

Bioassays of

Palm Coast Membrane Softening Water Treatment Plant

Flagler County

NPDES #FL0042838

Sampled November 14, 2005

February 2006

Biology Section
Bureau of Laboratories
Division of Resource Assessment and Management

Quality Manual No. 870346G
NELAC Certification No. E31780

Palm Coast Water Treatment Plant, 50 Citation Boulevard, Palm Coast, Flagler County, Florida, NPDES #FL0042838. Effluent samples for this facility were collected on November 14, 2005.

Introduction

The Palm Coast Water Treatment Plant, a membrane-softening water treatment plant, produces potable water for the city of Palm Coast. The facility has a permitted maximum discharge of 2.625 million gallons per day (MGD). The annual average daily flow from November 2004 through October 2005 was 0.603 MGD. The flow during the survey was 0.41 MGD. Reject Concentrate water is treated by aeration prior to discharge via Outfall D-001 to the Class III Freshwaters of the Royal Palms Canal. The point of discharge is located approximately at latitude 29º20'00" N, longitude 81º13'60" W, which is upstream of the intersection of the Royal Palm Canal with the East Hampton Canal.

The facility is currently operating under Administrative Order (AO) No. 65-NE. This order contains interim monitoring requirements for chronic toxicity. It also incorporates final effluent limits and monitoring requirements for total recoverable iron, specific conductance, gross alpha, and combined radium 226 & 228. The facility has mixing zones (MZ) for total recoverable iron (MZ length 3,657 meters), specific conductance (MZ length 4,266 meters), combined radium 226 & 228 (MZ length 2,590 meters), and gross alpha (MZ length 2,590 meters). The facility had several permit violations in 2004 including: an unionized ammonia exceedance (June 2004) which was attributed to higher than normal pH; exceedances of total recoverable iron, radium 226+228, and specific conductance (August and September 2004) which were attributed to Hurricane Frances; and an exceedance of total recoverable iron (December 2004) which was attributed to a steady rainfall from the week before the sampling day.

The May 2004 third year inspection bioassay samples were toxic to both *Americamysis bahia* and *Menidia beryllina*. The toxicity was attributed to seawater-ion imbalance and unknown constituents of the sample. At that time, the algal growth potential test exceeded the "problem threshold" of 10 mg/L dry weight for marine waters. All other parameters and water quality analyses were within permit or mixing zone limits (facility information provided by Reza Shayan FDEP Northeast District).

Methods

Samples were collected from the EFF-1 NPDES sampling point for Outfall D-001 by Reza Shayan (FDEP Northeast District) following DEP-SOP-001/01 FS 2400 Wastewater Sampling. All DEP SOP's are available on the web at: http://www.floridadep.org/labs/qa/sops.htm.

The 96-hour acute definitive toxicity tests and the algal growth potential test were performed following internal DEP SOP's TA07_03, TA07_04, and TA08_01 through TA08_09. All internal DEP SOP's are available on the web at: http://www.floridadep.org/labs/cgi-bin/sop/biosop.asp.

The bioassay samples were salinity adjusted from an apparent salinity of approximately 3.1 ppth (parts per thousand) to approximately 21 ppth using 40 Fathoms® artificial sea salts, per modified NPDES permit requirements. The salt control used for these tests was prepared by diluting 20 ppth salinity artificial seawater (ASW) with well water to an approximate salinity of 3.1 ppth, and then salting this solution with artificial sea salts to approximately 21 ppth salinity. The purpose of the salt controls was to confirm that there was no effect of adding artificial sea salts to the sample. There was 10% mortality in the salt control of the *Americamysis bahia* bioassay and no mortality in the salt control of the *Menidia beryllina* bioassay.

The AGP test was salt adjusted to meet the minimum salinity requirements of the test species.

Bioassay test data were analyzed by the Trimmed Spearman Karber procedure (available at Statistical Analysis for Biological Methods http://www.epa.gov/EERD/stat2.htm).

Toxicity Test Results

Tests were performed November 15 - 19, 2005.

Americamysis bahia 96-hour acute definitive bioassay –	LC_{50} = 53.39%, 100% mortality in 100% sample at 96 hours
Menidia beryllina 96-hour acute definitive bioassay –	LC_{50} > 100%, 10% mortality in 100% sample at 96 hours

The bioassay sample was acutely toxic to the *Americamysis bahia* test organisms but was not acutely toxic to the *Menidia beryllina* test organisms.

The chemistry results confirmed that the ion makeup of the sample was not in seawater proportions and that the apparent 3.1 ppth salinity of the sample was due to elevated levels of ground-water ions. The observed mortality in the *A. bahia* test is likely due, at least in part, to the seawater-ion imbalance of the sample. Previous research conducted by the FDEP Biology Section demonstrated that *A. bahia* is much more sensitive to seawater-ion imbalances than is *M. beryllina* (FDEP, 1995). The calcium concentration was 836 mg/L at 3.1 ppth salinity (salinity based on conductivity and temperature). This is approximately twenty-two times (22.5X) the normal concentration for calcium in seawater of this salinity. The calculated calcium concentration in the salinity adjusted sample was approximately four times the normal calcium concentration in seawater of this salinity (approximately 21 ppth). The elevated calcium is one source of toxicity in this sample, but other unidentified sources of toxicity cannot be ruled out without performing the major-seawater-ion imbalance toxicity testing protocols cited above.

See Appendix 1 for bioassay bench sheets.

Algal Growth Potential

The effluent Algal Growth Potential (AGP) was 80.3 mg dry wt/L of the marine species *Dunaliella tertiolecta.* Raschke and Shultz found that AGP values above 10.0 mg dry weight/L represent a “problem” threshold for marine receiving waters, implying nutrient enrichment (personal communication with Ron Raschke USEPA Region 4, 1987). The analytical chemistry suggests that the effluent is nitrogen-limited.

