

Biological Assessment of

Indian River South County Water System

Indian River County

NPDES #FL0037940

Sampled 23 April, 1991

August 1991

Biology Section
Division of Administrative and Technical Services

Department of Environmental Regulation

Results of Fifth Year Inspections

Discharger:	Indian River South County Water System
County:	Indian River
NPDES Number:	FL0037940
State Permit Expiration Date:	1 October, 1991

Toxics Sampling Inspection (XSI)	
Date Sampled:	23 April, 1991
Results:	No priority pollutants or problem concentrations of metals found.

Compliance Biomonitoring Inspection (CBI)	
Date Sampled:	23 April, 1991
Results:	Not toxic to *Ceriodaphnia dubia* or *Notropis leedsi*.

Impact Bioassessment Inspection (IBI)	
Date Sampled:	23 April, 1991
Results:	Receiving water macroinvertebrate community degraded, probably due to elevated conductivity in discharge or possibly to the presence of hydrogen sulfide.

Water Quality Inspection (WQI)	
Date Sampled:	23 April, 1991
Results:	No problems with nutrients or other standard parameters (*i.e*, D.O., etc.)

These fifth year inspections provide the necessary information to evaluate the facility's impact on its receiving waters and to provide the basis for specific condition recommendations for permit renewal.

Introduction

The Indian River South County Road Plant is a 0.88 MGD reverse-osmosis water treatment facility located in Vero Beach, Indian River County. It operates under state DER permit numbers IC 31-174667 and IO 31-121588, which both expire on 10/1/91. The NPDES permit expires on 7/31/91. The reject water is discharged to the South Relief Canal, a Class III freshwater body. This facility has a 250 foot mixing zone for specific conductance. The discharge water flows approximately 1.2 miles to the Indian River, classified as an Outstanding Florida Water and a state aquatic preserve.

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 reference site (located in the South Relief Canal upstream of the discharge) and a test site (the area down gradient of the discharge). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Notropis leedsi* as test organisms, were performed on an effluent sample (Peltier and Weber 1985, FDER 1985). The effluent was analyzed for organic constituents (base neutrals, acid extractables, and pesticide extractables) and metals. Additionally, nutrient analyses were performed on samples from the reference and test sites. Methods used for all chemical analyses are on file at the Tallahassee DER Chemistry Laboratory.

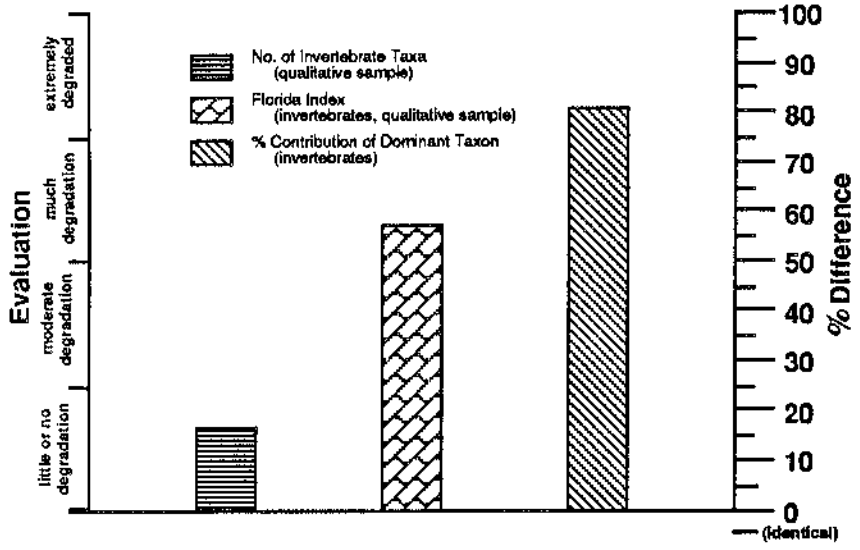
Benthic macroinvertebrate communities were evaluated at both the reference and test sites. Collection methods consisted of a timed (one hour per site) multi-substrate (*e.g.*, snags, vegetation, sediment) semi-quantitative effort, which was composited with three ponar grabs per site. Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

Explanation of Measurements of Community Health

Several different measurements of macroinvertebrate and algal community health have been employed. Many of these, such as the number of taxa and Shannon-Weaver Diversity Index are well known. Others are briefly explained here. The Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy (*i.e.*, many clean-water organisms are present). Excessive numerical dominance of a single type of organism (a high % contribution of dominant taxon) is usually associated with disturbance. The determination of the Quantitative Stability Index (for taxonomic % composition) is a two step process. First, the relative proportions of major taxonomic groups are calculated for each site. Then, the lesser of the two percentages for each discrete taxonomic group is totaled. A QSI (% composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (functional feeding groups).

