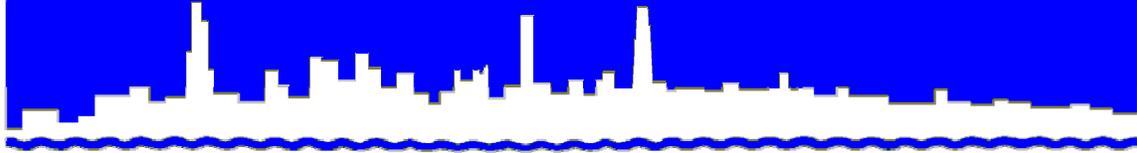


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***RESEARCH AND DEVELOPMENT
DEPARTMENT***

REPORT NO. 06-66

*BIOMONITORING REPORT
2006*

*ACUTE WHOLE EFFLUENT TOXICITY (WET) TEST RESULTS
FOR THE LEMONT WATER RECLAMATION PLANT
LEMONT, ILLINOIS*

*NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT NUMBER IL0028070, SEPTEMBER 2006*

OCTOBER 2006

Protecting Our Water Environment

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Director of Research and Development

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November 3, 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 September 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 September and October 2006. The test was scheduled for the 9th month (September 2006) prior to the NPDES permit expiration date. The *C. dubia* test was repeated in October as the test did not meet the test acceptability criteria in the laboratory control water.

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)

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

BIOMONITORING REPORT
2006

ACUTE WHOLE EFFLUENT TOXICITY (WET) TEST RESULTS
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LEMONT, ILLINOIS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT NUMBER IL0028070, SEPTEMBER 2006

Research and Development Department
Louis Kollias, Director

October 2006

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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 (WET) TEST RESULTS FOR THE
LEMONT WATER RECLAMATION PLANT, ILLINOIS
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT NUMBER IL0028070, SEPTEMBER 2006

Summary

Acute toxicity tests with the fathead minnow, *Pimephales promelas* (*P. promelas*) [96-hour, static, renewal] and the water flea, *Ceriodaphnia dubia* (*C. dubia*) [48-hour, static, non-renewal] were conducted on the samples of Lemont WRP final effluent collected on September 25-26, 2006. The fathead minnow test results indicated a valid test. No acute toxic effect on *P. promelas* was observed. Results of the quality control acute toxicity tests with fathead minnow using the reference toxicant sodium chloride (RTT) fell within control chart limits prescribed as acceptable by the United States Environmental Protection Agency (USEPA).

The *C. dubia* test results indicated an invalid test. The *C. dubia* exposed to dilution water (control) did not meet the test acceptability criteria of greater than 90% survival. Ninety five to 100% of the *C. dubia* organisms exposed to five effluent test concentrations survived, indicating no *C. dubia* toxicity. The *C. dubia* test was expeditiously repeated on the samples collected on October 9-10, 2006. The repeat *C. dubia* test results indicated a valid test and no acute toxic effect on *C. dubia* was observed. Results of the quality control acute toxicity tests with *C. dubia* using the RTT fell within control chart 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, 09/25/06, and 0100 & 0700 on Tuesday, 09/26/06. For the repeat *C. dubia* test, a grab sample was collected at 0700, 1300, and 1900 on Monday, 10/9/06, and 0100 & 0700 on Tuesday, 10/10/06. 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 10.6°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 *P. promelas* and *C. dubia* WET tests were conducted on the Lemont WRP effluent samples collected on September 25-26, 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% 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 September 26, 2006, and completed on September 30, 2006. The acute *C. dubia* test was set up on September 26, 2006, and completed on September 28, 2006. A repeat acute *C. dubia* test was setup on October 10, 2006 and completed on October 12, 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 the repeat *C. dubia* acute tests were prepared.

Analysts

Vince Billett (Laboratory Technician II), Hema Shukla (Laboratory Technician II), and Jon Yamanaka (Biologist I) conducted the WET tests. Jon Yamanaka entered the raw data in an

TABLE 1: SAMPLE COLLECTION INFORMATION

<p>Effluent Collection Point:</p>	<p>Lemont WRP Effluent Discharge Number 001</p>
<p>Effluent Collection Method:</p>	<p>Composite sample of five grab samples collected in a 24-h period</p>
<p>Effluent Water Collection Date and Sample Times:</p>	<p>September 25, 2006 0700, 1300, 1900 September 26, 2006 0100, 0700</p>
<p>Repeat Test (<i>C. dubia</i>) Effluent Water Collection Date and Sample Times:</p>	<p>October 9, 2006 0700, 1300, 1900 October 10, 2006 0100, 0700</p>

Excel and CETIS™ program. Jon Yamanaka, Richard Gore (Acting Microbiologist III), and Geeta Rijal (Microbiologist IV) prepared this report.

Results

Results of the acute fathead minnow and *C. dubia* WET tests are shown in Tables 2 and 3, respectively. The HSW control water met the test acceptability criteria (> 90% survival) for the fathead minnow test. The fathead minnow test results indicated a valid test. No acute toxicity to fathead minnow was observed. Results of the quality control acute toxicity test with fathead minnow using the RTT fell within limits prescribed as acceptable by the USEPA, i.e. within ± 2 standard deviations from the mean.

The HSW control water did not meet the test acceptability criteria (> 90% survival) for the September 2006 *C. dubia* test. However, there was no acute toxicity to *C. dubia* organisms exposed to five effluent test concentrations. Since the *C. dubia* control test results indicated an invalid test, the test had to be repeated on October 10, 2006. The repeat *C. dubia* test passed the test acceptability criteria and no acute toxicity was observed. Results of the quality control acute toxicity test with *C. dubia* using the RTT fell within limits prescribed as acceptable by the USEPA, i.e. within ± 2 standard deviations from the mean.

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.

TABLE 2: ACUTE FATHEAD MINNOW TEST RESULTS

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

TABLE 3: ACUTE *C. DUBIA* TEST RESULTS

	<u>September 26th</u>	<u>October 10th</u>
48-h LC ₅₀	>100%	>100%
Toxicity Observed	No	No
Mean % Survival in Laboratory Water Control (HSW)	55%	100%
Mean % Survival in 100% Final Effluent	100%	100%
Valid Test	No	Yes
Concurrent Reference Toxicant Test in Control	No ¹	Yes

¹The 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.