Effluent Quality Assessment

Tampa Electric Company Big Bend Power Station

Hillsborough County

NPDES #FL0000817

Sampled June 15, 2009

September 2009

Biology Section
Bureau of Laboratories
Division of Environmental Assessment and Restoration

Quality Manual No. 870346G
NELAC Certification No. E31780

CONTENTS

Tampa Electric Company Big Bend Power Station, 13031 Wyandotte Road, Apollo Beach, Hillsborough County, Florida, 33572. NPDES #FL0000817. Effluent grab samples for bioassay and chemical analyses for this facility were collected on June 15, 2009.

Introduction

Tampa Electric Company Big Bend Power Station is an electric power generating facility which consists of four coal-fired steam electric units with a total nameplate rating of 1,823 MegaWatts (MW) and three oil-fired combustion turbines with a combined capacity of 175 MW. The facility is currently operating under a Consent Order (OGC File # 98-2888D) concerning depressed dissolved oxygen concentrations in the effluent as compared to DO concentrations in the influent. (See Appendix F for detailed facility information provided by Pete Wenner of FDEP Southwest District.)

Methods

Samples were collected from the EFF-1 NPDES sampling point for Outfall D-001 by Jason Cohen and Peter Wenner (FDEP Southwest District) following DEP-SOP-001/01 FS 2400 Wastewater Sampling. All DEP SOPs are available on the web at: http://www.floridadep.org/labs/qa/sops.htm.

See Appendix A for the completed chain of custody form.

The 48-hour acute screening toxicity tests and algal growth potential test were performed following internal DEP SOPs TA07_03, TA07_04, and TA08_01 through TA08_09. All internal DEP SOPs are available on the web at: http://www.floridadep.org/labs/cgi-bin/sop/biosop.asp.

Results and Discussion

Toxicity Test Results

Tests were performed June 16 - 18, 2009.

Americamysis bahia 48-hour acute screening bioassay – LC_{50} > 100%, 0%* mortality in 100% sample at 48 hours

Menidia beryllina 48-hour acute screening bioassay – LC_{50} > 100%, 10%* mortality in 100% sample at 48 hours

The bioassay samples were not acutely toxic to the test organisms.

*NOTE: In a 48-hour acute screening test of 100% effluent, mortality of <20% provides confidence that the effluent meets the acute toxicity criterion of Florida's Surface Water Quality Standards (Rule 62-302.500 (1) (a) 4, F.A.C.). Mortality between 20-50% indicates low to moderate levels of toxicity, and further action may be required. Mortality of >50% indicates that the effluent fails to meet the minimum requirement to discharge to waters of the state (Rule 62-4.244(3) (a), F.A.C.).

See Appendix B for bioassay bench sheets. See Appendix C for results of the last 20 standard reference toxicant (SRT) tests and the bench sheets and statistical analyses of the SRT tests that correspond to these facility tests. See Appendix D for test organism receipts.

Algal Growth Potential

The effluent Algal Growth Potential (AGP) was 3.0 U (U - Material was analyzed for but not detected; the value reported is the minimum detection limit) mg dry wt/L of the saltwater

species *Dunaliella tertiolecta.* Raschke and Schultz found that AGP values above 10.0 mg dry weight/L represent a “problem” threshold for marine receiving waters, implying nutrient enrichment (personal communication, Marshall Faircloth, et. al. FDEP, with Ron Raschke USEPA Region 4 1987). The ratio of total nitrogen to total phosphorus suggests that the effluent is nitrogen limited (Maloney et al. 1978).

See Table 1 for AGP results.

Chemistry Results

Total residual chlorine and total ammonia were not detected in the bioassay sample in the laboratory. The total ammonia concentration in the composite sample collected and preserved for chemical analysis was 0.054 mg N/L. Based on the pH, salinity, and temperature of the effluent as collected, the calculated unionized ammonia concentration was < 0.02 mg/L.

Total alpha particles and Combined Radium 226 + 228 were detected in the effluent at levels that comply with Class III marine water quality criteria (62-302.530, F.A.C.). Arsenic, chromium, iron, and nickel were detected between the laboratory method detection limits (MDL) and practical quantitation limits (PQL). Ortho-phosphate was detected in the field blank.

See Table 2 for results of analytes detected in the effluent, and corresponding limits. See Appendix E for a complete list of chemical analyses performed.

Conclusion

The effluent sample collected from the EFF-1 for this facility on June 15, 2009, was not acutely toxic to either test species during the 48-hour acute screening bioassays. The effluent AGP result was less than the "problem” threshold for marine receiving waters. Effluent water quality samples collected on June 15, 2009, did not exceed any applicable water quality criteria or violate any permit conditions.

Literature Cited

Maloney, T. E., W. E. Miller, and D. T. Specht. 1974. The Marine Algal Assay Procedure: Bottle Test. National Environmental Research Center Office of Research and Development. U. S. EPA, Corvallis, Oregon. 43 p.

Table 1. Measured algal growth potential (AGP; mg dry weight/L) of the saltwater species *Dunaliella tertiolecta* and ratios of nitrogen to phosphorus for samples collected from TECO Big Bend Power Station on June 15, 2009.

Tampa Electric Company Big Bend Power Station NPDES # FL0000817			
Location	**AGP (measured)**	**Inorganic N:P ratio**	**Total N:P ratio**
D-001	3.0 U	0.4	4.7

U - Material analyzed for but not detected; value reported is the method detection limit

Table 2. Effluent limits, Class III Criteria for predominantly marine waters and chemical data for samples collected from the TECO Big Bend Power Station on June 15, 2009.

Tampa Electric Company Big Bend Power Station NPDES# FL0000817	Class III Criteria	Effluent Limits	Effluent	
Metals (µg/L unless otherwise noted)				
Aluminum	≤ 1,500	-	180	U
Antimony	≤ 4,300	-	1	U
Arsenic	≤ 50	-	1.8	I
Beryllium	≤ 0.13 a	-	0.075	U
Cadmium	≤ 8.8	-	0.12	U
Calcium (mg/L)	-	-	363	
Chromium-III	-	-	2.8	I
Copper	≤ 3.7	-	2	U
Iron	≤ 300	-	170	I
Lead	≤ 8.5	-	0.8	U
Magnesium (mg/L)	-	-	1110	
Nickel	≤ 8.3	-	1	I
Selenium	≤ 71	-	0.8	U
Silver	≤ 2.3	-	0.1	U
Zinc	≤ 86	-	15	U
Nutrients (mg/L)				
Ortho-phosphate	-	-	0.13	F
Total Phosphorus	-	-	0.18	
Total Ammonia	-	-	0.054	
Un-ionized Ammonia	-	-	0.01	c
Nitrate and Nitrite	-	-	0.004	U
Total Kjeldahl Nitrogen	-	-	0.84	
Organic Nitrogen	-	-	0.786	c
Total Nitrogen	-	-	0.842	c
General Physical and Chemical Parameters				
Dissolved Oxygen (mg/L)	≥ 4.0	≥ 4.0 i	4.3	
pH (SU)	6.5 - 8.5	6.5 - 8.5	7.9	
Conductivity (µmhos/cm)	-	-	47,000	
Temperature (°C)	-	42.78 i	38.5	
Salinity	-	-	30.4	£
Sample Depth (m)	-	-	0.2	
Total Residual Chlorine (mg/L)	≤ 0.01	-	≤ 0.03	£
Chlorophyll *a* (µg/L) - Corrected	-	-	3	
Phaeophytin (µg/L)	-	-	1.3	
Total Suspended Solids (mg/L)	-	-	7	I
CBOD, 5 day (mg/L), N - inhibited	-	-	1.4	I
Oils and Greases (mg/L)	≤ 5.0	-	1.4	U
Alpha, Total (pCi/L)	≤ 15	-	2.1	
Alpha-Counting Error (pCi/L)	-	-	1.5	
Radium 226 (pCi/L)	-	-	1	
Radium 226-Counting Error (pCi/L)	-	-	0.2	
Radium 228 (pCi/L)	-	-	0.9	U
Radium 228-Counting Error (pCi/L)	-	-	0.6	
Radium 226 + 228 (pCi/L)	≤ 5	-	1	c
Flow (MGD)	-	Report	1121.01	a
Hardness (mg $CaCO_3$)	-	-	5477.39	c

Value exceeds the Class III Water Quality Criteria or permit limits

a - Annual average

c - Value is calculated

i - Instantateous Maximum

F - Analyte was detected in both sample and field blank

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit

U - Material analyzed for but not detected; value reported is the method detection limit

£ - Measured in Central labs and entered into Tox sheets

Appendix A. Chain of Custody Form

Florida Department of Environmental Protection

Central Laboratory Sample Submittal Form

Event ID *

Request Number: RQ-2009-06-15-39
TECO - Big Bend Power Plant

Requester: Jennifer Paris

Field Report Prepared By:

Customer: SW-DIST

Collected By: P WENNER, J COHEN

Send Final Report To: Ilia Balcom

Project ID: FYI3

Sampling Agency: FDEP SWD

PMAS: 1143

Lab ID *	Location	Field ID	Matrix (Include type e.g. Salt, Fresh, etc)	Temp (C)	pH	Latitude	Longitude	Comp/Grab	Collection (begin)	Tot Res Chlorine (mg/L)	Diss Oxygen (mg/L)	Sample Depth	Salinity (PPTh) / Sp Conductance (umho/cm)	Collection (end)	Storet Station Number	NPDES Number	Comments	Bottle Group(s)**
37693	D001		SALT	38.50	7.94	N 27 47 36.0	W 82 24 49.7	Grab ✓	Date 6/15/09 Time 1020 (Eastern)		4.32	0.2 m ✓	30.00 / 47,000 (Salinity ✓, Sp Conductance ✓)					A
37694	FIELD BLANK		DI WATER					Grab ✓	Date 6/15/09 Time 1220 (Eastern)									B
																	2 bioassay Recd by JD in TOX 10:18 6.16.09	

Relinquished By:	Date/Time	Shipping Method:	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	6/15/09 1300	FED EX	ABJ	6-16-09 09:30				

* Shaded Areas for Lab use only.

** Please see reverse side for Bottle Group information.

last revised October 1, 2003

Page 1 of 3

Appendix B. Bench Sheets

FDEP Biology Laboratory - Acute Screen Bioassay Bench Sheets

Facility: Teco - Big Bend Power Plant

Address: Big Bend Road

City: North Ruskin County: Hillsborough

Contact/District: Peter Wenner - Jason Cohen / Southwest

NPDES Permit #: FL 0000817

LIMS Job #: TLH-2009-06-16-35 LIMS Sample #: 1194619

Lims Data Entry: 7-1-09 MF Data Entry Verification: 7-2-09 BA

Sample Collection: Date: 6-15-09 Time: 1030

Hold Time Start: Date: 6-15-09 Time: 1030

Comments:

Instructions (for below): Circle appropriate wording. If yes is circled, complete blanks.

Test Type: (Screen) (Static) / Static Renewal / Flow-through

Test Duration: (48) 96 Hours.