Due to the apparent salinity of the sample, an AGP test with the freshwater species, *Pseudokirchneriella subcapitata*, was not performed. However, an inference can be made that the freshwater problem threshold of 5 mg dry wt/L (Raschke and Schultz, 1987) would have also been exceeded.

See Table 1 for AGP results.

Chemistry Results

Total residual chlorine was not detected in the bioassay sample in the laboratory. Total ammonia was detected in the bioassay sample in the laboratory at a concentration of 2.85 mg/L. The total ammonia concentration in the sample collected and preserved for chemical analysis was 3.5 mg/L. Based on the pH, salinity, and temperature of the effluent as collected, the calculated unionized ammonia concentration was 0.02 mg/L.

Arsenic was detected in the effluent at levels that comply with Class III fresh water quality criteria. Aluminum and selenium were detected between the laboratory method detection limits (MDL) and practical quantitation limits (PQL). Effluent concentrations of iron (2,630 µg/L) and combined radium 226+228 (9.5 pCi/L) exceeded Class III fresh water quality criteria of 1,000 µg/L (62-302.530(39), F.A.C.) and 5 pCi/L (62-302.530(58)(a), F.A.C.), respectively. However, this facility has mixing zones for these analytes and the permitted limits were not exceeded.

See Table 2 for results of analytes detected in the effluent, and corresponding limits.

See Appendix 2 for a complete list of chemical analyses performed.

Conclusion

The effluent sample collected from Outfall D-001 for this facility on November 14, 2005, was acutely toxic to the *Americamysis bahia* test organisms, but was not toxic to the *Menidia beryllina* test organisms during the acute definitive 96-hour bioassays. The toxicity was attributed to the seawater-ion imbalance within the sample; however other causes of toxicity were not ruled out. The saltwater AGP result for the effluent suggests that AGP would likely exceed the "problem" threshold for fresh receiving waters. Effluent concentrations of iron and combined radium 226+228 exceeded fresh water quality criteria; however, this facility has mixing zones for these substances and the permitted limits were not exceeded.

Literature Cited

Raschke, R. L. and D. A. Schultz. 1987. The use of the algal growth potential test for data assessment. J. Wat. Poll. Cont. Fed. 59(4): 222-227.

FDEP. 1995. Protocols for determining Major-Seawater-Ion Toxicity in Membrane-Technology Water-Treatment Concentrate. Biology and Chemistry Section, FDEP Bureau of Laboratories, Tallahassee, Florida. 99 pp.

Table 1. Measured and predicted algal growth potential (AGP; mg dry weight/L) of Dunaliella tertiolecta *and ratios of nitrogen to phosphorus for samples collected from Palm Coast Water Treatment Plant on November 14, 2005.*

Location	AGP (measured)	Inorganic N:P ratio	Total N:P ratio
Effluent Samples	80.3 AV	2.33	2.9

A - Value reported is the mean of two or more determinations
V - Analyte was detected in both the sample and method blank

Table 2. Effluent limits, Class III Freshwater Criteria, and chemical data for samples collected from Palm Coast Water Treatment Plant on November 14, 2005.

Palm Coast Water Treatment Plant NPDES# FL0042838	Class III Freshwater Stds	Effluent Limits	Effluent Samples
Organic Constituents (µg/L)			
None Detected	-	-	-
Metals (µg/L unless otherwise noted)			
Aluminum	-	-	8.6 I
Arsenic	≤ 50	-	2.1 A
Cadmium	≤ 3.4 b	-	0.05 U
Calcium (mg/L)	-	-	836
Chromium-III	≤ 268.2 b	-	1 U
Copper	≤ 30.5 b	-	1.8 U
Iron	≤ 1,000	≤ 6,400 e	2,630
Lead	≤ 18.6 b	-	0.075 U
Magnesium (mg/L)	-	-	89.9
Nickel	≤ 168.5 b	-	0.25 U
Selenium	≤ 5	-	0.54 I
Silver	≤ 0.07	-	0.025 U
Thallium	≤ 6.3	-	0.1 U
Zinc	≤ 387.8 b	-	9 U
Nutrients (mg/L)			
Ortho-phosphate	-	-	1.5
Total Phosphorus	-	-	2.1 A
Ammonia	-	Report	3.5 A
Unionized Ammonia	≤ 0.02	≤ 0.02	0.02 c
Nitrate+Nitrite	-	-	0.004 U
Total Kjeldahl Nitrogen	-	-	6.1 A
Organic Nitrogen	-	-	2.6 c
Total Nitrogen	-	Report	6.1 c
General Physical and Chemical Parameters			
Alpha, Total (pCi/L)	≤ 15	≤ 55.7 de	13.4
Alpha-Counting Error (pCi/L)	-	-	6.7
Radium 226 (pCi/L)	-	-	7.9
Radium 226-Counting Error (pCi/L)	-	-	0.5
Radium 228 (pCi/L)	-	-	1.6
Radium 228-Counting Error (pCi/L)	-	-	0.7
Radium 226+228 (pCi/L)	≤ 5	≤ 15.8 e	9.5 c
Dissolved Oxygen (mg/L)	≥ 5	≥ 5	5.2
pH (S.U.)	6-8.5	6-8.5	7
Conductivity (umhos/cm)	≤ 1,275	≤ 4,964 e	700
Temperature (C)	-	Report	20.3
Flow (MGD)	-	≤ 2.625 d	0.603 a
Hardness (mg/L)	-	-	2,457.7 c

