

Biological Assessment of

Rivers Edge Reverse Osmosis Water Treatment Plant

Charlotte County

NPDES #FL0042412

Sampled April 2000

October 2001

Biology Section

Bureau of Laboratories

Division of Resource Assessment and Management

Comprehensive Quality Assurance Plan No. 870346G

Florida Department of Environmental Protection
Fifth Year Inspection Summary

Discharger:	Rivers Edge RO Water Treatment Plant
County:	Charlotte
NPDES Permit Number:	FL0042412
Permit Expiration:	January 10, 2001

Toxics Sampling Inspection (**XSI**)

Date Sampled: April 3, 2000

Results: Nickel was detected in the effluent (11.4 µg/L) at a level that exceeded the Class III water quality standard (8.3 µg/L) (Rule 62-302.530(45) FAC). Copper was detected in the effluent (3.1 µg/L)at a level that exceeded the minimum detection limit but was less the minimum quantitation limit. Radionucleotide analyses revealed the presence of gross alpha radiation (15.7 pCi/L) and a combined radium value of 2.8 pCi/L. The gross alpha radiation level slightly exceeded the plant's permit limit (15.0 pCi/L).

Compliance Biomonitoring Inspection (**CBI**)

Date Sampled: April 3, 2000

Results: The effluent sample was acutely toxic to *Americamysis. bahia.* Test organism mortality was 100% at 48 hours and is a violation of Rules 62-302.500(1)(a)(4), and 62-302.530(62) FAC. The mortality may be due to the seawater-ion imbalance of the sample. The test results did not indicate toxicity to *Menidia beryllina*. Previous research conducted by the FDEP demonstrated that *A. bahia* is more sensitive to seawater-ion imbalances than is *M. beryllina.*

Impact Bioassessment Inspection (**IBI**)

Date Sampled: April 3, 2000

Results: Measures of phytoplankton community health showed some degradation at the test site compared to the control site. Taxa richness was 24% lower and diversity was 6% lower at the test site compared to the control site. Chlorophyll *a* was elevated throughout the study area (18 µg/L at the test site and 20 µg/L at the control site), indicating sources of nutrients in addition to the effluent. The chlorophyll *a* values were higher than 90% of other typical Florida estuaries. Quantitative measures of macroinvertebrate community health also showed degradation potentially associated with the discharge. Taxa richness decreased 34% and diversity declined 13% from the control site to the test site. Pelecypods, typically considered indicators of 'good water quality', declined 30% from the control site (36%) to the test site (6%).

Water Quality Inspection (**WQI**)

Date Sampled: April 3, 2000

Results: The control and test sites were similar with respect to most physical/chemical parameters. Nutrients samples were not collected from the study sites. AGP was below the 10 mg dry wt/L 'problem threshold' at both study sites.

Biological assessments are prepared by FDEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions.

Introduction

The Rivers Edge Reverse Osmosis Water Treatment Plant is located in Charlotte County, north of Punta Gorda (see maps in Appendix). The reverse osmosis concentrate treatment and disposal system consists of a forced draft aerator for the removal of hydrogen sulfide and the addition of dissolved oxygen prior to discharge through a multiport plenum into the tidally influenced Class III Hunter Creek. Although the design flow is 0.017 MGD with an average flow of 0.001 MGD, the discharge is intermittent. The actual mean flow during this survey was 0.001 MGD.

Mixing zones are established for specific conductance, chlorides, combined radium and gross alpha (see Facility Summary in Appendix). The mixing zones extend three meters upstream and downstream from the discharge plenum.

State permit limits for this facility are listed in Table 1. According to the facility's monthly operating reports, the plant has had permit limit violations within the last two years. In the third and fourth quarter of 1999, gross alpha results were reported as 33 pCi/L exceeding the permit of 15 pCi/L. For the first five months of 2000, dissolved oxygen violations were reported. On August 8, 2000, the South District issued a warning letter for gross alpha and conductance violations (see Facility Summary). This facility will repermit by January 2001 and plans to remove the surface water discharge to a permitted groundwater disposal site.

Because the new (1998) water plant membranes concentrate brine more efficiently than in the past, discharge monthly reports are showing increases in gross alpha, radium 226 and 228 and specific conductance.

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a control site (located approximately 900 meters upstream of the discharge) and a test site (located approximately 100 meters above the discharge point) (see map in the Appendix). The test site was selected upstream of the discharge because of tidal influences. A habitat assessment was performed *in situ* to establish comparability between sites, and supplemental physical/chemical data were also collected on the effluent and study sites on April 3, 2000. The effluent was analyzed for nutrients, metals, organic constituents (base neutral and acid extractables, and pesticide extractables), and radionucleotides. Methods used for all chemical analyses are on file at the DEP Central Chemistry Laboratory in Tallahassee.

Acute screening toxicity bioassays, using the invertebrate, *Americamysis bahia,* and the fish, *Menidia beryllina*, as test organisms, were performed on an effluent sample.

Phytoplankton were sampled at both control and test sites via subsurface grabs. Chlorophyll *a* was also determined for phytoplankton communities. Algal Growth Potential (AGP) tests were performed using *Selenastrum capricornutum* as the test organism for the freshwater effluent and *Dunaliella tertiolecta* for the marine receiving-water sites.

Benthic macroinvertebrate communities were evaluated at the control and test sites using three replicate petite Ponar grabs. Several different measures of macroinvertebrate and algal community health have been employed to determine the effects of the discharge. These measurements include: taxa richness, Shannon-Weaver Diversity Index, community composition, functional feeding groups, and algal biomass. For a discussion of each of these measures see the *Explanation of Measurements of Community Health* in the Appendix. All field and laboratory biological methods followed Biology Section Standard Operating Procedures (SOP's) and can be viewed at http://www8.myflorida.com/environment/search/science/laboratories/index.html.

Ford Walton and Thomas Jackson from the FDEP's South District were responsible for collecting the data for this investigation. The Central Laboratory staff in Tallahassee analyzed the samples, interpreted the data, and drafted and produced the final report. Reports are reviewed by Dr. Wayne Magley, Michael Tanski, and Chuck Ziegmont, of the Point Sources Studies Review Committee as well as district representatives.

