Bioassays of

Rotonda West Reverse Osmosis Plant

Rotonda West, Charlotte County, Florida

NPDES #FL0025780

Sampled 8/10/92

October 1992

Biology Section
Division of Technical Services

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Introduction

Rotonda West Reverse Osmosis Plant, Rotonda West, Charlotte County, Florida, NPDES #FL0025780, tests performed on 11 to 13 August, 1992.

This facility is located at Cape Haze Drive and Haitian Road in Rotonda West. The plant is a reverse osmosis drinking water treatment facility which discharges brine reject water to the west branch of Coral Creek. The volume of effluent is about 0.5 mgd (NPDES files).

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1991, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition, EPA/600/4-90/027.

Results and Discussion

The FDER Biology Section performed a 48-hour static acute definitive toxicity bioassay on a sample of effluent from this facility. The salinity of the sample was about 13 ppt, therefore, the bioassay organism used for this test was the mysid shrimp, *Mysidopsis bahia*. The control water for the tests was adjusted to a similar salinity using an artificial sea salt mixture (Forty Fathoms®); the salinity of the sample was not altered. The test results indicated that the effluent was toxic to the mysids, producing a 48-hour LC_{50} of 65%.

Total residual chlorine was < 0.05 mg/L in the sample as measured in the laboratory. Total and unionized ammonia concentrations were 1.02 mg/L and < 0.01 mg/L, respectively. Further chemical analyses were performed only for copper and total sulfide.

Analysis indicated the presence of copper (12 µg/L), although a high level of potential spectral interferences was found. The state surface water criterion for copper is ≤ 2.9 µg/L for Class III marine waters, while copper levels as low as 5.6 µg/L have been found to be acutely toxic to some saltwater organisms (EPA *Quality Criteria for Water, 1986*).

The total sulfide concentration of the sample was 1,500 µg/L. The sample had a strong H_2S smell, which was noted at test initiation. However, the sample contained sufficient amounts of dissolved oxygen during testing to suggest that the volatile H_2S portion of the total sulfide present was negligible.

Conclusion

The sample of effluent collected on 10 August, 1992, from this facility was toxic to *M. bahia*. The level of copper in the sample probably contributed to this toxicity. The test protocol was not appropriate for determining the existence of H_2S toxicity in this effluent.

Table 1. Concentration series and volumes used for the 48-hour static acute definitive bioassay of Rotonda West Reverse Osmosis Plant effluent performed on 11 to 13 August, 1992.

Mysidopsis bahia (mysid shrimp)

Concentration	Dilution Water	Sample	Total Volume
Control	500 mL	0 mL	500 mL
10 %	450 mL	50 mL	500 mL
30 %	350 mL	150 mL	500 mL
50 %	250 mL	250 mL	500 mL
75 %	125 mL	375 mL	500 mL
100 %	0 mL	500 mL	500 mL

Table 2. Data recorded during the 48-hour acute definitive bioassay of a sample of reject brine from the Rotonda West Reverse Osmosis Plant, Charlotte County, Florida, NPDES# FL0025780, performed on 11 to 13 August, 1992.

Facility:	**Rotonda West Reverse Osmosis Plant**	**NPDES #**	**FL0025780**	Facility Type:	**Reverse Osmosis**
Location:	Cape Haze Drive & Haitian Road, Rotonda West	Contact/District:	Gary Millington / S		Drinking Water Treatment
County:	Charlotte	Test type:	static acute definitive		
Sample Collection Date:	**8/10/92** Time: 1010	# tests:	1	Receiving Water:	west branch of Coral Creek
Test Beginning Date:	8/11/92 Time: 1300	Chlorination Type:	**not chlorinated**		
Test Ending Date:	8/13/92 Time: 1330			**Page 1 of 1**	

Total Residual Cl2	mg/l	Method
Field:	not measured	-
Lab:	< 0.05	DR -100

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (mysids):	0.00	0.00
100% Sample:	1.02	< 0.01

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (mysids):	80	-
100% Sample:	119	-

Salinity (ppt)	
Control Water:	11.5
100% Sample:	12.7

Organism: ***Mysidopsis bahia*** Life stage: 3 days

LC50: 65% by Trimmed Spearman-Karber method

	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	8.4	8.1	7.9	24.3	23.5	23.0	7.0	6.5	6.8	-	-
Control	5	5	5	8.4	8.1	7.9	-	-	-	7.0	6.5	6.8	19,910	20,100
10%	5	5	4	8.2	8.0	7.9	24.3	23.4	23.0	7.1	6.4	6.9	-	-
10%	5	5	5	8.2	8.0	7.9	-	-	-	7.1	6.4	6.9	20,100	20,200
30%	5	5	5	7.2	7.7	7.8	24.3	23.2	23.0	6.8	6.4	6.8	-	-
30%	5	5	5	7.2	7.7	7.9	-	-	-	6.8	6.4	6.8	20,300	20,400
50%	5	5	5	6.8	7.6	7.9	24.3	23.2	23.0	6.3	6.4	7.0	-	-
50%	5	5	5	6.8	7.6	7.9	-	-	-	6.3	6.5	7.0	20,400	20,500
75%	5	2	2	6.6	7.5	7.9	24.5	23.4	23.0	6.1	6.4	7.0	-	-
75%	5	0	0	6.6	7.5	7.9	-	-	-	6.1	6.4	7.0	20,600	20,700
100%	5	0	0	6.5	7.4	7.9	24.5	23.6	23.0	5.6	6.2	7.1	-	-
100%	5	1	0	6.5	7.4	7.9	-	-	-	5.6	6.1	7.1	20,800	21,000