Value exceeds the Class III Fresh Water Quality Criteria (62-302, F.A.C.) and/or Effluent Limits

a - Annual average

b - Value is calculated based on hardness

c - Calculated value

d- daily maximum

e- mixing zone limit

A - Value reported is the mean of two or more determinations

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

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

FDEP Biology Section - Acute Definitive Bioassay Bench Sheets

Facility: Palm Coast Water Treatment Plant

Address: 50 Citation Boulevard

City: Palm Coast County: Flagler

Contact/District: Melissa Long / North East

NPDES Permit #: FL 0042838

LIMS Job #: TLH-2005-11-15-88 LIMS Sample #: 878832

Sample Collection: Date: 11-14-05 Time: 1340

Hold Time Start: Date: 11-14-05 Time: 1340

Lims Data Entry: 11/23/05 MF Data Entry Verification: 11/23/05 JP

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

SOP #07_03 / _04

Test Type: Definitive
Static / Static Renewal / Flow-through
Test Duration: 48 (96) Hours.
Light Intensity : 50 - 100 ft. candles.
Photoperiod : 16 hours light 8 hours dark.
Initial sample handling:

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

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

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: 31 Final Salinity: 20.7 (Salts) Hypersaline brine

Salinity adjusted (Test 2) (yes) no Initial Salinity: 31 Final Salinity: 20.7 (Salts) Hypersaline brine

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

Sample Validation:
Temperature: Shipped ≤6°C (Yes) No Hand Delivered: Cooling (received °C < collected °C) Yes No
Holding Time: ≤36 Hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Comments: ammonia of salinity adjusted sample was 2.64 mg/L MF 11-15-05 - Salt adjustment control ammonia was <0.034 mg/L MF - 11-15-05
Per District STAFF Sample salinity adjusted to ~ 20.7 parts per thousand (ppth) by the addition of marinedad (Aquarium) artificial sea salts, MF 11-15-05
Dilution / control water prepared from 20 ppth salinity Artificial Sea water (Natural salinity ~ 20.5 ppth).
Salt control prepared by the addition of sea salts to artificial seawater which had been dilluted with DI well water to match the initial salinity of the sample (ca 3.1 ppt). MF-11-15-05

Temperature Range °C
Incubator # 3 Range 24.5-26.7
Room B246: 24.4 - 25.3
Waterbath: n/a

Investigators' Signatures
Sarah Fairchild
Erica Leif
Martha Faircloth
Jamer Daniel
Nicole Willenborg
REVIEWER

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Water Quality Parameters	20% DMW	Well Water	Salt Water (ASW) NSW Test 1	Salt Water (ASW) NSW Test 2	Moderately Hard Water	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):	N/A	N/A	N/A	N/A	N/A	—	Not	measured	MF
Lab Total Residual Cl2 (mg/L):			<0.03	<0.03		2.64 (A) <0.03	HACH	SP	MF
Alkalinity (mg/L as $CaCO_3$):			486	486		420	HACH	SP	MF
Hardness (mg/L as $CaCO_3$):			—	—		2250	HACH	MF/SP (B)	MF
Total Ammonia (mg/L as N):			<0.034	<0.034		2.85	DENVER	MF	SP
Salinity (ppt):			20.8	20.8		3.1	YSI	JD SP	MF

(B) SP measured - monitored by MF 11-15-05 (A) recorded ammonia on dilution/sea MF 11-15-05

Appendix 1. Bench Sheets (continued)

FDEP Biology Section - - Bioassay Bench Sheet

Survival

LIMS Sample #: 878832 Test #: 1 Test Started: Date 11-15-05 Time: 1400

Organism: A. bahia Test Ended: Date 11-19-05 Time: 1300

Organism Batch: 26-05 Diluent/ Batch: ASW / 15-05

Organism Age: 3days Food: YCT *P. subcapitata* - *Artemia* GSL536-90

Chamber Size 350 mL Batch: - -

Test Volume 250 mL Feeding: (Prior to test) Prior to renewal (Daily)

Concentration	~~Chamber# Replicate~~	~~Replicate Chamber #~~	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	Tox 2	A	5	4 ID	4	4	4	4
	Tox 3	B	5	5	5	5	5	5
	Tox 4	C	5	5	5	5	5	5
	tox 5	D	5	5	4 ID	4	4	4
6.25%	Tox 6	A	5	5	5	5	5	5
	Tox 7	B	5	4 ID	4	4	4	4
	Tox 9	C	5	5	5	5	5	5
	Tox 10	D	5	5	5	5	5	5
12.5%	Tox 11	A	5	5	5	5	5	5
	Tox 12	B	5	4 ID	4	4	4	4
	tox 14	C	5	4 ID	4	4	4	4
	Tox 15	D	5	4 ID	4	4	4	4
25%	Tox 16	A	5	5	5	5	5	5
	Tox 17	B	5	4 ID	4	4	4	4
	Tox 18	C	5	5	5	5	5	5
	Tox 22	D	5	4 ID	4 ~~A~~	4	4	4
50%	Tox 23	A	5	5	4 ID	4	3 ID	2 ID
	Tox 24	B	5	4 ID	4	4	4	4
	Tox 25	C	5	4 ID	4	4	4	4
	Tox 26	D	5	5	5	5	4 ID	3 ID
100%	Tox 29	A	5	2 3D	0 2D	-	-	-
	Tox 30	B	5	1 4D	0 1D	-	-	-
	Tox 32	C	5	2 3D	0 2D	-	-	-
	Tox 33	D	5	1 4D	0 1D	-	-	-
Salt CTRL	Tox 36	A	5	4 ID	4	4	4	4
	Tox 39	B	5	5	4 1D	4	4	4
	Tox 40	C	5	5	5	5	5	5
	Tox 41	D	5	5	5	5	5	5
				JD/BP	JD	BP	BP	BP

Organisms loaded by: BP Checked by:

Loading Verified by: (initials)

Comments: @4 - organism not dead

m = missing d = dead BR = before renewal AR = after renewal

Test Results:

% mortality in 100% sample 100%

LC_{50}: 53.39 If Calculated: 95% CI 44.91-63.47 Method: Spearman-Karber (trimmed)