Results and Discussion

The study sites were located in Hunter Creek, a mangrove dominated tidal system (which is actually a braided portion of the Peace River) about one mile upstream of Charlotte Harbor (see maps in Appendix). Habitat quality was similar at both sites with 74 points at the control site and 69 points at the test site (see Habitat Assessment Field Data Sheets in Appendix). Surrounding land use consisted of natural mangrove forest and residential areas.

No organic priority pollutants were detected in the effluent sample. Nickel was detected in the effluent (11.4 µg/L) at a level that exceeded the Class III water quality standard (Rule 62-302.530(45) FAC). Copper was detected in the effluent (3.1 µg/L) at a level that was above the minimum detection limit but less than the minimum quantitation limit. Radionucleotide analyses revealed the presence of gross alpha radiation (15.7 pCi/L) and a combined radium value of 2.8 pCi/L [radium ^{226} (2.4 pCi/L) and radium^{228} (0.4 pCi/L)] in the effluent sample. The gross alpha radia-

tion level slightly exceeded the plant's permit limit (15.0 pCi/L). The control and test sites were similar with respect to most physical/chemical parameters, such as specific conductivity (20,300-21,100 µmhos/cm), pH (7.2-7.3 SU) and dissolved oxygen (6.3-6.6 mg/L).

Toxicity test results did not indicate toxicity to *Menidia beryllina*. However, there was 100% mortality to the *Americamysis bahia* after 48 hours (Appendix). This toxicity is a violation of Rules 62-302.500(1)(a)(4), and 62-302.530(62) FAC and may be due 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* (Wolfe, *et al.* 1995).

Effluent nutrients are shown in Table 1. Nutrient samples were not collected from the control or test sites because reverse osmosis plants typically do not discharge nutrients at problem levels (Albert Walton, FDEP, pers. comm.). AGP, which measures bioavailable nutrients via algal response, was below the 10 mg dry wt/L 'problem threshold' (Ron Raschke, USEPA, pers. comm.) at both study sites (Table 1).

Measures of phytoplankton community health showed slight degradation at the test site compared to the control site (Table 2). Taxa richness was 24% lower at the test site (29 taxa) compared to the control site (38 taxa) and the diversity score was slightly lower (6%) at the test site (4.05) compared to the control site (4.33). Chlorophyll *a* was elevated throughout the study area (18 mg/L at the test site and 20 mg/L at the control site). These values are higher than 90% of other Florida estuaries and imply nutrient enrichment throughout the study area (see *Typical Values for Selected Parameters in Florida Waters*). Diatoms dominated the phytoplankton communities at both the control and test sites (> 61% of the total community).

Table 1. Effluent limits and summary of chemistry data.

Rivers Edge Reverse Osmosis Plant	Effluent Limits	Effluent Sample	Control Site	Test Site
Organic Constituents (µg/L)				
None Detected	-	-	-	-
Metals (µg/L)				
Aluminum	≤ 1500 **	250 U	-	-
Arsenic	≤ 36 **	3.0 U	-	-
Cadmium	≤ 9.3 **	0.05 I	-	-
Chromium	≤ 50 **	0.70 U	-	-
Copper	≤ 2.9 **	3.1 I	-	-
Iron_259	≤ 300 **	10 U	-	-
Iron_271	≤ 300 **	100 U	-	-
Lead	≤ 5.6 **	0.25 U	-	-
Nickel	≤ 8.3 **	11.4	-	-
Selenium	≤ 71 **	3.0 U	-	-
Silver	≤ 2.3 **	0.06 I	-	-
Zinc	≤ 86 **	25 U	-	-
Nutrients (mg/L)				
Ortho-phosphate	-	0.02 U	-	-
Total phosphorus	≤ 0.1 *	0.015 U	-	-
Ammonia	-	1.9	-	-
Nitrate+Nitrite	-	0.06	-	-
TKN	-	2.5 A	-	-
Organic Nitrogen	-	0.6	-	-
Total Nitrogen	-	2.56	-	-
General Phys-Chem Parameters				
Habitat Assessment	-	-	74	69
D O (mg/L) bottom	5.0 *	-	6.6	6.3
pH (SU) bottom	6.5-8.5 *	-	7.2	7.2
Conductivity (µmhos/cm) bottom	Report	-	20,300	21,100
Temperature (°C) bottom	-	-	25.9	25.6
Gross Alpha (pCi/L)	≤ 15 *	15.7	-	-
Chloride	Report	3100	-	-
Combined Radium (pCi/L)	≤ 5 *	2.8	-	-
Flow (MGD)	0.017 *	0.001	-	-
Hardness (mg CaCO3)	-	2887	-	-
AGP (mg dry wt/L)	-	-	3.1	4.5
Toxicity				
Bioassay - Fish	NOEC	100 L	-	-
Bioassay - Invertebrate (Mysid)	NOEC	Toxic	-	-

A - Value is the mean of two or more determinations
I - Value is < the MOL, and ≥ the MDL
J - Estimated value
K - Actual value is known to be < value given
L - Actual value is known to be > value given
O - Sample held beyond normal holding time
U - Not detected; value is the MDL
LC50 - Lethal Concentration to 50% of the test oganisms
NOEC - No Observable Effect Concentration

* Permit Limit
** Class III standard
a - Annual average
b - Hardness based
c - Calculated value
d - Daily Maximum
s - Single sample

Quantitative measures of benthic macroinvertebrate community health also showed degradation that may be associated with the discharge (Table 2). Taxa richness decreased 34% at the test site (19) compared to the control site (29) and diversity was 13% lower at the test site (2.60) compared to the control site (3.00). Pelecypods, considered indicators of 'good water quality', made up 36% of the control site community and only 6% of the test site community. The relatively pollution-tolerant amphipod, *Grandidierella bonnieroides* (36% community contribution) was the dominant taxon at the control site and the pollution-tolerant polychaete, *Streblospia* sp. (47% contribution) was dominant taxon at the test site (see Macroinvertebrate Taxa Lists in the Appendix).

Table 2. Community structure of control and test sites.

