

REVIEW OF TOXICITY BIOMONITORING REPORT

Environmental Toxicology, NPDES Permitting Program/OWQ

Biomonitoring Review Report: IDEM/100/29/334/131/2024	Document Date:	04/18/2024
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Discharger: Cleveland-Cliffs Steel LLC IN H. Works NPDES No. IN0000205
City: East Chicago **County:** Lake **State:** IN **Zip:** 46312

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

A. Test Material:

Effluent/W. Water: Whole Effluent **Outfall No(s):** 009
Grab/Composite: 24- hr Composite **Date(s) Effluent Collected:** 04/08/2024 04/10/2024 04/12/2024
Concentrations Used: Control, 6.25%, 12.5%, 25%, 50%, 100% **Dilution Factor:** 0.5
Dilution Water: Receiving Water Reconstituted Perrier
Name of Receiving Water Body: Indiana Harbor Ship Canal 04/09/2024 - 04/16/2024

B. Testing Laboratory:

City: Stove **State:** OH **Zip:** 44224
Responsible Person(s):
Study Director/Manager: Alexandra Tite
Technical Staff: Initials
Phone No.: 332-688-0111

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> | <input type="checkbox"/> Survival & Reproduction test |
| <input type="checkbox"/> 3. <i>Pimephales promelas</i> (FH. minnow) | <input type="checkbox"/> 2. <i>Pimephales promelas</i> (FH. minnow) |
| <input type="checkbox"/> 4. Other: _____ | <input type="checkbox"/> 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:	✓	—	✓	—	✓	—	—	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>Shapiro Wilks Test</u>	<u>Failed. Indicates Non-Normal Distribution for Reprod.</u>
Homogeneity test:	<u>Bartlett's Test</u>	<u>Failed. Indicates Un-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 Fiffrence 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:
LC₅₀ (48-hr): >100% Effluent (<1 TUa)

2. Chronic:

NOEC:	Survival	<u>100% (1 TU_c)</u>	Reproduction	<u>100% (1 TU_c)</u>	Growth	_____
LOEC:	Survival	_____	Reproduction	_____	Growth	_____
Chronic Value:	Survival	_____	Reproduction	_____	Growth	_____

C. Permit Limits Requirement:

1. Acute:
LC₅₀ (48-hr): 100% Effluent (1 TUa)

2. Chronic:

NOEC:	Survival	<u>35.7 (2.8 TU_c)</u>	Reproduction	<u>35.7 (2.8 TU_c)</u>	Growth	_____
LOEC:	Survival	_____	Reproduction	_____	Growth	_____

D. Reference Toxicant Data:

- Reference Toxicant: Sodium chloride (NaCl)
- Test Date: March 12 – 19, 2024
- Results: LC₅₀ = 1.99 g/L., IC₂₅ = 0.788 g/L. NaCl,
- 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 TUa)</u>	<input type="checkbox"/>	Fail (LC ₅₀ [48-hr])	_____
<input checked="" type="checkbox"/>	Pass (NOEC/Survival)	<u>(1 TU_c)</u>	<input type="checkbox"/>	Fail (NOEC/Survival)	_____
<input checked="" type="checkbox"/>	Pass (NOEC/Reprod.)	<u>(1 TU_c)</u>	<input type="checkbox"/>	Fail (NOEC/Reprod.)	_____
<input type="checkbox"/>	Pass (NOEC/Growth)	_____	<input type="checkbox"/>	Fail (NOEC/Growth)	_____

Is the Test Acceptable? Yes No Reason PMSD = 16.1%.

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:	_____	_____
Homogeneity test:	_____	_____
Significance test:	_____	_____
1. Parametric:	_____	_____
2. Non-Parametric:	_____	_____
3. Are the Critical Values of Significance Provided?	_____	_____
4. Other:	_____	_____

B. Toxicity Test Results:

1. Acute:

LC50 (96-hr): _____

2. Chronic:

NOEL:	Survival	_____	Reproduction	_____	Growth	_____
LOEL:	Survival	_____	Reproduction	_____	Growth	_____
Chronic Value:	Survival	_____	Reproduction	_____	Growth	_____

C. Permit Limits Requirement:

1. Acute:

LC50 (96-hr): _____

2. Chronic:

NOEL:	Survival	_____	Reproduction	_____	Growth	_____
LOEL:	Survival	_____	Reproduction	_____	Growth	_____

D. Reference Toxicant Data:

- Reference Toxicant: _____
- Test Date: _____
- Results: _____
- Acceptable Range: _____

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

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

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: | _____ | | | |

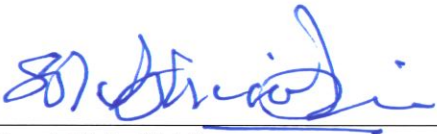
B. Laboratory Raw Data Sheets:

- | | | | | |
|--|-------|-------------------------------------|----|--------------------------|
| 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: | _____ | | | |

V. Comments and Recommendations:
(To be Completed by IDEM Staff Only)

- In April 2024, in the Annual testing whole effluent from **Cleveland -Cliffs Steel LLC (Outfall-009)** did not demonstrate any acute or chronic toxicity to *Ceriodaphnia dubia* tested as the most Sensitive species. The 48-hr LC₅₀ to the test species was **>100% effluent (<1 TUa)** and acceptable versus **100% effluent (1 TUa)** WET compliance limit in the NPDES permit. Likewise, the NOEC for *Ceriodaphnia dubia* Survival and Reproduction was **100% effluent (1 TUc)** and acceptable as compared to **35.7% effluent (2.8 TUc)** WET compliance limit in the facility NPDES permit.

Reviewed by:

Signature:  Date: 06/10/2024
 Syed GhiasUddin Title: Environmental Toxicologist
 NPDES Permits Branch, OWQ

Electronic copy:

Jerry Dittmer, BC, NPDES Permits Branch, OWQ
 Richard Hamilton SC, NPDES Permits Branch, OWQ