Major characteristics of community structure of control and test sites.

	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	30	25
Florida Index	14	6
% Contribution of Dominant Taxon	34.0	61.5
% Malacostraca	1.6	2.8
% Diptera	75.6	88.1
% Ephemeroptera	16.9	2.3
% Gastropoda	1.1	4.3
% Odonata	1.4	1.0
% Coleoptera	2.3	0.7
% Other	1.1	0.8
% Predators	4.6	22.1
% Collector-Gatherers	70.3	44.2
% Collector-Filterers	7.0	1.9
% Scrapers	12.9	9.9
% Shredders	5.2	21.9
Algal Growth Potential (mg dry wt/l)		Effluent = 0.9



Effect of discharge on receiving stream
(measured as difference between control and test sites).

For graphical purposes, the percent differences between the control and test sites involving the number of taxa and the Florida Index are measured as the control site minus test site divided by the control site. The percent differences between sites involving the percent contribution of dominant taxon is measured as the test site minus control site divided by the control site.

The following personnel were involved in this investigation: Philip Kane (DER Central District) and Lyn Burton, Russel Frydenborg, Kathleen Lurding, and Sandra McClure (Tallahassee Biology Laboratory).

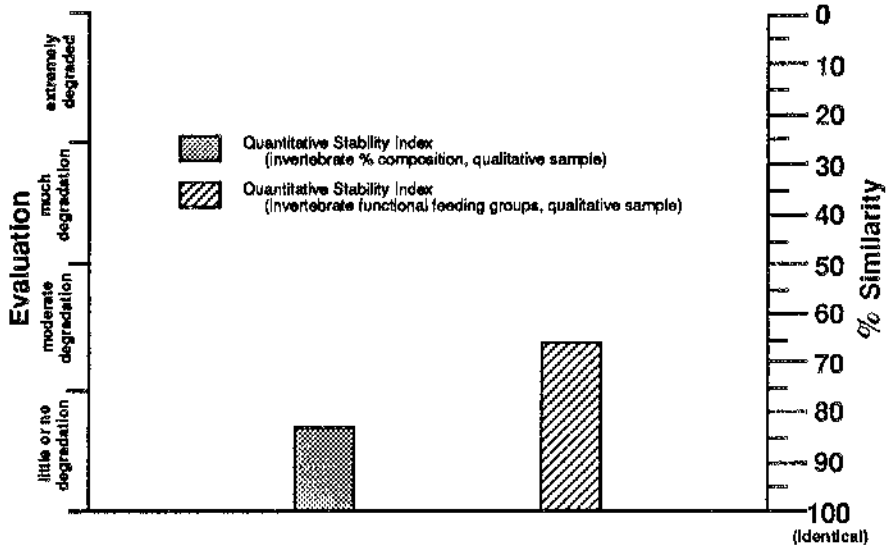
Results and Discussion

The two locations examined during this study were very comparable with respect to habitat quality (with 34 points at the control and 32 points at the test site) (Appendix). The receiving waterbody is a flowing, channelized stream which drains natural areas (marsh, forest), pastures, and residential areas. The water was well oxygenated (above 7.6 mg/L) with a circum-neutral pH at both the control and test sites. The major operative difference between sites was the substantial increase in conductivity observed downstream of the discharge (from 497 µmhos/cm^2 at the control to 1382 µmhos/cm^2 at the test site). Had the samples been taken below the mixing zone, this would have been a violation of the ambient standard for specific conductance (17-302.560 FAC).

Acute bioassays indicated the discharge was not toxic to either the water flea, *Ceriodaphnia dubia*, or to the fish, *Notropis leedsi*. No organic priority pollutants or problem levels of metals were detected in the effluent.

Nutrients were also below problem levels in the area and the algal growth potential of the effluent was very low (i.e., there is little concern regarding eutrophication).

