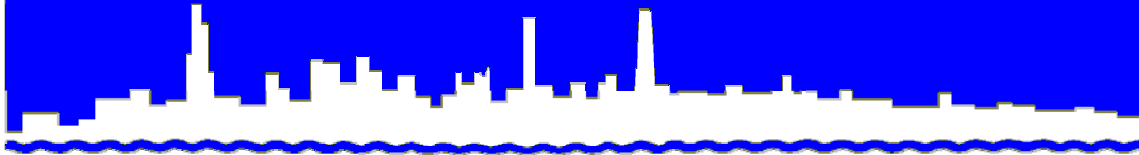


*Protecting Our Water Environment*



*Metropolitan Water Reclamation District of Greater Chicago*

**RESEARCH AND DEVELOPMENT  
DEPARTMENT**

*REPORT NO. 06-60*

*BIOMONITORING REPORT  
2006*

*RESULTS OF ACUTE WHOLE EFFLUENT TOXICITY (WET) TESTS  
CONDUCTED ON FINAL EFFLUENT SAMPLES*

*LEMONT WATER RECLAMATION PLANT  
LEMONT, ILLINOIS  
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM  
PERMIT NUMBER IL0028070*

*SEPTEMBER 2006*

**Metropolitan Water Reclamation District of Greater Chicago**  
100 East Erie Street Chicago, IL 60611-2803 (312) 751-5600

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2006

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Research and Development Department  
Louis Kollias, Director

September 2006

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September 27, 2006

Mr. Jeb McGhee  
Environmental Specialist  
Compliance Assurance Section - 19  
Illinois Environmental Protection Agency  
1021 North Grand Avenue  
Springfield, IL 62794-9276

Dear Mr. McGhee:

Subject: Biomonitoring Report for August 2006 – Lemont Water Reclamation Plant  
NPDES Permit Number IL0028070

The subject biomonitoring report is submitted in compliance with the National Pollutant Discharge Elimination System (NPDES) Permit Number IL0028070, Special Condition 12. Whole effluent toxicity (WET) tests were conducted in accordance with the biomonitoring plan for the Lemont Water Reclamation Plant (WRP), dated July 7, 2005 (copy enclosed), which was approved by Mr. Robert Mosher of the Illinois Environmental Protection Agency in a letter to Mr. Richard Lanyon dated July 18, 2005 (copy enclosed).

In exception to the above mentioned biomonitoring plan, the enclosed report is for samples collected and tested in August 2006. The test was scheduled for the 12<sup>th</sup> month (June 2006) prior to the NPDES permit expiration date. The test was postponed due to the receipt of the NPDES permit required Discharge Monitoring Report-Quality Assurance Study 26 (DMR-QA) samples in June 2006. Subsequently, the in-house *C. dubia* organisms did not meet the test organism criteria required for WET testing.

The subject report includes copies of all bench sheets, chain-of-custody forms, sample receipt and preparation forms, hard copies of computer generated statistical analyses, control charts, and a certification of accuracy statement.

If you have any questions concerning this report, please contact Dr. Geeta Rijal, Microbiologist IV, at 708-588-3767.

Very truly yours,

Louis Kollias  
Director  
Research and Development

LK:GR:rag  
Enclosures  
cc/enc: Granato/O'Connor/Rijal/O'Connell  
Quintanilla/Moe  
cc: Nason (Transmittal letter and report title page)

## TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	iii
ACKNOWLEDGEMENTS	iv
DISCLAIMER	iv
ACUTE WHOLE EFFLUENT TOXICITY TEST RESULTS FOR THE LEMONT WATER RECLAMATION PLANT, ILLINOIS, NPDES PERMIT NUMBER IL0028070, AUGUST 2006	1
Summary	1
Sample Information	1
Whole Effluent Toxicity (WET) Tests	2
Analysts	2
Results	4
Certification of Accuracy	7
APPENDICES	
AI    Summary of Acute Toxicity Results <i>Pimephales promelas</i> (Fathead minnow) CETIS Test Summary and Comparison Report	AI-1
AII   Summary of Acute Toxicity Results <i>Ceriodaphnia dubia</i> ( <i>C. dubia</i> ) CETIS Test Summary and Comparison Report	AII-1
BI    Raw Data for <i>Pimephales promelas</i> (Fathead minnow) WET Test Conducted on Lemont WRP Final Effluent Col- lected on August 21-22, 2006	BI-1
BII   Raw Data for <i>Ceriodaphnia dubia</i> ( <i>C. dubia</i> ) WET Test Conducted on Lemont WRP Final Effluent Collected on August 21-22, 2006	BII-1