Test 1 validation: Test 1: SOP TA 07_03
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

Test 2 validation: Test 2: SOP TA 07_04
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

(√one)
Test 1 incubated in: [√] Incubator #: 2 [ ] Waterbath #:____
Test 2 incubated in: [√] Incubator #: 2 [ ] Waterbath #:____

Initial sample handling:

PH adjustment: yes (no) Initial pH: ____ NaOH N HCl N ____ Drops mL Final pH: ____

Aeration: yes (no) Initial DO: ____ mg/L Final DO: ____ mg/L Duration: ____ minutes Rate: ~ ____ bubbles/min

Salinity adjusted (Test 1): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine

Salinity adjusted (Test 2): yes (no) Initial Salinity: ____ Final Salinity: ____ Salts Hypersaline brine

Dechlorination: yes (no) ____ mL of 0.025N Sodium Thiosulfate per liter of sample. Final TRC: ____

Light Intensity: 50 - 100 ft. candles
Photoperiod: 16 light 8 dark
Temperature Range °C: (If used)
Incubator # 2 min 26.0 max 26.6 mean 26.3
Incubator # ____ min.____ max.____ mean____
Waterbath # ____ min.____ max.____ mean____
Room B246 min 25.0 max 25.5 mean 25.3

Sample Validation:

Temperature: Shipped ≤6°C (Yes) ~~No~~ — IF Hand Delivered: Cooling (received °C < collected °C) Yes No wrong [illegible] MF for JD 6-16-09

Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Batch #

Water Quality Parameters	20% DMW	Well Water	Moderately Hard Water	Salt Water (ASW) NSW Test 1 (6-15-09)	Salt Water (ASW) NSW Test 2 (6-16-09)	Other:	Original Sample	Measured by	Verified by
Field Total Residual Cl_2 (mg/L):	N/A	N/A	N/A	N/A	N/A		Not measured		MF
Lab Total Residual Cl_2 (mg/L):				<0.03	<0.03		<0.03	AGR	JD
Alkalinity (mg/L as $CaCO_3$):				~~235~~ 219	~~235~~ 219		135	AGR	JD
Hardness (mg/L as $CaCO_3$):				– transcription error		[illegible]	–	–	–
Total Ammonia (mg/L as N):				<0.034	<0.034		<0.034	BA	DD
Conductivity: µmhos (mmhos)				45.3	45.3		46.7	JD	MF
Salinity (ppth):				29.2	29.1		30.4	JD	MF

Investigators' Signatures
James Daniels
Amelia Rankin
Marshall Frindeth
Bruce Alcorn

Loretta C. Wolfe
REVIEWER

V 1.6 7/8/08

Page 100000

Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1194619 Test #: 1/2 SOP#:TA 07 03 Test Started: Date 6.16.09 Time: 1200

Organism/Batch/Age: A.bahia / 6.16.09 / 40days Test Ended: Date 6-18-09 Time: 1330

Chamber/Test Volume: 350 / 250 ml Diluent/ Batch: ASW / 6.1.09 Test Duration: (48) hr 96 hr

Food/Batch: [ ] YCT____ [ ] P.sub____

[X] Artemia Lot# 38138 Batch #: 0hr 79.09 24hr 80.09 48hr____ 72hr____

Feeding: [X] Prior to Test [ ] Prior to Renewal [X] 0 hr [X] 24 hr [X] 48 hr [ ] 72 hr

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Ctrl	A	Tox 9	5	5	5			
	B	Tox 10	5	5	5			
	C	Tox 11	5	5	5			
	D	Tox 12	5	5	5			
100%	A	Tox 13	5	5	5			
	B	Tox 14	5	5	5			
	C	Tox 15	5	5	5			
	D	Tox 17	5	5	5			
Loaded/Verified by: JP / BA		Checked by:	HF	BA	mF			

m = missing d = dead BR/AR = Before/After Renewal

Comments:

Test Results:

Screening Tests: Report LC50 as >100%, =100%, or <100%.

% mortality in 100% sample: 0 LC50: >100%

If Calculated: 95% CI______ Method______

V 2.3 7/15/2008

Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

Page 000002

Appendix B. (continued)

FDEP Biology Laboratory - Bioassay Survival Bench Sheet

LIMS Sample #: 1194619 Test #: 2/2 SOP#:TA 07 04 Test Started: Date 61609 Time: 1200
Organism/Batch/Age: M.beryllina / 61609 / 13day 5 Test Ended: Date 6-18-09 Time: 1340
Chamber/Test Volume: 1000 / 500 ml Diluent/ Batch: ASW / 6.1.09 Test Duration: 48 hr 96 hr
Food/Batch: [ ] YCT [ ] P.sub
[X] Artemia Lot# 35138 Batch #: 0hr 79-09 24hr 48hr 72hr
Feeding: [X] Prior to Test [ ] Prior to Renewal [X] 0 hr [ ] 24 hr [ ] 48 hr [ ] 72 hr

Concentration	Replicate	Chamber #	0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Crnl	A	A1	5	5	5			
	B	A2	5	5	5			
	C	A7	5	5	5			
	D	A4	5	5	5			
100 %	A	A5	5	4 1D	5 4 (A) mf			
	B	A6	5	5	5			
	C	A3	5	4 1D	5 4 (A) mf			
	D	A8	5	5	5			

Loaded/Verified by: JD / BD Checked by: mf BA mF
m = missing d = dead BR/AR = Before/After Renewal
Comments: (A) entered mysid 48 hr data in wrong place, MF 6-18-09

Test Results:
Screening Tests: Report LC50 as >100%, =100%, or <100%.
% mortality in 100% sample: 10% LC50: >100
If Calculated: 95% CI ______ Method ______

V 2.3 7/15/2008

Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

Page 000003

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1194619 Test #: 1 of 2

TEST SOP #: TA07_03 Test Species: ☐ *Ceriodaphnia dubia* ☐ *Cyprinella leedsi* ☐ *Pimephales promelas*

Test aerated: yes (no) (circle one) Check 1: ☑ *Americamysis bahia* ☐ *Menidia beryllina* ☐ Other:_____

Concentration Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	8.6	8.5	8.2			
Temperature °C	25.0	24.0	24.9			
Dissolved Oxygen mg/L aerate if < 4	6.6	5.6 (A) ~~6.0~~	4.4			
Conductivity µmhos (mmhos)	45.3	45.9	47.4			
Salinity ppth	29.2	29.1	31.0			
(initials) Measured by:	~~TS~~	AOK	MF			
(initials) Recorded by:	~~TS~~	AOK	MF			

Comments: (A) had to re-read DO on correct salinity AOK 6.17.09

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	8.2	8.1	7.8			
Temperature °C	25.5	24.9	24.8			
Dissolved Oxygen mg/L aerate if < 4	6.8	~~6.3~~ 5.9 (A)	4.1			
Conductivity µmhos (mmhos)	46.7	46.5	47.8			
Salinity ppth	30.3	30.0	31.3			
(initials) Measured by:	~~TS~~	AOK	MF			
(initials) Recorded by:	~~TS~~	AOK	MF			

Comments: (A) See comment to left AOK 6.17.09

Salinity only needs measuring if saltwater.

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L aerate if < 4						
Conductivity µmhos mmhos						
Salinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L aerate if < 4						
Conductivity µmhos mmhos						
Salinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

FDEP Biology Laboratory - Bioassay Parameter Bench Sheet

LIMS Sample # : 1194619 Test #: 2 of 2

TEST SOP #: TA07_04_ Test Species: ☐ *Ceriodaphnia dubia* ☐ *Cyprinella leedsi* ☐ *Pimephales promelas*

Test aerated: yes no (circle one) Check 1: ☐ *Americamysis bahia* ☑ *Menidia beryllina* ☐ Other:_____

Concentration 6.1	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	8.6	8.5	8.4			
Temperature °C	24.9	25.3	24.7			
Dissolved Oxygen mg/L aerate if < 4	6.8	6.5	6.0			
Conductivity µmhos (mmhos)	45.3	45.7	46.5			
Salinity ppth	29.1	29.1	30.2			
(initials) Measured by:	~~JS~~	TRK	MF			
(initials) Recorded by:	~~JS~~	TRK	MF			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C			
pH (S.U.)	8.2	8.2	8.1			
Temperature °C	25.2	25.2	24.7			
Dissolved Oxygen mg/L aerate if < 4	6.8	6.7	5.4			
Conductivity µmhos (mmhos)	47.1	46.3	47.7			
Salinity ppth	30.4	30.0	31.3			
(initials) Measured by:	~~JS~~	TRK	MF			
(initials) Recorded by:	~~JS~~	TRK	MF			

Comments:

Salinity only needs measuring if saltwater.

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L aerate if < 4						
Conductivity µmhos mmhos						
Salinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L aerate if < 4						
Conductivity µmhos mmhos						
Salinity ppth						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

000005

Appendix B. (continued)

Bioassay Instrument ID

Test ID: TECO – Big Bend Power Plant   Dates: 6-16-09 – 6-18-09

METER / DEVICE	ID	SOP	Parameter	Method	√used
YSI Model 58 Dissolved Oxygen Meter	90H018262	TA06_04	Dissolved Oxygen	SM 4500 O G	✓
Accumet AR-10 pH Meter	93312105	TA06_23	pH	SM 4500 H+	✓
Mettler-Toledo SevenMulti Conductivity Meter	SN 1225117049 Probe H04257	TA06_25	Conductivity	SM 2510 B	✓
			Salinity	SM 2520 B	✓
Denver Model 225 ISE with ammonia probe	SN K01377	TA06_17	Ammonia	SM 4500 NH3 F	✓
Thermometer (DO probe)	YSI 5750 SN 05J1720	TA06_05	Temperature	SM-2530B modified DEP SOP-001/01 FT1400	✓
Hach Pocket Colorimeter II	05050C026378	TA06_22	Total Residual Chlorine	EPA 330.5 SM 4500 CL G	✓
Alkalinity (Hach Kit)	No SN	TA06_08	Alkalinity	SM 2320 B	✓
Hardness (Hach Kit)	No SN	TA06_09	Hardness	SM 2340 C	NA
OHAUS Balance 250D	1125481084	TA06_21 TA06_27	Weight	-	NA
S-Weights	BIO-S-WEIGHTS-01	NA	Balance check	-	NA