Major shifts in the macroinvertebrate community at the test site indicated that the discharge was ex-



Effect of discharge on receiving stream
(measured as similarity between control and test sites).

erting a negative effect on the biota (see table and figures). There was a 57% decrease in the Florida Index at the test site, suggesting that the area below the discharge was less hospitable to pollution intolerant organisms. Other indicators of degradation caused by the discharge included a large increase in the percent contribution of the dominant taxon and shifts in overall trophic functions. The likely cause for these disturbances was the substantial increase in conductivity (equivalent to almost 1‰ salinity) downstream of the discharge. Most freshwater species have difficulty with osmoregulation well before this level of conductivity/salinity is reached. Additionally, a very intense hydrogen sulfide smell was detected in the test area. The hydrogen sulfide dissolved in the water column also could have contributed to the observed stress.

Conclusions

The discharge from the Indian River South County Water System was found to degrade biological communities in the receiving waters. The primary cause for this appeared to be elevated conductivity and hydrogen sulfide. Acute toxicity, priority pollutants, metals, and nutrients were not a problem with this discharger.

Literature Cited

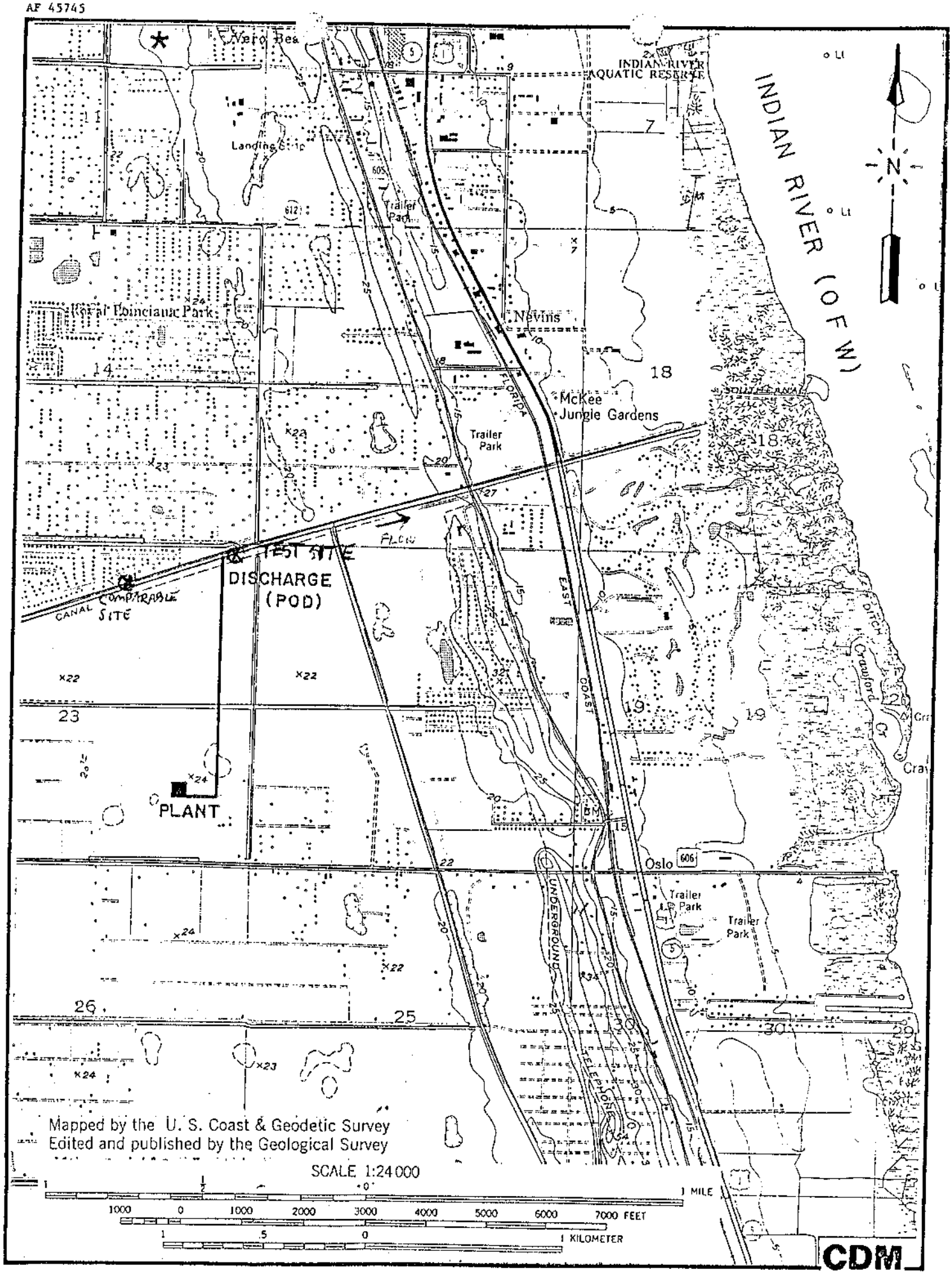
Florida Department of Environmental Regulation. 1985. Quality assurance manual for performing acute toxicity tests. 2nd edition. Fla. Dept. Environmental Regulation, Biology Section, Tallahassee. 53 pp.

