Florida

Department of Environmental Protection

Bioassays of

Florida Power Corporation [redacted]

Crystal River, Citrus County, Florida

NPDES #FL0000159

Sampled 7/19/93

August 1993

Biology Section
Division of Technical Services

Bioassays of

Florida Power Corporation Crystal River Plant

Crystal River, Citrus County, Florida

NPDES #FL0000159

Biology Section
Bureau of Laboratories
August 1993

Introduction

Florida Power Corporation Crystal River Plant, Crystal River, Citrus County, Florida, NPDES #FL0000159, tests performed on 20 to 22 July, 1993

The electric power generating plant is located at the west end of Power Line Road, 8.4 miles west-northwest of Crystal River in western Citrus County. The plant actually consists of two coal-fired and one nuclear power generating plants. Fifteen permitted outfalls exist to serve these plants.

The sample for these bioassays was taken from an access point approximately 100 feet before the actual discharge site of outfall 006. Nuclear auxiliary cooling water is discharged to outfall 006 (FDEP permit). Effluent from outfall 006 is discharged underwater into the site drainage canal which empties into the Gulf of Mexico (personal communication Kathy Hicks, FDEP Southwest District office).

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 FDEP Biology Section performed two 48-hour static acute screening toxicity bioassays on a sample of effluent from this facility. The salinity of the sample was 28 ppt, therefore, the test species used for these bioassays were the mysid shrimp, *Mysidopsis bahia*, and the inland silverside, *Menidia beryllina*. The control water for the tests were prepared from an artificial sea salt mixture (Forty Fathoms®); the salinity of the sample was not altered.

The test results indicated minimal toxicity to *M. beryllina* (1 death) and no toxicity to *M. bahia*. Total residual chlorine and total ammonia were not detected in the sample.

Conclusion

The sample of effluent collected from this facility on 19 July, 1993, did not show toxicity to *M. bahia* and showed minimal toxicity to *M. beryllina*.

Table 1. Concentration series and volumes used for the 48-hour static acute screening bioassays of the Florida Power Corporation Crystal River electric power generating plant effluent performed on 20 to 22 July, 1993.

Mysidopsis bahia (mysid shrimp)

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

Menidia beryllina (inland silverside)

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

Table 2. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Florida Power Corporation Crystal River electric power generating plant, Crystal River, Citrus County, Florida, NPDES# FL0000159, performed on 20-22 July, 1993.

Facility:	Florida Power Corporation Crystal River	NPDES #	FL0000159	Facility Type:	Electric Power Generating Plant
Location:	Power Line Road, Crystal River	Contact / District:	Kathy Hicks/SW		
County:	Citrus	Test type:	static acute screen		
Sample Collection Date:	7/19/93 Time: 1200	# tests:	2	Receiving Water:	Gulf of Mexico
Test Beginning Date:	7/20/93 Time: 1430	Chlorination Type:	not chlorinated		
Test Ending Date:	7/22/93 Time: 1430			Page 1 of 1	

Total Residual Cl2	mg/l	Method
Field:	not measured	
Lab:	<0.03	DR-100

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water:	< 0.017	0.00
100% Sample:	< 0.017	0.00

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water:	120	-
100% Sample:	145	-

Salinity (ppt)	
Control Water:	22
100% Sample:	28

Organism: ***Menidia beryllina*** Life stage: 14 days

	SURVIVAL			pH			Temperature			Dissolved Oxygen			mmhos/cm 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	8.2	8.1	8.0	24.3	24.5	24.1	6.3	6.5	7.2	32.9	33.4
Control	5	5	5	8.2	8.1	8.0	-	-	-	6.3	6.6	7.2	33.0	33.7
100%	5	5	5	7.9	7.9	7.8	25.3	24.5	24.2	5.9	6.8	6.7	43.6	43.3
100%	5	5	4	7.9	7.9	7.8	-	-	-	5.9	6.7	6.6	43.6	43.4

