

Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***MONITORING AND RESEARCH
DEPARTMENT***

REPORT NO. 10-37

***BIOMONITORING REPORT
2010***

***CHRONIC WHOLE EFFLUENT TOXICITY TESTS RESULTS
FOR THE HANOVER PARK WATER RECLAMATION PLANT,
HANOVER PARK, ILLINOIS***

***NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT NUMBER IL0036137, JUNE 2010***

AUGUST 2010

Protecting Our Water Environment

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August 4, 2010

Ms. Catherine Siders
Environmental Specialist
Compliance Assurance Section - 19
Illinois Environmental Protection Agency
1021 North Grand Avenue
Springfield, IL 62794-9276

Dear Ms. Siders:

Subject: Biomonitoring Report for 2010 – Chronic Whole Effluent Toxicity Test Results for the Hanover Park Water Reclamation Plant, Hanover Park, Illinois, National Pollutant Discharge Elimination System Permit Number IL0036137, June 2010

The subject Biomonitoring Report is submitted in compliance with the National Pollutant Discharge Elimination System Permit Number IL0036137, Special Condition 11.

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, Supervising Environmental Microbiologist, at (708) 588-4224.

Very truly yours,

Louis Kollias
Director
Monitoring and Research

LK:GR:ps

Enclosures

cc: Sharma/Gronski/Grabis/Granato/O'Connor/Lazicki/Rijal

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**BIOMONITORING REPORT
2010**

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HANOVER PARK, ILLINOIS**

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**Monitoring and Research Department
Louis Kollias, Director**

AUGUST 2010

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ACKNOWLEDGMENTS

Ms. Pamela Slaby 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.

**CHRONIC WHOLE EFFLUENT TOXICITY TEST RESULTS FOR THE
HANOVER PARK WATER RECLAMATION PLANT, HANOVER PARK, ILLINOIS**

**NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
PERMIT NUMBER IL0036137, JUNE 2010**

Summary

The chronic toxicity test with *Pimephales promelas* (*P. promelas*) (7-day, static, renewal), was conducted on samples of Hanover Park Water Reclamation Plant (WRP) final effluent collected June 7-12, 2010. The results indicated that the tests were valid. No toxic effect on *P. promelas* larval survival or growth was observed. Results of the quality control chronic toxicity tests with *P. promelas* using the reference toxicant sodium chloride (NaCl) fell within limits prescribed as acceptable by the United States Environmental Protection Agency (USEPA).

The chronic toxicity test with *Ceriodaphnia dubia* (*C. dubia*) (7-day, static, renewal) was conducted on samples of the Hanover Park WRP final effluent collected June 7-12, 2010. The results indicated that the tests were valid. No toxic effect on *C. dubia* survival or reproduction was observed. Results of quality control chronic toxicity tests with *C. dubia* using the reference toxicant NaCl fell within limits prescribed as acceptable by the USEPA.

Sample Information

Tests were performed using 24-hour composite samples of Hanover Park WRP final effluent collected on June 7 through June 12, 2010 for the chronic toxicity tests. The individual grab samples were stored on site at 0.1 – 6°C in a refrigerator. Sample temperatures at the time of receipt were below 9°C. Samples were stored in the laboratory at 4 ± 1°C. Sample collection information is shown in Table 1.

Whole Effluent Toxicity Tests

The chronic toxicity tests with *P. promelas* and *C. dubia* were conducted on the Hanover Park WRP effluent samples collected June 7 through June 12, 2010. Chronic Whole Effluent Toxicity (WET) test methods and procedures were followed in accordance with *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, EPA 821/R-02/013, Fourth Edition, October 2002. *P. promelas* were exposed to 12.5, 25, 50, 75, and 100 percent concentration of final effluent for seven days. *C. dubia* were exposed to the same concentrations of effluent for seven days.

TABLE 1: SAMPLE COLLECTION INFORMATION

| | | |
|--------------------------------------|--|---------------|
| Effluent Collection Point: | Hanover Park Reclamation Plant Effluent Discharge | |
| 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 | June 7, 2010 |
| | 1200 | June 7, 2010 |
| | 1800 | June 7, 2010 |
| | 2400 | June 7, 2010 |
| | 0600 | June 8, 2010 |
| Second Sample Set | 0600 | June 9, 2010 |
| | 1200 | June 9, 2010 |
| | 1800 | June 9, 2010 |
| | 2400 | June 9, 2010 |
| | 0600 | June 10, 2010 |
| Third Sample Set | 0600 | June 11, 2010 |
| | 1200 | June 11, 2010 |
| | 1800 | June 11, 2010 |
| | 2400 | June 11, 2010 |
| | 0600 | June 12, 2010 |

The first 24-hour composite sample was used to set up the test at approximately 10 a.m. on Wednesday, June 9, 2010, and for renewals on Thursday, June 10, 2010. The second 24-hour composite sample was used for renewals of test solutions on Friday and Saturday, June 11 and June 12, 2010. The third 24-hour composite sample was used for renewals of test solutions on Sunday, June 13; Monday, June 14; and Tuesday, June 15, 2010. A reference toxicant test using the toxicant NaCl was conducted concurrently with each WET test conducted on WRP effluent.

