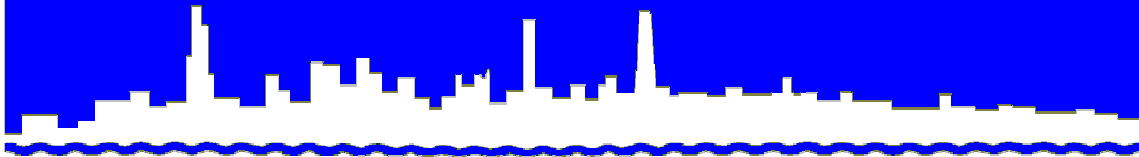


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***RESEARCH AND DEVELOPMENT
DEPARTMENT***

REPORT NO. 08-18

***BIOMONITORING REPORT
2008***

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

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

MARCH 2008

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

BIOMONITORING REPORT
2008

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

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT NUMBER IL0047741, FEBRUARY 2008

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	iii
ACKNOWLEDGEMENTS	iv
DISCLAIMER	iv
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, FEBRUARY 2008	1
Summary	1
Sample Information	1
Whole Effluent Toxicity (WET) Tests	1
Analysts	3
Results	3
CERTIFICATION OF ACCURACY	6
APPENDICES	
AI Summary of Acute Toxicity Results <i>Pimephales promelas</i> (Fathead minnow) CETIS Test Summary and Comparison Report	AI-1
AII Summary of Acute Toxicity Results <i>Ceriodaphnia dubia</i> (<i>C. dubia</i>) CETIS Test Summary and Comparison Report	AII-1
BI Raw Data for <i>Pimephales promelas</i> (Fathead minnow) WET Test Conducted on James C. Kirie WRP Final Efflu- ent Collected on February 4-5, 2008	BI-1
BII Raw Data for <i>Ceriodaphnia dubia</i> (<i>C. dubia</i>) WET Test Conducted on James C. Kirie WRP Final Effluent Collected on February 4-5, 2008	BII-1

TABLE OF CONTENTS (Continued)

APPENDICES		<u>Page</u>
CI	Chain-of-Custody for WET Tests Conducted on James C. Kirie WRP Final Effluent Collected on February 4-5, 2008	CI-1
DI	Quality Assurance for the <i>Pimephales promelas</i> (Fathead minnow) WET Test: Raw Data and Statistical Calculations for the Concurrent Reference Toxicant Test, Control Charts, and Culture Data	DI-1
DII	Quality Assurance for the <i>Ceriodaphnia dubia</i> (<i>C. dubia</i>) WET Test: Raw Data and Statistical Calculations for the Concurrent Reference Toxicant Tests, Control Charts, and Culture Data	DII-1
DIII	<i>Ceriodaphnia dubia</i> (<i>C. dubia</i>)/Acute Toxicity Failed Reference Toxicant Test Data Sheets	DIII-1

LIST OF TABLES

<u>Table No.</u>		<u>Page</u>
1	Sample Collection Information	2
2	Acute Fathead Minnow Test Results	4
3	Acute <i>Ceriodaphnia dubia</i> Test Results	5

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

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 Kirie Water Reclamation Plant (WRP) final effluent collected on February 4-5, 2008. 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 a valid test. No acute toxic effect on *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 tests with *C. dubia* using the RTT did not meet the test acceptability criteria of greater than 90% survival in control (laboratory dilution water). The RTT with *C. dubia* was repeated on 2/14/08. The results of the repeated quality control acute toxicity tests with *C. dubia* met the test acceptability criteria of greater than 90% survival and fell within control chart limits prescribed as acceptable by the USEPA.

Sample Information

Five grab samples of final effluent were collected from the Kirie WRP. A grab sample was collected at 0700, 1300, and 1900 on Monday, 02/04/08, and 0100 & 0700 on Tuesday, 02/05/08. 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 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 ± 1°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 Kirie WRP effluent samples collected on February 4-5, 2008. 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 February 5, 2008, and completed on February 9, 2008. The acute *C. dubia* test was set up on February 5, 2008, and completed on February 7, 2008. A repeat acute *C. dubia* RTT test was setup on February 14, 2008 and completed on February 16, 2008.

TABLE 1: SAMPLE COLLECTION INFORMATION

<p>Effluent Collection Point:</p>	<p>Kirie 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>February 4, 2008 0700, 1300, 1900 February 5, 2008 0100, 0700</p>

Hard synthetic water with selenium (HSW) 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 RTT using sodium chloride (NaCl) were conducted and the control charts for the fathead minnow and the *C. dubia* acute reference toxicant test 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 fathead minnow WET test is shown in Table 2. The fathead minnow test results indicated a valid test. No acute toxicity to fathead minnow was observed. The HSW control water met the test acceptability criteria (> 90% survival) for the fathead minnow test. 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.

Results of the acute *C. dubia* WET test is 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 did not meet the test acceptability criteria (> 90% survival) for the concurrent *C. dubia* RTT test. Since the *C. dubia* control test results indicated an invalid test, the RTT had to be repeated on February 14, 2008. The repeat *C. dubia* reference toxicant test passed the test acceptability criteria. 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 *CERIODAPHNIA DUBIA* TEST RESULTS

	<u>February 5th</u>	<u>February 14th</u>
48-h LC ₅₀	>100%	NT ²
Toxicity Observed	No	NT ²
Mean % Survival in Laboratory Water Control (HSW)	100%	100%
Mean % Survival in 100% Final Effluent	100%	NT ²
Valid Test	Yes	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 in control (laboratory dilution water).

²NT – Not tested.

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 708-588-4224.