

Bioassays of

Harbor Branch Oceanographic Institute
Reverse Osmosis Concentrate Disposal Facility

St. Lucie County

NPDES #FL0139912

Sampled November 28, 2005

March 2006

Biology Section
Bureau of Laboratories
Division of Resource Assessment and Management

Quality Manual No. 870346G
NELAC Certification No. E31780

Harbor Branch Oceanographic Institute Reverse Osmosis Concentrate Disposal Facility, 5600 US Highway 1 North, Fort Pierce, St. Lucie County, Florida, NPDES #FL0139912. Effluent samples for this facility were collected on November 28, 2005.

Introduction

Harbor Branch Oceanographic Institute Reverse Osmosis Concentrate Disposal Facility is a reverse osmosis (RO) water treatment plant which supplies potable water to the Harbor Branch Oceanographic Institute. The facility uses the surficial aquifer for its supply water. The facility has a design flow of 12,000 gallons per day (GPD) and had an annual average daily flow (AADF) of 4,420 GPD (December 2004 to November 2005) through internal Outfall I-002. The RO concentrate is not treated prior to discharge into a stormwater retention pond. Dilution occurs within the stormwater pond prior to discharge of effluent from the pond through Outfall D-001 to Class III freshwater wetlands adjacent to the Class III Marine waters of the Indian River Lagoon. Flow is not monitored at Outfall D-001.

The facility is not under any Administrative or Consent Orders. The facility has no toxicity test requirements. There have been no permit violations or plant upsets within the past year. During the past year, copper values at D-001 ranged from 2.2 µg/L to 7.4 µg/L. These concentrations were attributed to accumulation of copper in the pond sediment from prior treatment of the pond with copper sulfate (to control algal growth) and were not attributed to the RO plant (facility information provided by Terry Davis of FDEP Southeast District).

Methods

Samples were collected from Outfall D-001 and Internal Outfall I-002 by Terry Davis (FDEP Southeast 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 acute screen toxicity tests and algal growth potential test were performed following internal DEP SOP's TA07_01, TA07_02, 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 Department uses the 48-hour acute screening toxicity test to provide reasonable assurance that the facility does not adversely affect waters of the state.

The primary bioassays for this facility were performed on the effluent sample collected from Outfall D-001, the permitted discharge from the stormwater retention pond. Two additional bioassays were performed on a sample of effluent collected from Outfall I-002, the internal outfall discharging RO concentrate into the stormwater retention pond. Bioassays were performed with effluent from both outfalls to allow us to distinguish between potential toxicity in the main effluent versus the stormwater retention pond. The EPA suite of chemical analyses was performed on effluent samples collected from Outfall D-001. Metal analyses only were performed on effluent samples collected from Outfall I-002. The algal growth potential (AGP) sample was collected from Outfall D-001.

Toxicity Test Results

Tests were performed November 29 – December 1, 2005.

Outfall D-001

Ceriodaphnia dubia 48-hour acute screening bioassay – LC_{50} > 100%, 5% mortality* in 100% sample at 48 hours

Cyprinella leedsi 48-hour acute screening bioassay – No Result Reported (Control Failure)

Internal Outfall I-002

Ceriodaphnia dubia 48-hour acute screening bioassay – LC_{50} < 100%, 65% mortality* in 100% sample at 48 hours

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

The bioassay sample from Outfall D-001 was not acutely toxic to the *Ceriodaphnia dubia* test organisms. The *Cyprinella leedsi* test for this sample was invalidated due to the control failure (15% control mortality, 10% mortality allowed). The bioassay sample from Outfall I-002 was acutely toxic to the *Ceriodaphnia dubia* test organisms but was not acutely toxic to the *Cyprinella leedsi* test organisms.

Ion imbalance is suspected to be the primary contributor to the mortality in the *Ceriodaphnia dubia* bioassay. The effluent (I-002) calcium concentration (402 mg/L) is well within the range reported to produce acute effects to *Ceriodaphnia dubia* and similar species (USEPA, 2006. ECOTOX: Ecotoxicology Database).

See Appendix 1 for bioassay bench sheets.

*NOTE: In a 48-hour acute screening test of 100% effluent, mortality of <20% provides reasonable assurance 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% mortality indicates low to moderate levels of toxicity, and further action may be required. Mortality of >50% provides reasonable assurance 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.).

Algal Growth Potential

The D-001 effluent AGP was 4.19 mg dry wt/L of the freshwater unicellular green alga, *Pseudokirchneriella subcapitata*, formerly known as *Selenastrum capricornutum*. Raschke and Shultz (1987) found that AGP values above 5.0 mg dry weight/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The analytical chemistry suggests that the D-001 effluent is nitrogen-limited. The predicted AGP based on inorganic nitrogen concentrations was 1.03 (±20%) mg dry wt/L (Table 1; Miller et al. 1978).

See Table 1 for AGP results.

Chemistry Results

Total residual chlorine was not measured in the field and was not detected in either of the bioassay samples in the laboratory. Total ammonia was not detected in the bioassay sample collected from Outfall D-001 but was detected in the bioassay sample collected from Outfall I-002 at a concentration of 0.0829 mg/L. The total ammonia concentration in the sample collected from Outfall D-001 and preserved for chemical analysis was 0.012 mg/L. This value is between the laboratory method detection limit (MDL) and the laboratory practical quantitation limit (PQL). Based on the pH, salinity, and temperature of Outfall D-001 effluent as collected, the calculated unionized ammonia concentration was < 0.02 mg/L.

