

Bioassays of

Millennium Specialty Chemicals

Jacksonville, Duval County, Florida

NPDES #FL0000884

Sampled 4/9/01

August 2001

Biology Section

Division of Resource Assessment & Management

Comprehensive Quality Assurance Plan #870346G

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Introduction

Millennium Specialty Chemicals, 601 Crestwood Street, Jacksonville, Duval County, Florida, NPDES #FL0000884, tests performed on 10 to 12 April 2001.

This mixed, used-organic chemical refinery has a wastewater treatment facility with a design flow of 0.6 MGD. The wastewater comprises boiler blowdown, cooling tower blowdown, water softener blowdown, non-contact cooling water, and stream condensate wastewater. Wastewater is treated by primary settling of suspended particulates, cooling in a 1.0 MG pond, and disinfection by an ultra-violet unit. After disinfection, the effluent passes through two Storm Filter TM treatment units. These units provide additional sedimentation, gravity separation of oil and grease, filtration, adsorption, and ion exchange for removal of soluble metals. The pH of the treated water is adjusted going into and out of the treatment system by an in-line station. After treatment the effluent is continuously discharged through Outfall D-001 to the Class III fresh waters of Moncrief Creek, (facility summary provided by Katheryn Shuler, FDEP, Jacksonville).

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1993, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition, EPA/600/4-90/027F.

Results and Discussion

The FDEP Biology Section performed two 48-hour static acute screening toxicity bioassays on a sample of effluent from this facility. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. The test results did not indicate toxicity by 48 hours (Table 1).

Total residual chlorine and total ammonia were not detected in the sample. Further chemical analyses were performed on the sample, and several metals and a pesticide were identified (Table 2).

Conclusion

The sample of effluent collected from this facility on April 9, 2001, did not show acute toxicity to either test species within 48 hours.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Millennium Specialty Chemicals, 601 Crestwood Street Jacksonville, Duval County, Florida, NPDES# FL0000884 performed on 10 to 12 April 2001.

Facility:	**Millennium Specialty Chemicals**			**NPDES #**	**FL0000884**	Facility Type:	**Wastewater Treatment Plant**
Location:	601 Crestwood Street			Contact/District:	T. Kallenmeyn/Northwest		
County:	Duval			Test type:	static acute screen		
Sample Collection Date:	4/9/01	Time:	1400	# tests:	2	Receiving Water:	Moncrief Creek
Test Beginning Date:	4/10/01	Time:	1345	Chlorination Type:	Non-chlorinated		
Test Ending Date:	4/12/01	Time:	1400				**Page 1 of 1**

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	<0.03	Hach

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	< 0.017	<0.017
20% Dilute Mineral Water (cladocerans):	< 0.017	<0.017
100% Sample:	< 0.017	<0.017

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	145	146
20% Dilute Mineral Water (cladocerans):	73	81
100% Sample:	117	430

Salinity[C]	(ppt)
Control Water:	<1
100% Sample:	~1.3

[C] Salinity based on conductivity and temperature measurements.

Organism: ***Ceriodaphnia dubia*** Life stage: < 24 hours

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[A]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control A	0/20	5	5	5	8.3	-	8.4	25.3	-	23.5	8.1	-	8.1	175	180
Control B	0/20	5	5	5	-	-	8.7	-	-	23.4	-	-	8.3	-	175
Control C	0/20	5	5	5	-	-	8.6	-	-	23.2	-	-	8.3	-	185
Control D	0/20	5	5	5	-	-	8.7	-	-	23.1	-	-	8.5	-	215
100% A	20/0	5	5	5	8.0	-	8.3	25.0	-	23.5	6.1	-	8.4	2550	3010
100% B	20/0	5	5	5	-	-	8.3	-	-	23.6	-	-	8.3	-	3040
100% C	20/0	5	5	5	-	-	8.3	-	-	23.4	-	-	8.3	-	3080
100% D	20/0	5	5	5	-	-	8.3	-	-	23.4	-	-	8.3	-	3360

[A] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.5-26.5°C.
Incubator #2 temperature range for the test period was 24.5-25.5°C.