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

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

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Appendix 1. Bench Sheets (continued)

FDEP Biology Section - - Bioassay Bench Sheet
Survival

LIMS Sample #: 878832 Test #: 2 Test Started: Date 11-15-05 Time: 1330
Organism: M. beryllina Test Ended: Date 11-19-05 Time: 1315
Organism Batch: 28-05 Diluent/ Batch: ASW / 15-05
Organism Age: 11 days Food: YCT *P. subcapitata* *Artemia*
Chamber Size 1000 mL Batch: - - GSL 536-90
Test Volume 500 mL Feeding: (Prior to test) - Prior to renewal - Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	A1	10	10	10	10	10	10
	B	A2	10	10	10	10	9 10	9
6.25%	A	A3	10	10	10	10	10	10
	B	A4	10	9 10	9	9	9	9
12.5%	A	A5	10	10	10	10	10	10
	B	A6	10	10	10	10	10	10
25%	A	A7	10	10	10	10	10	10
	B	A8	10	9 10	9	9	9	9
50%	A	A9	10	10	10	10	10	10
	B	A10	10	10	10	10	10	10
100%	A	A11	10	9 10	9	9	9	9
	B	A12	10	9 10	9	9	9	9
Salt CTRL	A	A13	10	10	10	10	10	10
	B	A14	10	10	10	10	10	10
Organisms loaded by: JD		Checked by:	JD	JD	JD	SP	EW	SP
Loading Verified by: [illegible]		(initials)						

m = missing d = dead BR = before renewal AR = after renewal
Comments: Tim + stray letter. 11-21-05

Test Results:
% mortality in 100% sample 10%
LC_{50}: >100 If Calculated: 95% CI N/A Method: N/A

Screening Tests: Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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Bioassay Parameters

LIMS Sample # : 878832 **Test # :** 1 **of** 2

TEST SOP: TA07_03 **Test Species:** *Ceriodaphnia dubia Cyprinella leedsi Pimephales promelas* (*Americamysis bahia*) *Menidia beryllina* Other:_____

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Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.3	8.0	7.9	8.1	7.9	8.0
Temperature °C	24.5	24.7	24.1	24.0	24.4	23.8
Dissolved Oxygen mg/L	6.5	4.9	4.4	6.3	5.2	5.4
Conductivity µmhos (mmhos)	329	339	348	336	348	352
(initials) Measured by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(initials) Recorded by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

Concentration 6.25%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.1	8.0	7.9	8.1	8.0	8.0
Temperature °C	24.6	25.2	24.5	24.0	24.4	24.1
Dissolved Oxygen mg/L	6.7	4.5	4.5	6.2	5.2	5.5
Conductivity µmhos (mmhos)	330	335	353	340	360	356
(initials) Measured by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(initials) Recorded by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

Concentration 12.5%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	7.9	8.0	7.9	8.0	8.0	8.0
Temperature °C	24.7	24.5	24.6	24.0	24.4	23.9
Dissolved Oxygen mg/L	6.8	4.9	4.4	6.2	5.2	5.7
Conductivity µmhos (mmhos)	329	338	351	342	355	365
(initials) Measured by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(initials) Recorded by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

Concentration 25%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	7.6	8.0	7.9	7.9	8.0	8.0
Temperature °C	24.7	24.8	24.2	24.0	24.2	23.8
Dissolved Oxygen mg/L	6.5	5.2	4.3	6.2	5.4	5.2
Conductivity µmhos (mmhos)	330	341	343	339	360	358
(initials) Measured by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(initials) Recorded by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

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Bioassay Parameters

LIMS Sample # : 878832 **Test # :** 1 **of** 2

TEST SOP: TA07_ 03 **Test Species:** *Ceriodaphnia dubia Cyprinella leedsi Pimephales promelas* (*Americamysis bahia*) *Menidia beryllina* Other:_____

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Concentration 50%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	7.3	8.0	8.0	7.4	8.0	8.1
Temperature °C	24.8	24.3	25.4	24.2	24.3	24.0
Dissolved Oxygen mg/L	6.6	5.2	4.7	6.2	5.3	5.4
Conductivity µmhos (mmhos)	33.0	34.4	34.7	33.8	35.0	37.0
(initials) Measured by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(initials) Recorded by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	~~C~~ SP	-	-
pH (S.U.)	7.9	8.0	8.0	-	-	-
Temperature °C	24.7	24.3	24.0	~~24.7~~	-	-
Dissolved Oxygen mg/L	6.1	5.1	4.8	-	-	-
Conductivity µmhos (mmhos)	52.8	33.8	35.1	-	-	-
(initials) Measured by:	[illegible]	[illegible]	[illegible]			
(initials) Recorded by:	[illegible]	[illegible]	[illegible]			

Comments:

Concentration Salt CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	8.3	8.1	8.0	8.2	8.0	8.0
Temperature °C	24.2	24.4	23.7	24.0	23.9	24.0
Dissolved Oxygen mg/L	6.8	~~5.4~~ 5.6	5.0	6.1	5.2	5.4
Conductivity µmhos (mmhos)	32.1	31.8	33.9	33.2	32.7	34.8
(initials) Measured by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(initials) Recorded by:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

V.1 2/24/04

Bioassay Parameters

LIMS Sample # : 878832 **Test # :** 2 **of** 2

TEST SOP: TA07_ 04 **Test Species:** *Ceriodaphnia dubia* *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:_____

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Concentration CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	8.3	8.1	8.0	8.2	8.0	8.1
Temperature °C	24.9	24.0	23.7	24.2	24.4	24.1
Dissolved Oxygen mg/L	6.6	5.2	5.5	6.3	5.9	5.8
Conductivity µmhos (mmhos)	32.3	32.8	34.0	33.1	32.9	34.2
(initials) Measured by:	EW	SP	SP	SP	EW	EW
(initials) Recorded by:	EW	SP/SD	SD	SP	SP	SP