SM-2530B modified to allow use of electronic and non-mercury filled thermometers.
Insert other device information in blank spaces(if used).   Test ID = Facility or SRTs (acute SRT--Chronic SRT)

entered by M Fairclath 7-2-09

V 1.1 6/12/08 MF

000006

PAGE

Appendix C. SRT Bench Sheets and Statistical Analysis

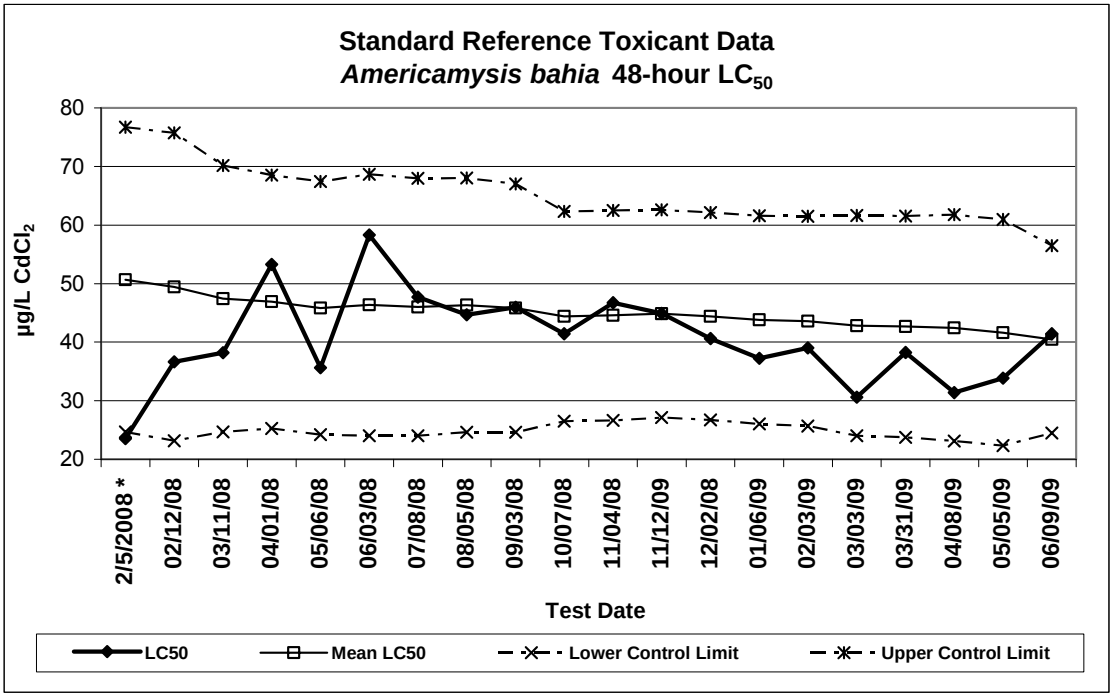
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - 48-hour Acute Toxicity
Americamysis bahia (mysid shrimp) - Cadmium Chloride ($CdCl_2$)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
2/5/2008 *	23.52	50.68	13.02	24.64	76.72
02/12/08	36.63	49.45	13.14	23.17	75.74
03/11/08	38.21	47.42	11.38	24.66	70.19
04/01/08	53.27	46.90	10.82	25.26	68.53
05/06/08	35.65	45.82	10.81	24.19	67.45
06/03/08	58.28	46.36	11.17	24.03	68.69
07/08/08	47.67	46.00	10.99	24.02	67.98
08/05/08	44.68	46.32	10.84	24.63	68.01
09/03/08	45.94	45.82	10.60	24.62	67.02
10/07/08	41.43	44.39	8.96	26.47	62.30
11/04/08	46.75	44.58	8.97	26.64	62.51
11/12/09	44.92	44.87	8.87	27.13	62.61
12/02/08	40.59	44.42	8.84	26.73	62.11
01/06/09	37.22	43.80	8.89	26.01	61.59
02/03/09	39.02	43.57	8.96	25.66	61.49
03/03/09	30.58	42.81	9.40	24.02	61.61
03/31/09	38.24	42.65	9.45	23.76	61.55
04/08/09	31.38	42.44	9.66	23.12	61.76
05/05/09	33.86	41.62	9.66	22.31	60.93
06/09/09	41.42	40.46	8.00	24.47	56.45

Lower Confidence Limit = mean - 2 * Std Dev
Upper Confidence Limit = mean + 2 * Std Dev

CV = 19.76
EPA reference 75th quartile CV = 26%



Appendix C. (continued)

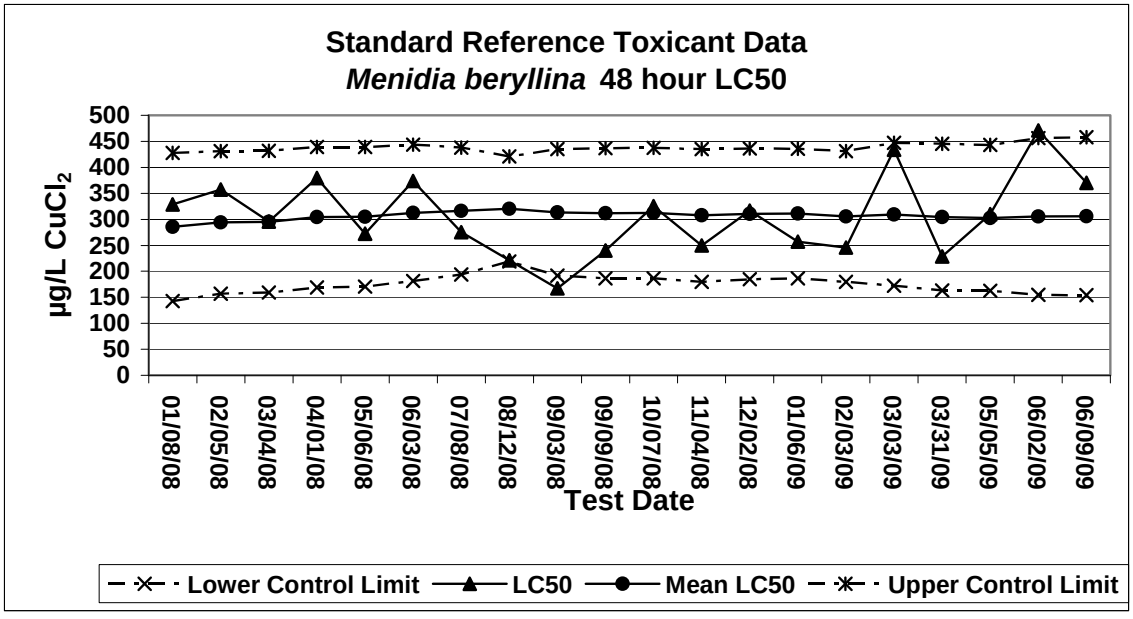
Florida Department of Environmental Protection
Bureau of Laboratories

Standard Reference Toxicant (SRT) Test Data - Acute Toxicity
Menidia beryllina (Inland silverside) - Copper Chloride ($CuCl_2$)

Date	LC50	Mean LC50	Std Dev	Lower Control Limit	Upper Control Limit
01/08/08	329.03	285.29	71.1	143.0	427.5
02/05/08	357.47	294.07	68.5	157.1	431.0
03/04/08	295.52	295.31	68.1	159.3	431.9
04/01/08	379.50	304.05	67.5	169.0	439.1
05/06/08	272.50	304.73	67.1	170.5	438.9
06/03/08	373.47	312.52	65.5	181.5	443.5
07/08/08	275.20	316.13	61.0	194.2	438.1
08/12/08	221.17	320.17	50.5	219.2	421.1
09/03/08	167.46	313.48	60.9	191.7	435.3
09/09/08	240.07	311.58	62.6	186.3	436.9
10/07/08	325.55	312.05	62.7	186.6	437.5
11/04/08	249.81	307.63	63.9	179.9	435.4
12/02/08	316.79	310.59	62.8	185.0	436.2
01/06/09	257.04	311.08	62.3	186.5	435.7
02/03/09	245.51	305.47	62.9	179.6	431.4
03/03/09	433.98	309.64	68.6	172.5	446.8
03/31/09	228.94	304.17	70.5	163.1	445.2
05/05/09	310.12	302.74	70.1	162.6	442.9
06/02/09	471.25	305.32	75.4	154.6	456.0
06/09/09	370.27	306.03	75.9	154.2	457.9

Means are of the last 20 SRT tests.

EPA reference 75th quartile CV = 21% **CV = 24.81**



Appendix C. (continued)

[redacted]

FDEP Biology Laboratory - Acute SRT Bench Sheet

Method from EPA-821-R-02-012 except *H. azteca*

Test Organism: (check one)
[X] *Americamysis bahia* Method 2007.0 TA07.03 [ ] *Menidia Beryllina* Method 2006.0 TA07.04 [ ] *Hyalella azteca* Method 100.1 EPA-600-R-99-064
[ ] *Ceriodaphnia dubia* Method 2002.0 TA07.01 [ ] *Cyprinella leedsi* Method 2000.0 TA07.02 [ ] *Pimephales promelas* Method 2000.0 TA07.02

Test Type: [ ] non-renewal [X] renewal
Test Page 1 of 2

Diluent/ Batch #: ASW / 6.1.09
Toxicant/ Batch#: CdCl2 / 6.9.09
Organism Batch: 6.9.09 Age: 5 days
Test Beginning: Date: 6.9.09 Time: 1200
Test Ending: Date: 6.13.09 Time: 10:30

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<.003	TA06_22	[illegible]
Alkalinity (mg/L as $CaCO_3$):	235	TA06_08	BA
Hardness (mg.L as $CaCO_3$):	–	TA06_09	–
Total Ammonia (mg/L as N):	<0.037	TA06_17	MF
Conductivity: µmhos (mmhos circled)	32.2	TA06_25	JD
Salinity (ppth):	20.1	TA06_25	JD

Food:		Batch
[ ]	YCT	
[ ]	*P. subcapitata*	
[✓]	Artemia Lot # 38438	

Artemia Batch:
0 hr: 75-09
24 hr: 76-09
48 hr: 77-09
72 hr: 78-09

Chamber size: 350 mL
Test volume: 250 mL per replicate

Concentrations prepared by: JD
Temperature Range °C:(if used)
Test Incubated in: Incubator # 2 Waterbath # NA
Incubator # 2 min 25.9 max 26.6 mean 26.4
Light Intensity: 50-100 Ft. candles
Waterbath # ___ min ___ max ___ mean ___
Photoperiod: 16 hours Light / 8 hours dark
Room B246 min 24.8 max 25.7 mean 25.3

Feeding: √as needed	
✓	Before test
✓	0 hr
✓	24 hr
✓	48 hr
✓	72 hr
	all species 2 hrs prior to test
	mysids daily
	all species except *H. azteca* 2 hr prior to renewal
	H. azteca 0 hr and 48 hr

Concentration (µg/L circled) mg/L g/L	Replicate	Chamber #	Test Hour: 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	A	Tox 1	5	5	5	5	5	5
	B	Tox 2	5	5	5	5	5	5
	C	Tox 3	5	5	5	5	5	5
	D	Tox 4	5	5	5	5	5	5
20	A	Tox 5	5	5	5	5	5	4 1D
	B	Tox 6	5	5	5	5	5	4 1D
	C	Tox 7	5	5	5	5	4 1D	2 2D
	D	Tox 8	5	5	5	5	5	5
30	A	Tox 9	5	5	5	5	0 5D	–
	B	Tox 10	5	5	3 2D	3	0 3D	–
	C	Tox 11	5	5	5	5	0 5D	–
	D	Tox 12	5	5	5	5	5	0 5D
45	A	Tox 13	5	5	2 3D	0 2D	0 2D	–
	B	Tox 14	5	5	0 5D	–	–	–
	C	Tox 15	5	5	1 4D	0 1D	0 1D	–
	D	Tox 16	5	5	3 2D	1 2D	1 2D	0 1D
67	A	Tox 17	5	5	0 5D	–	–	–
	B	Tox 18	5	5	0 5D	–	–	–
	C	Tox 19	5	5	1 4D	0 1D	0 1D	–
	D	Tox 20	5	5	1 4D	0 1D	0 1D	–
100	A	Tox 21	5	4 1D	0 4D	–	–	–
	B	Tox 22	5	5	0 5D	–	–	–
	C	Tox 23	5	5	0 5D	–	–	–
	D	Tox 24	5	5	0 5D	–	–	–
Organisms loaded by: JD		Checked by:	BA	JD	JD	JD	JD	BA

