

Bioassays of

Simplex Industries

Jacksonville, Duval County, Florida

NPDES #FL0001368

Sampled 6/6/94

October 1994

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan #870346G

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Bureau of Laboratories
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Introduction

Simplex Industries, Jacksonville, Duval County, Florida, NPDES #FL0001368, tests performed on 7 to 9 June 1994.

This paper and plastics extrusion facility is located at 1302 Eastport Road in Jacksonville and produces specialty paper products, such as wrapping for building materials. Wastewater consists of non-contact cooling water and occasionally stormwater. Stormwater mixes with cooling water at the sample collection pump. The wastewater receives no treatment. Approximately 500 GPD of effluent is discharged to the Broward River, a tributary of the St. Johns River. The bioassay sample collected on 6 June 1994 consisted of both non-contact cooling water and stormwater (facility summary prepared by Mike Dunbar, 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 sample had a strong hydrogen sulfide smell and a dissolved oxygen (D.O.) concentration of less than 2.5 mg/L at the time of collection and upon arrival at the FDEP Biology Laboratory. EPA test methods require D.O. concentrations in test containers to remain above 4.0 mg/L throughout the bioassay for the results to be valid.

The sample was aerated to a D.O. concentration of 6.7 mg/L prior to initiating the test. The test containers were aerated continuously throughout the test because of concern that the D.O. concentrations would fall below 4.0 mg/L. 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; however, aerating the test containers probably reduced the toxicity of the sample by driving off the hydrogen sulfide or other volatile toxics. If low D.O. and elevated hydrogen sulfide levels persist, the facility should conduct flow-through acute bioassays to correctly assess the toxicity of their effluent. Static test methods cannot properly assess effluents containing hydrogen sulfide.

Total residual chlorine was not detected in the sample. Total and unionized ammonia concentrations were 0.92 mg/L and 0.004 mg/L, respectively. Further chemical analyses were performed on the sample and several metals were identified (Table 2). Pesticides and organics were not detected.

Conclusion

The sample of effluent collected from this facility on 6 June, 1994 did not show toxicity; however, aerating the test containers probably reduced the toxicity of the sample by driving off the hydrogen sulfide. If low D.O. and elevated hydrogen sulfide levels persist, the facility should conduct flow-through acute bioassays to correctly assess the toxicity of their effluent.

Table 1. Concentration series and volumes used for the 48-hour static acute screening toxicity bioassays of the Simplex Industries effluent performed on 7 to 9 June, 1994.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	20 mL	0 mL	20 mL
100 %	0 mL	20 mL	20 mL

Cyprinella leedsi (bannerfin shiner)

Concentration	Dilution Water	Sample	Total Volume
Control	500 mL	0 mL	500 mL
100 %	0 mL	500 mL	500 mL

Table 2. Results of chemical analyses on the effluent from Simplex Industries, sampled on 6 June, 1994.

Metals

	Effluent		Class III marine standards
Aluminum	7340 µg/L	A *	≤ 1500 µg/L
Cadmium	3.7 µg/L		≤ 9.3 µg/L
Calcium	252 mg/L	A	none at present
Chromium	26 µg/L	A	none at present
Copper	54 µg/L	A *	≤ 2.9 µg/L
Iron	11,700 µg/L	A *	≤ 300 µg/L
Lead	49 µg/L	I *	≤ 5.6 µg/L
Magnesium	12.7 mg/L	A	none at present
Nickel	18 µg/L	A *	≤ 8.3 µg/L
Zinc	713 µg/L	J *	≤ 86 µg/L

Pesticides & Herbicides

None Detected

Base-Neutral & Acid Extractables

None Detected

Volatile Organic Compounds

None Detected

A Value reported is the mean of two or more determinations.
I Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit.
J Estimated value.
* Value exceeded Class III marine surface water quality criterion, 17-302.530 FAC.

Table 3. Data recorded during the 48-hour static acute screening bioassays of a sample of effluent from Simplex Industries, Jacksonville, Duval County, Florida, NPDES# FL0001368, performed on 7 to 9 June, 1994.