Comments:

Concentration 6.25%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	8.1	8.0	8.0	8.2	8.0	8.0
Temperature °C	24.8	23.7	23.7	24.1	24.3	24.0
Dissolved Oxygen mg/L	6.6	5.4	5.4	6.3	5.6	5.4
Conductivity µmhos (mmhos)	32.4	33.5	34.0	33.7	33.6	34.1
(initials) Measured by:	EW	SP	SD	SP	EW	EW
(initials) Recorded by:	EW	SP/SD	SD	SP	SP	SP

Comments:

Concentration 12.5%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	7.9	8.0	8.0	8.1	8.0	8.1
Temperature °C	24.8	24.3	23.6	24.3	24.9	23.8
Dissolved Oxygen mg/L	6.7	5.3	5.3	6.3	5.5	5.4
Conductivity µmhos (mmhos)	32.8	33.6	34.0	33.6	34.5	33.9
(initials) Measured by:	EW	SP	SD	SP	EW	EW
(initials) Recorded by:	EW	SP/SD	SD	SP	SP	SP

Comments:

Concentration 25%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	7.6	8.0	8.0	7.6	8.0	8.1
Temperature °C	24.7	23.7	24.0	24.6	24.3	24.0
Dissolved Oxygen mg/L	6.7	5.4	5.4	6.4	5.3	5.2
Conductivity µmhos (mmhos)	32.8	33.4	34.5	33.6	33.8	34.7
(initials) Measured by:	EW	SP	SD	SP	EW	SP
(initials) Recorded by:	EW	SP/SD	SD	SP	SP	SP

Comments:

V.1 2/24/04

Bioassay Parameters

LIMS Sample # : 878832 **Test # :** 2 **of** 2

TEST SOP: TA07_ 04 **Test Species:** *Ceriodaphnia dubia Cyprinella leedsi Pimephales promelas Americamysis bahia* (*Menidia beryllina*) Other:_____

V.1 2/24/04

Concentration 50%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	7.2	7.9	8.0	7.6	7.9	8.0
Temperature °C	24.3	24.3	23.8	24.8	25.6	24.6
Dissolved Oxygen mg/L	6.6	5.0	5.1	6.1	5.5	5.4
Conductivity µmhos (mmhos)	32.8	33.3	34.3	33.7	34.2	34.6
(initials) Measured by:	EW				EW	
(initials) Recorded by:	EW					

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	6.9	7.9	8.1	7.1	8.0	8.0
Temperature °C	24.2	23.8	23.7	25.7	24.8	23.8
Dissolved Oxygen mg/L	6.2	5.2	5.1	6.2	5.5	5.4
Conductivity µmhos (mmhos)	32.6	33.9	34.4	33.8	34.8	33.8
(initials) Measured by:	EW				EW	
(initials) Recorded by:	EW					

Comments:

Concentration Salt CTRL	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	A	A	B	A
pH (S.U.)	8.4	8.1	8.0	8.3	8.1	8.0
Temperature °C	24.2	23.8	23.3	24.3	23.9	23.8
Dissolved Oxygen mg/L	6.9	4.9	5.2	6.1	5.6	5.2
Conductivity µmhos (mmhos)	31.4	32.1	33.7	32.6	32.1	33.4
(initials) Measured by:	EW				EW	
(initials) Recorded by:	EW					

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						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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Appendix 2. Chemical Analyses performed on the effluent from the Palm Coast Water Treatment Plant Outfall D-001, sampled on November 14, 2005.

Date Sampled	Field ID	Analysis	Component	Results	Units	Remark	MDL	PQL
11/14/2005 13:40	D-001	Bio-AGP/LimNut	Algal Growth Potential	80.3	mg DryWt/L	AV	0.3	0.9
11/14/2005 13:40	D-001	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
11/14/2005 13:40	D-001	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
11/14/2005 13:40	D-001	Bio-Toxicology	Bioassay-Acute-Def-SW-Fish, LC50	100	LC50	L		
11/14/2005 13:40	D-001	Bio-Toxicology	Bioassay-Acute-Def-SW-Mysid, LC50	53.4	LC50			
11/14/2005 13:40	D-001	BNA-Water	1,2,4-Trichlorobenzene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	1,2-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	1,3-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	1,4-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	2,4,6-Trichlorophenol	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	2,4-Dichlorophenol	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
11/14/2005 13:40	D-001	BNA-Water	2,4-Dinitrophenol	14	ug/L	UJ	14	58
11/14/2005 13:40	D-001	BNA-Water	2,4-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	2,6-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	2-Chloronaphthalene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	2-Chlorophenol	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	12
11/14/2005 13:40	D-001	BNA-Water	2-Nitrophenol	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	UJ	38	150
11/14/2005 13:40	D-001	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	4,4'-DDT	1.4	ug/L	UJ	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	4-Bromophenyl phenyl ether	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	4-Chloro-3-methylphenol	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.7
11/14/2005 13:40	D-001	BNA-Water	4-Nitrophenol	14	ug/L	U	14	58
11/14/2005 13:40	D-001	BNA-Water	Acenaphthene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Acenaphthylene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	Anthracene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Benzidine	96	ug/L	U	96	380
11/14/2005 13:40	D-001	BNA-Water	Benzo(a)anthracene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Benzo(a)pyrene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Benzo(b)fluoranthene	0.96	ug/L	U	0.96	3.8