Copper and iron were detected in the Outfall D-001 effluent at levels that comply with Class III freshwater quality criteria. Arsenic, lead, nickel, and zinc were detected between the laboratory MDL and PQL. Aluminum was detected in the Outfall D-001 effluent.

Chromium III was detected in the Outfall I-002 effluent at a level that complied with Class III freshwater quality criteria. Copper, lead, and nickel were detected at levels between the MDL and

PQL. Aluminum was detected in Outfall I-002 effluent. Concentrations of chromium-III and zinc were greater at Outfall I-002 than at Outfall D-001.

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 28, 2005, was not acutely toxic to the *Ceriodaphnia dubia* test species during the acute screen 48-hour bioassay. The *Cyprinella leedsi* test was invalidated due to excessive control organism mortality. The freshwater AGP result for the effluent was less than the "problem" threshold for fresh receiving waters. Effluent water quality samples did not violate any permit conditions.

The effluent sample collected from Outfall I-002 for this facility on November 28, 2005, was acutely toxic to the *Ceriodaphnia dubia* test species but was not acutely toxic to the *Cyprinella leedsi* test organisms during the acute screen 48-hour bioassays. The cause of the toxicity was attributed in part to the calcium concentration in the sample.

Literature Cited

Miller, W. E., T. E. Maloney, and J. C. Greene. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. EPA-600/9-78-018. U. S. EPA, Cincinnati, Ohio. 126 p.

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.

Table 1. Measured and predicted algal growth potential (AGP; mg dry wt/L) of the freshwater species Psuedokirchneriella subcapitata *for total soluble nitrogen (TSIN) and total nitrogen (TN) limitation and ratios of nitrogen to phosphorus for samples collected from Harbor Branch Oceanographic Institute Reverse Osmosis Concentrate Disposal Facility on November 28, 2005.*

Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Predicted AGP (TN) ± 20%	Inorganic N:P ratio	Total N:P ratio
Outfall D-001	4.16	1.03 ± 0.206	24.13 ± 4.826	0.1	1.81

Table 2. Effluent limits, Class III Freshwater Criteria, and chemical data for samples collected from Harbor Branch Oceanographic Institute Reverse Osmosis Concentrate Disposal Facility on November 28, 2005.

Harbor Branch Oceanographic Institute NPDES# FL0139912	Class III Freshwater Stds	Effluent Limits I-002	Effluent Limits D-001	Outfall I-002	Outfall D-001
Organic Constituents (µg/L)					
None Detected	-	-	-	-	-
Metals (µg/L unless otherwise noted)					
Aluminum	-	-	-	28	26 A
Arsenic	≤ 50	-	-	4 U	6.4 I
Cadmium	≤ 3.4 b	-	-	0.25 U	0.05 U
Calcium (mg/L)	-	-	-	402	57.8 A
Chromium-III	≤ 268.2 b	-	-	6	1 U
Copper	≤ 30.5 b	-	Report	2.6 I	4.13 A
Iron	≤ 1,000	-	-	1,000	81 A
Lead	≤ 18.6 b	-	-	0.96 I	0.11 I
Magnesium (mg/L)	-	-	-	13.3	4.4 A
Nickel	≤ 168.5 b	-	-	4 I	1.6 I
Selenium	≤ 5	-	-	2.5 eU	1 eU
Silver	≤ 0.07	-	-	0.12 U	0.025 U
Zinc	≤ 387.8 b	-	-	96	4 I
Nutrients (mg/L)					
Ortho-phosphate	-	-	-	-	0.28
Total Phosphorus	-	Report	Report	-	0.35
Ammonia	-	-	-	-	0.012 I
Unionized Ammonia	≤ 0.02	-	-	-	< 0.02 c
Nitrate+Nitrite	-	-	-	-	0.015 f
Total Kjeldahl Nitrogen	-	-	-	-	0.62
Organic Nitrogen	-	-	-	-	0.61 c
Total Nitrogen	-	-	-	-	0.64 c
General Physical and Chemical Parameters					
pH (S.U.)	6.0-8.5	6.0-8.5	Report	6.5	7.5
Conductivity (umhos/cm)	1,275	-	-	2,008	474
Temperature (C)	-	-	-	25.9	23.7
Dissolved Oxygen (mg/L)	≥ 5.0	-	-	-	9.2
Chlorophyll *a* (µg/L)	-	-	-	-	1.8 I
Phaeophytin *a* (µg/L)	-	-	-	-	0 J
Flow (MGD)	-	≤ 0.0075 m	-	0.0042a	-
Hardness (mg/L)	-	-	-	1,058.6 c	162.4 c
Chloride (mg/L)	-	Report	Report	-	-

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

a - Annual average

c - Calculated value

e - Selenium was detected in the field blank at a concentration of 0.52 µg/L I

f - Nitrate+nitrite was detected in the field blank at a concentration of 0.046 mg/L

m - Monthly average

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 limit.