Facility:	Simplex Industries		NPDES #	FL0001368	Facility Type: Industrial
Location:	1302 Eastport Road, Jacksonville		Contact/District:	M. Dunbar, E. Cordova/Northeast	
County:	Duval		Test type:	static acute screen	
Sample Collection Date:	6/6/94	Time: 1530	# tests:	2	Receiving Water: Broward River to
Test Beginning Date:	6/7/94	Time: 1530	Chlorination Type:	Non-chlorinated	the St. Johns River
Test Ending Date:	6/9/94	Time: 1500			Page 1 of 1

Total Residual Cl2	mg/L	Method
Field:	0.0	-
Lab:	<0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	< 0.017	0.00
20% Dilute Mineral Water (cladocerans):	< 0.017	0.00
100% Sample:	0.092	0.004

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	125	120
20% Dilute Mineral Water (cladocerans):	70	80
100% Sample:	160	210

Salinity	(ppt)
Control Water:	0
100% Sample:	0

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

	SURVIVAL			pH			Temperature			Dissolved Oxygen*			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 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	5	5	5	8.3	-	8.1	23.9	-	24.0	7.9*	-	8.3	180	190
Control	5	5	5	-	-	8.1	-	-	24.1	-	-	8.4	-	210
Control	5	5	5	-	-	8.1	-	-	24.1	-	-	8.5	-	190
Control	5	5	5	-	-	8.1	-	-	24.2	-	-	8.4	-	200
100%	5	5	5	8.0	-	8.6	21.5	-	24.8	7.9*	-	8.4	445	470
100%	5	5	5	-	-	8.6	-	-	24.9	-	-	8.4	-	475
100%	5	5	5	-	-	8.6	-	-	25.0	-	-	8.4	-	460
100%	5	5	5	-	-	8.6	-	-	25.1	-	-	8.5	-	485

Organism: ***Cyprinella leedsi*** Age: 11 days

	SURVIVAL			pH			Temperature			Dissolved Oxygen*			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 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	5	5	5	8.0	8.3	8.4	23.4	23.5	23.4	8.3*	8.9*	8.9*	245	250
Control B	5	5	5	8.0	8.3	8.4	-	-	23.4	8.3*	8.9*	8.9*	245	250
100% A	5	5	5	8.0	8.4	8.5	20.7	23.3	23.2	8.2*	8.9*	9.0*	455	495
100% B	5	5	5	8.0	8.4	8.5	-	-	23.1	8.2*	8.9*	9.1*	455	500

* The initial dissolved oxygen concentration of the sample was 2.4 mg/L. The sample and control waters were aerated prior to measurement of parameters and loading of the test organisms. All fish test jars were aerated for the duration of the test.

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Simplex Industries
County: Duval
Contact / District: Michael Ouimbac / NE
NPDES Permit #: FL0001368
LIMS Sample #: 81408 LIMS Job #: 94-Jun-07-07 entered 6/10/94

Sample Collection: Date 6/6/94 Time 330PM
Test Beginning: Date 6/7/94 Time 1530
Test Ending: Date 6/9/94 Time 1500
Organism Batch #: 21 Diluent Batch #: 20
Organism Age: < 24 hrs
Test Organism: Ceriodaphnia dubia

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Test Number: 1 of 2

Remarks:
Strong rotten egg odor.
D.O. 2.4 @ 16°C
aerated sample to 7.6 mg/L D.O.
MF 6/7/94
AERA

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.4 @ 23.5	8.5 @ 23.4 °C	980 @ 1000 9810 @ 10000 @ 24.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.4 @ 24.1 °C	975 @ 1000 7790 @ 10000 @ 24.0 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.9 @ 24.0	8.4 @ 24.1 °C	995 @ 1000 9910 @ 10,000 @ 24.5 °C

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Control	A	5	5	5	8.3		8.1	23.9		24.0	7.9		8.3	150		190
Control	B	5	5	5			8.1			24.1			8.4			210
Control	C	5	5	5			8.1		* ~~24.8~~	MF			8.5			190
Control	D	5	5	5			8.1			24.2			8.4			200
100%	A	5	5	5	8.0		8.6	21.5		24.8	7.9		8.4	445		470
100%	B	5	5	5			8.6			24.9			8.4			425
100%	C	5	5	5			8.6			25.0			8.4			460
100%	D	5	5	5			8.6			25.1		** 8.5	8.5			485
									* 24.1			** pow slipped				
									MF 6/9/94 ERROR in recording #			MF				
Measured/Loaded by:		MF	TM	TM	MF		TM	MF		TM	MF		TM	MF		TM
Recorded by:		TR	TR	TM	TR		MF	TR		MF	TR		MF	TR		MF

