

# REVIEW OF TOXICITY BIOMONITORING REPORT

## Environmental Toxicology, NPDES Permitting Program/OWQ

Biomonitoring Review Report: <u>IDEM/100/29/334/134-2024</u>	Document Date: <u>04/16/2024</u>
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Discharger: Poet Biorefining-Portland LLC NPDES No. IN0062618  
 City: Portland County: Jay County State: IN Zip: 47371

**I. Background Information:** (To be Completed by the Testing Lab.)

**A. Test Material:**

Effluent/W. Water: Whole Effluent Outfall No(s): 001S  
 Grab/Composite: 24-hr Composite Date(s) Effluent Collected: 03/25/2024  
 Concentrations Used: Control, 6.25%, 12.5%, 25%, 55.6%, 100% Dilution Factor: 0.5  
 Dilution Water: Receiving Water  Reconstituted  Perrier   
 Name of Receiving Water Body: Salamonie River and Wikel Ditch 03/26/2024 – 04/03/2024  
**Test Date(s):** 03/25/2023 – 04/02/2024

**B. Testing Laboratory:** Element Materials Technology

City: Lafayette State LA Zip 70508

**Responsible Person(s):**

Study Director/Manager: Jon Richardson  
 Technical Staff: Initials  
 Phone No. 337-235-0483

**C. Toxicity Test Conducted:**

Acute Test:	Short-Term Chronic Test:
<input checked="" type="checkbox"/> 1. <i>Ceriodaphnia dubia / reticulata</i>	<input checked="" type="checkbox"/> 1. <i>Ceriodaphnia dubia / reticulata</i>
<input type="checkbox"/> 2. <i>Daphnia magna</i> or <i>D. pulex</i>	Survival & Reproduction test
<input checked="" type="checkbox"/> 3. <i>Pimephales promelas</i> (FH. minnow)	<input checked="" type="checkbox"/> 2. <i>Pimephales promelas</i> (FH. minnow)
<input type="checkbox"/> 4. Other: _____	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	
<b>1. Control:</b>								
D.O. Initial	✓	✓	✓	✓	✓	✓	✓	_____
Final	✓	✓	✓	✓	✓	✓	✓	_____
pH Initial	✓	✓	✓	✓	✓	✓	✓	_____
Final	✓	✓	✓	✓	✓	✓	✓	_____
Alkalinity:	✓	—	—	—	—	—	—	_____
Hardness:	✓	—	—	—	—	—	—	_____
Conductivity:	✓	—	✓	✓	✓	—	✓	_____
Chlorine:	✓	—	—	—	—	—	—	_____
<b>2. Test Sample:</b>								
D.O. Initial	✓	✓	✓	✓	✓	✓	✓	_____
Final	✓	✓	✓	✓	✓	✓	✓	_____
pH Initial	✓	✓	✓	✓	✓	✓	✓	_____
Final	✓	✓	✓	✓	✓	✓	✓	_____
Alkalinity:	✓	—	—	—	—	—	—	_____
Hardness:	✓	—	—	—	—	—	—	_____
Conductivity:	✓	—	✓	—	✓	—	✓	_____
Chlorine:	✓	—	—	—	—	—	—	<u>100% Only</u>

**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>Shapiro Wilk's Test</u>	<u>Failed. Indicates Normal Distribution for Reprod.</u>
Homogeneity test:	<u>Bartlett's Test</u>	<u>Passed. Indicates Equal Variances for Reprod.</u>
Significance test:		
1. Parametric	<u>Dunnett's Test</u>	_____
2. Non-Parametric:	<u>Steel Many-One Rank Test</u>	<u>Passed. No Significant Difference for Reprod.</u>
	<u>Fisher's Exact Test</u>	<u>Passed. No Significant Difference for Survival.</u>
3. Are the Critical Values of Significance Provided?		<u>Yes</u>
4. Other:	_____	

**B. Toxicity Test Results:**

**1. Acute:**

LC<sub>50</sub> (48-hr): >100% Effluent (<1 TUa)

**2. Chronic:**

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

**C. Permit Limits Requirement:**

**1. Acute:**

LC<sub>50</sub> (48-hr): 100% Effluent (1 TUa)

**2. Chronic:**

NOEL:	Survival	<u>55.6% (1.8 TUc)</u>	Reproduction	<u>55.6% (1.8 TUc)</u>	Growth	_____
LOEL:	Survival	_____	Reproduction	_____	Growth	_____

**D. Reference Toxicant Data:**

- Reference Toxicant: Potassium Chloride
- Test Date: March 24, 2024
- Results: NOEC (Survival) = 500 ppm
- Acceptable Range: Within Laboratory Control Limits