J - Estimated value

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

FDEP Biology Section - Acute Screen Bioassay Bench Sheets

Facility: Harbor Branch #1 (RO Effluent I-002)
Address: 5600 US Hwy 1 North
City: Fort Pierce County: St. Lucie
Contact/District: Terry Davis / Southeast Dist.
NPDES Permit #: FL 0139912
LIMS Job # THH-2005-11-21-46 LIMS Sample #: 88289
Lims Data Entry: 12-08-05 MC Data Entry Verification: 12-8-05 gp

Sample Collection: Date: 11-28-05 Time: 10:40
Hold Time Start: Date: 11-28-05 Time: 1040

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.
Light Intensity : 50 - 100 ft. candles.
Photoperiod : 16 hours light 8 hours dark.

Test 1 validation: Test 1: SOP TA 07_01
Control survival ≥90%: Yes No
Temperature Range ≤3°C: Yes No
Test 2 validation: Test 2: SOP TA 07_02
Control survival ≥90%: Yes No
Temperature Range ≤3°C: Yes No

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: ____

Temperature Range °C
Incubator # 3 Range 24.3-26.4°C
Room 0246: 23.3-24.6°C
Waterbath: N/A

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)

Investigators' Signatures

Sarah Friedrich
Marshall Faircloth
Jessi Ebnit
Erin Wilcox

Nicole Wellhoff
REVIEWER

Water Quality Parameters	20% DMW	Moderately Hard Water/ Well Water	Salt Water ASW NSW Test 1	Salt Water ASW NSW Test 2	Other	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):	N/A	N/A	N/A	N/A		not measured	—	SP	
Lab Total Residual Cl2 (mg/L)	<0.03	<0.03				<0.03	HACH	SP/EW	MF
Alkalinity (mg/L as $CaCO_3$)	59	142				250.5	HACH	EW	MF
Hardness (mg/L as $CaCO_3$)	79	138.5				7400	HACH	EW	MF
Total Ammonia (mg/L as N):	<0.017	<0.017				0.082	DENVER	MF	SP
Salinity (ppth)	<1	<1				1.08	YSI / Mettler	SP	MC

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Appendix 1. Bench Sheets (continued)

FDEP Biology Section - Bioassay Survival Sheet

LIMS Sample #: 882189 Test #: 1 Test Started: Date 11-29-05 Time: 1400

Organism: C. dubia SOP #: TA 07_ 01 Test Ended: Date 12-1-05 Time: 1300

Organism Batch: 43-05 Diluent/ Batch: DMW / 35-05

Organism Age: <24 hrs Food: YCT *P. subcapitata* *Artemia*

Chamber Size: 30 mL Batch: 04-05 06-05 –

Test Volume: 20 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	A	5	5	5			
	B	B	5	5	5			
	C	C	5	5	4^{1D}			
	D	D	5	5	5			
100%	A	A	5	3^{2D}	2^{1D}			
	B	B	5	2^{3D}	1^{1D}			
	C	C	5	5	3^{2D}			
	D	D	5	5	1^{4D}			
Organisms loaded by: JO		Checked by:	[redacted]	JO	SP			

Loading Verified by: SP

Comments:

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

Test Results:

% mortality in 100% sample: 65%

LC_{50}: < 100 If Calculated: 95% CI______ Method:______

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 Survival Sheet

LIMS Sample #: 882189 Test #: 2 Test Started: Date 11-29-05 Time: 1500
Organism: C. leedsi SOP #: TA 07_02 Test Ended: Date 12-1-05 Time: 1330
Organism Batch: 34-05 Diluent/ Batch: Well H_2O / 11-29-05
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	C17	5	5	5			
	B	C18	5	5	5			
	C	C19	5	4 (1D)	4			
	D	C20	5	5	5			
100%	A	C21	5	5	5			
	B	C22	5	5	5			
	C	C23	5	4 1D	4			
	D	C24	5	4 1D	4			
Organisms loaded by: JD		Checked by:		JD	JD			

Loading Verified by: SP

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

Comments:

Test Results:
% mortality in 100% sample: 10
LC_{50}: >100 If Calculated: 95% CI________ Method:________

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 Parameter Sheet

LIMS Sample #: 822189 Test #: 1 of 2

TEST SOP #: TA07_01 Test Species: *Ceriodaphnia dubia* *Cyprinella leedsi* *Pimephales promelas* *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			
pH (S.U.)	6.8		8.1			
Temperature °C	24.7		24.2			
Dissolved Oxygen mg/L	7.6		7.3			
Conductivity ~~µmhos~~ mmhos	180		215			
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A		B			
pH (S.U.)	6.6		8.2			
Temperature °C	25.1		[illegible]			
Dissolved Oxygen mg/L	6.7		6.7			
Conductivity ~~µmhos~~ mmhos	2180		2470			
(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						
Conductivity ~~µmhos~~ mmhos						
(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						
Conductivity ~~µmhos~~ mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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Appendix 1. Bench Sheets (continued)

FDEP Biology Section - Bioassay Parameter Sheet

LIMS Sample #: 8921897 Test #: 2 of 2

TEST SOP #: TA07_02 Test Species: *Ceriodaphnia dubia* *Cyprinella leedsi* *Pimephales promelas* *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	AC			
pH (S.U.)	7.9	8.3	8.2			
Temperature °C	25.7	24.0	24.7			
Dissolved Oxygen mg/L	6.6	8.1	6.7			
Conductivity µmhos mmhos	2.68	3.15	2.97			
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

Comments:

Concentration 100 %	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	AC			
pH (S.U.)	6.5	7.1	7.3			
Temperature °C	25.7	24.2	24.7			
Dissolved Oxygen mg/L	6.6	7.0	6.2			
Conductivity µmhos mmhos	2.15	2.18	2.25			
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