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis	Component	Results	Units	Remark	MDL	PQL
11/14/2005 13:40	D-001	BNA-Water	Benzo(g,h,i)perylene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Benzo(k)fluoranthene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	Bis(2-chloroethoxy)methane	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Bis(2-chloroethyl)ether	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	12
11/14/2005 13:40	D-001	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	58
11/14/2005 13:40	D-001	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
11/14/2005 13:40	D-001	BNA-Water	Chrysene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	Dibenzo(a,h)anthracene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	Diethyl phthalate	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
11/14/2005 13:40	D-001	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
11/14/2005 13:40	D-001	BNA-Water	Di-n-octyl phthalate	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Endosulfan I	3.8	ug/L	UJ	3.8	15
11/14/2005 13:40	D-001	BNA-Water	Endosulfan II	3.8	ug/L	UJ	3.8	15
11/14/2005 13:40	D-001	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15
11/14/2005 13:40	D-001	BNA-Water	Fluoranthene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Fluorene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.8
11/14/2005 13:40	D-001	BNA-Water	Hexachlorobenzene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	12
11/14/2005 13:40	D-001	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	U	2.9	12
11/14/2005 13:40	D-001	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	12
11/14/2005 13:40	D-001	BNA-Water	Indeno(1,2,3-cd)pyrene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Isophorone	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Naphthalene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.7
11/14/2005 13:40	D-001	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.7
11/14/2005 13:40	D-001	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.7
11/14/2005 13:40	D-001	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	12

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis	Component	Results	Units	Remark	MDL	PQL
11/14/2005 13:40	D-001	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	12
11/14/2005 13:40	D-001	BNA-Water	Phenanthrene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Phenol	0.96	ug/L	UJ	0.96	3.8
11/14/2005 13:40	D-001	BNA-Water	Pyrene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	1,2,4-Trichlorobenzene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	1,2-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	1,3-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	1,4-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	2,4,6-Trichlorophenol	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	2,4-Dichlorophenol	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
11/14/2005 16:15	EQ BLANK	BNA-Water	2,4-Dinitrophenol	14	ug/L	UJ	14	58
11/14/2005 16:15	EQ BLANK	BNA-Water	2,4-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	2,6-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	2-Chloronaphthalene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	2-Chlorophenol	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	12
11/14/2005 16:15	EQ BLANK	BNA-Water	2-Nitrophenol	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	UJ	38	150
11/14/2005 16:15	EQ BLANK	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	4,4'-DDT	1.4	ug/L	UJ	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	4-Bromophenyl phenyl ether	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	4-Chloro-3-methylphenol	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.7
11/14/2005 16:15	EQ BLANK	BNA-Water	4-Nitrophenol	14	ug/L	U	14	58
11/14/2005 16:15	EQ BLANK	BNA-Water	Acenaphthene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Acenaphthylene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Anthracene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Benzidine	96	ug/L	U	96	380
11/14/2005 16:15	EQ BLANK	BNA-Water	Benzo(a)anthracene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Benzo(a)pyrene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Benzo(b)fluoranthene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Benzo(g,h,i)perylene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Benzo(k)fluoranthene	0.96	ug/L	U	0.96	3.8

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis	Component	Results	Units	Remark	MDL	PQL
11/14/2005 16:15	EQ BLANK	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Bis(2-chloroethoxy)methane	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Bis(2-chloroethyl)ether	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	12
11/14/2005 16:15	EQ BLANK	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	58
11/14/2005 16:15	EQ BLANK	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
11/14/2005 16:15	EQ BLANK	BNA-Water	Chrysene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Dibenzo(a,h)anthracene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Diethyl phthalate	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
11/14/2005 16:15	EQ BLANK	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
11/14/2005 16:15	EQ BLANK	BNA-Water	Di-n-octyl phthalate	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Endosulfan I	3.8	ug/L	UJ	3.8	15
11/14/2005 16:15	EQ BLANK	BNA-Water	Endosulfan II	3.8	ug/L	UJ	3.8	15
11/14/2005 16:15	EQ BLANK	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15
11/14/2005 16:15	EQ BLANK	BNA-Water	Fluoranthene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Fluorene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Hexachlorobenzene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	12
11/14/2005 16:15	EQ BLANK	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	U	2.9	12
11/14/2005 16:15	EQ BLANK	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	12
11/14/2005 16:15	EQ BLANK	BNA-Water	Indeno(1,2,3-cd)pyrene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Isophorone	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Naphthalene	0.96	ug/L	U	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.7
11/14/2005 16:15	EQ BLANK	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.7
11/14/2005 16:15	EQ BLANK	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.7
11/14/2005 16:15	EQ BLANK	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	12
11/14/2005 16:15	EQ BLANK	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	12
11/14/2005 16:15	EQ BLANK	BNA-Water	Phenanthrene	0.96	ug/L	U	0.96	3.8