Rivers Edge RO WWTP	Control Site	Test Site
Phytoplankton Algae		
Number of Taxa	38	29
Chlorophyll *a* (µg/L)	20	18
Shannon-Weaver diversity	4.33	4.05
Algal Density (#/mL)	4,662	4,099
% Blue-green	2.3	3.0
% Cryptophytes	11.3	9.8
% Diatoms	61.9	66.1
% Dinoflagellates	2.3	0.9
% Green	20.2	19.9
Macroinvertebrate Quantitative		
Number of Taxa	29	19
Shannon-Weaver diversity	3.0	2.6
Number of Polychaete Taxa	5	4
Community Composition		
% Amphipoda	42.6	5.4
% Balanus	0.6	5.2
% Cumacea	0.4	2.5
% Diptera	1.1	9.4
% Isopoda	8.8	0.7
% Nemertea	0.0	2.0
% Pelecypoda	35.8	5.6
% Polychaeta	9.1	68.7
% Other	1.2	0.9
Functional Feeding Groups		
% Browsers-grazers	22.6	2.9
% Predators/Carnivores	4.5	21.1
% Scavengers	22.6	3.4
% Surface Deposit Feeders	12.2	35.5
% Suspension Feeders	33.4	37.1
% Unknown	4.2	0.0

Literature Cited

EA Engineering, Science, and Technology and Tetra Tech, Inc. 1994. Bioassessment for the nonpoint source program (draft). Prepared for the Fla. Dept. Environ. Protection. Unpaginated.

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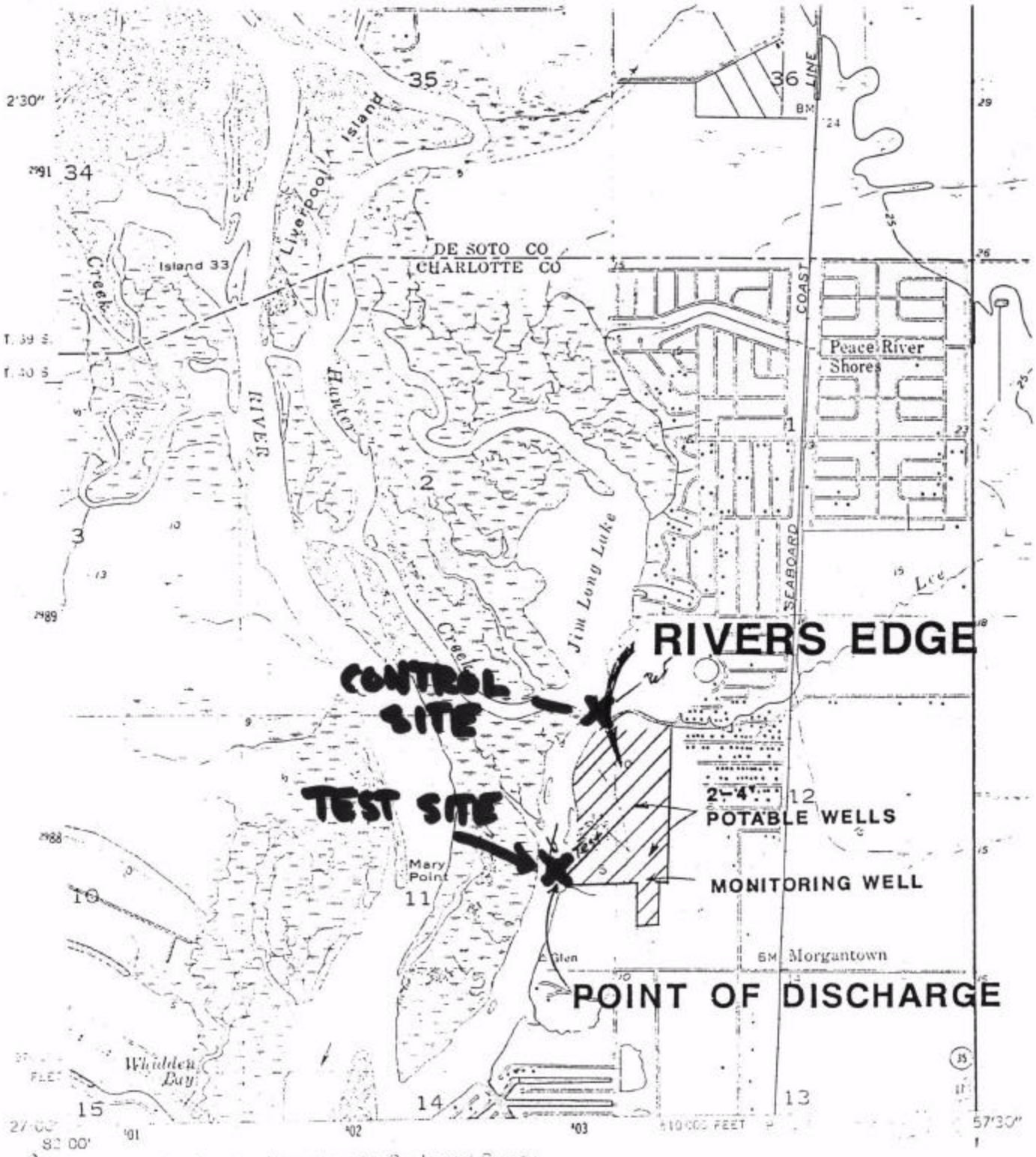
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Weber, C. I. 1993. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027. U. S. EPA, Cincinnati, Ohio. 216 pp.

Wolfe, *et al.* 1995. Protocols for determining Major-Seawater-Ion Toxicity in Membrane-Technology Water-Treatment Concentrate. Florida Department of Environmental Protection, Bureau of Laboratories. 96pp.

ATTACHMENT "A"

www.topozone.com



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Photographs taken 1951. Topography by planetable surveys 1956

Polyconic projection. 1927 North American datum

10,000-foot grid based on Florida coordinate system, west zone

10,000-foot Universal Transverse Mercator grid ticks.

