REVIEW OF TOXICITY BIOMONITORNG REPORT
Environmental Toxicology, NPDES Permitting Program/OWQ

Biomonitoring Review Report: IDEM/100/29/334/119/2024	Document Date:	04/242024

Discharger: BP Products North America Inc NPDES No. IN0000108
City: Whiting County: Lake State: IN Zip: 46394

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

A. Test Material:

Effluent/W. Water: Whole Effluent **Outfall No(s):** 005
Grab/Composite: 24-hr Composite **Date(s) Effluent Collected:** 03/04/2024 03/06/2024 03/08/2024
Concentrations Used: Control, 0.675%, 1.35%, 2.7%, 5.4%, 10.8% 21.6, 43.2% Dilution Factor: >0.50
Dilution Water: Receiving Water [ ] Reconstituted [✓] Perrier [ ]
Name of Receiving Water Body: Lake Michigan and Lake George **Test Date(s):** 03/05/2024– 03/12/2024
03/05/2024– 03/12/2024

B. Testing Laboratory: Enviro Science Inc.
City: Stow State OH Zip 44224
Responsible Person(s):

Study Director/Manager: Alexandria Tite, Aquatic Biologist
Technical Staff: Initials
Phone No. (330) 688- 0111)

C. Toxicity Test Conducted:

Acute Test:

[✓] 1. *Ceriodaphnia dubia / reticulata*
[ ] 2. *Daphnia magna* or *D. pulex*
[✓] 3. *Pimephales promelas* (FH. minnow)
[ ] 4. Other: _____

Short-Term Chronic Test:

[✓] 1. *Ceriodaphnia dubia / reticulate* Survival & Reproduction test
[✓] 2. *Pimephales promelas* (FH. minnow) Larval Survival & Growth test
[ ] 3. *Selenastrum capricornutum* Growth
[ ] 4. Other: _____

D. Chemical Analyses Checklist:

Parameter	Day 1	2	3	4	5	6	7	Comment
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:	Shapiro-Wilk's Test	Failed. Indicates Non-Normal Distribution for Reprod.
Homogeneity test:	Bartlett's Test	Failed. Indicates Un-Equal Variances for Reprod.
Significance test:		
1. Parametric	Dunnett's Test	
	Bonferroni Adj t Test	
2. Non-Parametric:	Steel's Many-One rank Test	Passed. No Significaant Difference for Reprod.
	Fisher's Exact Test	Passed. No Significant Difference for Survival
3. Are the Critical Values of Significance Provided?		Yes
4. Other:		

B. Toxicity Test Results:

1. **Acute:**
   LC_{50} (48-hr): >43.2% Effluent (2.32 TU_c)

2. **Chronic:**

NOEC:	**Survival**	43.2% (2.32 TU_c)	**Reproduction**	43.2% (2.32 TU_c) IC_{25} = 43.2% (2.32 TUc)	**Growth**	
LOEC:	**Survival**		**Reproduction**		**Growth**	
Chronic Value:	**Survival**		**Reproduction**		**Growth**	

C. Permit Limits Requirement:

1. **Acute:**
   LC_{50} (48-hr): 9.09% Effluent = 11 TUa

2. **Chronic:**

NOEC:	**Survival**	2.7% (37 TU_c)	**Reproduction**	2.7% (37 TU_c)	**Growth**	
LOEC:	**Survival**		**Reproduction**		**Growth**	

D. Reference Toxicant Data:

1. **Reference Toxicant:** Sodium chloride (NaCl)
2. **Test Date:** Febtuary 20 - 26, 2024
3. **Results:** IC_{25} = 0336 g/L NaCl.
4. **Acceptable Range:** Within Laboratory Control Limits

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

✓	**Pass** (LC_{50} [48-hr])	2.32 TU_c		**Fail** (LC_{50} [48-hr])	
✓	**Pass** (NOEC/Survival)	2.32 TU_c		**Fail** (NOEC/Survival)	
✓	**Pass** (NOEC/Reprod)	2.32 TUc		**Fail** (NOEC/Reprod)	
	Pass (NOEC/Growth)			**Fail** (NOEC/Growth)	

Is the Test Acceptable? **Yes** ✓ **No** ___ **Reason** _____

III. Fathead Minnow (*Pimephales*) Toxicity Test Information

(To be Completed by the Testing Lab.)