Organism: ***Mysidopsis bahia*** Age: 4 days

	SURVIVAL			pH			Temperature			Dissolved Oxygen			mmhos/cm 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	8.2	8.0	7.9	24.3	24.5	23.9	6.5	7.0	7.0	33.0	33.3
Control	5	5	5	8.2	8.0	7.9	-	-	-	6.5	7.0	7.1	33.0	33.5
100%	5	5	5	7.9	7.9	7.8	25.1	24.5	24.0	5.9	6.6	6.8	43.4	42.6
100%	5	5	5	7.9	7.9	7.8	-	-	-	5.9	6.6	6.9	43.8	43.0

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Power Corp
Location: FPC. Crystal River
County: Citrus
Contact/District: Kathy Hicks / SW
NPDES Permit #: FL0000159 Outfall #:

Sample Collection: Date 7-19-93 Time 1200-1300
Test Beginning: Date 7-20-93 Time 1430
Test Ending: Date 7-22-93 Time 1430
Organism Batch #: 12 Diluent Batch #: 33
Organism Age: 14 days
Test Organism: Menidia Beryllina

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

Test Number: 2 of 2 93-JUL-20-04 58597

Remarks:
TESTED AT NATURAL SALINITY OF SAMPLE

Instrument Calibrations: pH Temperature °C D.O. mg/L Conductivity µmhos/cm

0 hr 7.0 @ 7.0 25.0 @ 25.1 8.3 @ 24.6 1015 @ 1,000 @ 24.7
9.0 @ 9.0 9820 @ 10,000

24 hr 7.0 @ 7.0 25.3 @ 25.4 8.3 @ 25.1 1020 @ 1,000 @ 24.6
9.0 @ 9.0 9850 @ 10,000

48 hr 7.0 @ 7.0 24.8 @ 24.9 8.3 @ 24.7 995 @ 1,000 @ 24.5
9.0 @ 9.0 9820 @ 10,000

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			Cond. (mmhos/cm) ~~Cond. (µmhos/cm)~~		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control A	85	5	5	5	8.2	8.1	8.0	24.3	24.5	24.1	6.3	6.5	~~5.9~~	32.9	33.6	33.4
Control B	25	5	5	5	8.2	8.1	8.0				6.3	6.6	~~5.7~~	33.0	33.6	33.7
100% A	333	5	5	5	7.9	7.9	7.8	25.3	24.5	24.2	5.9	6.8	~~4.3~~	43.6	43.4	43.3
100% B	682	5	5	4	7.9	7.9	7.8				5.9	6.7	~~4.4~~	43.6	43.5	43.4
												*	7.2			
													7.2			
													6.7			
													6.6			
													wrong Pbo TM			
Measured/Loaded by:		TR	TM	TM	TR	TM	TM	TR	TM	TM	TR	TM	TM	TR	TM	TM
Recorded by:		TR	TM	TM	TM	TR	EAM	TM	TR	EAM	TM	TR	EAM	TM	TR	EAM

Investigators' Signatures

Tobin C. Rader

Tina M. Kalafus

Edward Miller

Reviewer

form updated 10/20/92

Water Quality Parameters	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not	measured	
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TM
Alkalinity:	120	70	145	Hach	TR
Hardness:	—	80	—	Hach	TR
Total Ammonia:	<0.017		<0.017	Orion	MF

Cl_2 Blank: ____ Ammonia Meter Slope: ____ Ammonia Blank: ____ Sample Salinity: 28 ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Power Corp
Location: FPC - Crystal River
County: Citrus
Contact/District: Kathy Hicks / SW
NPDES Permit #: FL0000159 **Outfall #:**

Sample Collection: Date 7-19-93 Time 1200-1300
Test Beginning: Date 7-20-93 Time 1430
Test Ending: Date 7-22-93 Time 1430
Organism Batch #: 101 **Diluent Batch #:** 32
Organism Age: 4 days
Test Organism: Mysidopsis Bahia

Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 1 of 2 93-JUL-20-04 58597

Remarks:
SAMPLE SALINITY = 28 ppt
TESTED AT NATURAL SALINITY OF SAMPLE.