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:

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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FDEP Biology Section - Acute Screen Bioassay Bench Sheets

Facility: Harbor Branch #2 (D-001)
Address: 5600 US Hwy 1 North
City: Fort Pierce County: St. Lucie
Contact/District: Terry Davis / Southeast
NPDES Permit #: FL 0139912
LIMS Job #: TLH-2005-11-29-48 LIMS Sample #: 882023
Lims Data Entry: 12-05-05 ML Data Entry Verification: 12-8-05 GP

Sample Collection: Date: 11-28-05 Time: 11:20
Hold Time Start: Date: 11-28-05 Time: 11:20

Comments:
(A) transcription error correct value 0.03 SP
(B) Test #2 reported as no resp. Held to excessive control mortality 15% - 10% allowed - MF 12/7/05

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.
Light Intensity : 50 - 100 ft. candles.
Photoperiod : 16 hours light 8 hours dark.

Test 1 validation: Test 1: SOP TA 07_01
Control survival ≥90%: (Yes) No
Temperature Range ≤3°C: (Yes) No

Test 2 validation: Test 2: SOP TA 07_02
Control survival ≥90%: Yes (No) 15% mortality (B)
Temperature Range ≤3°C: (Yes) No

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: ____

Temperature Range °C
Incubator # 3 Range 24.8-26.4°C
Room D240: 23.3-24.4°C
Waterbath: NA

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)

Investigators' Signatures:
Janet Pickard
Marshall Faircloth
Erin Wilcox
Jenn Davis
Nicole Wetherby
REVIEWER

Water Quality Parameters	20% DMW	Moderately Hard Water/ Well Water	~~Salt Water 20% DMW~~	~~Salt Water 100%~~	Other	Original Sample	Method	Measured by	Verified by
			Test 1	Test 2					
Field Total Residual Cl2 (mg/L):	N/A	N/A	N/A	N/A		not measured	-		SP
Lab Total Residual Cl2 (mg/L):			<0.03	<0.03		~~<0.03~~ (A)	HACH	SP/EW	ML
Alkalinity (mg/L as $CaCO_3$)			89	142		120	HACH	EW	SP
Hardness (mg/L as $CaCO_3$)			99	138.5		182	HACH	EW	SP
Total Ammonia (mg/L as N):			<0.017	<0.017		<0.017	DENVER	MF	SP
Salinity (ppth):			<1	<1		~~1.00~~	YSI / Mettler	SP	MF

salinity <1 SP

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2 [redacted]

Appendix 1. Bench Sheets (continued)

FDEP Biology Section - Bioassay Survival Sheet

LIMS Sample #: 882023 Test #: 1 Test Started: Date 11-29-05 Time: 1350

Organism: ~~C.dubia~~ C.dubia SOP #: TA 07_ ~~22~~ 01 Test Ended: Date 12-1-05 Time: 1250

Organism Batch: 43-05 Diluent/ Batch: ~~ASW~~ / DMW 35-05

Organism Age: <24 hrs Food: YCT P. subcapitata Artemia

Chamber Size: ~~400~~ 30 mL Batch: 04-05 06-05 -

Test Volume: ~~250~~ 20 mL Feeding: ~~Prior to test~~ - Prior to renewal : ~~Daily~~ BP

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	Tox 2	5	5	5			
	B	Tox 3	5	5	5			
	C	Tox 4	5	5	5			
	D	Tox 5	5	5	5			
100%	A	Tox 7	5	5	5			
	B	Tox 9	5	5	5			
	C	Tox 10	5	5	4[1]			
	D	Tox 11	5	5	5			
Organisms loaded by: JD		Checked by: [redacted]	JD	BP				
Loading Verified by: BP								

Comments:

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

Test Results:

% mortality in 100% sample: 5

LC_{50}: >100 If Calculated: 95% CI _____ Method: _____

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 Survival Sheet

LIMS Sample #: ~~88~~ 882023 Test #: 2
Organism: ~~M. beryllina~~ C. leedsi SOP #: TA 07_04.02
Organism Batch: 34-05 Diluent/ Batch: ~~ASW~~ / Well H_2O 11-29-05
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

Test Started: Date 11-29-05 Time: 1515
Test Ended: Date 12-1-05 Time: 1400

Concentration	Replicate	Chamber #	Test Hour: 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	A1	5	5	5			
	B	A2	5	4 1D	4			
	C	A3	5	3 2D	3			
	D	A4	5	5	5			
100%	A	A5	5	5	5			
	B	A6	5	4 1D	4			
	C	A7	5	4 1D	4			
	D	A8	5	4 1D	3 1D			
Organisms loaded by: JJ		Checked by:	[redacted]	JJ	JO			

Loading Verified by: SP

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

Comments: Reported as No result due to Control failure (15%) mortality. MF 12-7-05 NCR 1830

Test Results:
% mortality in 100% sample: 20%
LC_{50}: >100 If Calculated: 95% CI________ Method:________

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

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LIMS Sample # : 882023 Test #: 1 of 2

TEST SOP #: TA07_ ~~A~~ 01 Test Species: (Ceriodaphnia dubia) Cyprinella leedsi Pimephales promelas ~~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			
pH (S.U.)	6.8		7.9			
Temperature °C	24.8		24.6			
Dissolved Oxygen mg/L	7.5		7.5			
Conductivity ~~µmhos~~ mmhos	184		215			
(initials) Measured by:	[illegible]		[illegible]			
(initials) Recorded by:	[illegible]		[illegible]			