Loading Verified by: BA
AR = after renewal
m = missing d = dead BR = before renewal hr = hour

H. azteca		
0 hr	Alk	Hrd
Well		
100%		
96 hr	Alk	Hrd
Well		
100%		

Comments: Repeat of 6-2-09 test

Investigators' Signatures
Bud Alexander
Jorge David
Amelia Rankin
Marshall Fairclath

Reviewer: Loretta Wolfe

Method: TSK

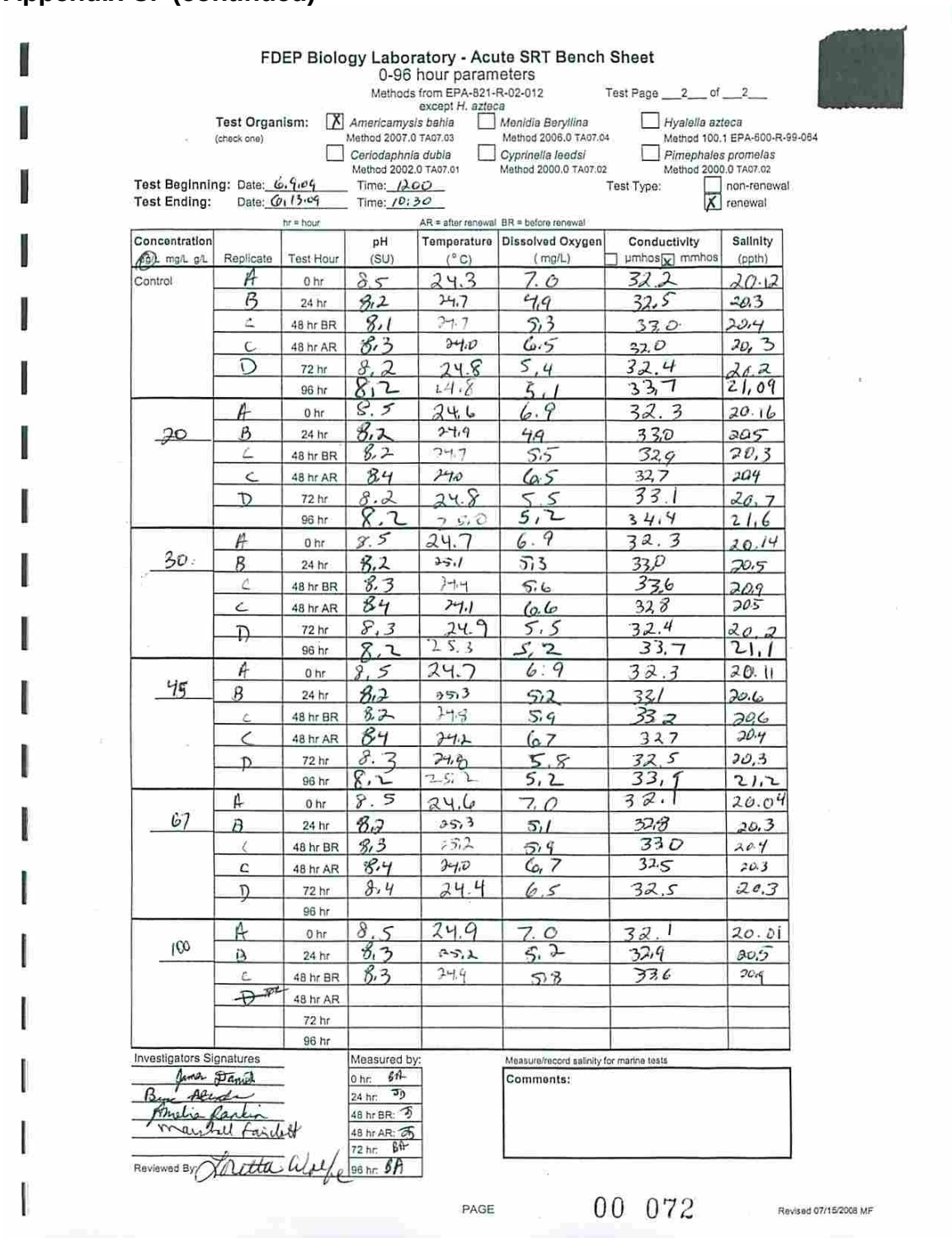
Statistics: LC50		95% confidence intervals Lower	Upper
48 hour:	41.42	37.02	46.35
96 hour:	22.89	unreliable	unreliable

00 071

PAGE

Revised 7/15/2008 mf

Appendix C. (continued)



FDEP Biology Laboratory - Acute SRT Bench Sheet
0-96 hour parameters

Methods from EPA-821-R-02-012 except *H. azteca*

Test Page 2 of 2

Test Organism: (check one)
- [X] *Americamysis bahia* Method 2007.0 TA07.03
- [ ] *Menidia Beryllina* Method 2006.0 TA07.04
- [ ] *Hyalella azteca* Method 100.1 EPA-600-R-99-064
- [ ] *Ceriodaphnia dubia* Method 2002.0 TA07.01
- [ ] *Cyprinella leedsi* Method 2000.0 TA07.02
- [ ] *Pimephales promelas* Method 2000.0 TA07.02

Test Beginning: Date: 6.9.09 Time: 1200
Test Ending: Date: 6.13.09 Time: 10:30

Test Type: [ ] non-renewal [X] renewal

hr = hour AR = after renewal BR = before renewal

Concentration (mg/L g/L)	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity [ ] µmhos [X] mmhos	Salinity (ppth)
Control	A	0 hr	8.5	24.3	7.0	32.2	20.12
	B	24 hr	8.2	24.7	4.9	32.5	20.3
	C	48 hr BR	8.1	24.7	5.3	33.0	20.4
	C	48 hr AR	8.3	24.0	6.5	32.0	20.3
	D	72 hr	8.2	24.8	5.4	32.4	20.2
		96 hr	8.2	24.8	5.1	33.7	21.09
20	A	0 hr	8.5	24.6	6.9	32.3	20.16
	B	24 hr	8.2	24.9	4.9	33.0	20.5
	C	48 hr BR	8.2	24.7	5.5	32.9	20.3
	C	48 hr AR	8.4	24.0	6.5	32.7	20.4
	D	72 hr	8.2	24.8	5.5	33.1	20.7
		96 hr	8.2	25.0	5.2	34.4	21.6
30	A	0 hr	8.5	24.7	6.9	32.3	20.14
	B	24 hr	8.2	25.1	5.3	33.0	20.5
	C	48 hr BR	8.3	24.4	5.6	33.6	20.9
	C	48 hr AR	8.4	24.1	6.6	32.8	20.5
	D	72 hr	8.3	24.9	5.5	32.4	20.2
		96 hr	8.2	25.3	5.2	33.7	21.1
45	A	0 hr	8.5	24.7	6.9	32.3	20.11
	B	24 hr	8.2	25.3	5.2	33.1	20.6
	C	48 hr BR	8.2	24.8	5.9	33.2	20.6
	C	48 hr AR	8.4	24.2	6.7	32.7	20.4
	D	72 hr	8.3	24.8	5.8	32.5	20.3
		96 hr	8.2	25.2	5.2	33.1	21.2
67	A	0 hr	8.5	24.6	7.0	32.1	20.04
	B	24 hr	8.2	25.3	5.1	32.8	20.3
	C	48 hr BR	8.3	25.2	5.9	33.0	20.4
	C	48 hr AR	8.4	24.0	6.7	32.5	20.3
	D	72 hr	8.4	24.4	6.5	32.5	20.3
		96 hr					
100	A	0 hr	8.5	24.9	7.0	32.1	20.01
	B	24 hr	8.3	25.2	5.2	32.9	20.5
	C	48 hr BR	8.3	24.9	5.8	33.6	20.9
	~~D~~	48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures

Measured by:
0 hr: BA
24 hr: JD
48 hr BR: JD
48 hr AR: JD
72 hr: BA
96 hr: BA

Reviewed By:

Measure/record salinity for marine tests

Comments:

PAGE 00 072

Revised 07/15/2008 MF

Appendix C. (continued)

FDEP Biology Laboratory - Acute SRT Bench Sheet

Method from EPA-821-R-02-012 except *H. azteca*

..st Organism: (check one)

- [ ] *Americamysis bahia* — Method 2007.0 TA07.03
- [X] *Menidia Beryllina* — Method 2006.0 TA07.04
- [ ] *Hyalella azteca* — Method 100.1 EPA-600-R-99-064
- [ ] *Ceriodaphnia dubia* — Method 2002.0 TA07.01
- [ ] *Cyprinella leedsi* — Method 2000.0 TA07.02
- [ ] *Pimephales promelas* — Method 2000.0 TA07.02

Test Type: [ ] non-renewal [X] renewal

Test Page 1 of 2

Diluent/ Batch #: ASW / 6.1.09
Toxicant/ Batch#: CdCl2 / 6.4.09
Organism Batch: 6.9.09 Age: 13 days
Test Beginning: Date: 6.9.09 Time: 1215
Test Ending: Date: 6.13.09 Time: 10:45

Water Quality Parameters:	Diluent	SOP	Initials
Total Residual Cl_2 (mg/L):	<0.03	TA06_22	[illegible]
Alkalinity (mg/L as $CaCO_3$):	235	TA06_08	BA
Hardness (mg.L as $CaCO_3$):	—	TA06_09	-
Total Ammonia (mg/L as N):	<0.034	TA06_17	MP
Conductivity: µmhos mmhos (circled)	32.1	TA06_25	[illegible]
Salinity (ppth):	20.0	TA06_25	[illegible]

Food:	Batch
[ ] YCT	
[ ] *P. subcapitata*	
[✓] Artemia Lot #	38438

Artemia Batch:
0 hr: 75-09
24 hr:
48 hr: 77-09
72 hr:

Chamber size: 1000 mL
Test volume: 500 mL per replicate

Concentrations prepared by: [illegible]
Temperature Range °C:(if used)
Test Incubated in: Incubator # 2 Waterbath # N/A Incubator # 2 min. 25.9 max. 26.6 mean 26.4
Light Intensity: 50-100 Ft. candles Waterbath # ___ min. ___ max. ___ mean ___
Photoperiod: 16 hours Light / 8 hours dark Room B246 min. 24.8 max. 25.7 mean 25.3

Feeding: √as needed
- [✓] Before test
- [✓] 0 hr
- [ ] 24 hr
- [✓] 48 hr
- [ ] 72 hr

all species 2 hrs prior to test
mysids daily
all species except *H. azteca* 2 hr prior to renewal
H. azteca 0 hr and 48 hr

H. azteca		
0 hr	Alk	Hrd
Well		
100%		
96 hr	Alk	Hrd
Well		
100%		

Concentration (µg/L circled; mg/L crossed out) g/L	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
Control	A	F 13	10	10	10	10	10	10
	B	F 14	10	10	10	10	10	10
100	A	F15	10	10	10	10	10	10
	B	F16	10	10	10	10	10	10
	+							
200	A	F17	10	10	10	10	10	10
	B	F18	10	10	10	10	10	9 1D
300	A	F19	10	8 2D	7 1D	7	7	7
	B	F20	10	8 2D	8	8	8	8
400	A	F21	10	7 3D	6 1D	6	6	6
	B	F22	10	6 4D	6	6	6	5 1D
500	A	F23	10	0 10D	—	—	—	—
	B	F24	10	0 10D	—	—	—	—
Organisms loaded by: [illegible]		Checked by:	BA	[illegible]	[illegible]	[illegible]	[illegible]	BA