A. Data Analyses:

Statistical Test	Method Used	Comment
Normality test:	Shapiro-Wilk's Test	Passed. Indicates Normal Distribution for Growth.
Homogeneity test:	Bartlett's Test	Passed. Indicates Equal Variance for Growth.
Significance test:		
1. Parametric	Dunnett's Test	Passed. No Significant Difference for Growth. Passed. No Significant Difference for Survival.
2. Non-Parametric	Bonferroni Adj t Test	

3. Are the Critical Values of Significance Provided? Yes
4. Other: _____

B. Toxicity Test Results:

1. **Acute:**

   LC_{50} (96-hr): >43.2% Effluent (2.32 TU_c)

2. **Chronic:**

NOEL:	**Survival**	43.2% (2.32TU_c)	**Reproduction**	_____	**Growth**	21.6% (4.6 TU_c) IC_{25} = 41.46% (2.4 TUc)
LOEL:	**Survival**	_____	**Reproduction**	_____	**Growth**	_____
Chronic Value:	**Survival**	_____	**Reproduction**	_____	**Growth**	_____

C. Permit Limits Requirement:

1. **Acute:**

   LC_{50} (96-hr): 9.09% Effluent = 11 TUa

2. **Chronic:**

NOEL:	**Survival**	2.7% (37 TU_c)	**Reproduction**	_____	**Growth**	2.7% (37 TU_c)
LOEL:	**Survival**	_____	**Reproduction**	_____	**Growth**	_____

D. Reference Toxicant Data:

1. **Reference Toxicant:** Potassium chloride (KCl)
2. **Test Date:** Febtuary 20 - 27, 2024
3. **Results:** IC_{25} = 0.969 g/L NaCl,
4. **Acceptable Range:** Within Laboratory Control Limits

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

✓	**Pass (LC50)**	2.32 TU_c		**Fail (LC50)**	_____
✓	**Pass (NOEL/Survival)**	2.32 TU_c		**Fail (NOEL/Survival)**	_____
	Pass (NOEL/Reprod.)	_____		**Fail (NOEL/Reprod.)**	_____
✓	**Pass (NOEL/Growth)**	4.6 TUc		**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** ✓ **No** _____
2. **QA/QC Compliance Statement:** **Yes** ✓ **No** _____
3. **Were the required GLPs followed?** **Yes** ✓ **No** ___
4. **If not, the Report lacks what major information:**

_____

_____

B. Laboratory Raw Data Sheets:

1. **Does the Report enclose raw data sheets?** **Yes** ✓ **No** _____
2. **Does the raw data sheets provide essential information?** **Yes** ✓ **No** _____
3. **If not, the Report lacks what major information:**

_____

_____

V. Comments and Recommendations:

(To be Completed by IDEM Staff Only)

1. In March 2024 in the Quarterly testing whole effluent from **BP Products North America** did not show any acute or chronic toxicity to *Ceriodaphnia dubia* or to Fathead minnow, *Pimephales promelas*. The 48-hr and the 96-hr LC_{50} to both the test species was **>43.2% effluent (2.32 TU_c)** and acceptable as compared to **9.09% effluent (11 TUa)** WET compliance limit for acute toxicity. Likewise, the NOEC for *Ceriodaphnia dubia* Survival and Reproduction Survival was **43.2% effluent (2.32 TUc)** and for *Pimephales promelas* for Survival and Growth was **43.2% effluent (2.32 TUc) and 21.6% effluent (4.6 TU_c)** respectively, with an **IC_{25} = 41.46% (2.4 TUc)** for Growth, and acceptable as compared to **2.7% effluent (37 TUc)** WET compliance limit in the facility NPDES permit.

   Note:
   This was the 1st Quarter 2024 WET test.

Reviewed by:

Signature: _____ Date: 06/12/2024

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NPDES Permits Branch, OWQ

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