/>	Pass (NOEL/Survival)	<u>(1 TUc)</u>	<input type="checkbox"/>	Fail (NOEL/Survival)	_____
<input type="checkbox"/>	Pass (NOEL/Reprod.)	_____	<input type="checkbox"/>	Fail (NOEL/Reprod.)	_____
<input checked="" type="checkbox"/>	Pass (NOEL/Growth)	<u>(1 TUc)</u>	<input type="checkbox"/>	Fail (NOEL/Growth)	_____

Is the Test Acceptable? Yes No Reason _____

IV. GLP and QA/QC Compliance:
(To be completed by IDEM Staff only)

A. Does the Biomonitoring Report provide?

- | | | | | |
|---|-----|-------------------------------------|----|--------------------------|
| 1. GLP Compliance Statement: | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| 2. QA/QC Compliance Statement: | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| 3. Were the required GLPs followed? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| 4. If not, the Report lacks what major information: | | | | |
-
-

B. Laboratory Raw Data Sheets:

- | | | | | |
|--|-----|-------------------------------------|----|--------------------------|
| 1. Does the Report enclose raw data sheets? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| 2. Does the raw data sheets provide essential information? | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| 3. If not, the Report lacks what major information: | | | | |
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-

V. Comments and Recommendations:
(To be completed by IDEM Staff only)


- In March 2024 in the Semi-Annual testing whole effluent from Speedway WWTP did not demonstrate any acute toxicity to *Ceriodaphnia dubia* or to Fathead minnow, *Pimephales promelas*. The 48-hr and the 96-hr LC₅₀ to both the test species was >100% effluent (<1 TUa), respectively and acceptable. Likewise, the NOEL (NOEC) for *Pimephales promelas* Survival and Growth was 100% effluent (1 TUc) and acceptable as compared to 90.9% effluent (1.1 TUc) WET compliance limit in the facility NPDES permit.

Unlike the above, whole effluent demonstrated chronic toxicity to *Ceriodaphnia dubia*. The NOEC for *Ceriodaphnia dubia* Survival was although 100% effluent (1 TUc) but for for Reproduction it was 90.9 % effluent (1.1 TUc) with an IC₂₅= 78.5% effluent (1.3 TUc) and unacceptable as compared to 90.9% effluent (1.1 TUc) WET compliance limit in the facility NPDES permit.

Note:

Failure of the WET tests for chronic toxicity with *Ceriodaphnia dubia* for Reproduction requires the facility repeat the WET test with the same test species within 2 weeks of test failure.

Reviewed by:

Signature:  Date: 06/12/2024
 Syed GhiasUddin Title: Environmental Toxicologist
 NPDES Permits Branch, OWQ

Electronic copy:

- Jerry Dittmer, BC, NPDES Permits Branch, OWQ
- Leigh Voss, SC, NPDES Permits Branch, OWQ