Zone 17, shown in blue

Revisions shown in purple compiled from aerial photographs

MN
GN
0°26'
8 MILS
½°
9 MILS

Typical Values for Selected Parameters in Florida Waters

Rivers Edge RO — **Percentile Distribution ESTUARIES** — (690 stations)

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
Control site												
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	**2.90**	**3.15**	3.59	4.01	4.53	4.98	**3.0**
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	**25.00**	**35.00**	41.00	62.00	90.00	**29**
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	**17.60**	**22.20**	**20**
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49	
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28	
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23	
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59	
Ortho-Phosphate	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44	
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75	
Test site												
Dredge Diversity	1.34	1.53	1.91	2.28	**2.56**	**2.90**	3.15	3.59	4.01	4.53	4.98	**2.6**
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	**18.50**	**25.00**	35.00	41.00	62.00	90.00	**19**
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	**17.60**	**22.20**	**18**
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49	
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28	
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23	
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59	
Ortho-Phosphate	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44	
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75	

Units: Phytoplankton Chlorophyll *a* (□g/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates. A percentile rank increase for parameters above the bold line indicates healthy conditions. A percentile rank increase for parameters below the bold line indicates unhealthy conditions. Adapted from Joe Hand, FDER, personal communication, 1991 (Data was collected between 1980 and 1989).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of a discharge. These are briefly discussed here.

Taxa richness: Stress tends to reduce the number of different types of organisms present in a system, although moderate nutrient enrichment may sometimes be correlated with increased algal taxa richness.

Shannon-Weaver diversity: This index is specified in the Florida Administrative Code as a measure of biological integrity. Low diversity scores are undesirable. They represent conditions where only a few organisms are abundant, to the exclusion of other taxa. Excessive numerical dominance of a single type of organism (a high % contribution of the dominant taxon) is a related measure which is also associated with disturbance.

Numbers of pollution sensitive taxa: Some organisms become rare or absent as the intensity or duration of disturbance increases. Species sensitivity data from other sources, such as Chang *et al.* (1992), Farrell (1992), Hudson *et al.* (1990), Hulbert (1990), Lenat (1993), and Whitmore (1989), are used as appropriate.

Community structure: Substantial shifts in proportions of major groups of organisms, compared to control conditions, may indicate degradation. In marine systems, an increase in the % tubificid oligochaetes, a decrease in the % pelecypods, and a decrease in the number of polychaete taxa are all considered indicators of disturbance (Engel *et al.* 1994).

Trophic composition/feeding guilds: Disturbance can shift the feeding strategies of invertebrates. In Florida for example, pollution may be responsible for reducing the numbers of filter-feeders (FDEP 1994) and shredders (EA Engineering 1994).

Algal biomass: High algal biomass (algal density or chlorophyll *a*) implies nutrient stress.

Department of Environmental Protection

Lawton Chiles
Governor

South District
2295 Victoria Avenue, Suite 364
Fort Myers, Florida 33901-3881

Virginia B. Wetherell
Secretary

PERMITTEE:

River's Edge, Inc.
1601 Hunter Creek Drive
Punta Gorda, FL 33982

CHARLOTTE COUNTY - IW

PERMIT NUMBER:	**FL0042412**
ISSUE DATE:	**January 10, 1996**
EXPIRATION DATE:	**January 10, 2001**
FACILITY I.D. NO. :	**FL0042412**
	PATS278436

FACILITY:

River's Edge RO Water Treatment Plant
1601 Hunter Creek Drive, Punta Gorda
Latitude: 27° 00' 35"N Longitude: 81° 58' 24"W

This permit is issued under the provisions of Chapter 403, Florida Statutes and applicable rules of the Florida Administrative Code and constitutes authorization to discharge to waters of the state unmder the National Pollutant Discharge Elimination System. The above named permittee is hereby authorized to operate the facilities shown on the application and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

WASTEWATER FACILITY AND TREATMENT DESCRIPTION:

This is a reverse osmosis drinking water treatment plant concentrate treatment and disposal system. EPA has designated this facility as a minor facility. The system has a design flow of 0.017 MGD, a maximum daily wastewater flow of 0.0074 MGD and an annual average flow of 0.004 MGD. The system consists of a forced draft aerator for removal of hydrogen sulfide and addition of dissolved oxygen, a multiport discharge plenum to facilitate rapid mixing and associated pumps and piping.

EFFLUENT DISPOSAL/USE

The effluent from the treatment system is discharged via a single outfall numbered 001 to Hunter Creek, which is classified as class III surface waters of the State. Hunter Creek varies from fresh to marine seasonally depending on rainfall levels in it's drainage basin. Mixing Zones are established for specific conductance, chlorides, combined radium and gross alpha. The mixing zones extend fifteen feet upstream and downstream from the discharge plenum. The system is as described in application number 279075, previous permit applications and in associated documents by Maury Denneler, P.E. of ABS & Associates, Inc. and others.

IN ACCORDANCE WITH: The limitations, monitoring requirements and other conditions set forth in this permit.

"Protect, Conserve and Manage Florida's Environment and Natural Resources"

Printed on recycled paper.

PERMITTEE:

River's Edge, Inc.

PERMIT NUMBER: FL0042412
ISSUE DATE: January 10, 1996
EXPIRATION DATE: January 10, 2001
FACILITY I.D. NO: FL0042412
PATS278436

I. Effluent Limitations and Monitoring Requirements

A. Surface Water Discharges

1. During the period beginning on the issue date and lasting through the expiration date of this permit, the permittee is authorized to discharge from Outfall 001, treated reverse osmosis drinking water treatment plant concentrate. Such discharge shall be limited and monitored by the permittee as specified below:

The effluent shall be sampled after final treatment but prior to discharge to the receiving waters in accordance with the following:

Parameters (units)	Discharge Limitations			Monitoring Requirements		
	Monthly Avg.	Daily Max.	Other (specify)	Frequency	Sample Type	Sample Point
Flow 50050	———	0.017 MGD	———	continuous	meter	20077
Dissolved Oxygen 00300	———	———	Minimum 5.0 mg/l	once/month	grab	20077
pH 00400	———	8.5 S.U.	Minimum 6..5 S.U.	once/month	grab	20077
Hydrogen Sulfide 71875	———	0.04 mg/l	———	once/month	grab	20077

The receiving waters shall be sampled at the upstream edge of the fifteen foot mixing zone in accordance with the following:

Parameters (units)	Discharge Limitations			Monitoring Requirements		
	Monthly Avg.	Daily Max.	Other (specify)	Frequency	Sample Type	Sample Point
Chlorides 00940	———	REPORT	———	once/quarter	grab	20075
Specific Conductance 00095	———	REPORT	———	once/quarter	grab	20075

PERMITTEE:

River's Edge, Inc.