Loading Verified by: BA
AR = after renewal
m = missing d = dead BR = before renewal hr = hour

Comments: Retest of 6-2-09

Investigators' Signatures
Bruce Alexander
James Daniels
Amelia Parker
Marshall Fairclath

Reviewer: Loretta Wolfe

Method: TSK

Statistics: LC50		95% confidence intervals Lower	Upper
48 hour:	370.27	339.29	404.08
96 hour:	355.67	320.87	394.24

PAGE 00 069

Revised 7/15/2008 mf

Appendix C. (continued)

FDEP Biology Laboratory - Acute SRT Bench Sheet
0-96 hour parameters

Methods from EPA-821-R-02-012 except *H. azteca*

Test Page 2 of 2

Test Organism: (check one)
- [ ] *Americamysis bahia* Method 2007.0 TA07.03
- [X] *Menidia Beryllina* Method 2006.0 TA07.04
- [ ] *Hyalella azteca* Method 100.1 EPA-600-R-99-064
- [ ] *Ceriodaphnia dubia* Method 2002.0 TA07.01
- [ ] *Cyprinella leedsi* Method 2000.0 TA07.02
- [ ] *Pimephales promelas* Method 2000.0 TA07.02

Test Beginning: Date: 6.9.09 Time: ~~12.75~~ JD 12:15
Test Ending: Date: 6.13.09 Time: 10:45

Test Type: [ ] non-renewal [X] renewal

hr = hour AR = after renewal BR = before renewal

Concentration (µg/L)	Replicate	Test Hour	pH (SU)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (mmhos)	Salinity (ppth)
Control	A	0 hr	8.5	24.4	6.8	~~80~~ (A) 32.1	20.01
	B	24 hr	8.3	25.2	5.3	32.4	20.3
	A	48 hr BR	8.3	25.5	6.2	33.1	20.4
	A	48 hr AR	8.4	24.0	6.8	31.8	20.1
	B	72 hr	8.4	25.3	6.8	32.5	20.1
	A	96 hr	8.2	25.2	6.2	33.6	21.0
100	A	0 hr	8.5	24.5	6.8	~~80~~ (A) 32.2	20.13
	B	24 hr	8.3	25.0	5.6	32.7	20.4
	A	48 hr BR	8.3	25.5	6.0	33.0	20.4
	A	48 hr AR	8.4	24.1	6.8	32.5	20.3
	B	72 hr	8.3	25.2	6.6	32.4	20.2
	A	96 hr	8.3	25.3	6.0	33.7	21.1
200	A	0 hr	8.5	24.5	6.9	~~80~~ (A) 32.1	20.12
	B	24 hr	8.3	25.0	5.8	32.8	20.5
	A	48 hr BR	8.3	25.3	6.0	33.2	20.5
	A	48 hr AR	8.4	24.0	6.7	32.5	20.3
	B	72 hr	8.3	25.1	6.7	32.3	20.2
	A	96 hr	8.2	25.2	5.9	33.8	21.1
300	A	0 hr	8.5	24.6	~~6.8~~ 6.8 BA	32.2	20.07
	B	24 hr	8.3	25.0	5.7	32.4	20.2
	A	48 hr BR	8.3	25.6	6.1	32.9	20.3
	A	48 hr AR	8.4	24.0	6.7	32.4	20.2
	B	72 hr	8.3	25.2	6.4	32.1	20.1
	A	96 hr	8.2	25.1	5.8	33.8	21.2
400	A	0 hr	8.5	24.7	6.8	32.2	20.01
	B	24 hr	8.3	25.3	5.8	32.6	20.4
	A	48 hr BR	8.3	25.5	6.0	32.8	20.3
	A	48 hr AR	8.3	24.0	6.7	32.0	20.0
	B	72 hr	8.3	25.2	6.3	32.0	19.9
	A	96 hr	8.2	25.2	5.8	33.4	20.9
500	A	0 hr	8.5	24.7	6.9	32.1	20.06
	B	24 hr	8.3	25.2	5.7	32.3	20.1
		48 hr BR				~~32.0~~ JD	~~20.1~~ JD
		48 hr AR					
		72 hr					
		96 hr					

Investigators Signatures: James David, Buel Alexander, Amelia Rankin, Marshall Fairchild

Measured by: 0 hr: BA; 24 hr: JD; 48 hr BR: JD; 48 hr AR: JD; 72 hr: BA; 96 hr: BA

Measure/record salinity for marine tests

Comments: (A) transcription error 6-09-09 [illegible]

Reviewed By: Loretta Wolfe

PAGE 00 070

Revised 07/15/2008 MF

Appendix C. (continued)

***Americamysis bahia* Acute Standard Reference Toxicant Test**

DATE: 6-9-09 DURATION: 48 hr TOXICANT: CdCl2
SPECIES: *Americamysis bahia*

RAW DATA: Concentration (ug/L)	Number Exposed	Mortalities
0.00	20	0
20.00	20	0
30.00	20	2
45.00	20	14
67.00	20	18
100.00	20	20

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: **41.42**
95% LOWER CONFIDENCE: 37.02
95% UPPER CONFIDENCE: 46.35

***Menidia beryllina* Acute Standard Reference Toxicant Test**

DATE: 6-9-09 DURATION: 48 hr TOXICANT: CuCl2
SPECIES: *Menidia beryllina*

RAW DATA: Concentration (ug/l)	Number Exposed	Mortalities
0.00	20	0
100.00	20	0
200.00	20	0
300.00	20	5
400.00	20	8
500.00	20	20

SPEARMAN-KARBER TRIM: .00%

SPEARMAN-KARBER ESTIMATES: LC50: **370.27**
95% LOWER CONFIDENCE: 339.29
95% UPPER CONFIDENCE: 404.08

Appendix D. Test Organism Receipts

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Organism Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Date: 6/8/09

Shipped to: FDEP

P.O. No: _____

Species	Quantity	Age	Brood Number	Temp.	pH	Salinity
Mysidopsis bahia	150+	4DAYS	MS090604	25°C	7.9 s.u	20‰
Menidia beryllina	150+	12DAYS	SS090527	25°C	7.9 s.u	20‰
						Hardness
Cyprinella leedsi						
Pimephales promelas						

Packed by: [signature]

Shipped Via: Fed Ex

Notes: _____

Thank you for your order.

4569 Samuel Street · Sarasota, FL 34233 · Tel: 941-925-3594 · Fax: 941-922-3874 · Web: www.biologylab.com

Appendix D. (continued)

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

NELAP Certification # E84191

Organism Shipment Record

State of Florida Aquaculture Certificate Number AQ0668007

Date: 6/15/09

Shipped to: FL DEP

P.O. No:

Species	Quantity	Age	Brood Number	Temp.	pH	Salinity
Mysidopsis bahia	100	3~~0~~ DAYS	MS090612	25°C	7.9 S.U	20‰
Menidia beryllina	100	12 DAYS	MS090603	25°C	7.9 S.U	20‰
						Hardness
Cyprinella leedsi	100	12 DAYS	CL090603	25°C	7.8 S.U	80mg/L
Pimephales promelas	350	<24 HRS	FM090614-1700	25°C	7.8 S.U	80mg/L

Packed by:

Shipped Via: FedEx

Notes:

Thank you for your order.

4569 Samuel Street · Sarasota, FL 34233 · Tel: 941-925-3594 · Fax: 941-922-3874 · Web: www.biologylab.com

Appendix E. Chemical Analyses performed on the effluent from Tampa Electric Company Big Bend Power Station Outfall D-001, sampled on June 15, 2009.

Date Sampled	Field ID	Analysis Group	Components	Result	Remarks	Units	MDL	PQL
6/15/2009 10:30	37693	AGP/LN	Algal Growth Potential	3	U	mg DryWt/L	3	3
6/15/2009 10:30	37693	Chlorophyll/Grain Size/BOD	Chlorophyll-a, Corrected	3		ug/L	0.55	1.7
6/15/2009 10:30	37693	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	1.4	I	mg/L	0.2	2
6/15/2009 10:30	37693	Chlorophyll/Grain Size/BOD	Phaeophytin-a	1.3		ug/L	0.4	1.2
6/15/2009 10:30	37693	Toxicology	Bioassay-Acute-Screen-SW-Fish, LC50	100	L	LC50		
6/15/2009 10:30	37693	Toxicology	Bioassay-Acute-Screen-SW-Mysid, LC50	100	L	LC50		
6/15/2009 10:30	37693	Metals	Arsenic	1.8	I	ug/L	1	4
6/15/2009 10:30	37693	Metals	Zinc	15	U	ug/L	15	60
6/15/2009 10:30	37693	Metals	Beryllium	0.075	U	ug/L	0.075	0.3
6/15/2009 10:30	37693	Metals	Antimony	1	U	ug/L	1	4
6/15/2009 10:30	37693	Metals	Aluminum	180	U	ug/L	180	720
6/15/2009 10:30	37693	Metals	Nickel	1	I	ug/L	1	4
6/15/2009 10:30	37693	Metals	Chromium	2.8	I	ug/L	1.2	4.8
6/15/2009 10:30	37693	Metals	Calcium	363		mg/L	0.22	0.9
6/15/2009 10:30	37693	Metals	Silver	0.1	U	ug/L	0.1	0.4
6/15/2009 10:30	37693	Metals	Selenium	0.8	U	ug/L	0.8	3.2
6/15/2009 10:30	37693	Metals	Magnesium	1110		mg/L	2	8
6/15/2009 10:30	37693	Metals	Iron	170	I	ug/L	90	360
6/15/2009 10:30	37693	Metals	Copper	2	U	ug/L	2	2
6/15/2009 10:30	37693	Metals	Cadmium	0.12	U	ug/L	0.12	0.48
6/15/2009 10:30	37693	Metals	Lead	0.8	U	ug/L	0.8	3.2
6/15/2009 10:30	37693	Nutrients	Ammonia-N	0.054		mg N/L	0.01	0.02
6/15/2009 10:30	37693	Nutrients	Total-P	0.18		mg P/L	0.008	0.02
6/15/2009 10:30	37693	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
6/15/2009 10:30	37693	Nutrients	TSS	7	I	mg/L	4	16
6/15/2009 10:30	37693	Nutrients	Kjeldahl Nitrogen	0.84		mg N/L	0.16	0.4
6/15/2009 10:30	37693	Nutrients	O-Phosphate-P	0.13		mg P/L	0.008	0.02
6/15/2009 10:30	37693	Overflow	Radium 228-Counting Error	0.6		pCi/L		
6/15/2009 10:30	37693	Overflow	Oil and Grease	1.4	U	mg/L	1.4	5
6/15/2009 10:30	37693	Overflow	Radium 228	0.9	U	pCi/L		
6/15/2009 10:30	37693	Overflow	Alpha, Total	2.1		pCi/L		
6/15/2009 10:30	37693	Overflow	Radium 226	1		pCi/L		