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: ROTONDA WEST R/O PLANT
Address/City: _____
County: Charlotte
Contact/District: Gary Millington / South
NPDES Permit #: FL0025780 Outfall #: _____

Sample Collection: Date 8-10-92 Time 1010
Test Beginning: Date 8-11-92 Time 1300
Test Ending: Date 8/13/92 Time 1330
Test Organism: MYSIDOPSIS BAHIA
Life Stage/Age: 3 days

92-AUG-11-10
39042 entered 8/13/92

Test Number: 1 of 1 Test Type: Screening (Definitive)
(Static) | Static Renewal | Flow-through

Remarks: STRONG H2S SMELL

TSK LC50 = 65.13 (95% CI 71.65)

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7, 7.10, 10	8.4 @ 25°C	24.0 @ 24.0	985 / 9850 @ 24.2
24 hr	7, 7.10, 10	8.4 @ 25°C	26.0 @ 26.0	999 / 9950 @ 24.1
48 hr	7, 7.10 10	8.4 @ 25°C	24.9 @ 24.9	1000 / 10000 @ 24.5

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	DO (mg/L) 0	24	48	Cond. (µmhos/cm) 0	24	48
control	30	5	5	5	8.4	8.1	7.9	24.3	23.5	23.0	7.0	6.5	6.8			
control	75	5	5	5	8.4	8.1	7.9				7.0	6.5	6.8	19910	20100	20100
10%	68	5	5	4	8.2	8.0	7.9	24.3	23.4	23.0	7.1	6.4	6.9			
10%	77	5	5	5	8.2	8.0	7.9				7.1	6.4	6.9	20100	20100	20200
30%	20	5	5	5	7.2	7.7	7.8	24.3	23.2	23.0	6.8	6.4	6.8			
30%	32	5	5	5	7.2	7.7	7.9				6.8	6.4	6.8	20300	20300	20400
50%	57	5	5	5	6.8	7.6	7.9	24.3	23.2	23.0	6.3	6.4	7.0			
50%	92	5	5	5	6.8	7.6	7.9				6.3	6.5	7.0	20400	20400	20500
75%	39	5	2	2	6.6	7.5	7.9	24.5	23.4	23.0	6.1	6.4	7.0			
75%	18	5	0	0	6.6	7.5	7.9				6.1	6.4	7.0	20600	20600	20700
100%	4	5	0	0	6.5	7.4	7.9	24.5	23.6	23.0	5.6	6.2	7.1			
100%	50	5	1	0	6.5	7.4	7.9				5.6	6.1	7.1	20800	20800	21000
Measured/Loaded by:		MK	MF/KP	MK	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP
Recorded by:		MF KP	MF KP	MF	KP	KP	MF	KP	KP	MF	KP	KP	MF	KP	KP	MF

Investigators' Signatures

Kim Pearce
Marshall Faircloth

Reviewer

recorded Sunshine #'s here 8/11 KP SALT

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			not measured		
Lab Tot. Resid. Cl2:			<0.05	HACH DR100	KP
Alkalinity:	120 KP	70 80	119	HACH	KP
Hardness:	127 KP	KP 80	257	not measured	
Total Ammonia:		0	1.02	prior	MF

Ammonia Meter Slope: -56.6
Ammonia Blank: 0.0
Salinity Sample: ~12.5 ppt

TRIMMED SPEARMAN-KARBER METHOD

DATE: 08/11/92 TEST NUMBER: 1 DURATION: 48 HR

CHEMICAL: ROTONDA WEST R/O REJECT, 13 PPT SPECIES: M. BAHIA

RAW DATA:

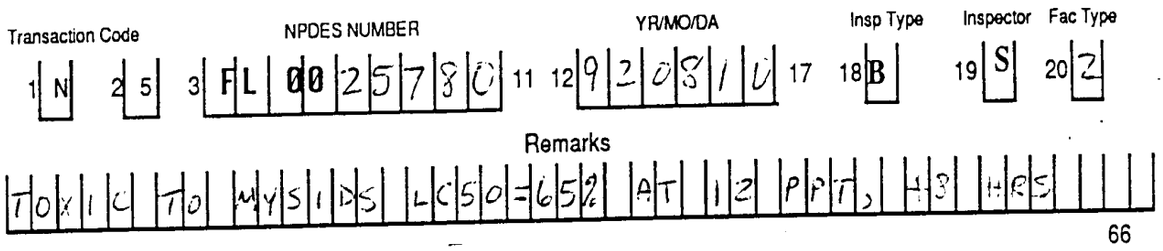
CONCENTRATION(%)	10.00	30.00	50.00	75.00	100.00
NUMBER EXPOSED:	10	10	10	10	10
MORTALITIES:	0	0	0	8	10
SPEARMAN-KARBER TRIM:		0.00%			

SPEARMAN-KARBER ESTIMATES: LC50: 65.63

95% LOWER CONFIDENCE: 60.12

95% UPPER CONFIDENCE: 71.65

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



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