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

Peltier, W. H. and C. I. Weber. 1985. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 3rd edition. EPA/600/4-85/013. U. S. EPA, Cincinnati, Ohio. 216 pp.

Ross, L. T. 1990. Methods for aquatic biology. Fla. Dept. Environ. Reg. Tech. Ser. 10(1): 1-47.

AF 45745


Vero Beach
INDIAN RIVER AQUATIC RESERVE
INDIAN RIVER (O F W)
Landing Strip
Trailer Park
Coral Poinciana Park
Nevins
McKee Jungle Gardens
Trailer Park
FLORIDA
TEST SITE
DISCHARGE (POD)
FLOW
CANAL
COMPARABLE SITE
EAST COAST
PLANT
Crawford Ditch
Oslo
606
UNDERGROUND
TELEPHONE
Trailer Park
Trailer Park
SOUTH CANAL
Mapped by the U. S. Coast & Geodetic Survey
Edited and published by the Geological Survey
SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER
CDM

COMPARABLE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: 30	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
SUBMITTING AGENCY NAME: FDER CENTRAL DISTRICT	FDER# IC 31-121588	04/23/91	SOUTH RELIEF CANAL

REMARKS:	LOCATION: INDIAN R. CTY SOUTH WATER SYSTEM 1550 SOUTHWEST 9th AVENUE VERO BEACH, FLORIDA	FIELD ID/NAME: IRSC RO PLANT

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 10	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 10	Max. observed; >0.3 m/sec. **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 2	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 2	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 10	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments		TOTAL SCORE
34 PUK	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	34

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
04/23/91	PHILIP N. KANE, Ed.D.	Philip N. Kane, Ed.D.

COMRABLE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDER CENTRAL DISTRICT	STORET STATION NUMBER: NPDES # FL0033740 / FDER # IO31-121588	DATE (M/D/Y): 04/23/91	RECEIVING BODY OF WATER: SOUTH RELIEF CANAL

REMARKS:	LOCATION: INDIAN R. CTY SOUTH WATER SYSTEM 1550 SOUTHWEST 9th AVENUE VERO BEACH, FLORIDA	FIELD ID/NAME: IRSL RO PLANT

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
40%	40%		20%			

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

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

Point-Source Pollution (list location and describe):

Estimated Stream Width (range, m): 50m	Estimated Stream Depth (range, m): 0.25m	yes
High Water Mark (m above bed): 2.0M	Velocity (range, m/s): 0.28 m/s	Impounded ☐ Channelized ☑

Canopy Cover % (check box): Open: ☐ Lightly Shaded: ☑ Moderately Shaded: ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

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

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

Sediment Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☐ Sand: ☑ Shell: ☐ Other: ☐

Substrate Types (estimated % surface coverage):

Limestone:		Sand/Silt/Clay Mix:	
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell		Coarse Organic Debris:	10%
Sand:	90%	Mud/Muck (organic):	

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top			Secchi Depth (m):	TO BOT
Mid-depth	26.7	8.5	pH (SU):	7.1
Bottom			Conductivity (µmho/cm):	447
			Other Parameters: SALINITY	0.0

Stream Type (check box): Blackwater: ☐ Deep Aquifer Fed: ☐ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☑ STORM WATER