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Components	Result	Remarks	Units	MDL	PQL
6/15/2009 10:30	37693	Overflow	Alpha-Counting Error	1.5		pCi/L		
6/15/2009 10:30	37693	Overflow	Radium 226-Counting Error	0.2		pCi/L		
6/15/2009 10:30	37693	Pesticides	Endosulfan Sulfate	0.02	U	ug/L	0.02	0.08
6/15/2009 10:30	37693	Pesticides	Norflurazon	0.15	U	ug/L	0.15	0.6
6/15/2009 10:30	37693	Pesticides	Aldrin	0.01	U	ug/L	0.01	0.04
6/15/2009 10:30	37693	Pesticides	Delta-BHC	0.01	U	ug/L	0.01	0.04
6/15/2009 10:30	37693	Pesticides	Metalaxyl	0.26	U	ug/L	0.26	1
6/15/2009 10:30	37693	Pesticides	Mevinphos	0.2	U	ug/L	0.2	0.8
6/15/2009 10:30	37693	Pesticides	Parathion Ethyl	0.15	U	ug/L	0.15	0.6
6/15/2009 10:30	37693	Pesticides	Simazine	0.051	U	ug/L	0.051	0.2
6/15/2009 10:30	37693	Pesticides	Endosulfan I	0.02	U	ug/L	0.02	0.08
6/15/2009 10:30	37693	Pesticides	Toxaphene	0.77	U	ug/L	0.77	3.1
6/15/2009 10:30	37693	Pesticides	Bromacil	0.2	U	ug/L	0.2	0.8
6/15/2009 10:30	37693	Pesticides	Ethoprop	0.1	U	ug/L	0.1	0.4
6/15/2009 10:30	37693	Pesticides	Metolachlor	0.51	UJ	ug/L	0.51	2
6/15/2009 10:30	37693	Pesticides	Naled	0.82	U	ug/L	0.82	3.3
6/15/2009 10:30	37693	Pesticides	DDD-p,p'	0.02	U	ug/L	0.02	0.08
6/15/2009 10:30	37693	Pesticides	DDE-p,p'	0.02	U	ug/L	0.02	0.08
6/15/2009 10:30	37693	Pesticides	Dieldrin	0.02	U	ug/L	0.02	0.08
6/15/2009 10:30	37693	Pesticides	Endrin	0.051	U	ug/L	0.051	0.2
6/15/2009 10:30	37693	Pesticides	Atrazine	0.051	U	ug/L	0.051	0.2
6/15/2009 10:30	37693	Pesticides	Azinphos Methyl	0.2	UJ	ug/L	0.2	0.8
6/15/2009 10:30	37693	Pesticides	Chlorpyrifos Ethyl	0.051	U	ug/L	0.051	0.2
6/15/2009 10:30	37693	Pesticides	Ethion	0.051	U	ug/L	0.051	0.2
6/15/2009 10:30	37693	Pesticides	Alpha-BHC	0.01	U	ug/L	0.01	0.04
6/15/2009 10:30	37693	Pesticides	DDT-p,p'	0.031	U	ug/L	0.031	0.12
6/15/2009 10:30	37693	Pesticides	Endosulfan II	0.02	U	ug/L	0.02	0.08
6/15/2009 10:30	37693	Pesticides	Diazinon	0.051	U	ug/L	0.051	0.2
6/15/2009 10:30	37693	Pesticides	Fenamiphos	0.2	U	ug/L	0.2	0.8
6/15/2009 10:30	37693	Pesticides	Malathion	0.15	U	ug/L	0.15	0.6
6/15/2009 10:30	37693	Pesticides	Phorate	0.051	U	ug/L	0.051	0.2
6/15/2009 10:30	37693	Pesticides	Endrin Aldehyde	0.02	U	ug/L	0.02	0.08
6/15/2009 10:30	37693	Pesticides	Gamma-BHC	0.01	U	ug/L	0.01	0.04
6/15/2009 10:30	37693	Pesticides	Alachlor	0.61	UJ	ug/L	0.61	2.4

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Components	Result	Remarks	Units	MDL	PQL
6/15/2009 10:30	37693	Pesticides	Hexazinone	0.1	U	ug/L	0.1	0.4
6/15/2009 10:30	37693	Pesticides	Beta-BHC	0.01	U	ug/L	0.01	0.04
6/15/2009 10:30	37693	Pesticides	Heptachlor	0.01	U	ug/L	0.01	0.04
6/15/2009 10:30	37693	Pesticides	Heptachlor Epoxide	0.02	U	ug/L	0.02	0.08
6/15/2009 10:30	37693	Pesticides	Methoxychlor	0.051	U	ug/L	0.051	0.2
6/15/2009 10:30	37693	Pesticides	Ametryn	0.051	UJ	ug/L	0.051	0.2
6/15/2009 10:30	37693	Pesticides	Butylate	0.2	UJ	ug/L	0.2	0.8
6/15/2009 10:30	37693	Pesticides	Chlorpyrifos Methyl	0.1	U	ug/L	0.1	0.4
6/15/2009 10:30	37693	Pesticides	Fonofos	0.1	UJ	ug/L	0.1	0.4
6/15/2009 10:30	37693	Pesticides	Metribuzin	0.1	U	ug/L	0.1	0.4
6/15/2009 10:30	37693	Pesticides	Parathion Methyl	0.1	U	ug/L	0.1	0.4
6/15/2009 10:30	37693	Pesticides	Prometryn	0.15	UJ	ug/L	0.15	0.6
6/15/2009 10:30	37693	Pesticides	Chlordane	0.2	U	ug/L	0.2	0.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Benzidine	94	U	ug/L	94	380
6/15/2009 10:30	37693	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Diethyl phthalate	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Hexachlorobutadiene	2.8	U	ug/L	2.8	11
6/15/2009 10:30	37693	Priority Organic Pollutants	Hexachloroethane	2.8	U	ug/L	2.8	11
6/15/2009 10:30	37693	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.6
6/15/2009 10:30	37693	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.8	U	ug/L	2.8	11
6/15/2009 10:30	37693	Priority Organic Pollutants	Pyrene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Hexachlorobenzene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.6
6/15/2009 10:30	37693	Priority Organic Pollutants	Nitrobenzene	1.9	U	ug/L	1.9	7.6
6/15/2009 10:30	37693	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.8	U	ug/L	2.8	11
6/15/2009 10:30	37693	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.6
6/15/2009 10:30	37693	Priority Organic Pollutants	Di-n-octyl phthalate	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Phenanthrene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	2-Chloronaphthalene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	2-Chlorophenol	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	2-Nitrophenol	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	3,3'-Dichlorobenzidine	38	UJ	ug/L	38	150

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Components	Result	Remarks	Units	MDL	PQL
6/15/2009 10:30	37693	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	4-Nitrophenol	14	U	ug/L	14	57
6/15/2009 10:30	37693	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	14	U	ug/L	14	57
6/15/2009 10:30	37693	Priority Organic Pollutants	Chrysene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Di-n-butyl phthalate	4.7	U	ug/L	4.7	19
6/15/2009 10:30	37693	Priority Organic Pollutants	Dimethyl phthalate	9.4	U	ug/L	9.4	38
6/15/2009 10:30	37693	Priority Organic Pollutants	Fluoranthene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Fluorene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Isophorone	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Naphthalene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	2,4-Dichlorophenol	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Anthracene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Benzo(k)fluoranthene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Butyl benzyl phthalate	4.7	U	ug/L	4.7	19
6/15/2009 10:30	37693	Priority Organic Pollutants	Pentachlorophenol	2.8	U	ug/L	2.8	11
6/15/2009 10:30	37693	Priority Organic Pollutants	2,4-Dinitrophenol	14	U	ug/L	14	57
6/15/2009 10:30	37693	Priority Organic Pollutants	Acenaphthene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Acenaphthylene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Benzo(a)anthracene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Benzo(b)fluoranthene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Phenol	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	2,4-Dimethylphenol	9.4	U	ug/L	9.4	38
6/15/2009 10:30	37693	Priority Organic Pollutants	2,4-Dinitrotoluene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	2,6-Dinitrotoluene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Benzo(a)pyrene	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.94	U	ug/L	0.94	3.8
6/15/2009 10:30	37693	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.8	U	ug/L	2.8	11
6/15/2009 10:30	37693	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.8	UJ	ug/L	2.8	11

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Components	Result	Remarks	Units	MDL	PQL
6/15/2009 10:30	37693	Field Parameter	Sample Depth	0.2		m		
6/15/2009 10:30	37693	Field Parameter	Temperature	38.5		C		
6/15/2009 10:30	37693	Field Parameter	Specific Conductance	47000		umhos/cm		
6/15/2009 10:30	37693	Field Parameter	Dissolved Oxygen	4.32		mg/L		
6/15/2009 10:30	37693	Field Parameter	pH	7.94				
6/15/2009 12:20	Field Blank	Chlorophyll/Grain Size/BOD	Biochemical Oxygen Demand-5 Day,N-Inhib	0.2	U	mg/L	0.2	2
6/15/2009 12:20	Field Blank	Metals	Aluminum	60	U	ug/L	60	240
6/15/2009 12:20	Field Blank	Metals	Cadmium	0.03	U	ug/L	0.03	0.12
6/15/2009 12:20	Field Blank	Metals	Chromium	0.3	U	ug/L	0.3	1.2
6/15/2009 12:20	Field Blank	Metals	Silver	0.025	U	ug/L	0.025	0.1
6/15/2009 12:20	Field Blank	Metals	Nickel	0.25	U	ug/L	0.25	1
6/15/2009 12:20	Field Blank	Metals	Antimony	0.25	U	ug/L	0.25	1
6/15/2009 12:20	Field Blank	Metals	Selenium	0.2	U	ug/L	0.2	0.8
6/15/2009 12:20	Field Blank	Metals	Calcium	0.075	U	mg/L	0.075	0.3
6/15/2009 12:20	Field Blank	Metals	Magnesium	0.04	U	mg/L	0.04	0.16
6/15/2009 12:20	Field Blank	Metals	Zinc	5	U	ug/L	5	20
6/15/2009 12:20	Field Blank	Metals	Arsenic	0.25	U	ug/L	0.25	1
6/15/2009 12:20	Field Blank	Metals	Iron	30	U	ug/L	30	120
6/15/2009 12:20	Field Blank	Metals	Lead	0.2	U	ug/L	0.2	0.8
6/15/2009 12:20	Field Blank	Metals	Copper	0.5	U	ug/L	0.5	0.5
6/15/2009 12:20	Field Blank	Metals	Beryllium	0.025	U	ug/L	0.025	0.1
6/15/2009 12:20	Field Blank	Nutrients	O-Phosphate-P	0.006	I	mg P/L	0.004	0.01
6/15/2009 12:20	Field Blank	Nutrients	Total-P	0.004	U	mg P/L	0.004	0.01
6/15/2009 12:20	Field Blank	Nutrients	NO2NO3-N	0.004	U	mg N/L	0.004	0.01
6/15/2009 12:20	Field Blank	Nutrients	Ammonia-N	0.01	U	mg N/L	0.01	0.02
6/15/2009 12:20	Field Blank	Nutrients	Kjeldahl Nitrogen	0.08	U	mg N/L	0.08	0.2
6/15/2009 12:20	Field Blank	Overflow	Radium 228	0.9	U	pCi/L		
6/15/2009 12:20	Field Blank	Overflow	Radium 226	0.2	U	pCi/L		
6/15/2009 12:20	Field Blank	Overflow	Radium 226-Counting Error	0.1		pCi/L		
6/15/2009 12:20	Field Blank	Overflow	Oil and Grease	1.4	U	mg/L	1.4	5
6/15/2009 12:20	Field Blank	Overflow	Radium 228-Counting Error	0.5		pCi/L		
6/15/2009 12:20	Field Blank	Overflow	Alpha-Counting Error	0.5		pCi/L		
6/15/2009 12:20	Field Blank	Overflow	Alpha, Total	0.9	U	pCi/L		
6/15/2009 12:20	Field Blank	Pesticides	Azinphos Methyl	0.19	UJ	ug/L	0.19	0.76