PERMIT NUMBER:	**FL0042412**
ISSUE DATE:	**January 10, 1996**
EXPIRATION DATE:	**January 10, 2001**
FACILITY I.D. NO:	**FL0042412**
	PATS278436

The receiving waters shall be sampled at the downstream edge of the fifteen foot mixing zone in accordance with the following:

Parameters (units)	Limitations			Monitoring Requirements		
	Monthly Avg.	Daily Max.	Other (specify)	Frequency	Sample Type	Sample Point
Chlorides 00940	———	See 2. Below	———	once/quarter	grab	20074
Specific Conductance 00095	———	See 3. Below	———	once/quarter	grab	20074
Gross Alpha Particle Activity 80029	———	15 pCi/l	———	once/quarter	grab	20074
Combined Radium 226 & 228 11503	———	5 pCi/l	———	once/quarter	grab	20074

2. If the chloride concentration of the upstream chloride sample is 1,500 mg/l or greater: Chlorides shall not be more than 10% above that concentration.

3. If the chloride concentration of the upstream chloride sample is less than 1,500 mg/l: Specific Conductance shall not exceed 1,275 micromos/cm or 50% above background levels as determined by the upstream specific conductance sample.

4. The direction of flow of Hunter Creek shall be determined before each sampling event in order to determine the upstream and downstream sampling points.

5. Mixing zones are established for specific conductance, chlorides, combined radium 226 & 228 and gross alpha particle activity. The mixing zones extend fifteen feet upstream and downstream from the discharge plenum.

6. The sampling requirements and limits specified in this permit shall be in effect for the duration of this permit , unless notified otherwise by the permit issuing authority.

7. There shall be no discharge of floating solids or visible foam in other than trace amounts.

8. The discharge shall not cause a visible sheen on the receiving water.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: RIVER'S EDGE R.O.		Date Summary Prepared: SEPT. 5, 2000
Location (attach detailed map): 1601 HUNTER CREEK DR. PUNTA GORDA, FL 33982	County: CHARLOTTE	District: SOUTH
Federal Permit # and expiration date: FL0042412 1/10/01	State GMS # and State expiration date: FL0042412 1/10/01	Facility Type: (Industrial) Municipal Federal Agricultural Other (list):

Function of facility:
REVERSE OSMOSIS CONCENTRATE TREATMENT AND DISPOSAL

Description of treatment process:
TREATMENT CONSISTS OF A FORCED DRAFT AERATOR FOR THE REMOVAL OF HYDROGEN SULFIDE AND THE ADDITION OF DISSOLVED OXYGEN PRIOR TO DISCHARGE INTO HUNTER CREEK THROUGH A MULTIPORT PLENUM

Receiving waters: HUNTER CREEK	Classification: I II (III) MARINE/FRESH DEPENDING ON RAIN	
Design Flow: 0.017 MGD	Mean Flow: 0.001 MGD	Flow during survey: 0.001 MGD

Discharge is: Continuous (Intermittent) Seasonal Rainfall dependent
Other (describe)

therefore, the best time to sample is: EARLY MORNING

If facility has a mixing zone, give details (size, parameters affected, etc.):
MIXING ZONES ARE ESTABLISHED FOR SPECIFIC CONDUCTANCE, CHLORIDES, COMBINED RADIUM AND GROSS ALPHA. THE MIXING ZONES EXTEND FIFTEEN FEET UPSTREAM AND DOWNSTREAM FROM THE DISCHARGE PLENUM.

List effluent limits (if necessary, attach relevant paperwork):

Parameter	Limit (units)
SEE ATTACHED PERMIT AND LIMITS	

Describe special permit conditions and permit modifications:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

RIVERS EDGE
(Facility)

Description of permitted outfall(s): SINGLE OUTFALL TO HUNTER CREEK WHICH IS CLASSIFIED AS A CLASS III SURFACE WATER (MARINE/FRESH) DEPENDING ON RAINFALL.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year: 3RD & 4TH QUARTER OF 1999. GROSS ALPHA RESULTS WERE REPORTED AS 33. PICOCURIES/LITER. THE LIMIT SET BY THE PERMIT IS 15. Pci/l.

DISSOLVED OXYGEN VIOLATIONS (< 5.0 mg/l) FOR THE FIRST 5 MONTHS OF THIS YEAR

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions:

IMPACTS NONE IN FILE AFTER OCTOBER 1995, (ATTACHED)

CURRENT ENFORCEMENT – WARNING LETTER AUGUST 8, 2000 FOR GROSS ALPHA AND CONDUCTANCE VIOLATIONS. THIS FACILITY WILL REPERMIT BY 1/01 AND PLANS TO REMOVE THE SURFACE WATER DISCHARGE TO A PERMITTED GROUNDWATER DISPOSAL SITE.

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set: TRENDS APPEAR TO BE DECLINING BECAUSE THE NEW (1998) WATER PLANT MEMBRANES CONCENTRATE THE BRINE MORE EFFICIENTLY. DMR'S SHOW AN INCREASE IN GROSS ALPHA, RADIUM 226 + 228, AND CONDUCTANCE.

Additional information:

1. PERMIT ATTACHED
2. 1995 BIOLOGICAL ASSESSMENT ATTACHED
3. LOCATION MAP

Staff contributing to this review (signature):

	(Biologist)
THOMAS E. JACKSON	(Inspector)
	(Engineer)
	( )
	( )
	( )

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
	25-02-0545	4-3-00	1235	HUNTER CREEK

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
27 01 00.1 81 58 33.6	CHARLOTTE	RIVER'S EDGE R.O. PLANT – REFERENCE SITE	TEJ 000403-13

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
60				40			

Local Watershed Erosion (check box): None ☑ Slight ☐ Moderate ☐ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☑ Obvious sources ☐

Width of riparian vegetation (m) on least buffered side: 4

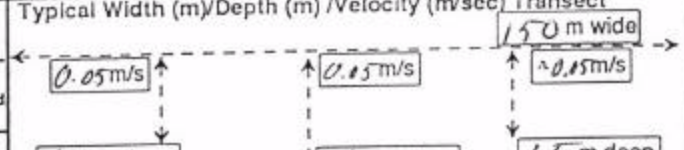
List & map dominant vegetation on back

Artificially Channelized ☑ no ☐ recent, severe ☐ some recovery ☐ mostly recovered