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis	Component	Results	Units	Remark	MDL	PQL
11/14/2005 16:15	EQ BLANK	BNA-Water	Phenol	0.96	ug/L	UJ	0.96	3.8
11/14/2005 16:15	EQ BLANK	BNA-Water	Pyrene	0.96	ug/L	U	0.96	3.8
11/14/2005 13:40	D-001	GC-Water	Alachlor	0.6	ug/L	U	0.6	2.4
11/14/2005 13:40	D-001	GC-Water	Ametryn	0.05	ug/L	U	0.05	0.2
11/14/2005 13:40	D-001	GC-Water	Atrazine	0.05	ug/L	U	0.05	0.2
11/14/2005 13:40	D-001	GC-Water	Azinphos Methyl	0.2	ug/L	U	0.2	0.8
11/14/2005 13:40	D-001	GC-Water	Bromacil	0.2	ug/L	U	0.2	0.8
11/14/2005 13:40	D-001	GC-Water	Butylate	0.2	ug/L	U	0.2	0.8
11/14/2005 13:40	D-001	GC-Water	Chlorpyrifos Ethyl	0.05	ug/L	U	0.05	0.2
11/14/2005 13:40	D-001	GC-Water	Chlorpyrifos Methyl	0.1	ug/L	U	0.1	0.4
11/14/2005 13:40	D-001	GC-Water	Diazinon	0.05	ug/L	U	0.05	0.2
11/14/2005 13:40	D-001	GC-Water	Ethion	0.05	ug/L	U	0.05	0.2
11/14/2005 13:40	D-001	GC-Water	Ethoprop	0.1	ug/L	U	0.1	0.4
11/14/2005 13:40	D-001	GC-Water	Fenamiphos	0.2	ug/L	U	0.2	0.8
11/14/2005 13:40	D-001	GC-Water	Fonofos	0.1	ug/L	UJ	0.1	0.4
11/14/2005 13:40	D-001	GC-Water	Hexazinone	0.1	ug/L	U	0.1	0.4
11/14/2005 13:40	D-001	GC-Water	Malathion	0.15	ug/L	UJ	0.15	0.6
11/14/2005 13:40	D-001	GC-Water	Metalaxyl	0.25	ug/L	U	0.25	1
11/14/2005 13:40	D-001	GC-Water	Metolachlor	0.5	ug/L	U	0.5	2
11/14/2005 13:40	D-001	GC-Water	Metribuzin	0.1	ug/L	U	0.1	0.4
11/14/2005 13:40	D-001	GC-Water	Mevinphos	0.2	ug/L	U	0.2	0.8
11/14/2005 13:40	D-001	GC-Water	Naled	0.8	ug/L	U	0.8	3.2
11/14/2005 13:40	D-001	GC-Water	Norflurazon	0.15	ug/L	U	0.15	0.6
11/14/2005 13:40	D-001	GC-Water	Parathion Ethyl	0.15	ug/L	U	0.15	0.6
11/14/2005 13:40	D-001	GC-Water	Parathion Methyl	0.1	ug/L	U	0.1	0.4
11/14/2005 13:40	D-001	GC-Water	Phorate	0.05	ug/L	U	0.05	0.2
11/14/2005 13:40	D-001	GC-Water	Prometryn	0.15	ug/L	U	0.15	0.6
11/14/2005 13:40	D-001	GC-Water	Simazine	0.05	ug/L	U	0.05	0.2
11/14/2005 16:15	EQ BLANK	GC-Water	Alachlor	0.58	ug/L	U	0.58	2.3
11/14/2005 16:15	EQ BLANK	GC-Water	Ametryn	0.049	ug/L	U	0.049	0.2
11/14/2005 16:15	EQ BLANK	GC-Water	Atrazine	0.049	ug/L	U	0.049	0.2
11/14/2005 16:15	EQ BLANK	GC-Water	Azinphos Methyl	0.19	ug/L	U	0.19	0.76
11/14/2005 16:15	EQ BLANK	GC-Water	Bromacil	0.19	ug/L	U	0.19	0.76
11/14/2005 16:15	EQ BLANK	GC-Water	Butylate	0.19	ug/L	UJ	0.19	0.76
11/14/2005 16:15	EQ BLANK	GC-Water	Chlorpyrifos Ethyl	0.049	ug/L	U	0.049	0.2
11/14/2005 16:15	EQ BLANK	GC-Water	Chlorpyrifos Methyl	0.097	ug/L	U	0.097	0.39
11/14/2005 16:15	EQ BLANK	GC-Water	Diazinon	0.049	ug/L	U	0.049	0.2

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis	Component	Results	Units	Remark	MDL	PQL
11/14/2005 16:15	EQ BLANK	GC-Water	Ethion	0.049	ug/L	U	0.049	0.2
11/14/2005 16:15	EQ BLANK	GC-Water	Ethoprop	0.097	ug/L	U	0.097	0.39
11/14/2005 16:15	EQ BLANK	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
11/14/2005 16:15	EQ BLANK	GC-Water	Fonofos	0.097	ug/L	U	0.097	0.39
11/14/2005 16:15	EQ BLANK	GC-Water	Hexazinone	0.097	ug/L	U	0.097	0.39
11/14/2005 16:15	EQ BLANK	GC-Water	Malathion	0.15	ug/L	U	0.15	0.6
11/14/2005 16:15	EQ BLANK	GC-Water	Metalaxyl	0.24	ug/L	U	0.24	0.96
11/14/2005 16:15	EQ BLANK	GC-Water	Metolachlor	0.49	ug/L	U	0.49	2
11/14/2005 16:15	EQ BLANK	GC-Water	Metribuzin	0.097	ug/L	U	0.097	0.39
11/14/2005 16:15	EQ BLANK	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
11/14/2005 16:15	EQ BLANK	GC-Water	Naled	0.78	ug/L	UJ	0.78	3.1
11/14/2005 16:15	EQ BLANK	GC-Water	Norflurazon	0.15	ug/L	U	0.15	0.6
11/14/2005 16:15	EQ BLANK	GC-Water	Parathion Ethyl	0.15	ug/L	U	0.15	0.6
11/14/2005 16:15	EQ BLANK	GC-Water	Parathion Methyl	0.097	ug/L	U	0.097	0.39
11/14/2005 16:15	EQ BLANK	GC-Water	Phorate	0.049	ug/L	U	0.049	0.2
11/14/2005 16:15	EQ BLANK	GC-Water	Prometryn	0.15	ug/L	U	0.15	0.6
11/14/2005 16:15	EQ BLANK	GC-Water	Simazine	0.049	ug/L	U	0.049	0.2
11/14/2005 13:40	D-001	Metals-Water	Aluminum	8.6	ug/L	I	5	20
11/14/2005 13:40	D-001	Metals-Water	Arsenic	2.1	ug/L	A	0.5	2
11/14/2005 13:40	D-001	Metals-Water	Cadmium	0.05	ug/L	U	0.05	0.2
11/14/2005 13:40	D-001	Metals-Water	Calcium	836	mg/L		0.25	1
11/14/2005 13:40	D-001	Metals-Water	Chromium	1	ug/L	U	1	4
11/14/2005 13:40	D-001	Metals-Water	Copper	1.8	ug/L	U	1.8	7
11/14/2005 13:40	D-001	Metals-Water	Iron	2630	ug/L		10	40
11/14/2005 13:40	D-001	Metals-Water	Lead	0.075	ug/L	U	0.075	0.3
11/14/2005 13:40	D-001	Metals-Water	Magnesium	89.9	mg/L		0.01	0.04
11/14/2005 13:40	D-001	Metals-Water	Nickel	0.25	ug/L	U	0.25	1
11/14/2005 13:40	D-001	Metals-Water	Selenium	0.54	ug/L	I	0.5	2
11/14/2005 13:40	D-001	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
11/14/2005 13:40	D-001	Metals-Water	Thallium	0.1	ug/L	U	0.1	0.4
11/14/2005 13:40	D-001	Metals-Water	Zinc	9	ug/L	U	9	36
11/14/2005 16:15	EQ BLANK	Metals-Water	Aluminum	5	ug/L	U	5	20
11/14/2005 16:15	EQ BLANK	Metals-Water	Arsenic	0.5	ug/L	U	0.5	2
11/14/2005 16:15	EQ BLANK	Metals-Water	Cadmium	0.05	ug/L	U	0.05	0.2
11/14/2005 16:15	EQ BLANK	Metals-Water	Calcium	0.05	mg/L	U	0.05	0.2
11/14/2005 16:15	EQ BLANK	Metals-Water	Chromium	1	ug/L	U	1	4
11/14/2005 16:15	EQ BLANK	Metals-Water	Copper	0.25	ug/L	U	0.25	1