## TABLE OF CONTENTS (Continued)

APPENDICES		<u>Page</u>
CI	Chain-of-Custody for WET Tests Conducted on Lemont WRP Final Effluent Collected on August 21-22, 2006	CI-1
DI	Quality Assurance for the <i>Pimephales promelas</i> (Fathead minnow) WET Test: Raw Data and Statistical Calculations for the Concurrent Reference Toxicant Test, Control Charts, and Culture Data	DI-1
DII	Quality Assurance for the <i>Ceriodaphnia dubia</i> ( <i>C. dubia</i> ) WET Test: Raw Data and Statistical Calculations for the Reference Toxicant Tests, Control Charts, and Culture Data	DII-1

## LIST OF TABLES

<u>Table No.</u>		<u>Page</u>
1	Sample Collection Information	3
2	Acute Fathead Minnow Test Results	5
3	Acute <i>C. dubia</i> Test Results	6

## ACKNOWLEDGEMENTS

Ms. Rhonda Griffith is acknowledged for typing this report.

## DISCLAIMER

Mention of proprietary equipment and chemicals in this report does not constitute endorsement by the Metropolitan Water Reclamation District of Greater Chicago.

ACUTE WHOLE EFFLUENT TOXICITY TEST RESULTS FOR THE LEMONT  
WATER RECLAMATION PLANT, ILLINOIS  
NPDES PERMIT NUMBER IL0028070, AUGUST 2006

Summary

Acute toxicity tests with the fathead minnow, *Pimephales promelas* (96-hour, static, renewal) and the water flea, *Ceriodaphnia dubia* (48-hour, static, non-renewal) were conducted on the samples of Lemont WRP final effluent collected on August 21-22, 2006. The results indicated that the tests were valid. No acute toxic effect on *Pimephales promelas* was observed. No acute toxic effect on *Ceriodaphnia dubia* was observed. Results of the quality control acute toxicity tests with *Pimephales promelas* using the reference toxicant sodium chloride (RTT) fell below the lower control chart limits prescribed as acceptable by the United States Environmental Protection Agency (USEPA). An out of control RTT result can be expected five percent of the time and does not necessarily invalidate WET test results. Results of the quality control acute toxicity test with *Ceriodaphnia dubia* using the concurrent reference toxicant sodium chloride (RTT) failed the test acceptability criteria. The *C. dubia* RTT was immediately repeated on August 29, 2006. The repeated *C. dubia* RTT passed the test acceptability criteria and the results fell within limits prescribed as acceptable by the USEPA.

Sample Information

Five grab samples of final effluent were collected from the Lemont WRP. A grab sample was collected at 0700, 1300, and 1900, on Monday, 08/21/06 and 0100 & 0700 on Tuesday, 08/22/06. The individual grab samples were stored on-site at 0.1-6°C in a refrigerator. These samples were received in the laboratory within 4 hours of the final grab sample collection. Sample temperatures at the time of receipt were below 13.5°C. The five grab samples were combined



in the Laboratory to make a 24-hour composite sample. Samples were stored in a locked refrigerator in the laboratory at  $4 \pm 1^\circ\text{C}$ . Sample collection information is shown in Table 1.

### Whole Effluent Toxicity (WET) Tests

Acute *Pimephales promelas* (fathead minnow) and *Ceriodaphnia dubia* (*C. dubia*) WET tests were conducted on the Lemont WRP effluent samples collected on August 21-22, 2006. Acute WET test methods and procedures were followed in accordance with *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, EPA/821-R-02-012, Fifth Edition, October 2002. Fathead minnows were exposed to 6.25, 12.5, 25, 50, and 100 percent effluent concentrations for 96 hours. *C. dubia* were exposed to the same concentrations of effluent for 48 hours. The acute fathead minnow test was set up on August 22, 2006, and completed on August 26, 2006. The acute *C. dubia* test was set up on August 22, 2006, and completed on August 24, 2006. Hard synthetic water with selenium (HSW) was used as control and dilution water. Statistical analyses were performed using the CETIS™ Software program version 1.1.1 revC (Tidepool Scientific Software, California).