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Components	Result	Remarks	Units	MDL	PQL
6/15/2009 12:20	Field Blank	Pesticides	Hexazinone	0.097	U	ug/L	0.097	0.39
6/15/2009 12:20	Field Blank	Pesticides	Naled	0.78	U	ug/L	0.78	3.1
6/15/2009 12:20	Field Blank	Pesticides	Prometryn	0.15	UJ	ug/L	0.15	0.6
6/15/2009 12:20	Field Blank	Pesticides	Beta-BHC	0.0097	U	ug/L	0.0097	0.039
6/15/2009 12:20	Field Blank	Pesticides	Heptachlor	0.0097	U	ug/L	0.0097	0.039
6/15/2009 12:20	Field Blank	Pesticides	Butylate	0.19	UJ	ug/L	0.19	0.76
6/15/2009 12:20	Field Blank	Pesticides	Chlorpyrifos Ethyl	0.048	U	ug/L	0.048	0.19
6/15/2009 12:20	Field Blank	Pesticides	Mevinphos	0.19	U	ug/L	0.19	0.76
6/15/2009 12:20	Field Blank	Pesticides	Parathion Ethyl	0.15	U	ug/L	0.15	0.6
6/15/2009 12:20	Field Blank	Pesticides	Simazine	0.048	U	ug/L	0.048	0.19
6/15/2009 12:20	Field Blank	Pesticides	Endosulfan I	0.019	U	ug/L	0.019	0.076
6/15/2009 12:20	Field Blank	Pesticides	Diazinon	0.048	U	ug/L	0.048	0.19
6/15/2009 12:20	Field Blank	Pesticides	Chlordane	0.19	U	ug/L	0.19	0.76
6/15/2009 12:20	Field Blank	Pesticides	DDD-p,p'	0.019	U	ug/L	0.019	0.076
6/15/2009 12:20	Field Blank	Pesticides	DDT-p,p'	0.029	U	ug/L	0.029	0.12
6/15/2009 12:20	Field Blank	Pesticides	Toxaphene	0.73	U	ug/L	0.73	2.9
6/15/2009 12:20	Field Blank	Pesticides	Chlorpyrifos Methyl	0.097	U	ug/L	0.097	0.39
6/15/2009 12:20	Field Blank	Pesticides	Fenamiphos	0.19	U	ug/L	0.19	0.76
6/15/2009 12:20	Field Blank	Pesticides	Fonofos	0.097	UJ	ug/L	0.097	0.39
6/15/2009 12:20	Field Blank	Pesticides	Malathion	0.15	U	ug/L	0.15	0.6
6/15/2009 12:20	Field Blank	Pesticides	Metribuzin	0.097	U	ug/L	0.097	0.39
6/15/2009 12:20	Field Blank	Pesticides	Phorate	0.048	U	ug/L	0.048	0.19
6/15/2009 12:20	Field Blank	Pesticides	Aldrin	0.0097	U	ug/L	0.0097	0.039
6/15/2009 12:20	Field Blank	Pesticides	DDE-p,p'	0.019	U	ug/L	0.019	0.076
6/15/2009 12:20	Field Blank	Pesticides	Dieldrin	0.019	U	ug/L	0.019	0.076
6/15/2009 12:20	Field Blank	Pesticides	Gamma-BHC	0.0097	U	ug/L	0.0097	0.039
6/15/2009 12:20	Field Blank	Pesticides	Methoxychlor	0.048	U	ug/L	0.048	0.19
6/15/2009 12:20	Field Blank	Pesticides	Ethion	0.048	U	ug/L	0.048	0.19
6/15/2009 12:20	Field Blank	Pesticides	Ethoprop	0.097	U	ug/L	0.097	0.39
6/15/2009 12:20	Field Blank	Pesticides	Delta-BHC	0.0097	U	ug/L	0.0097	0.039
6/15/2009 12:20	Field Blank	Pesticides	Alpha-BHC	0.0097	U	ug/L	0.0097	0.039
6/15/2009 12:20	Field Blank	Pesticides	Endosulfan II	0.019	U	ug/L	0.019	0.076
6/15/2009 12:20	Field Blank	Pesticides	Endosulfan Sulfate	0.019	U	ug/L	0.019	0.076
6/15/2009 12:20	Field Blank	Pesticides	Endrin	0.048	U	ug/L	0.048	0.19

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Components	Result	Remarks	Units	MDL	PQL
6/15/2009 12:20	Field Blank	Pesticides	Endrin Aldehyde	0.019	U	ug/L	0.019	0.076
6/15/2009 12:20	Field Blank	Pesticides	Atrazine	0.048	U	ug/L	0.048	0.19
6/15/2009 12:20	Field Blank	Pesticides	Metalaxyl	0.24	U	ug/L	0.24	0.96
6/15/2009 12:20	Field Blank	Pesticides	Metolachlor	0.48	UJ	ug/L	0.48	1.9
6/15/2009 12:20	Field Blank	Pesticides	Heptachlor Epoxide	0.019	U	ug/L	0.019	0.076
6/15/2009 12:20	Field Blank	Pesticides	Alachlor	0.58	UJ	ug/L	0.58	2.3
6/15/2009 12:20	Field Blank	Pesticides	Ametryn	0.048	UJ	ug/L	0.048	0.19
6/15/2009 12:20	Field Blank	Pesticides	Bromacil	0.19	U	ug/L	0.19	0.76
6/15/2009 12:20	Field Blank	Pesticides	Norflurazon	0.15	U	ug/L	0.15	0.6
6/15/2009 12:20	Field Blank	Pesticides	Parathion Methyl	0.097	U	ug/L	0.097	0.39
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	2,4-Dichlorophenol	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	4-Nitrophenol	15	U	ug/L	15	58
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Isophorone	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Hexachlorobenzene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Bis(2-ethylhexyl)phthalate	15	U	ug/L	15	58
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	4-Chloro-3-methylphenol	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	2,4-Dinitrotoluene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Pentachlorophenol	2.9	U	ug/L	2.9	12
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Benzo(a)anthracene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Indeno(1,2,3-cd)pyrene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	1,2,4-Trichlorobenzene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	2,4,6-Trichlorophenol	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	2,4-Dimethylphenol	9.7	U	ug/L	9.7	39
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Anthracene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Hexachlorobutadiene	2.9	U	ug/L	2.9	12
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Nitrobenzene	1.9	U	ug/L	1.9	7.7
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Pyrene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	2-Methyl-4,6-dinitrophenol	2.9	U	ug/L	2.9	12
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Acenaphthylene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Benzo(k)fluoranthene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Diethyl phthalate	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Hexachloroethane	2.9	U	ug/L	2.9	12
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	2,4-Dinitrophenol	15	U	ug/L	15	58
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	2-Chloronaphthalene	0.97	U	ug/L	0.97	3.9

Appendix E. (continued)

Date Sampled	Field ID	Analysis Group	Components	Result	Remarks	Units	MDL	PQL
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	3,3'-Dichlorobenzidine	39	UJ	ug/L	39	150
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Dibenzo(a,h)anthracene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Hexachlorocyclopentadiene	2.9	U	ug/L	2.9	12
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	N-Nitrosodiphenylamine/ Diphenylamine	2.9	U	ug/L	2.9	12
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Phenanthrene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	2-Nitrophenol	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	4-Chlorophenyl phenyl ether	1.9	U	ug/L	1.9	7.7
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Benzo(b)fluoranthene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Benzo(g,h,i)perylene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Bis(2-chloroethyl)ether	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Chrysene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Fluoranthene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	N-Nitrosodi-n-propylamine	1.9	U	ug/L	1.9	7.7
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	2,6-Dinitrotoluene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	4-Bromophenyl phenyl ether	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Bis(2-chloroethoxy)methane	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Butyl benzyl phthalate	4.8	U	ug/L	4.8	19
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Di-n-butyl phthalate	4.8	U	ug/L	4.8	19
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	N-Nitrosodimethylamine	1.9	U	ug/L	1.9	7.7
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Phenol	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	2-Chlorophenol	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Acenaphthene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Benzidine	97	U	ug/L	97	390
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Benzo(a)pyrene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Bis(2-chloroisopropyl)ether	2.9	U	ug/L	2.9	12
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Di-n-octyl phthalate	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Dimethyl phthalate	9.7	U	ug/L	9.7	39
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Fluorene	0.97	U	ug/L	0.97	3.9
6/15/2009 12:20	Field Blank	Priority Organic Pollutants	Naphthalene	0.97	U	ug/L	0.97	3.9

Appendix F. Facility Summary, Effluent Limits, and Permit Violations Recorded on Discharge Monitoring Report

State of Florida
Department of Environmental Protection
Facility Introduction & Summary

PART I: Information gathered prior to sampling event	
Prepared By: Pete Wenner Peter.Wenner@dep.state.fl.us	**Contact Number:** 813-632-7600 x442
Facility Name (as it appears on permit): Tampa Electric Company Big Bend Power Station	**Former Names:**
NPDES Permit Number: FL0000817	**Permit Expiration Date:** March 16, 2010
Physical Address: 13031 Wyandotte Road Apollo Beach, FL 33572	
District: Southwest	**County:** Hillsborough
Function of Facility: Four coal fired steam electric units, and 3 oil fired combustion turbines	
Facility Type: Major	**Permitted Capacity (MGD):** Report
Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months): (05/01/2008-04/30/2009): 1121.01 MGD	
If applicable, Mean Flow for previous 12 months for REUSE outfall(s) (list date range including months):	
Description of type of Discharge: ☒**Continuous** ☐ **Intermittent** ☐ **Seasonal** ☐ **Rainfall Dependent** ☐ **Other, please specify**	

Appendix F. (continued)

Description of Sampling Location(s) - actual permit designation of permitted sampling point(s): [illegible] and as described

Sample Point	Description of Monitoring Location
FLW-1	Flow shall be calculated from the operation of the once-through cooling water pumps located at the intake canal.
EFF-1	Discharge temperature shall be taken from the averaged value of the temperature array located in the discharge canal adjacent to the dilution pump house dock at Outfall D-001.
INT-1	Intake temperature, used for calculating temperature rise, shall be taken at the intake side of each unit condenser.
INT-2	Center of the Eastern Catwalk between the intake structures of Units 2 and 3. Samples shall be taken at the centerline depth and 8 feet above the centerline depth of the intake pipes at the same location on the catwalk.
EFF-2	In the discharge canal next to the dilution pump house dock at Outfall D-001. Dissolved Oxygen readings shall be taken within 3 feet of the water surface.