Organism: ***Cyprinella leedsi*** Life stage: 14 days

	Sample/Diluent	SURVIVAL # Alive			pH			Temperature[B]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control A	0/500	5	5	5	8.0	8.1	8.5	25.6	25.1	23.8	7.3	7.2	8.4	310	350
Control B	0/500	5	5	5	8.1	8.2	8.6	25.6	24.9	23.8	7.3	7.3	8.1	260	300
Control C	0/500	5	5	5	8.0	8.2	8.6	25.6	24.5	23.6	7.4	7.4	8.1	260	300
Control D	0/500	5	5	5	8.0	8.2	8.6	25.5	24.5	23.6	7.4	7.6	8.1	260	300
100% A	500/0	5	5	5	7.9	8.0	8.3	24.9	24.8	23.9	6.3	7.3	8.2	2580	2650
100% B	500/0	5	5	5	7.9	8.0	8.3	24.7	24.7	23.9	6.4	7.3	8.2	2670	2750
100% C	500/0	5	5	5	8.0	8.0	8.3	24.6	24.9	24.0	6.4	7.1	8.3	2660	2700
100% D	500/0	5	5	5	8.0	8.1	8.3	24.5	24.9	24.0	6.5	7.1	8.3	2660	2780

[B] Temperatures of room and test incubator were continuously recorded on a strip chart recorder.
Room Temperature range for the test period was 25.5-26.5°C.
Incubator #3 temperature range for the test period was 24.0-25.0°C.

Table 2. Results of chemical analyses on the effluent from Millennium Specialty Chemicals sampled on April 9, 2001.

Metals			
Calcium	93.4	mg/L	
Copper	1.6	µg/L	[1]
Iron	91	µg/L	
Magnesium	33	mg/L	
Nickel	3.1	µg/L	[1]
Selenium	1.5	µg/L	[1]
Zinc	31	µg/L	
Pesticides and Herbicides			
Atrazine	0.099	µg/L	[1]
Base, Neutral, & Acid Extractable Organics			
None detected			

[1] Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit.

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: M. Hemmingway
County: Duval
Contact / District: T. Kallinmeyn / NE - District
NPDES Permit #: FL0000884
LIMS Sample #: 517605 **LIMS Job #:** TLH-2001-04-10-09
sample log 4-13-01 MF
Test Type: Screening | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 1 of 2

Sample Collection: Date 4/9/01 Time 1400
Test Beginning: Date 4/10/01 Time 1345
Test Ending: Date 4/12/01 Time 1400
Organism Batch #: 19 **Diluent Batch #:** 9
Organism Age: ~~24~~ hrs SRT toxicant batch #: NA
Test organism: C. dubia

Remarks:

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
CTRL A	A	5	5	5	8.3	—	8.4	25.3	—	23.5	8.1	—	8.1	175	—	190
B	B	5	5	5	—	—	8.7	—	—	23.4	—	—	8.3	—	—	175
C	C	5	5	5	—	—	8.6	—	—	23.2	—	—	8.3	—	—	185
D	D	5	5	5	—	—	8.7	—	—	23.1	—	—	8.5	—	—	215
100% A	A	5	5	5	8.0	—	8.3	25.0	—	23.5	6.1	—	8.4	2550	—	3010
B	B	5	5	5	—	—	8.3	—	—	23.6	—	—	8.3	—	—	3040
C	C	5	5	5	—	—	8.3	—	—	23.4	—	—	8.3	—	—	3080
D	D	5	5	5	—	—	8.3	—	—	23.4	—	—	8.3	—	—	3310
measured by:		DPH	SG	SG	DPH	—	DPH	DPH	—	DPH	DPH	—	DPH	DPH	—	DPH
recorded by:		SG	SG	SG	SH	—	SG	JA	—	JA	JA	—	JA	JA	—	JA

Investigators' Signatures

Temperature Range °C
Incubator # 2 24.5 - 25.5°C
Room 6246 25.5 - 24.5°C

Water Quality Parameters	Salt Water / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			NA	NA	NA	JG
Lab Total Residual Cl2 (mg/L):		<0.03	<0.03	DR/CL	JA	DPH
Alkalinity (mg/L as $CaCO_3$):		73	117	Hach	SG	DPH
Hardness (mg/L as $CaCO_3$):		74 81	430	Hach	SG	DPH
Total ammonia (mg/L as N):		<0.017	<0.017	Distill	DPH	DPH
Salinity:		<1	~1.3	YSI	DPH	DPH

reviewer

form updated 3/3/99

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: M. Hemimum
County: Duval
Contact / District: T. Kallemeyn / NW. District
NPDES Permit #: FL0000884
LIMS Sample #: 517665 LIMS Job #: TLH-2001-04-[illegible]
sample log 4-13-01 MF
Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 2 of 2

