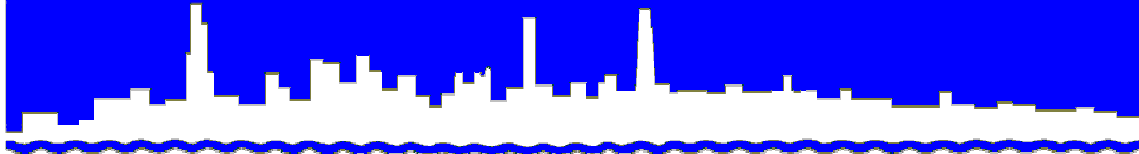


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***RESEARCH AND DEVELOPMENT
DEPARTMENT***

REPORT NO. 06-22

***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***

APRIL 2006

Metropolitan Water Reclamation District of Greater Chicago

100 East Erie Street

Chicago, IL 60611-2803

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BIOMONITORING REPORT
2006

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CONDUCTED ON FINAL EFFLUENT SAMPLES

LEMONT WATER RECLAMATION PLANT
LEMONT, ILLINOIS
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Research and Development Department
Richard Lanyon, Director

April 2006

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Richard Lanyon
Director of Research & Development
312-751-5190

May 1, 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 March 2006 – Lemont Water Reclamation Plant
NPDES Permit Number IL0028070

The subject biomonitoring report is submitted in compliance with the 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, dated July 7, 2005 (copy attached), which was approved by Mr. Robert Mosher of the Illinois Environmental Protection Agency in a letter to Mr. Lanyon dated July 18, 2005 (copy attached).

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 III, at 708-588-3767.

Very truly yours,

Richard Lanyon
Director
Research and Development

RL:JTZ:rag
Attachments
cc via MWRDGC website:
Granato/O'Connor/Zmuda/Rijal/Yamanaka
O'Connell/Carmody/Moe/Nason (Transmittal
letter and report title page)

ACUTE WHOLE EFFLUENT TOXICITY TEST RESULTS FOR THE LEMONT WATER
RECLAMATION PLANT, ILLINOIS
NPDES PERMIT NUMBER IL0028070, MARCH 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 March 20-21, 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 quality control acute toxicity test with *Ceriodaphnia dubia* using the reference toxicant sodium chloride (RTT) fell slightly 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 quality control acute toxicity test with *Pimephales promelas* using the RTT fell within limits prescribed as acceptable by the United States Environmental Protection Agency (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, 03/20/06 and 0100 & 0700 on Tuesday, 03/21/06. 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 9°C. The five grab samples were combined in the laboratory to make a 24-hour composite sample. Samples were stored in the laboratory at 4 ± 1°C. Sample collection information is shown in Table 1.

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: | March 20, 2006 0700, 1300, 1900 March 21, 2006 0100, 0700 |

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 March 20-21, 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 March 21, 2006 and completed on March 25, 2006. The acute *C. dubia* test was set up on March 21, 2006 and completed on March 23, 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.

Analysts

Vince Billett (Laboratory Technician II) conducted the WET tests. Jon Yamanaka (Biologist I) entered the raw data in an Excel program. Jon Yamanaka, Geeta Rijal (Microbiologist III), and James Zmuda (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. No acute toxicity to fathead minnows or *C. dubia* was observed. The HSW control met USEPA test acceptability criteria. Results of quality control acute toxicity test with *Pimephales promelas* using the RTT fell within limits prescribed as acceptable by the United

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 2

ACUTE FATHEAD MINNOW TEST RESULTS

| | |
|---|--------|
| 96-h LC ₅₀ | > 100% |
| Toxicity Observed | No |
| Mean Percent Survival in Laboratory Water Control (HSW) | 95% |
| Mean Percent Survival in 100 % Final Effluent | 95% |
| Valid Test | Yes |
| Concurrent Reference Toxicant Test in Control | Yes |

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 3

ACUTE *C. DUBIA* TEST RESULTS

| | |
|---|-----------------|
| 48-h LC ₅₀ | >100% |
| Toxicity Observed | No |
| Mean Percent Survival in Laboratory Water Control (HSW) | 95% |
| Mean Percent Survival in 100 % Final Effluent | 100% |
| Valid Test | Yes |
| Concurrent Reference Toxicant Test in Control | No ¹ |

¹ The concurrent reference toxicant test LC₅₀ result was slightly below the lower limits. Such a result is expected to occur in one of every twenty tests or five percent of the time.

States Environmental Protection Agency (USEPA), i.e. within ± 2 standard deviations from the mean. Results of quality control acute toxicity test with *Ceriodaphnia dubia* using the RTT fell slightly below the lower control chart limits. The lower limits of *C. dubia* RTT indicated that the test organisms were sensitive. An out of control RTT result does not necessarily invalidate WET test results.

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* concurrent reference toxicant tests are provided in Appendices DI and DII, respectively.

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

Richard Lanyon
Director
Research and Development

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