Artificially Impounded ☐ yes ☐ more sinuous

High Water Mark: 1.0 (m above present water level) + 4.0 (present depth in m) = 5.0 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect



Canopy Cover %: Open: ☑ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐

Sediment Oils: Absent: ☑ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposition: Sludge: ☐ Sand smothering: ☐ none ☐ slight ☐ moderate ☐ severe Silt smothering: ☐ none ☐ slight ☐ moderate ☐ severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	100	3	
Leaf Packs or Mats				Mud/Muck/Silt			
Aquatic Vegetation				Other:			
Rock or Shell Rubble				Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	0.3	25.8	7.25	6.53	19600			0.7
Mid-depth								
Bottom	1.1	25.9	7.24	6.59	20300			

System Type: Stream: ☐ (1st - 2nd order, 3rd - 4th order, 5th - 6th order, 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☑ Other: ☐

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☑ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☐ Slightly turbid: ☐ Turbid: ☑ Opaque: ☐

Color (check box): Tannic: ☑ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes:

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☐	☐	☑
Fish	☐	☐	☐	☑
Aquatic Macrophytes	☐	☐	☐	☑
Iron/sulfur Bacteria	☑	☐	☐	☐

SAMPLING TEAM:	SIGNATURE:	DATE:
WALTON / JACKSON	A.H. Walton	4-3-00

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	25-02-0545	4-3-00	HUNTER CR

REMARKS:	LOCATION:	FIELD ID/NAME:
	RIVERS EDGE R.O. – REFERENCE	TEJ000403-13

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 8	None—Unaltered shoreline. 9-10 points	Mostly natural shoreline, but with occasional riprap. 6-8 points	Shoreline consisting mostly of riprap and vertical seawalls. 3-5 points	Shoreline consisting almost entirely of vertical seawalls. 0-2 points
Community Types Observed: 34	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. 38-50 points	Two or three communities observed from those listed. 26-37 points	One community observed from those listed. 13-25 points	No communities observed from those listed. 0-12 points
Tidal Fluctuation: 3	>0.75 m. 4-5 points	0.5 - 0.75 m. 3 points	0.25 - 0.5 m. 2 points	<0.25 m. 0-1 point
Freshwater Discharges/ Alterations: 8	Only natural runoff.. 9-10 points	Mostly natural runoff, but with a few, small stormwater sources. 6-8 points	Considerable stormwater discharge from local roads, parking lots, etc. 3-5 points	Extensive manmade discharges, especially from canals draining large tracts of land. 0-2 points
Flow and Wave Action: 10	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. 9-10 points	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. 0-2 points
Sediment Type: 11	Combination of sand, gravel, and shell. 12-15 points	Primarily sand, with small areas of mud. 8-11 points	Mixture of sand and mud, or well-aerated mud only. 4-7 points	Anaerobic mud. 0-3 points

TOTAL SCORE 74

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
4-3-00	WALTON	asWalton

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (5-10-90)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
	25-02-0547	4-3-00	1158	HUNTER CREEK

REMARKS: ~~27° 01' 00.1"~~ 27 00 32.6 ~~81 58 33.1~~ 81 58 33.4	COUNTY:	LOCATION:	FIELD ID/NAME:
	CHARLOTTE	RIVER'S EDGE R.O. – AFFECTED DOWN STREAM	TEJ000403·12

RIPARIAN ZONE/INSTREAM FEATURES

Predominant Land-Use in Watershed (specify relative percent in each category):

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
50				50			

Local Watershed Erosion (check box): None ☑ Slight ☐ Moderate ☐ Heavy ☐

Local Watershed NPS Pollution (check box): No evidence ☐ Slight ☐ Moderate potential ☑ Obvious sources ☐

Width of riparian vegetation (m) on least buffered side: 3

List & map dominant vegetation on back

Artificially Channelized ☑ no ☐ recent, severe ☐ some recovery ☐ mostly recovered, more sinuous

Artificially Impounded ☐ yes

High Water Mark: 1.0 (m above present water level) + 3.0 (present depth in m) = 4.0 (m above bed)

Typical Width (m)/Depth (m) /Velocity (m/sec) Transect

75 m wide

0.2 m/s	0.2 m/s	0.2 m/s
2 m deep	3 m deep	1 m deep

Canopy Cover % : Open : ☑ Lightly Shaded (11-45%): ☐ Moderately Shaded (46-80%): ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☐ Other: ☐

Sediment Oils: Absent: ☑ Slight: ☐ Moderate: ☐ Profuse: ☐

Sediment Deposition: Sludge: ☐ Sand smothering: (none) slight moderate severe Silt smothering: (none) slight moderate severe Other:

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand	✓ 5		
Leaf Packs or Mats				Mud/Muck/Silt	✓ 80		
Aquatic Vegetation				Other: SHELL	✓ 15		
Rock or Shell Rubble				Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top	0.3	25.7	7.22	6.47	21 000			0.5
Mid-depth								
Bottom	1.3	25.6	7.21	6.31	21,100			

System Type : Stream: ☐ (1st - 2nd order, ~~3rd - 4th order~~, 5th - 6th order, 7th order or greater) Lake: ☐ Wetland: ☐ Estuary: ☑ Other: ☐

Water Odors (check box): Normal: ☑ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☐

Water Surface Oils (check box): None: ☑ Sheen: ☐ Globs: ☐ Slick: ☐

Clarity (check box): Clear: ☐ Slightly turbid: ☐ Turbid: ☑ Opaque: ☐

Color (check box): Tannic: ☑ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions/Notes:

Abundance:	Absent	Rare	Common	Abundant
Periphyton	☐	☐	☐	☑
Fish	☐	☐	☐	☑
Aquatic Macrophytes	☐	☐	☐	☑
Iron/sulfur Bacteria	☑	☐	☐	☐

SAMPLING TEAM:	SIGNATURE:	DATE:
WALTON / JACKSON	aswalton	4-3-00

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	25-02-0547	4-3-00	HUNTER CREEK