**E. Permit Limits Compliance: (To be Completed by IDEM Staff Only)**

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

Is the Test Acceptable? Yes  No  Reason \_\_\_\_\_

**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>Shapiro Wilk's Test</u>	<u>Passed.. Indicates Normal Distribution for Growth.</u>
Homogeneity test:	<u>Bartlett's Test</u>	<u>Passed. Indicates Equal Variances for Growth.</u>
Significance test:		
1. Parametric	<u>Dunnett's Test</u>	<u>Failed. Signiicant Difference for Growth.</u>
2. Non-Parametric:	<u>Steel Many-One Rank Test</u>	<u>Failed. Significant Difference for Survival at 5.25%</u>
3. Are the Critical Values of Significance Provided?		<u>Yes</u>
4. Other:	_____	

**B. Toxicity Test Results:**

1. Acute:

LC<sub>50</sub> (96-hr): >100% Effluent (<1 TUa)

2. Chronic:

NOEL:	Survival	<u>&lt;6.25% (&gt;1.8 TUc)</u>	Reproduction	_____	Growth	<u>&lt;6.25% (&gt;1.6 TUc) IC<sub>25</sub> = 2.79% (36 TUc)</u>
LOEL:	Survival	_____	Reproduction	_____	Growth	_____
Chronic Value:	Survival	_____	Reproduction	_____	Growth	_____

**C. Permit Limits Requirement:**

1. Acute:

LC<sub>50</sub> (96-hr): 100% Effluent (1 TUa)

2. Chronic:

NOEL:	Survival	<u>55.6% (1.8 TUc)</u>	Reproduction	_____	Growth	<u>55.6% (1.8 TUc)</u>
LOEL:	Survival	_____	Reproduction	_____	Growth	_____

**D. Reference Toxicant Data:**

- Reference Toxicant: Sodium Dodecyl Sulfate
- Test Date: March 24 2024
- Results: NOEC (Survival) = 16 ppm
- Acceptable Range: Within Laboratory Control Limits

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

<input checked="" type="checkbox"/>	Pass (LC <sub>50</sub> [96-hr])	(1 TUa)	<input type="checkbox"/>	Fail (LC <sub>50</sub> [96-hr])	_____
<input type="checkbox"/>	Pass (NOEL/Survival)	_____	<input checked="" type="checkbox"/>	Fail (NOEL/Survival)	<u>&lt;6.25% (&gt;1.8 TUc)</u>
<input type="checkbox"/>	Pass (NOEL/Reprod.)	_____	<input type="checkbox"/>	Fail (NOEL/Reprod.)	_____
<input type="checkbox"/>	Pass (NOEL/Growth)	_____	<input checked="" type="checkbox"/>	Fail (NOEL/Growth)	<u>6.25% (&gt;1.6 TUc) IC<sub>25</sub> = 2.79% (36 TUc) = 2.79% (36 TUc)</u>
					<u>TUc _____</u>
rowtht Acceptable?	Yes	_____	No	<input checked="" type="checkbox"/>	Reason <b>Failed for FHM Surv/Growth</b>

**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: |     |                                     |    |                          |
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**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 Annual Testing whole effluent from POET Biorefining Outfall-001S in Portland, Indiana did not show any acute toxicity to *Ceriodaphnia dubia* or to Fathead minnow, *Pimephales promelas*. The 48-hr and the 96-hr LC<sub>50</sub> to both the species was >100% effluent (<1 TUa), respectively. Likewise, the NOEC for *Ceriodaphnia dubia* Survival and Reproduction was 100% effluent (1 TUc) and acceptable as compared to 55.6% effluent (1.8 TUc) WET compliance limit in the facility NPDES permit.

- Unlike the above, whom ffluent demonstrated chronic toxicity to Fathead minnow (FHM), *Pimephales promelas*. The NOEC for FHM Survival and Growth was <6.25% effluent (>1.6 TUc) with an IC<sub>25</sub> = 2.79% (36 TUc and unacceptable as compared to 55.6% effluent (1,8 TUc) WET compliance limit in the facility NPDES permit.**

POET Biorefining in Portland, Indiana conducted WET toxicity tests using just one set of composite whole effluent sample collected on March 25, 2024, from Outfall-001S instead of three effluent samples taken on 3 alternate days for test solution renewal on days 1, 3 and 5. POET Biorefining was allowed this sample collection frequency since the facility has an intermittent effluent discharge for less than 24 hours. Also, as an alternative a 24-hour composite effluent sample can be acquired by collecting and mixing s series of 4 grab samples taken every 4-6 hours apart over a 24-hour period or for the duration of the discharge if it is less than 24 hours. The sample holding time begins when the 24-hr composite or the grab effluent sample has been taken.

**NoteL**

**Failure of the WET test with Fathead minnow for Survival and Growth requires the facility to repeat the test with the same species within 2 weeks of test failure.**

Reviewed by:

Signature: Syed GhiasUddin Date: 06/17/2024  
 Syed GhiasUddin Title: Environmental Toxicologist  
 NPDES Permits Branch, OWQ

Electronic copy:

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