RESEARCH AND DEVELOPMENT DEPARTMENT

REPORT NO. 06-63

BIOMONITORING REPORT
2006

RESULTS OF CHRONIC WHOLE EFFLUENT TOXICITY (WET) TESTS FOR THE HANOVER PARK WATER RECLAMATION PLANT, HANOVER PARK, ILLINOIS, NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT NUMBER IL0036137, MAY 2006

OCTOBER 2006

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

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HANOVER PARK, ILLINOIS
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT NUMBER IL0036137, MAY 2006

Research and Development Department
Louis Kollias, Director

October 2006

Protecting Our Water Environment

Metropolitan Water Reclamation District of Greater Chicago

100 EAST ERIE STREET CHICAGO, ILLINOIS 60611-3154 312·751·5600

Louis Kollias, P.E., BCEE
Director of Research and Development
312·751·5190

October 6, 2006

Mr. Jay Balmer
Compliance Assurance Section
Illinois Environmental
Protection Agency
1021 North Grand Avenue
P.O. Box 19276
Springfield, IL 62794-9276

Dear Mr. Balmer:

Subject: Biomonitoring Report for 2006 – Hanover Park Water Reclamation Plant NPDES Permit Number IL0036137

The subject Biomonitoring Report is submitted in compliance with the NPDES Permit Number IL0036137, Special Condition 11.

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

Very truly yours,

Louis Kollias
Director
Research and Development

LK:GR:rag
Attachments
cc/att: Granato/O'Connor/Rijal/McNamara/Garelli
O'Connell
cc: Nason (Transmittal letter and report title page)

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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.

RESULTS OF CHRONIC WHOLE EFFLUENT TOXICITY (WET) TESTS FOR THE HANOVER PARK WATER RECLAMATION PLANT, HANOVER PARK, ILLINOIS, NPDES PERMIT NUMBER IL0036137, MAY 2006

Summary

Chronic toxicity tests with *Pimephales promelas* (7 days, static, and renewal) and *Ceriodaphnia dubia* (6-8 days, static, and renewal) were conducted on the Hanover Park Water Reclamation Plant (WRP) effluent collected May 15 through May 20, 2006. The results indicated that the tests were valid. No toxic effect on *Pimephales promelas* larval survival or growth was observed. No toxic effect on *Ceriodaphnia dubia* survival or reproduction was observed. Results of quality control chronic toxicity tests with *Pimephales promelas* and *Ceriodaphnia dubia* using the reference toxicant sodium chloride (NaC1), fell within limits prescribed as acceptable by the United States Environmental Protection Agency (USEPA).

Sample Information

Samples of Hanover Park WRP effluents were collected on May 15 through May 20, 2006. These samples were received in the laboratory within 5 hours of sample collection. Sample temperatures, at the time of receipt, were below 9.5°C. Samples were stored in a locked refrigerator in the laboratory at 4 ± 1°C. Sample collection information is shown in Table 1.

Whole Effluent Toxicity (WET) Tests

Chronic toxicity tests with *Pimephales promelas* (Fathead minnow) and *Ceriodaphnia dubia* (*C. dubia*) were conducted on the Hanover Park WRP effluent samples collected May 15 through May 20, 2006. Chronic WET test methods and procedures were followed in accordance with *Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to*

TABLE 1

SAMPLE COLLECTION INFORMATION

Effluent Collection Point:	Hanover Park WRP Effluent Discharge Outfall 007
Effluent Collection Method:	Three 24-hour composite samples. Five 2 1/2 gallon grab samples collected over a 24-hour period were combined to make each 24-hour composite sample. The individual grab samples were collected at 6-hour intervals.
Effluent Collection Times and Dates:	
First Sample Set	0600 May 15, 2006 1200 May 15, 2006 1800 May 15, 2006 2400 May 15, 2006 0600 May 16, 2006
Second Sample Set	0600 May 17, 2006 1200 May 17, 2006 1800 May 17, 2006 2400 May 17, 2006 0600 May 18, 2006
Third Sample Set	0600 May 19, 2006 1200 May 19, 2006 1800 May 19, 2006 2400 May 19, 2006 0600 May 20, 2006

*Freshwater and Marine Organism (*EPA 821/R-02/013, Fourth Edition, October 2002). Fathead minnows were exposed to 12.5, 25, 50, 75, and 100 percent concentrations of final effluent for seven days. *Ceriodaphnia dubia* were exposed to the same concentrations of effluent for eight days. The *C. dubia* test was extended because the surviving control females (≥ 60%) did not produce 3-broods to meet the test acceptability criteria for a valid test. The chronic fathead minnow test was setup on 05/17/06 and completed on 05/24/06. The chronic *C. dubia* test was setup on 05/17/06 and completed on 05/25/06. Hard synthetic water with selenium (HSW) was used as dilution/control water for both test species. Statistical analyses in the subject report were performed using the CETIS® Software program version 1.1.1 revC (Tidepool Scientific Software, California).

Analysts

WET tests were conducted by G. V. Billett (Laboratory Technician II), and Hema Shukla (Laboratory Technician II), under the supervision of Geeta Rijal (Microbiologist IV). This report was prepared by Jon Yamanaka (Biologist I), Richard Gore (Acting Microbiologist III), and Geeta Rijal.

Results

Results of the chronic fathead minnow and *C. dubia* WET tests are shown in Tables 2 and 3, respectively. The laboratory controls met the USEPA test acceptability criteria for both test species. The WET test results indicated the absence of chronic toxicity to fathead minnow and *C. dubia*. Results of the quality control chronic toxicity tests with *Pimephales promelas* and *Ceriodaphnia dubia* using the reference toxicant sodium chloride (NaC1) fell within limits prescribed as acceptable by the United States Environmental Protection Agency (USEPA). The minimum significant difference (MSD) for *C. dubia* reproduction slightly exceeded the USEPA

TABLE 2

CHRONIC FATHEAD MINNOW TEST RESULTS

NOEC Value (Survival)	100%
NOEC Value (Growth)	100%
IC_{25} Growth (Original Number)	>100%
Minimum Significant Difference (MSD): Fathead minnow (Survival)	12.80% (α=0.05)
Minimum Significant Difference (MSD): Fathead minnow (Growth)	27.11% (α=0.05)
Toxicity Observed	No
Valid Test	Yes
Concurrent Reference Toxicant Test in Control	Yes

TABLE 3

CHRONIC *CERIODAPHNIA DUBIA* TEST RESULTS

NOEC Value (Survival)	100%
NOEC Value (Reproduction)	100%
IC_{25} (Reproduction)	>100%
Minimum Significant Difference (MSD): *C. dubia* (Survival)	31.24% (α=0.05)
Minimum Significant Difference (MSD): *C. dubia* (Reproduction)	48.10%* (α=0.05)
Toxicity Observed	No
Valid Test	Yes
Concurrent Reference Toxicant Test in Control	Yes

*The MSD for *C. dubia* reproduction slightly exceeded the USEPA recommended upper limit of 47%. The MSD measures within test method variability and the test sensitivity.

recommended upper limit of 47%. The MSD measures the smallest statistical significant difference between the control and the test treatment (effluent dilutions) in a given test. The MSD is used for reviewing WET test variability and 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* WET tests are presented in Appendices BI and BII, respectively. The 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

Louis Kollias
Director
Research and Development

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