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

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

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

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

Weather Conditions: CLOUDY

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

ANALYSIS DATE: 04/23/91	ANALYST: PHILIP N. KANE, Ed.D.	SIGNATURE: Philip N. Kane

DISCHARGE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: 30	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
SUBMITTING AGENCY NAME: FDER CENTRAL DISTRICT	NPDES # FL0CB1440 FDER # IO31-121588	04/23/91	SOUTH RELIEF CANAL

REMARKS:	LOCATION: FLORIDA POWER & LIGHT SOUTH WATER SYSTEM 1555 SOUTHWEST 4th AVENUE VERO BEACH, FLORIDA	FIELD ID/NAME: IRSC RO PLANT

Habitat Parameter — score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover — 10	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity — 10	Max. observed; >0.3 m/sec. **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec **0-7 points**
Artificial Channel/ Flow Alteration — 2	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability — 2	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality — 8	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments		TOTAL SCORE
-2	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	32

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
04/23/91	Philip N. Kane, Ed.D	Philip N. Kane, Ed.D

DISCHARGE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDER CENTRAL DISTRICT	STORET STATION NUMBER: NPDES # FL0039490 FQELTM TC31-121588	DATE (M/D/Y): 04/23/91	RECEIVING BODY OF WATER: SOUTH RELIEF CANAL

REMARKS:	LOCATION: INDIAN R. CTY SOUTH WATER SYSTEM 1550 SOUTHWEST 9th AVENUE VERO BEACH, FLORIDA	FIELD ID/NAME: IRSC RO PLANT

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
40%	40%		20%			

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

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

Point-Source Pollution (list location and describe):

Estimated Stream Width (range, m): 5.0	Estimated Stream Depth (range, m): 0.25m	yes
High Water Mark (m above bed): 2.0M	Velocity (range, m/s): 0.5m/s	Impounded ☐ Channelized ☑

Canopy Cover % (check box): Open: ☐ Lightly Shaded: ☑ Moderately Shaded: ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

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

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

Sediment Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☐ Sand: ☑ Shell: ☐ Other: ☐

Substrate Types (estimated % surface coverage):

Limestone:		Sand/Silt/Clay Mix:	MUCK
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell		Coarse Organic Debris:	10%
Sand:	90%	Mud/Muck (organic):	

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top			Secchi Depth (m):	TO BOTTOM
Mid-depth	28.9	7.6	pH (SU):	7.0
Bottom			Conductivity (µmho/cm):	1382
			Other Parameters:	SALINITY 0.2

Stream Type (check box): Blackwater: ☐ Deep Aquifer Fed: ☐ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☑ STORM WATER

Water Odors (check box): Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Other: ☑ H2S

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

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

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

Weather Conditions: PT. CLOUDY / SUN

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

ANALYSIS DATE: 04/23/91	ANALYST: PHILIP N. KANE, ED.D.	SIGNATURE: Philip N. Kane

18192/91-APR-25-04-01/W-BNA Continued from Page 2

Storet#	Analyte	Value	Units
34596	Di-n-octyl phthalate	2 U	ug/L
34361	Endosulfan-I	3 U	ug/L
34356	Endosulfan-II	3 U	ug/L
34351	Endosulfan-sulfate	3 U	ug/L
39390	Endrin	3 U	ug/L
34366	Endrin-aldehyde	3 U	ug/L
34376	Fluoranthene	2 U	ug/L
34381	Fluorene	2 U	ug/L
39410	Heptachlor	3 U	ug/L
39420	Heptachlor-epoxide	3 U	ug/L
39700	Hexachlorobenzene	2 U	ug/L
34391	Hexachlorobutadiene	2 U	ug/L
34396	Hexachloroethane	2 U	ug/L
34386	Hexachlorocyclypentadiene	5 U	ug/L
34403	Indeno(1,2,3-cd)pyrene	5 U	ug/L
34408	Isophorone	2 U	ug/L
34696	Naphthalene	2 U	ug/L
34447	Nitrobenzene	2 U	ug/L
34438	N-Nitrosodimethylamine	2 U	ug/L
34428	N-Nitrosodi-n-propylamine	2 U	ug/L
34433	N-Nitrosodiphenylamine	2 U	ug/L
34671	PCB-1016	1.0E+03 U	ug/L
39488	PCB-1221	1.0E+03 U	ug/L
39492	PCB-1232	1.0E+03 U	ug/L
39496	PCB-1242	1.0E+03 U	ug/L
39500	PCB-1248	1.0E+03 U	ug/L
39504	PCB-1254	1.0E+03 U	ug/L
39508	PCB-1260	1.0E+03 U	ug/L
	PCB-1262	1.0E+03 U	ug/L
34461	Phenanthrene	2 U	ug/L
34469	Pyrene	2 U	ug/L
39400	Toxaphene	1.0E+03 U	ug/L
34551	1,2,4-Trichlorobenzene	2 U	ug/L
34462	4-Chloro-3-methyl phenol	2 U	ug/L
34586	2-Chlorophenol	2 U	ug/L
34601	2,4-Dichlorophenol	2 U	ug/L
34606	2,4-Dimethylphenol	2 U	ug/L
34616	2,4-Dinitrophenol	15 U	ug/L
34657	2-Methyl-4,6-dinitrophenol	15 U	ug/L
34591	2-Nitrophenol	2 U	ug/L
34646	4-Nitrophenol	15 U	ug/L
39032	Pentachlorophenol	5 U	ug/L
34694	Phenol	2 U	ug/L
34621	2,4,6-Trichlorophenol	2 U	ug/L