Comments:

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A		B			
pH (S.U.)	7.5		8.2			
Temperature °C	24.9		24.5			
Dissolved Oxygen mg/L	8.1		7.4			
Conductivity ~~µmhos~~ mmhos	441		515			
(initials) Measured by:	[illegible]		[illegible]			
(initials) Recorded by:	[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:

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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FDEP Biology Section - Bioassay Parameter Sheet

LIMS Sample # : 8832023 Test #: 2 of 2

TEST SOP #: TA07_0402 Test Species: *Ceriodaphnia dubia* (*Cyprinella leedsi*) *Pimephales promelas*
Americamysis bahia (~~*Mysidopsis bahia*~~) 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.)	7.9	8.2	8.3			
Temperature °C	25.2	24.1	24.9			
Dissolved Oxygen mg/L	7.9	6.9	6.7			
Conductivity ~~µmhos~~ mmhos	270	298	315			
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

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.)	7.8	8.1	8.1			
Temperature °C	25.2	24.4	24.9			
Dissolved Oxygen mg/L	7.7	7.7	6.4			
Conductivity ~~µmhos~~ mmhos	443	466	489			
(initials) Measured by:	JD	JD	JD			
(initials) Recorded by:	JD	JD	JD			

Comments:

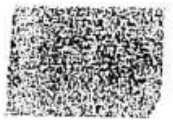
Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity ~~µmhos~~ mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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 Harbor Branch Oceanographic Institute Reverse Osmosis Concentrate Disposal Facility Outfall D-001 and Internal Outfall I-002, sampled on November 28, 2005.

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
11/28/2005 11:20	Outfall D-001	Bio-AGP/LimNut	Algal Growth Potential	4.16	mg DryWt/L		0.3	0.9
11/28/2005 11:20	Outfall D-001	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	1.8	ug/L	I	0.85	2.6
11/28/2005 11:20	Outfall D-001	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0	ug/L	J	0.85	2.6
11/28/2005 11:20	Outfall D-001	Bio-Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	LC50	L		
11/28/2005 11:20	Outfall D-001	Bio-Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	No Result	LC50			
11/28/2005 10:40	Effluent I-002	Bio-Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	LC50	K		
11/28/2005 10:40	Effluent I-002	Bio-Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	LC50	L		
11/28/2005 11:20	Outfall D-001	BNA-Water	1,2,4-Trichlorobenzene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	1,2-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	1,3-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	1,4-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	2,4,6-Trichlorophenol	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	2,4-Dichlorophenol	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
11/28/2005 11:20	Outfall D-001	BNA-Water	2,4-Dinitrophenol	14	ug/L	U	14	58
11/28/2005 11:20	Outfall D-001	BNA-Water	2,4-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	2,6-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	2-Chloronaphthalene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	2-Chlorophenol	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	12
11/28/2005 11:20	Outfall D-001	BNA-Water	2-Nitrophenol	0.96	ug/L	UJ	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	UJ	38	150
11/28/2005 11:20	Outfall D-001	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	4,4'-DDT	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	4-Bromophenyl phenyl ether	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	4-Chloro-3-methylphenol	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.7
11/28/2005 11:20	Outfall D-001	BNA-Water	4-Nitrophenol	14	ug/L	U	14	58
11/28/2005 11:20	Outfall D-001	BNA-Water	Acenaphthene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Acenaphthylene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Anthracene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Benzidine	96	ug/L	U	96	380
11/28/2005 11:20	Outfall D-001	BNA-Water	Benzo(a)anthracene	0.96	ug/L	U	0.96	3.8

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
11/28/2005 11:20	Outfall D-001	BNA-Water	Benzo(a)pyrene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Benzo(b)fluoranthene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Benzo(g,h,i)perylene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Benzo(k)fluoranthene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Bis(2-chloroethoxy)methane	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Bis(2-chloroethyl)ether	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	12
11/28/2005 11:20	Outfall D-001	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	58
11/28/2005 11:20	Outfall D-001	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
11/28/2005 11:20	Outfall D-001	BNA-Water	Chrysene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Dibenzo(a,h)anthracene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Diethyl phthalate	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
11/28/2005 11:20	Outfall D-001	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
11/28/2005 11:20	Outfall D-001	BNA-Water	Di-n-octyl phthalate	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
11/28/2005 11:20	Outfall D-001	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
11/28/2005 11:20	Outfall D-001	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15
11/28/2005 11:20	Outfall D-001	BNA-Water	Fluoranthene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Fluorene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Hexachlorobenzene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	12
11/28/2005 11:20	Outfall D-001	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	UJ	2.9	12
11/28/2005 11:20	Outfall D-001	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	12
11/28/2005 11:20	Outfall D-001	BNA-Water	Indeno(1,2,3-cd)pyrene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Isophorone	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Naphthalene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.7
11/28/2005 11:20	Outfall D-001	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.7

