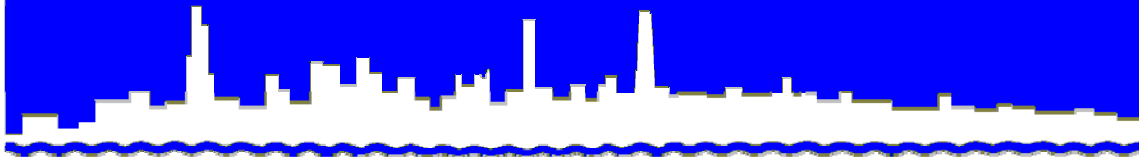


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***RESEARCH AND DEVELOPMENT
DEPARTMENT***

REPORT NO. 08-41

*BIOMONITORING REPORT
2008*

*ACUTE WHOLE EFFLUENT TOXICITY TEST RESULTS
FOR THE JAMES C. KIRIE WATER RECLAMATION PLANT
DES PLAINES, ILLINOIS*

*NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT NUMBER IL0047741, MAY 2008*

AUGUST 2008

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August 14, 2008

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

Dear Mr. Calloway:

Subject: Biomonitoring Report for May 2008 – James C. Kirie Water Reclamation Plant, National Pollutant Discharge Elimination System Permit Number IL0047741

The subject biomonitoring report is submitted in compliance with the National Pollutant Discharge Elimination System Permit Number IL0047741, Special Condition 11. Whole effluent toxicity tests were conducted in accordance with the biomonitoring plan for the Kirie Water Reclamation Plant, dated October 8, 2007.

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 708-588-4224.

Very truly yours,

Louis Kollias
Director
Research and Development

LK:GR:ss
Enclosures
cc w/enc: Jamjun/Gronski/Grabis/Granato
Moscinski/O'Connor/Rijal/Glymph
Yamanaka
cc: Cohen (Transmittal letter and report title page)

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BIOMONITORING REPORT
2008

ACUTE WHOLE EFFLUENT TOXICITY TEST RESULTS
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DES PLAINES, ILLINOIS

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT NUMBER IL0047741, AUGUST 2008

Research and Development Department
Louis Kollias, Director

OCTOBER 2008

ACUTE WHOLE EFFLUENT TOXICITY TEST RESULTS FOR THE
JAMES C. KIRIE WATER RECLAMATION PLANT, DES PLAINES, ILLINOIS
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT NUMBER IL0047741, MAY 2008

Summary

The acute toxicity test with the fathead minnow, *Pimephales promelas* (*P. promelas*) [96-hour, static, renewal], was conducted on samples of James C. Kirie Water Reclamation Plant (WRP) final effluent collected on May 5-6, 2008. The fathead minnow results indicated a valid test. No acute toxicity to *P. promelas* was observed. Results of the quality control acute toxicity tests with fathead minnow using the reference toxicant sodium chloride fell within control chart limits prescribed as acceptable by the United States Environmental Protection Agency (USEPA).

The acute toxicity test with *Ceriodaphnia dubia* (*C. dubia*) [48-hour, static, nonrenewal] scheduled for May 5-6, 2008 was cancelled because the in-house *C. dubia* culture did not meet the test acceptability criteria (parental organisms to produce three broods totaling fifteen or more neonates). The test was rescheduled and conducted on samples of James C. Kirie WRP final effluent collected on May 26-27, 2008. Test results indicated a valid test. No acute toxic effect to *C. dubia* was observed. One hundred percent of the *C. dubia* organisms exposed to five effluent test concentrations survived, indicating no *C. dubia* toxicity. Results of the concurrent quality control acute toxicity test using the reference toxicant sodium chloride fell within control chart limits prescribed as acceptable by the USEPA.

Sample Information

Five grab samples of James C. Kirie WRP final effluent were collected at 0600, 1200, 1800 and 2400 on Monday, 05/05/08 and 0600 on Tuesday, 05/06/08 for the acute toxicity test with the fathead minnow. 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 7°C. The five 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.