Comments (1)
(2)
(3)
(4)
(5)
(6)

FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
CENTRAL LABORATORY
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

CHEMICAL ANALYSIS REPORT

Job ID: 91-APR-25-01
Date Received: 25-APR-1991
Authorized: 1-JUL-1991

Project: OTHER
Customer ID: CE-ORL
By: Yuh-Hsu Pan

Submitted By: DER CENTRAL DISTRICT OFFICE
3319 Maguire Blvd., Suite 232
Orlando, florida 32803-3767

For Additional Information, Please Contact
G. William Coppenger, Ph.D.
Yuh-Hsu Pan, Ph.D.
Suncom 277-2571
(904) 487-2571

Certified By: Yhan Date: 7-1-91

Abbreviations & Storet Codes:

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practical quantitation limit
U - Material was analyzed for but not detected;
The value reported is the minimum detection limit
Q - Evidence that analyte was present in sample is equivocal
NA - Not applicable
NR - Not requested

Sample ID: 18187/91-APR-25-01-01 Matrix: W-SURF-FRH
Location: 1550 Southwest 9th Avenue/Vero Beach,Fl.
Field ID:
Collected: 23-APR-1991 10:55 By: Philip N.Kane
Authorized: 1-JUL-1991 By: Tim Fitzpatrick
Type: Grab Sample
Lab Comments:
Field Comments: INDIAN RIVER WATER SYSTEM

Analysis ID: W-NH3
Analysis for ammonia in water
Analyzed: 12-JUN-1991 By: Jin-Chaun Liu
Authorized: 1-JUL-1991 By: Tim Fitzpatrick
Sample exceeded holding time prior to analysis.

Storet#	Analyte	Value	Units
00610	Ammonia-N	0.81 A	mg N/L

Analysis ID: W-NO2NO3
Analysis for nitrite+nitrate in water
Analyzed: 13-MAY-1991 By: Jin-Chaun Liu
Authorized: 1-JUL-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
00630	NO2NO3-N	0.04 U	mg N/L

Analysis ID: W-TKN
TKN for water sample
Analyzed: 23-MAY-1991 By: John Montana
Authorized: 1-JUL-1991 By: Tim Fitzpatrick
Sample exceeded holding time prior to analysis.

Storet#	Analyte	Value	Units
00625	N_KJEL_TOT	0.90	mg N/L

Analysis ID: W-TP
Analysis for total phosphorus in water
Analyzed: 24-MAY-1991 By: John Montana
Authorized: 6-JUN-1991 By: Tim Fitzpatrick
Sample exceeded holding time prior to analysis.