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
11/28/2005 11:20	Outfall D-001	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.7
11/28/2005 11:20	Outfall D-001	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	12
11/28/2005 11:20	Outfall D-001	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	12
11/28/2005 11:20	Outfall D-001	BNA-Water	Phenanthrene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Phenol	0.96	ug/L	U	0.96	3.8
11/28/2005 11:20	Outfall D-001	BNA-Water	Pyrene	0.96	ug/L	U	0.96	3.8
11/28/2005 11:45	Field Blank	BNA-Water	1,2,4-Trichlorobenzene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	1,2-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	1,3-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	1,4-Dichlorobenzene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	2,4,6-Trichlorophenol	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	2,4-Dichlorophenol	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
11/28/2005 11:45	Field Blank	BNA-Water	2,4-Dinitrophenol	14	ug/L	U	14	57
11/28/2005 11:45	Field Blank	BNA-Water	2,4-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	2,6-Dinitrotoluene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	2-Chloronaphthalene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	2-Chlorophenol	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	11
11/28/2005 11:45	Field Blank	BNA-Water	2-Nitrophenol	0.95	ug/L	UJ	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	UJ	38	150
11/28/2005 11:45	Field Blank	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	4,4'-DDT	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	4-Bromophenyl phenyl ether	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	4-Chloro-3-methylphenol	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.6
11/28/2005 11:45	Field Blank	BNA-Water	4-Nitrophenol	14	ug/L	U	14	57
11/28/2005 11:45	Field Blank	BNA-Water	Acenaphthene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Acenaphthylene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	Anthracene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Benzidine	95	ug/L	U	95	380
11/28/2005 11:45	Field Blank	BNA-Water	Benzo(a)anthracene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Benzo(a)pyrene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Benzo(b)fluoranthene	0.95	ug/L	U	0.95	3.8

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
11/28/2005 11:45	Field Blank	BNA-Water	Benzo(g,h,i)perylene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Benzo(k)fluoranthene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	Bis(2-chloroethoxy)methane	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Bis(2-chloroethyl)ether	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	11
11/28/2005 11:45	Field Blank	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	57
11/28/2005 11:45	Field Blank	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
11/28/2005 11:45	Field Blank	BNA-Water	Chrysene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	Dibenzo(a,h)anthracene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	Diethyl phthalate	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
11/28/2005 11:45	Field Blank	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
11/28/2005 11:45	Field Blank	BNA-Water	Di-n-octyl phthalate	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
11/28/2005 11:45	Field Blank	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
11/28/2005 11:45	Field Blank	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15
11/28/2005 11:45	Field Blank	BNA-Water	Fluoranthene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Fluorene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.7
11/28/2005 11:45	Field Blank	BNA-Water	Hexachlorobenzene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	11
11/28/2005 11:45	Field Blank	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	UJ	2.9	11
11/28/2005 11:45	Field Blank	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	11
11/28/2005 11:45	Field Blank	BNA-Water	Indeno(1,2,3-cd)pyrene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Isophorone	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Naphthalene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.6
11/28/2005 11:45	Field Blank	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.6
11/28/2005 11:45	Field Blank	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.6
11/28/2005 11:45	Field Blank	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	11

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
11/28/2005 11:45	Field Blank	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	11
11/28/2005 11:45	Field Blank	BNA-Water	Phenanthrene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Phenol	0.95	ug/L	U	0.95	3.8
11/28/2005 11:45	Field Blank	BNA-Water	Pyrene	0.95	ug/L	U	0.95	3.8
11/28/2005 11:20	Outfall D-001	GC-Water	Alachlor	0.6	ug/L	U	0.6	2.4
11/28/2005 11:20	Outfall D-001	GC-Water	Ametryn	0.05	ug/L	U	0.05	0.2
11/28/2005 11:20	Outfall D-001	GC-Water	Atrazine	0.05	ug/L	U	0.05	0.2
11/28/2005 11:20	Outfall D-001	GC-Water	Azinphos Methyl	0.2	ug/L	U	0.2	0.8
11/28/2005 11:20	Outfall D-001	GC-Water	Bromacil	0.2	ug/L	U	0.2	0.8
11/28/2005 11:20	Outfall D-001	GC-Water	Butylate	0.2	ug/L	UJ	0.2	0.8
11/28/2005 11:20	Outfall D-001	GC-Water	Chlorpyrifos Ethyl	0.05	ug/L	U	0.05	0.2
11/28/2005 11:20	Outfall D-001	GC-Water	Chlorpyrifos Methyl	0.1	ug/L	U	0.1	0.4
11/28/2005 11:20	Outfall D-001	GC-Water	Diazinon	0.05	ug/L	UJ	0.05	0.2
11/28/2005 11:20	Outfall D-001	GC-Water	Ethion	0.05	ug/L	U	0.05	0.2
11/28/2005 11:20	Outfall D-001	GC-Water	Ethoprop	0.1	ug/L	U	0.1	0.4
11/28/2005 11:20	Outfall D-001	GC-Water	Fenamiphos	0.2	ug/L	U	0.2	0.8
11/28/2005 11:20	Outfall D-001	GC-Water	Fonofos	0.1	ug/L	U	0.1	0.4
11/28/2005 11:20	Outfall D-001	GC-Water	Hexazinone	0.1	ug/L	U	0.1	0.4
11/28/2005 11:20	Outfall D-001	GC-Water	Malathion	0.15	ug/L	UJ	0.15	0.6
11/28/2005 11:20	Outfall D-001	GC-Water	Metalaxyl	0.25	ug/L	U	0.25	1
11/28/2005 11:20	Outfall D-001	GC-Water	Metolachlor	0.5	ug/L	U	0.5	2
11/28/2005 11:20	Outfall D-001	GC-Water	Metribuzin	0.1	ug/L	U	0.1	0.4
11/28/2005 11:20	Outfall D-001	GC-Water	Mevinphos	0.2	ug/L	U	0.2	0.8
11/28/2005 11:20	Outfall D-001	GC-Water	Naled	0.8	ug/L	U	0.8	3.2
11/28/2005 11:20	Outfall D-001	GC-Water	Norflurazon	0.15	ug/L	U	0.15	0.6
11/28/2005 11:20	Outfall D-001	GC-Water	Parathion Ethyl	0.15	ug/L	U	0.15	0.6
11/28/2005 11:20	Outfall D-001	GC-Water	Parathion Methyl	0.1	ug/L	U	0.1	0.4
11/28/2005 11:20	Outfall D-001	GC-Water	Phorate	0.05	ug/L	U	0.05	0.2
11/28/2005 11:20	Outfall D-001	GC-Water	Prometryn	0.15	ug/L	U	0.15	0.6
11/28/2005 11:20	Outfall D-001	GC-Water	Simazine	0.05	ug/L	U	0.05	0.2
11/28/2005 11:45	Field Blank	GC-Water	Alachlor	0.58	ug/L	U	0.58	2.3
11/28/2005 11:45	Field Blank	GC-Water	Ametryn	0.048	ug/L	U	0.048	0.19
11/28/2005 11:45	Field Blank	GC-Water	Atrazine	0.048	ug/L	U	0.048	0.19
11/28/2005 11:45	Field Blank	GC-Water	Azinphos Methyl	0.19	ug/L	U	0.19	0.76
11/28/2005 11:45	Field Blank	GC-Water	Bromacil	0.19	ug/L	U	0.19	0.76
11/28/2005 11:45	Field Blank	GC-Water	Butylate	0.19	ug/L	UJ	0.19	0.76
11/28/2005 11:45	Field Blank	GC-Water	Chlorpyrifos Ethyl	0.048	ug/L	U	0.048	0.19