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis	Component	Results	Units	Remark	MDL	PQL
11/14/2005 16:15	EQ BLANK	Metals-Water	Iron	10	ug/L	U	10	40
11/14/2005 16:15	EQ BLANK	Metals-Water	Lead	0.075	ug/L	U	0.075	0.3
11/14/2005 16:15	EQ BLANK	Metals-Water	Magnesium	0.01	mg/L	U	0.01	0.04
11/14/2005 16:15	EQ BLANK	Metals-Water	Nickel	0.25	ug/L	U	0.25	1
11/14/2005 16:15	EQ BLANK	Metals-Water	Selenium	0.5	ug/L	U	0.5	2
11/14/2005 16:15	EQ BLANK	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
11/14/2005 16:15	EQ BLANK	Metals-Water	Thallium	0.1	ug/L	U	0.1	0.4
11/14/2005 16:15	EQ BLANK	Metals-Water	Zinc	3	ug/L	U	3	12
11/14/2005 13:40	D-001	Nutrients-Liquid	Ammonia-N	3.5	mg N/L	A	0.4	0.8
11/14/2005 13:40	D-001	Nutrients-Liquid	Kjeldahl Nitrogen	6.1	mg N/L	A	0.16	0.4
11/14/2005 13:40	D-001	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
11/14/2005 13:40	D-001	Nutrients-Liquid	O-Phosphate-P	1.5	mg P/L		0.08	0.2
11/14/2005 13:40	D-001	Nutrients-Liquid	Total-P	2.1	mg P/L	A	0.1	0.3
11/14/2005 16:15	EQ BLANK	Nutrients-Liquid	Ammonia-N	0.01	mg N/L	U	0.01	0.02
11/14/2005 16:15	EQ BLANK	Nutrients-Liquid	Kjeldahl Nitrogen	0.16	mg N/L	U	0.16	0.4
11/14/2005 16:15	EQ BLANK	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
11/14/2005 16:15	EQ BLANK	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
11/14/2005 16:15	EQ BLANK	Nutrients-Liquid	Total-P	0.02	mg P/L	U	0.02	0.06
11/14/2005 13:40	D-001	Overflow	Alpha, Total	13.4	pCi/L			
11/14/2005 13:40	D-001	Overflow	Alpha-Counting Error	6.7	pCi/L			
11/14/2005 13:40	D-001	Overflow	Radium 226	7.9	pCi/L			
11/14/2005 13:40	D-001	Overflow	Radium 226-Counting Error	0.5	pCi/L			
11/14/2005 13:40	D-001	Overflow	Radium 228	1.6	pCi/L			
11/14/2005 13:40	D-001	Overflow	Radium 228-Counting Error	0.7	pCi/L			
11/14/2005 16:15	EQ BLANK	Overflow	Alpha, Total	0.9	pCi/L	U		
11/14/2005 16:15	EQ BLANK	Overflow	Alpha-Counting Error	0.6	pCi/L			
11/14/2005 16:15	EQ BLANK	Overflow	Radium 226	0.2	pCi/L	U		
11/14/2005 16:15	EQ BLANK	Overflow	Radium 226-Counting Error	0.1	pCi/L			
11/14/2005 16:15	EQ BLANK	Overflow	Radium 228	0.9	pCi/L	U		
11/14/2005 16:15	EQ BLANK	Overflow	Radium 228-Counting Error	0.6	pCi/L			

The Bioassay of Palm Coast Water Treatment Plant effluent sampled on November 14, 2005. NPDES #FL0042838.

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 4 2 8 3 8 11	12 0 5 1 1 1 4	18 **B**	19 **S**	20 2

Remarks

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The Priority Pollutants Analysis of Palm Coast Water Treatment Plant effluent sampled on November 14, 2005. NPDES #FL0042838.

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 4 2 8 3 8 11	12 0 5 1 1 1 4	18 **X**	19 **S**	20 2

Remarks

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Biological Analyses of Palm Coast Water Treatment Plant effluent sampled on November 14, 2005. NPDES #FL0042838.

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 F L 0 0 4 2 8 3 8 11	12 0 5 1 1 1 4	18 **S**	19 **S**	20 2

Remarks

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