Five grab samples of James C. Kirie WRP final effluent were also collected at 0600, 1200, 1800 and 2400 on Monday, 05/26/08 and 0600 on Tuesday, 05/27/08 for the acute toxicity test with *C. dubia*. 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 7.5°C. The five 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.

TABLE 1: SAMPLE COLLECTION INFORMATION

<p>Effluent Collection Point:</p>	<p>James C. Kirie WRP Effluent Discharge Number 001</p>
<p>Effluent Collection Method:</p>	<p>Composite sample of five grab samples collected in a 24-hour period</p>
<p>Effluent Water Collection Date and Sample Time:</p>	<p>May 5, 2008 - 0600, 1200, 1800, 2400 May 6, 2008 - 0600</p>
<p>Effluent Water Collection Date and Sample Time (Repeat Sampling for <i>C. dubia</i>):</p>	<p>May 26, 2008 - 0600, 1200, 1800, 2400 May 27, 2008 - 0600</p>

Whole Effluent Toxicity Tests

The acute *P. promelas* Whole Effluent Toxicity (WET) test was conducted on the James C. Kirie WRP effluent samples collected on May 5-6, 2008. No acute *C. dubia* WET test was conducted on the James C. Kirie WRP effluent samples collected on May 5-6, 2008 because the in-house culture did not meet the test acceptability criteria which requires parental organisms to produce three broods totaling fifteen or more neonates. The acute *C. dubia* test was rescheduled for May 26-27, 2008.

The 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. *P. promelas* 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 *P. promelas* test was set up on May 6, 2008 and completed on May 10, 2008. The acute *C. dubia* test was set up on May 27, 2008 and completed on May 29, 2008. Hard synthetic water (HSW) with selenium was used as control and dilution water. Statistical analyses were performed using the CETIS™ Software program version 1.6.3 revE (Tidepool Scientific Software, California).

Concurrent reference toxicant tests (RTT) using sodium chloride (NaCl) were conducted and the control charts for the fathead minnow and the *C. dubia* acute RTT 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 Excel and CETIS™ program. Jon Yamanaka, Auralene Glymph (Microbiologist III), and Geeta Rijal (Microbiologist IV) prepared this report.

Results

Results of the acute WET test with *P. promelas* are shown in [Table 2](#). The *P. promelas* test results indicated a valid test. No acute toxicity to *P. promelas* was observed. The HSW control water met the test acceptability criteria (>90% survival) for the *P. promelas* test. Result of the quality control acute 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 acute *C. dubia* WET test are shown in [Table 3](#). The *C. dubia* test results indicated a valid test. There was no acute toxicity to *C. dubia* organisms exposed to five effluent test concentrations. The HSW control water met the test acceptability criteria (>90% survival) for the *C. dubia* test. 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

TABLE 2: ACUTE *PIMEPHALES PROMELAS* TEST RESULTS

96-h LC ₅₀	>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	Yes

TABLE 3: ACUTE *CERIODAPHNIA DUBIA* TEST RESULTS

	May 5-6 ¹	May 26-27
48-h LC ₅₀	NT ²	>100%
Toxicity Observed	NT	No
Mean Percent Survival in Laboratory Water Control (HSW)	NT	100%
Mean Percent Survival in 100 % Final Effluent	NT	100%
Valid Test	NT	Yes
Concurrent Reference Toxicant Test in Control	NT	Yes

¹No *C. dubia* test was performed on May 5-6, 2008 because the in-house *C. dubia* culture did not meet the test acceptability criteria requiring parental organisms to produce 3 broods totaling 15 or more neonates. The acute *C. dubia* WET test was rescheduled for May 26-27, 2008.

²No Test

± 2 standard deviations from the mean.

The WET test results indicated no acute toxicity to *P. promelas* and *C. dubia*. Tabulated summaries of the *P. promelas* and *C. dubia* WET test are presented in Appendices AI and AII, respectively. Raw data for the *P. promelas* and *C. dubia* are presented in Appendices BI and BII, respectively. Chain-of Custody documentation is provided in Appendix CI. Raw data, statistical calculations, and control charts for the *P. promelas* 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, please contact Dr. Geeta Rijal, Microbiologist IV, at 708-588-4224.