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
11/28/2005 11:45	Field Blank	GC-Water	Chlorpyrifos Methyl	0.096	ug/L	U	0.096	0.38
11/28/2005 11:45	Field Blank	GC-Water	Diazinon	0.048	ug/L	UJ	0.048	0.19
11/28/2005 11:45	Field Blank	GC-Water	Ethion	0.048	ug/L	U	0.048	0.19
11/28/2005 11:45	Field Blank	GC-Water	Ethoprop	0.096	ug/L	U	0.096	0.38
11/28/2005 11:45	Field Blank	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
11/28/2005 11:45	Field Blank	GC-Water	Fonofos	0.096	ug/L	U	0.096	0.38
11/28/2005 11:45	Field Blank	GC-Water	Hexazinone	0.096	ug/L	U	0.096	0.38
11/28/2005 11:45	Field Blank	GC-Water	Malathion	0.14	ug/L	UJ	0.14	0.56
11/28/2005 11:45	Field Blank	GC-Water	Metalaxyl	0.24	ug/L	U	0.24	0.96
11/28/2005 11:45	Field Blank	GC-Water	Metolachlor	0.48	ug/L	U	0.48	1.9
11/28/2005 11:45	Field Blank	GC-Water	Metribuzin	0.096	ug/L	U	0.096	0.38
11/28/2005 11:45	Field Blank	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
11/28/2005 11:45	Field Blank	GC-Water	Naled	0.77	ug/L	U	0.77	3.1
11/28/2005 11:45	Field Blank	GC-Water	Norflurazon	0.14	ug/L	U	0.14	0.56
11/28/2005 11:45	Field Blank	GC-Water	Parathion Ethyl	0.14	ug/L	U	0.14	0.56
11/28/2005 11:45	Field Blank	GC-Water	Parathion Methyl	0.096	ug/L	U	0.096	0.38
11/28/2005 11:45	Field Blank	GC-Water	Phorate	0.048	ug/L	U	0.048	0.19
11/28/2005 11:45	Field Blank	GC-Water	Prometryn	0.14	ug/L	U	0.14	0.56
11/28/2005 11:45	Field Blank	GC-Water	Simazine	0.048	ug/L	U	0.048	0.19
11/28/2005 11:20	Outfall D-001	Metals-Water	Aluminum	26	ug/L	A	5	20
11/28/2005 11:20	Outfall D-001	Metals-Water	Arsenic	6.4	ug/L	I	4	16
11/28/2005 11:20	Outfall D-001	Metals-Water	Cadmium	0.05	ug/L	U	0.05	0.2
11/28/2005 11:20	Outfall D-001	Metals-Water	Calcium	57.8	mg/L	A	0.05	0.2
11/28/2005 11:20	Outfall D-001	Metals-Water	Chromium	1	ug/L	U	1	4
11/28/2005 11:20	Outfall D-001	Metals-Water	Copper	4.13	ug/L	A	0.25	1
11/28/2005 11:20	Outfall D-001	Metals-Water	Iron	81	ug/L	A	10	40
11/28/2005 11:20	Outfall D-001	Metals-Water	Lead	0.11	ug/L	I	0.075	0.3
11/28/2005 11:20	Outfall D-001	Metals-Water	Magnesium	4.4	mg/L	A	0.01	0.04
11/28/2005 11:20	Outfall D-001	Metals-Water	Nickel	1.6	ug/L	I	1	4
11/28/2005 11:20	Outfall D-001	Metals-Water	Selenium	1	ug/L	U	1	4
11/28/2005 11:20	Outfall D-001	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
11/28/2005 11:20	Outfall D-001	Metals-Water	Zinc	4	ug/L	I	3	12
11/28/2005 10:40	Effluent I-002	Metals-Water	Arsenic	4	ug/L	U	4	16
11/28/2005 10:40	Effluent I-002	Metals-Water	Cadmium	0.25	ug/L	U	0.25	1
11/28/2005 10:40	Effluent I-002	Metals-Water	Calcium	402	mg/L		0.25	1
11/28/2005 10:40	Effluent I-002	Metals-Water	Chromium	6	ug/L		1	4
11/28/2005 10:40	Effluent I-002	Metals-Water	Copper	2.6	ug/L	I	1.2	5