Concurrent RTT using sodium chloride (NaCl) were conducted and the control charts for the fathead minnow and *C. dubia* acute tests were prepared. The concurrent *C. dubia* RTT failed the test acceptability criteria. The *C. dubia* RTT was immediately repeated on August 29, 2006.

### Analysts

Vince Billett (Laboratory Technician II) and Jon Yamanaka (Biologist I) conducted the WET tests. Jon Yamanaka entered the raw data in an Excel and CETIS™ program. Jon Yamanaka, Richard Gore (Acting Microbiologist III), and Geeta Rijal (Microbiologist IV) prepared this report.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1

SAMPLE COLLECTION INFORMATION

Effluent Collection Point:	Lemont WRP Effluent Discharge Number 001
Effluent Collection Method:	Composite sample of five grab samples collected in a 24-h period
Effluent Water Collection Date and Sample Times:	August 21, 2006 0700, 1300, 1900 August 22, 2006 0100, 0700

## Results

Results of the acute fathead minnow and *C. dubia* WET tests are shown in Tables 2 and 3, respectively. No acute toxicity to fathead minnows or *C. dubia* was observed. The HSW control met USEPA test acceptability criteria. Results of the quality control acute toxicity test with fathead minnow using the RTT fell below the lower control chart limits prescribed as acceptable by the USEPA, i.e. within  $\pm 2$  standard deviations from the mean. The lower survival of fathead minnow indicated that the test organisms were sensitive. An out of control RTT result does not invalidate WET test results.

Results of the quality control acute toxicity test with *C. dubia* using the concurrent RTT failed the test acceptability criteria of greater than 90 percent survival of all control organisms. The *C. dubia* RTT was immediately repeated on August 29, 2006. The repeated *C. dubia* RTT passed the test acceptability criteria and the results fell within limits prescribed as acceptable by the USEPA.

Tabulated summaries of the fathead minnow and *C. dubia* WET tests are presented in Appendices AI and AII, respectively. Raw data for the fathead minnow and *C. dubia* tests are presented in Appendices BI and BII, respectively. Chain-of Custody documentation is provided in Appendix CI. Raw data, statistical calculations, culture data, and control charts for the fathead minnow and *C. dubia* reference toxicant tests are provided in Appendices DI and DII, respectively.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 2

ACUTE FATHEAD MINNOW TEST RESULTS

96-h LC <sub>50</sub>	>100%
Toxicity Observed	No
Mean Percent Survival in Laboratory Water Control (HSW)	100%
Mean Percent Survival in 100% Final Effluent	90%
Valid Test	Yes
Concurrent Reference Toxicant Test in Control	No <sup>1</sup>

<sup>1</sup>The concurrent reference toxicant test LC<sub>50</sub> result was below the lower limits (i.e. -2 standard deviations from the mean). Such a result is expected to occur five percent of the time.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 3

ACUTE *C. DUBIA* TEST RESULTS

48-h LC <sub>50</sub>	>100%
Toxicity Observed	No
Mean Percent Survival in Laboratory Water Control (HSW)	100%
Mean Percent Survival in 100% Final Effluent	100%
Valid Test	Yes
Concurrent Reference Toxicant Test in Control	No <sup>1</sup>
Repeated Reference Toxicant Test in Control	Yes

<sup>1</sup>The concurrent reference toxicant test failed the test acceptability criteria of greater than 90% survival of all control organisms.

Certification of Accuracy

I certify under penalty of law that this document and all appendices were prepared under my supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations 40 C.F.R. 122.22 (d).

\_\_\_\_\_  
Date

\_\_\_\_\_  
Louis Kollias  
Director  
Research and Development

If you have any questions concerning this report, telephone Dr. Geeta Rijal, Microbiologist IV, at 708-588-3767.