Remarks:

Sample Collection: Date 4/9/01 Time 1400
Test Beginning: Date 4/10/01 Time 1345
Test Ending: Date 4/12/01 Time 1400
Organism Batch #: 27 Diluent Batch #: Well
Organism Age: 10 days SRT toxicant batch #: NA
Test organism: C. dubia

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
CTRL A	F1	5	5	5	8.0	8.1	8.5	25.6	25.1	23.[illegible]	7.3	7.2	8.4	310	320	350
B	F2	5	5	5	8.1	8.2	8.6	25.6	24.9	23.[illegible]	7.3	7.3	8.1	260	285	300
C	F3	5	5	5	8.0	8.2	8.6	25.6	24.5	23.6	7.4	7.4	8.1	260	285	300
D	F4	5	5	5	8.0	8.2	8.6	25.5	24.5	23.6	7.4	7.6	8.1	260	275	300
100% A	F5	5	5	5	7.9	8.0	8.3	24.9	24.8	23.9	6.3	7.3	8.2	2580	2660	2650
B	F6	5	5	5	7.9	8.0	8.3	24.7	24.7	23.9	6.4	7.3	8.2	2670	2680	2750
C	F7	5	5	5	8.0	8.0	8.3	24.6	24.9	24.6	6.4	7.1	8.3	2660	2680	2700
D	F8	5	5	5	8.0	8.1	8.3	24.5	24.9	24.0	6.5	7.1	8.3	2660	2660	2780
measured by:		SG	SG	SG	DPH	SG	DPH	DPH	SG	DPH	DPH	SG	DPH	DPH	SG	DPH
recorded by:		JA	SG	SG	JH	JA	SG	JH	JH	SG	JH	JA	SG	JH	JA	SG

Investigators' Signatures

[signature] [signature] Shannon Gerardi

A H Wolf
reviewer

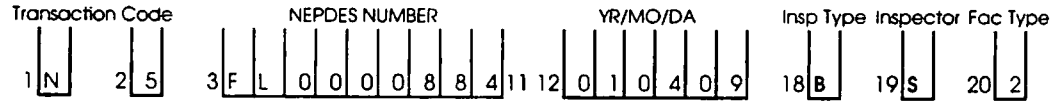
form updated 3/3/99

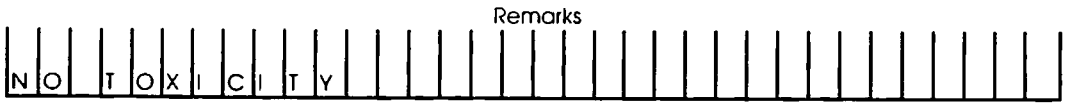
Temperature Range °C
Incubator # 3 24.0 - 25.0 °C
Room B246 25.5 - 26.5 °C

Water Quality Parameters	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):	[redacted]		NA	NA	NA	SG
Lab Total Residual Cl2 (mg/L):	<0.03		<0.03	DR100	JH	DPH
Alkalinity (mg/L as $CaCO_3$):	145		117	Hach	SG	DPH
Hardness (mg/L as $CaCO_3$):	146		430	Hach	SG	DPH
Total ammonia (mg/L as N):	<0.017		<0.017	Denver	DPH	DPH
Salinity:	<1		~1.3	451	DPH	DPH

The Bioassay of Millennium Specialty Chemicals effluent sampled on April 9, 2001, NPDES #FL0000884.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)

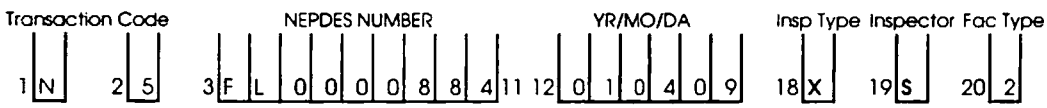


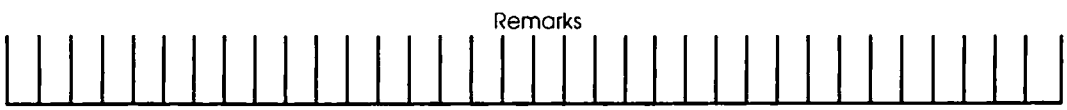


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The Priority Pollutants Analysis for Bioassay of Millennium Specialty Chemicals effluent sampled on April 9 2001, NPDES #FL0000884.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)





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