REMARKS:	LOCATION: RIVER'S EDGE RD. - AFFECTED DOWNSTREAM	FIELD ID/NAME:
		TEJ000403-12

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations: 8	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6-8 points**	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed: 35	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three communities observed from those listed. **26-37 points**	One community observed from those listed. **13-25 points**	No communities observed from those listed. **0-12 points**
Tidal Fluctuation: 3	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations: 6	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action: 10	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type: 7	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 69

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
4-3-00	WALTON	aff Walton

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: TEJ -- RO River Edge
County: CHARLOTTE
Contact / District: Tom Jackson / SO-DIST
NPDES Permit #: FL00 42412
LIMS Sample #: 445323 LIMS Job #: TLH-2000-04-05-10
sample log 4/7/00
Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through
Test Number: 1 of 2

Sample Collection: Date 4/3/00 Time 10:27
Test Beginning: Date 4/4/00 Time 14:10
Test Ending: Date 4/6/00 Time 13:20
Organism Batch #: 92 Diluent Batch #: ASW#16
Organism Age: 3 days SRT toxicant batch #: —
Test organism: A. bahia

Remarks:

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
CONT. A	C13	5	5	5	7.3	8.4	8.2	25.3	24.9	24.0	7.4	6.2	7.5	16.48	16.92	18.97
B	C14	5	5	5	7.5	8.4	8.2	25.2	24.8	24.0	7.4	6.4	7.4	17.92	18.12	19.03
C	C15	5	5	5	7.5	8.4	8.2	25.2	24.7	24.1	7.4	6.5	7.2	18.15	18.24	18.95
D	C16	5	5	5	7.5	8.4	8.1	25.1	24.9	24.5	7.4	6.5	7.2	17.77	18.76	18.98
SALT CONTROL A	C17	5	5	5	~~7.5~~ *	8.2	8.2	25.1	24.4	24.1	7.4	6.5	6.9	18.21	18.53	18.77
B	C18	5	5	5	~~7.5~~	8.2	8.2	25.1	24.5	24.6	7.4	6.5	6.9	18.40	18.47	19.07
C	C19	5	5	5	~~7.5~~	8.2	8.2	25.1	24.5	25.3	7.5	6.5	6.8	18.36	18.48	19.38
D	C20	5	5	5	~~7.5~~	8.2	8.2	25.1	25.0	25.6	7.5	6.5	6.8	18.36	18.80	20.30
100% A	C21	5	2 3D	0 3D	7.8	8.2	8.5	25.4	24.1	24.3	7.6	~~6.6~~ 6.5	6.6	18.28	18.59	18.80
B	C22	5	3 2D	0 3D	7.8	8.2	8.6	25.4	24.4	26.2	7.5	6.5	6.6	18.39	18.79	19.77
C	C23	5	2 3D 1M	0 2D	7.9	8.2	8.5	25.5	24.6	25.5	7.4	6.6	6.4	18.42	18.82	19.17
D	C24	5	1 4D	0 1D	7.8	8.2	8.5	25.5	24.6	26.0	7.4	6.6	6.6	18.41	18.83	19.71
measured by:		DPH	KL	SG	DPH	KL	DPH	DPH	KL	DPH	DPH	KL	DPH	DPH	KL	DPH
recorded by:		KL	KL	SG	KL	DPH	SG	KL	DPH	SG	KL	DPH	SG	KL	DPH	SG

* 7.8 DPH 4/4/00 wrong place

Investigators' Signatures

Shawna Gerardi
S P Bhuvel
Kellafaith Hanson
Marshall Faircloth

A H Wolfe
reviewer

form updated 3/3/99

Temperature Range °C
Incubator # 3 25.0 - 26.0°C
Room B246 23.0 - 27.0°C

Water Quality Parameters	Salt Water Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			—	—	—	
Lab Total Residual Cl2 (mg/L):	<0.03		0.07	DR100	KL	SG
Alkalinity (mg/L as $CaCO_3$):	180		2790	Hach	KL	SG
Hardness (mg/L as $CaCO_3$):	—		531	Hach	KL	SG
Total ammonia (mg/L as N):	<0.034		2.00	Denver	DPH	SG
Salinity:			4.7 ppt	Ysi	MF	SG

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: TEJ -- RO Rivers Edge
County: CHARLOTTE
Contact / District: Tom Jackson / SO-DIST
NPDES Permit #: FL00 42412
LIMS Sample #: 445323 LIMS Job #: TLH-2000-04-05-10
sample log 4/7/00
Test Type: Screening | Definitive
Static | Static Renewal | Flow-through
Test Number: 2 of 2

Remarks:

Sample Collection: Date 4/3/00 Time 10:27
Test Beginning: Date 4/4/00 Time 14:10
Test Ending: Date 4/6/00 Time 13:20
Organism Batch #: 12 Diluent Batch #: NSW#16
Organism Age: 11 days SRT toxicant batch #: —
Test organism: M. beryllina

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) or (µmhos/cm) 0 hr	24 h	48 h
CONT. A	C1	5	5	5	7.3	8.2	8.3	25.3	25.0	24.5	7.4	7.2	7.3	9.54	10.61	10.92
B	C2	5	5	5	7.4	8.2	8.3	25.0	24.8	25.9	7.4	7.1	7.3	10.38	10.53	10.61
C	C3	5	5	5	7.4	8.2	8.3	24.9	24.8	25.1	7.5	7.1	7.1	10.32	10.54	10.92
~~SALT CONTROL~~ D	C4	5	5	5	7.4	8.2	8.3	24.8	24.7	24.2	7.6	7.1	7.2	10.25	10.55	10.63
SALT CONTROL A	C5	5	5	5	7.5	8.2	8.2	24.9	24.4	24.3	7.7	7.1	7.1	10.44	10.89	11.13
B	C6	5	5	5	7.5	8.2	8.2	25.0	25.0	25.7	7.6	7.1	6.6	10.63	10.85	11.59
C	C7	5	5	5	7.5	8.2	8.2	24.9	24.5	25.6	7.6	6.9	6.5	10.56	10.69	11.18
D	C8	5	5	5	7.5	8.3	8.2	24.8	24.6	24.1	7.6	7.1	6.6	10.51	10.72	10.90
100% A	C9	5	5	5	7.8	8.5	8.6	24.9	25.3	24.0	7.8	6.8	7.3	10.16	11.01	11.18
B	C10	5	5	5	7.8	8.5	8.6	25.1	25.0	24.5	7.7	6.8	7.4	10.56	10.68	11.13
C	C11	5	5	5	7.8	8.5	8.6	25.2	24.4	25.3	7.6	6.9	7.3	10.42	10.57	11.09
D	C12	5	5	5	7.8	8.4	8.6	25.3	24.4	24.6	7.6	7.0	7.2	10.30	10.53	10.93
measured by:		SG	KL	SG	DPH	KL	DPH	DPH	KL	DPH	DPH	KL	DPH	DPH	KL	DPH
recorded by:		DPH	KL	SG	KL	DPH	SG	KL	DPH	SG	KL	DPH	SG	KL	DPH	SG