The chronic fathead minnow test (*P. promelas*) was set up on June 9, 2010 and completed on June 16, 2010. The chronic *C. dubia* test was set up on June 9, 2010 and completed on June 16, 2010. Hard synthetic water with selenium (HSW) was used as control and dilution water for both test species.

The Comprehensive Environmental Toxicity Information System (CETIS) software program, version 1.7.0 (Tidepool Scientific Software, California), was used to calculate no observed effect concentration (NOEC) and lowest observed effect concentration (LOEC) endpoints for survival (*P. promelas* and *C. dubia* tests), growth (*P. promelas* tests), and reproduction (*C. dubia* tests). CETIS software was also used to calculate IC₂₅ values for growth and reproduction for reference toxicant tests conducted concurrently with the WET test conducted on WRP effluent. Calculations made with the CETIS program were verified using the USEPA program for the Dunnett's procedure, version 1.5, obtained from the USEPA, Cincinnati, OH. The CETIS software program was also used to calculate percent minimum significant differences (MSDp) for growth and reproduction endpoints.

Concurrent reference toxicant tests (RTT) using sodium chloride (NaCl) were conducted, and the control charts for the *P. promelas* and *C. dubia* chronic RTT were prepared.

Analysts

WET tests were conducted by Hemangini Shukla (Assistant Environmental Microbiologist) and James Kaehn (Laboratory Technician II). Auralene Glymph (Senior Environmental Microbiologist) entered the raw data in an Excel and CETIS program. Auralene Glymph and Geeta Rijal (Supervising Environmental Microbiologist) prepared this report.

Results

Results of the chronic *P. promelas* WET test are shown in Table 2. The *P. promelas* test results indicated a valid test. There was no observed toxic effect of Hanover Park WRP effluent

TABLE 2: CHRONIC *PIMEPHALES PROMELAS* TEST RESULTS

| Chronic Test Parameters | Results |
|--|---------------------------|
| NOEC ¹ Value (Survival) | 100% |
| NOEC Value (Growth) | 100% |
| IC ₂₅ (Growth) | >100% |
| 7-Day Survival Rate (Control) ² | 95% |
| Mean Dry Weight (Control) ³ <i>P. promelas</i> (Growth) | 0.95 mg |
| Minimum Significant Difference (MSD) ⁴ <i>P. promelas</i> (Growth) | 23.0% ($\alpha = 0.05$) |
| Toxicity Observed | No |
| Valid Test | Yes |
| Concurrent Reference Toxicant Test in Control | Yes |

¹No observed effect concentration.

²Results within test acceptability criteria (80% - NL) limits.

³Results within test acceptability criteria (0.25 - NL) limits.

⁴Results within test acceptability criteria (12 - 30%) limits.

on *P. promelas* survival or growth. The HSW control water met the test acceptability criteria (>80% survival) for the *P. promelas* test. Results of the quality control chronic toxicity test with *P. promelas* using the RTT fell within limits prescribed as acceptable by the USEPA, i.e. within ± 2 standard deviations from the mean.

Results of the chronic *C. dubia* WET test are shown in Table 3. The *C. dubia* test results indicated a valid test. There was no observed toxic effect of Hanover Park WRP effluent on *C. dubia* survival or reproduction. The HSW control water met the test acceptability criteria (>80% survival) for the *C. dubia* test. Results of the quality control, chronic toxicity test with *C. dubia* using the RTT fell within limits prescribed as acceptable by USEPA, i.e. within ± 2 standard deviations from the mean.

The WET test results indicated the absence of chronic toxicity to *P. promelas* and *C. dubia*. Tabulated summaries of the *P. promelas* and *C. dubia* WET tests are presented in Appendices AI and AII, respectively. Raw data for the *P. promelas* and *C. dubia* WET 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 *P. promelas* and *C. dubia* concurrent RTT are provided in Appendices DI and DII, respectively.

TABLE 3: CHRONIC *CERIODAPHNIA DUBIA* TEST RESULTS

| Chronic Test Parameters | Results |
|---|---------------------------|
| NOEC ¹ Value (Survival) | 100% |
| NOEC Value (Reproduction) | 100% |
| IC ₂₅ (Reproduction) | >100% |
| 7-Day Survival Rate (Control) ² | 100% |
| 7-Day Mean Reproduction (Control) ³ | 26.9 |
| Minimum Significant Difference (MSD) ⁴ <i>C. dubia</i> (Reproduction) | 37.0% ($\alpha = 0.05$) |
| Toxicity Observed | No |
| Valid Test | Yes |
| Concurrent Reference Toxicant Test in Control | Yes |

¹No observed effect concentration.

²Results within test acceptability criteria (80% - NL) limits.

³Results within test acceptability criteria (15 - NL) limits.

⁴Results within test acceptability criteria (13- 47%) limits.

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 data, 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
Monitoring and Research

If you have any questions concerning this report, please contact Dr. Geeta Rijal, Supervising Environmental Microbiologist, at 708-588-4224.