Description of Permitted Outfall(s):

1) An existing discharge to the discharge canal (Class III Marine waters), D-011. This once-through-cooling-water outfall from Unit 1 is located approximately at latitude 27°47' 36"N, longitude 82°24'16"W.
2) An existing discharge to the discharge canal (Class III Marine waters), D-012. This once-through-cooling-water outfall from Unit 2 is located approximately at latitude 27°47' 36"N, longitude 82°24'12"W.
3) An existing discharge to the discharge canal (Class III Marine waters), D-013. This once-through-cooling-water outfall from Unit 3 is located approximately at latitude 27°47' 36"N, longitude 82°24'10"W.
4) An existing discharge to the discharge canal (Class III Marine waters), D-014. This once-through-cooling-water outfall from Unit 4 is located approximately at latitude 27°47' 36"N, longitude 82°24'16"W.
5) An existing discharge to Hillsborough Bay (Class III Marine waters), D-001. This combined plant discharge at the end of the discharge canal is located approximately at latitude 27°47' 36"N, longitude 82°24'45"W.

Internal Outfalls:

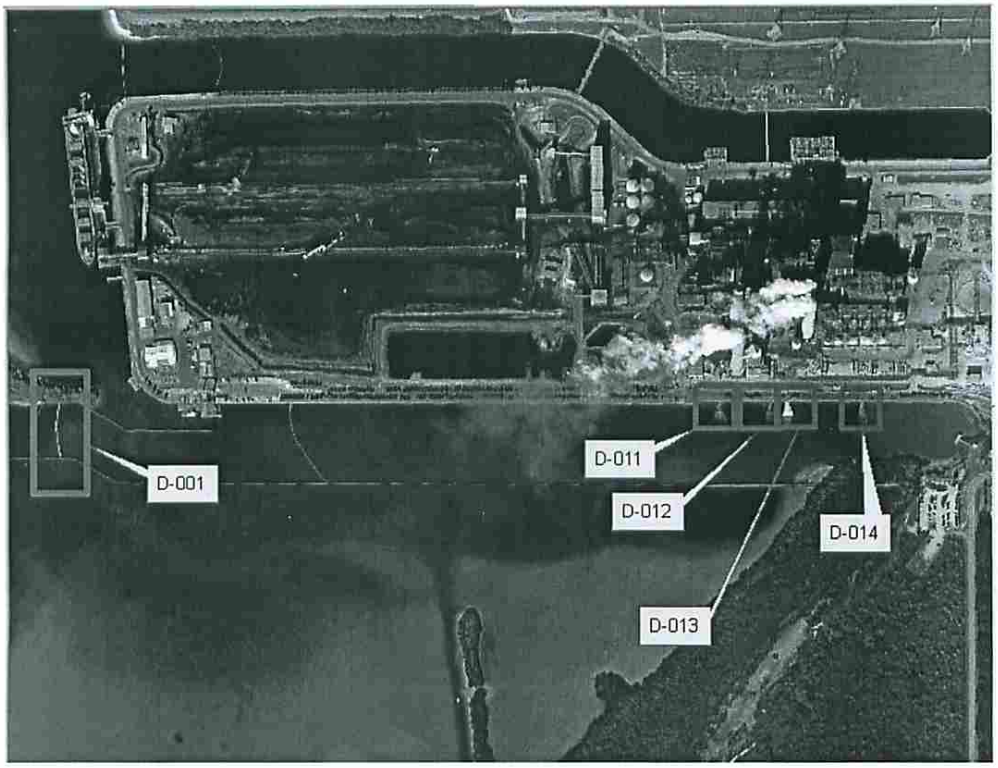
1) This permit authorizes the discharge from an existing internal Outfall I-130 to Outfalls D-011, D-012, D-013, or D-014.

Appendix F. (continued)

Description of Treatment Process (if multiple discharge points, include a detailed map or diagram of facility):

The plant consists of four coal-fired steam electric units with a total nameplate rating of 1823 MW and three oil-fired combustion turbines with a combined capacity of 175 MW.

Once-through-cooling-water (OTCW) from Units 1, 2, 3, and 4 is discharged through individual conduits to the facility's discharge canal. Treated Flue Gas Desulfurization (FGD) blowdown is discharged to one or more of the four OTCW discharge conduits prior to entering the discharge canal. In addition, the combined effluent from the on-site Tampa Bay Water Desalination Facility, including reverse osmosis concentrate, filter backwash/rinse water, and sludge filtrate, is discharged to one or more of the four OTCW discharge conduits prior to entering the discharge canal. The discharge from the Tampa Bay Water Desalination Facility is authorized under a separate permit (FL0186813).



Appendix F. (continued)

PART I: Continued

List current Effluent Limits of Outfall(s) to be Sampled: This should include any AO or CO limits the facility may be under (Leave cell blank if not applicable)

For Outfall D-001		**Effluent Limitations**					**Monitoring Requirements**			
Parameter	Units	Instantaneous Maximum	Annual Average	Monthly Average	Maximum Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Flow	MGD	Report		Report			Continuous	Pump logs	FLW-1	
Temperature	°F	109		Report			Continuous	Recorder	EFF-1	
Temp. Diff. between Intake and Discharge	°F				16.8		6/day	Calculated	INT-1 EFF-1	
Oxygen, Dissolved (DO)	mg/L	Refer to Item 3.B. in attached Consent Order					Weekly	Grab	INT-2 EFF-2	
pH	SU	Refer to Item 1 below					Weekly	Grab	EFF-2	

For Outfall I-130		**Effluent Limitations**					**Monitoring Requirements**			
Parameter	Units	Instantaneous Maximum	Maximum Daily Average	Monthly Average	Maximum Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Flow	MGD		Report	Report			Continuous	Recorder	FLW-2	
Solids, Total Suspended	mg/L	30.0					Quarterly	Grab	EFF-3	
Oil & Grease	mg/L	15.0					Quarterly	Grab	EFF-3	
Arsenic, Total Recoverable	µg/L	Report					Quarterly	Grab	EFF-3	
Chromium, Total Recoverable	µg/L	Report					Quarterly	Grab	EFF-3	
Copper, Total Recoverable	µg/L	Report					Quarterly	Grab	EFF-3	
Lead, Total Recoverable	µg/L	Report					Quarterly	Grab	EFF-3	

For Outfall I-130 (cont.)			Effluent Limitations				Monitoring Requirements			
Parameter	Units	Instantaneous Maximum	Maximum Daily Average	Monthly Average	Maximum Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location Site Number	Notes
Mercury, Total Recoverable	µg/L	Report					Quarterly	Grab	EFF-3	
Nickel, Total Recoverable	µg/L	Report					Quarterly	Grab	EFF-3	
Selenium, Total Recoverable	µg/L	Report					Quarterly	Grab	EFF-3	
Alpha, Gross Particle Activity	pCi/L	Report					Quarterly	Grab	EFF-3	
Radium 226 + Radium 228, Total	pCi/L	Report					Quarterly	Grab	EFF-3	
pH range	SU	Report	6.0 to 9.0				Quarterly	Grab	EFF-3	

1. The pH shall not be less that 6.5 nor greater than 8.5 standard units. If natural background is less than 6.5 units or greater than 8.5 units see Rule 62-302.530(52)(c) FAC.

I-130 FGD effluent sample points

Sample Point	Description of Monitoring Location
FLW-2	The flow monitoring location for the treated FGD wastewater
Eff-3	After final treatment but prior to discharge to Outfalls D-011, D-012, D-013, or D-014.

Appendix F. (continued)

PART I: Continued	
Receiving Waters: Hillsborough Bay	**Classification (indicate whether fresh or marine):** Class III Marine

Toxicity Test Requirements (routine and/or additional test language, test species, salinity adjustment, etc.): The current permit does not require toxicity testing

Administrative or Consent Orders (date executed, specific requirements, interim limit dates-if applicable, etc.): OGC File No: 98-2888D (Fifth Amended CO executed: May 29, 2009) Please see attached CO for additional information.

Facility Mixing Zone Details (if applicable): N/A

List Permit Violations (DMR data) and plant upsets that occurred at the plant within the last year:

Date	Parameter and Units	Limit	Result
3/31/2009	TSS (mg/L)	30.0	38.0

Describe previous FYI and WQBEL study:
See attached 1998 FYI and 2002 FYI3 reports. There is discussion underway that the ongoing Tampa Bay Nitrogen Management Consortium TN load allocation process serve as the Tampa Bay WQBEL.

Describe previous or current Enforcement Actions (including WLs):
TECO Big Bend is part of the Tampa Bay Nitrogen Management Consortium and as such as agreed to participate in the ongoing TN load allocation process slated to be completed by July 31, 2009. At the end of this process TECO Big Bend will be assigned at 5-year rolling average TN load and a one-year maximum TN load. It is not yet known at this time what that load will be.

Describe any violations or problems noted in previous inspection: Latest inspection on file was on April 2007 during which the facility was found to be out of compliance with its interim DO limit as stipulated in the CO. The latest C/E inspection was conducted in June of this year the results of which are not yet available.

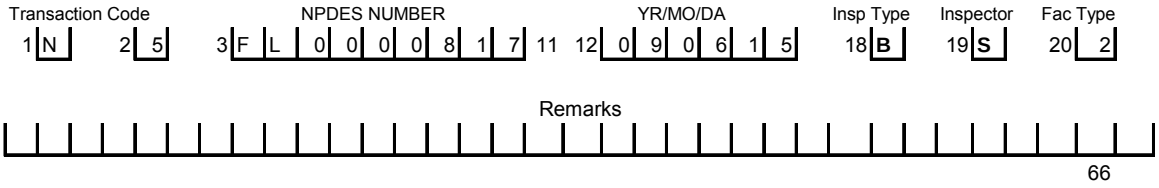
Discuss whether DMR trends within previous five years are improving or declining: Relative to DO which is under the consent order and has been an ongoing problem since 1998 DMR trends have remained relatively consistent. The 5th amended CO was executed on May 29, 2009 as part of the ongoing effort to address this problem

Additional Comments (this should include a trend of the Effluent, i.e. if the facility is now Reuse):

Appendix G. EPA End Sheet

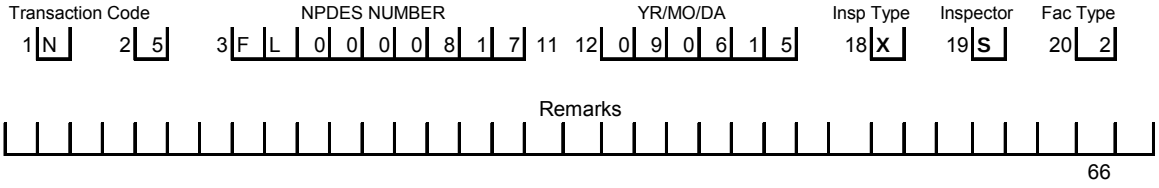
The Bioassay of Tampa Electric Company Big Bend Power Station effluent sampled on June 15, 2009. NPDES #FL0000817.

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



The Priority Pollutants Analysis of Tampa Electric Company Big Bend Power Station effluent sampled on June 15, 2009. NPDES #FL0000817.

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



Biological Analyses of Tampa Electric Company Big Bend Power Station effluent sampled on June 15, 2009. NPDES #FL0000817.

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