@ Rhonda Place 4/4/00 DPH

Investigators' Signatures
Shannon Gerard
Kelly Lord
Phillip Parks Hansen
Marshall Faircloth

Temperature Range °C
Incubator # 3 25.0 - 26.0°C
Room B246 23.0 - 27.0°C

Water Quality Parameters

	Salt Water Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):			—	—	—	—
Lab Total Residual Cl2 (mg/L):	<0.03		~~0.07~~ <0.03	DR 100	KL	SG
Alkalinity (mg/L as $CaCO_3$):	180		531	Hach	KL	SG
Hardness (mg/L as $CaCO_3$):	—		2790	Hach	KL	SG
Total ammonia (mg/L as N):	20.034		2.00	Denver	DPH	SG
Salinity:			4.7 ppt.	Ysi	MF	SG

Debra Wolfe
reviewer

form updated 3/3/99

Phytoplankton taxa list and densities (#/mL) for Rivers Edge RO Plant, collected via subsurface grabs in Hunter Creek on 3 April 2000.

	Control Site	Test Site 1
Bacillariophyceae		
Achnanthes exigua	18	17
Achnanthes lanceolata	18	–
Amphora sp.	36	17
Aulacoseira granulata angustissima	18	35
Bacillaria paradoxa	145	69
Chaetoceros sp.	73	–
Cocconeis disculus disculus	91	174
Cocconeis placentula	127	17
Cyclotella sp.	472	660
Diploneis oblongella	18	–
Diploneis ovalis	36	–
Diploneis pseudovalis	–	69
Encyonema evergladianum	18	17
Eunotia sp.	36	–
Fragilaria berolinensis	36	17
Fragilaria elliptica	–	35
Leptocylindrus minimus	54	–
Melosira sp.	91	–
Navicula sp.	54	17
Navicula cocconeiformis	18	–
Navicula cryptocephala	18	–
Navicula cryptotenella	36	17
Navicula cuspidata	18	–
Navicula minima	18	–
Navicula radiosa	18	–
Nitzschia sp.	308	347
Nitzschia amphibia	18	–
Nitzschia gracilis	–	17
Nitzschia nana	–	17
Nitzschia palea	36	104
Nitzschia panduriformis delicatula	91	17
Odontella mobiliensis	399	486
Pleurosigma salinarum	18	–
Rhizosolenia sp.	–	139
Skeletonema costatum	508	382
Synedra sp.	–	17
Synedra delicatissima	–	17
Synedra filiformis exilis	18	–

Synedra ulna	18	–
Chlorophyceae		
Chlorella sp.	127	17
Scenedesmus sp.	–	35
Undetermined Chlorophyceae	762	712
Volvocales sp.	54	52
Chrysophyceae		
Mallomonas sp.	–	17
Cryptophyceae		
Chroomonas sp.	345	243
Plagioselmis sp.	73	104
Undetermined Cryptophyceae	109	52
Cyanophyceae		
Oscillatoria sp.	54	52
Oscillatoria limnetica	–	17
Synechococcus sp.	54	52
Dinophyceae		
Goniodomataceae	73	35
Prorocentrum minimum	36	–
Euglenophyceae		
Euglena sp.	18	–
Undetermined Euglenophyceae	73	–

Benthic macroinvertebrate taxa list for Rivers Edge RO Plant, collected via Ponar grab samples in Hunter Creek, on 3 April 2000. Densities, in number/m^2, represent the mean of three replicates.

	Control Site	Test Site
Amphipoda		
Ampelisca sp.	–	42
Ampelisca abdita	–	97
Amphilochidae	–	153
Apocorophium sp.	833	14
Corophiidae	250	–
Grandidierella bonnieroides	4778	28
Melita nitida	14	–
Phoxocephalidae	14	–
Cumacea		
Cyathura polita	847	42
Cyclaspis sp.	42	83
Cyclaspis varians	14	69
Decapoda		
Americamysis bahia	42	–
Xanthidae	14	56
Diptera		
Ceratopogonidae	28	–
Coelotanypus sp.	–	583
Cryptochironomus sp.	14	–
Polypedilum scalaenum grp.	111	–
Gastropoda		
Odostomia sp.	14	–
Polymesoda caroliniana	3625	–
Isopoda		
Edotea triloba	347	–
Xenanthura brevitelson	28	–
Nemertea		
Undetermined Nemertea	56	97
Pelecypoda		
Amygdalum papyrium	97	–
Brachidontes exustus	–	14
Corbula sp.	–	56
Macoma sp.	–	14
Mulinia lateralis	42	–
Rangia cuneata	–	14
Spisula solidissima	250	–

Strigilla sp.	583	–
Pelecypoda		
Tagelus sp.	28	–
Tellina sp.	292	83
Tellinidae	–	125
Undetermined Pelecypoda	–	42
Veneridae	28	–
Polychaeta		
Hobsonia florida	250	111
Laeonereis culveri	264	–
Nereidae	69	–
Nereis succinea	528	1194
Polydora ligni	–	14
Streblospio sp.	139	2931
Polycladida		
Turbellaria	97	–
Thoracica		
Balanus sp.	83	319

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

1 Transaction Code	2	3 NPDES NUMBER	11	12 YR/MO/DA	17	18 Insp Type	19 Inspector	20 Fac Type
N	5	FL0042412		060403		X	S	2

Remarks

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1 Transaction Code	2	3 NPDES NUMBER	11	12 YR/MO/DA	17	18 Insp Type	19 Inspector	20 Fac Type
N	5	FL0042412		000403		B	S	2

Remarks

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