Appendix 2. Chemical Analyses (continued)

Date Sampled	Field ID	Analysis Group	Component	Result	Units	Remark	MDL	PQL
11/28/2005 10:40	Effluent I-002	Metals-Water	Iron	1.00E+03	ug/L		10	40
11/28/2005 10:40	Effluent I-002	Metals-Water	Lead	0.96	ug/L	I	0.38	1.5
11/28/2005 10:40	Effluent I-002	Metals-Water	Magnesium	13.3	mg/L		0.01	0.04
11/28/2005 10:40	Effluent I-002	Metals-Water	Nickel	4	ug/L	I	1	4
11/28/2005 10:40	Effluent I-002	Metals-Water	Selenium	2.5	ug/L	U	2.5	10
11/28/2005 10:40	Effluent I-002	Metals-Water	Silver	0.12	ug/L	U	0.12	0.5
11/28/2005 10:40	Effluent I-002	Metals-Water	Zinc	96	ug/L		3	12
11/28/2005 11:45	Field Blank	Metals-Water	Aluminum	5	ug/L	U	5	20
11/28/2005 11:45	Field Blank	Metals-Water	Arsenic	4	ug/L	U	4	16
11/28/2005 11:45	Field Blank	Metals-Water	Cadmium	0.05	ug/L	U	0.05	0.2
11/28/2005 11:45	Field Blank	Metals-Water	Calcium	0.05	mg/L	U	0.05	0.2
11/28/2005 11:45	Field Blank	Metals-Water	Chromium	1	ug/L	U	1	4
11/28/2005 11:45	Field Blank	Metals-Water	Copper	0.25	ug/L	U	0.25	1
11/28/2005 11:45	Field Blank	Metals-Water	Iron	10	ug/L	U	10	40
11/28/2005 11:45	Field Blank	Metals-Water	Lead	0.075	ug/L	U	0.075	0.3
11/28/2005 11:45	Field Blank	Metals-Water	Magnesium	0.01	mg/L	U	0.01	0.04
11/28/2005 11:45	Field Blank	Metals-Water	Nickel	1	ug/L	U	1	4
11/28/2005 11:45	Field Blank	Metals-Water	Selenium	0.52	ug/L	I	0.5	2
11/28/2005 11:45	Field Blank	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
11/28/2005 11:45	Field Blank	Metals-Water	Zinc	3	ug/L	U	3	12
11/28/2005 10:40	Effluent I-002	Metals-Water	Aluminum	28	ug/L		5	20
11/28/2005 11:20	Outfall D-001	Nutrients-Liquid	Ammonia-N	0.012	mg N/L	I	0.01	0.02
11/28/2005 11:20	Outfall D-001	Nutrients-Liquid	Kjeldahl Nitrogen	0.62	mg N/L		0.08	0.2
11/28/2005 11:20	Outfall D-001	Nutrients-Liquid	NO2NO3-N	0.015	mg N/L		0.004	0.01
11/28/2005 11:20	Outfall D-001	Nutrients-Liquid	O-Phosphate-P	0.28	mg P/L		0.012	0.03
11/28/2005 11:20	Outfall D-001	Nutrients-Liquid	Total-P	0.35	mg P/L		0.02	0.06
11/28/2005 11:45	Field Blank	Nutrients-Liquid	Ammonia-N	0.01	mg N/L	U	0.01	0.02
11/28/2005 11:45	Field Blank	Nutrients-Liquid	Kjeldahl Nitrogen	0.08	mg N/L	U	0.08	0.2
11/28/2005 11:45	Field Blank	Nutrients-Liquid	NO2NO3-N	0.046	mg N/L		0.004	0.01
11/28/2005 11:45	Field Blank	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
11/28/2005 11:45	Field Blank	Nutrients-Liquid	Total-P	0.02	mg P/L	U	0.02	0.06

The Bioassay of Harbor Branch Oceanographic Institute effluent sampled on November 28, 2005. NPDES #FL0139912.

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 1 3 9 9 1 2 11	12 0 5 1 1 2 8	18 **B**	19 **S**	20 2

Remarks

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The Priority Pollutants Analysis of Harbor Branch Oceanographic Institute effluent sampled on November 28, 2005. NPDES #FL0139912.

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 1 3 9 9 1 2 11	12 0 5 1 1 2 8	18 **X**	19 **S**	20 2

Remarks

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Biological Analyses of Harbor Branch Oceanographic Institute effluent sampled on November 28, 2005. NPDES #FL0139912.

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 1 3 9 9 1 2 11	12 0 5 1 1 2 8	18 **S**	19 **S**	20 2

Remarks

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