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
0 hr	7.0 @ 7.0 9.0 @ 9.0	25.0 @ 25.1	8.3 @ 24.6	1015 @ 1,000 @24 9820 @ 10,000
24 hr	7.0 @ 7.0 9.0 @ 9.0	25.3 @ 25.4	8.3 @ 25.1	1020 @ 1,000 @24 9850 @ 10,000
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.8 @ 24.9	8.3 @ 24.7	995 @ 1,000 @24 9820 @ 10,000

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			Cond. (mmhos/cm) ~~Cond. (µmhos/cm)~~		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control A	37	5	5	5	8.2	8.0	7.9	24.3	24.5	23.9	6.5	7.0	7.0	33.0	33.5	33.3
Control B	22	5	5	5	8.2	8.0	7.9				6.5	~~8.0~~	7.1	33.0	33.5	33.5
100% A	65	5	5	5	7.9	7.9	7.8	25.1	24.5	24.0	5.9	6.6	6.8	43.4	42.9	42.6
100% B	3	5	5	5	7.9	7.9	7.8				5.9	6.6	6.9	43.8	43.4	43.0
												*7.0 Wrong Valve TR				
Measured/Loaded by:		TM	TM	TM	TR	TM	TM	TR	TM	TM	TR	TM	TM	TR	TM	TM
Recorded by:		TR	TM	TM	TM	TR	EAM	TM	TR	EAM	TM	TR	EAM	TM	TR	EAM

Investigators' Signatures
Robin Co-Rader
Tina Mikulski
Edward Miller

Reviewer

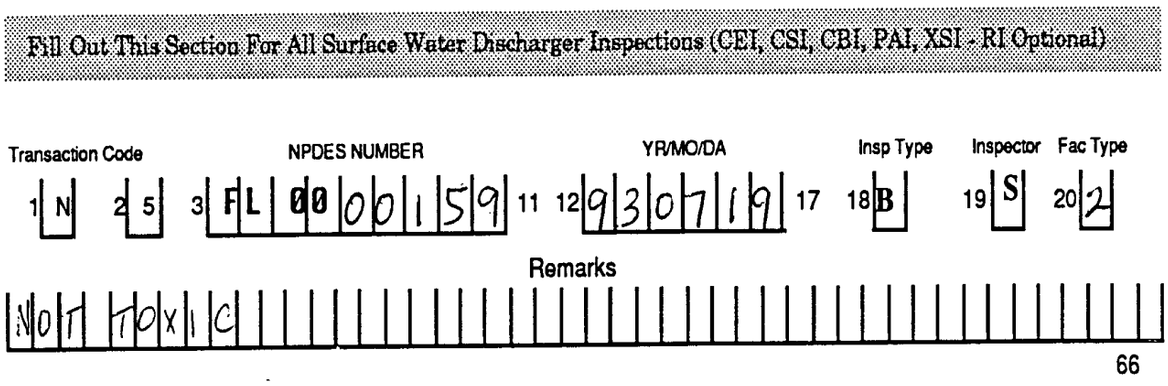
form updated 10/20/92

Water Quality Parameters

	(Salt Water/) Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not measured		
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TM
Alkalinity:	120	70	145	Hach	TR
Hardness:	—	80	—	Hach	TR
Total Ammonia:	<0.017		<0.017	Orion	MF

Cl_2 Blank: ____ Ammonia Meter Slope: -55.2 Ammonia Blank: <0.017 Sample Salinity: 28 ppt

The Bioassay of the Florida Power Corporation Crystal River electric power generating plant effluent sampled on July 19, 1993, NPDES# FL0000159.



The Priority Pollutants Analyses for the the Florida Power Corporation Crystal River electric power generating plant effluent sampled on July 19, 1993, NPDES# FL0000159.