Investigators' Signatures
John C. Rader
Marshall Faircloth
Terry McKnight

	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.0	—	MD
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TR
Alkalinity:	125	70	160	Hach	TR
Hardness:	120	80	210	Hach	TR
Total Ammonia:	<0.017	<0.017	0.092	Orion	MF

Reviewer

Ammonia Meter #98136 Ammonia Meter Slope: -58.1 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 4/27/94

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Simplex Industries
County: Duval
Contact / District: Michael Dunbar / NE
NPDES Permit #: FL0001368
LIMS Sample #: #14058 LIMS Job #: 94-Jun-07-07 entered 6/10/94

Sample Collection: Date 6/6/94 Time 1530
Test Beginning: Date 6/7/94 Time 1530
Test Ending: Date 6/9/94 Time 1500
Organism Batch #: 22 Diluent Batch #: Well
Organism Age: 11 days
Test Organism: Cyprinella leedsi

Test Type: (Screening) / Definitive
(Static) / Static Renewal / Flow-through

Test Number: 2 of 2

Remarks: Strong Rotten egg odor.
Initial D.O. 2.4 @ 16°C
aerated to 7.6 mg/l D.O.
aerated continuously both control and sample. MF 6/7/94

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	23.4 @ 23.5	8.5 @ 23.4°C	980 @ 1000 9810 @ 10000 @ 24.1 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.4 @ 24.1°C	975 @ 1000 9770 @ 10000 @ 24.0 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.9 @ 24.0	8.4 @ 24.1°C	995 @ 1000 9910 @ 10,000 @ 24.5 °C

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
Control A	630	5	5	5	8.0	8.3	8.4	23.4	23.5	23.1	8.3	8.9	8.9	245	245	250
Control B	28	5	5	5	8.0	8.3	8.4			23.1	8.3	8.9	8.9	245	245	250
100% A	366	5	5	5	8.0	8.4	8.5	20.7	23.3	23.2	8.2	8.9	9.0	455	490	495
100% B	57	5	5	5	8.0	8.4	8.5			23.1	8.2	8.9	9.1	455	490	500
Measured/Loaded by:		TR	TM	TM	MF	TM	TM	MF	TM	TM	MF	TM	TM	MF	TM	TM
Recorded by:		TR	TR	MF	TR	TR	MF	TR	TR	MF	TR	TR	MF	TR	TR	MF

Investigators' Signatures
Tobin C. Rader
Marshall Faircloth
Tina Mikulski

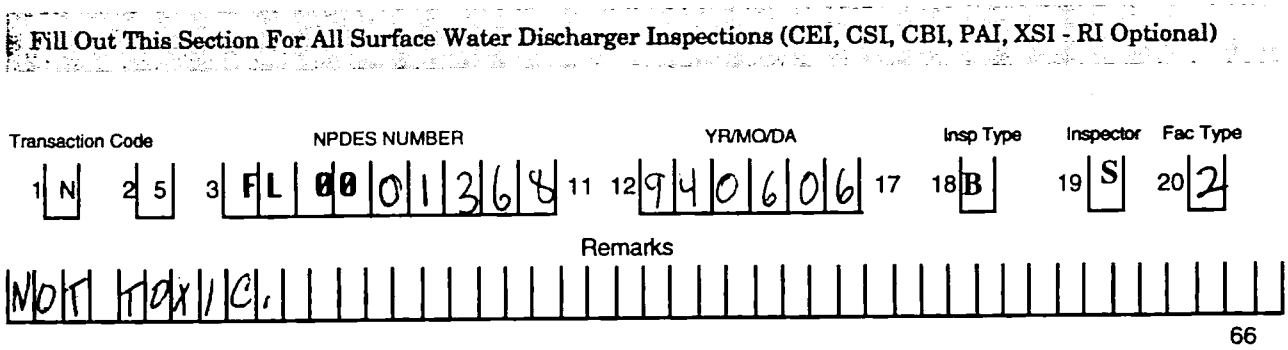
Reviewer

form updated 4/27/94

	Salt Water (Well Water) 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:		0.0	—	MD
Lab Total Residual Cl2:	<0.03 <0.03	<0.03	DR-100	TR
Alkalinity:	125 70	160	Hach	TR
Hardness:	120 80	210	Hach	TR
Total Ammonia:	<0.017 <0.017	0.092	orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.1 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

The Bioassay of the Simplex Industries effluent sampled on June 6, 1994, NPDES #FL0001368.



The Priority Pollutants Analysis for the Bioassay of the Simplex Industries effluent sampled on June 6, 1994, NPDES #FL0001368.