Storet#	Analyte	Value	Units
00665	Total-P	0.4 U	mg P/L

Sample ID: 18189/91-APR-25-02-01 Matrix: W-SURF-FRH
Location: 1550 Southwest 9th Avenue/Vero Beach,Fl.
Field ID:
Collected: 23-APR-1991 10:55 By: Philip N.Kane
Authorized: 24-JUN-1991 By: Tim Fitzpatrick
Type: Grab Sample
Lab Comments:
Field Comments: INDIAN RIVER WATER SYSTEM

Analysis ID: AG-G-W
Silver in water by furnace AA
Analyzed: 7-JUN-1991 By: Jack Merritt
Authorized: 14-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01077	Silver	0.2 U	ug/L

Analysis ID: CD-G-W
Cadmium by graphite furnace for water samples
Analyzed: 6-JUN-1991 By: Kate Brackett
Authorized: 13-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01027	Cadmium	0.2 K	ug/L

Analysis ID: HG-H-W
Mercury by cold vapor using hydride sys.-water
Analyzed: 1-MAY-1991 By: Laurie Roughton
Authorized: 3-MAY-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
71900	Mercury	0.2 K	ug/L

Analysis ID: SE-G-W
Selenium in water by furnace AA
Analyzed: 20-JUN-1991 By: Kate Brackett
Authorized: 24-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01147	Selenium	5 U (HYD.)	ug/L

FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION
CENTRAL LABORATORY
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

CHEMICAL ANALYSIS REPORT

Job ID: 91-APR-25-02
Date Received: 25-APR-1991
Authorized: 1-JUL-1991

Project: OTHER
Customer ID: CE-ORL
By: Yuh-Hsu Pan

Submitted By: DER CENTRAL DISTRICT OFFICE
3319 Maguire Blvd., Suite 232
Orlando, florida 32803-3767

For Additional Information, Please Contact
G. William Coppenger, Ph.D.
Yuh-Hsu Pan, Ph.D.
Suncom 277-2571
(904) 487-2571

Certified By: Han Date: 7-1-91

Abbreviations & Storet Codes:

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practical quantitation limit
U - Material was analyzed for but not detected;
The value reported is the minimum detection limit
Q - Evidence that analyte was present in sample is equivocal
NA - Not applicable
NR - Not requested

18189/91-APR-25-02-01 Continued from Page 2

INDIAN RIVER WATER SYSTEM

Analysis ID: W-ICP-23
ICP multielement analysis for water samples
Analyzed: 29-MAY-1991 By: Kate Brackett
Authorized: 24-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01106	Aluminum	18 T	ug/L
01002	Arsenic	20 U	ug/L
01097	Antimony	NR	ug/L
01007	Barium	NR	ug/L
01012	Beryllium	NR	ug/L
01027	Cadmium	6 U	ug/L
00916	Calcium	NR	mg/L
01034	Chromium	10 U	ug/L
01037	Cobalt	NR	ug/L
01042	Copper	5 T	ug/L
01045	Iron	31	ug/L
01051	Lead	15 U	ug/L
00927	Magnesium	NR	mg/L
01055	Manganese	NR	ug/L
01067	Nickel	5 U	ug/L
00937	Potassium	NR	mg/L
01147	Selenium	30 U	ug/L
01077	Silver	3 U	ug/L
00929	Sodium	NR	mg/L
01082	Strontium	NR	ug/L
01059	Thallium	NR	ug/L
01087	Vanadium	NR	ug/L
01092	Zinc	5 U	ug/L
Comment	NONE		

Sample ID: 18190/91-APR-25-02-02 Matrix: W-TRIP-BLK
Location: Trip Blank
Field ID:
Collected: 23-APR-1991 10:55 By: Philip N.Kane
Authorized: 24-JUN-1991 By: Tim Fitzpatrick
Type: Grab Sample
Lab Comments:
Field Comments:

18190/91-APR-25-02-02 Continued on Page 4

18190/91-APR-25-02-02 Continued from Page 3

Analysis ID: AG-G-W
Silver in water by furnace AA
Analyzed: 7-JUN-1991 By: Jack Merritt
Authorized: 14-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01077	Silver	0.2 U	ug/L

Analysis ID: CD-G-W
Cadmium by graphite furnace for water samples
Analyzed: 6-JUN-1991 By: Kate Brackett
Authorized: 13-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01027	Cadmium	0.2 U	ug/L

Analysis ID: HG-H-W
Mercury by cold vapor using hydride sys.-water
Analyzed: 1-MAY-1991 By: Laurie Roughton
Authorized: 3-MAY-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
71900	Mercury	0.2 K	ug/L

Analysis ID: SE-G-W
Selenium in water by furnace AA
Analyzed: 20-JUN-1991 By: Kate Brackett
Authorized: 24-JUN-1991 By: Tim Fitzpatrick

Storet#	Analyte	Value	Units
01147	Selenium	5 U (HYD.)	ug/L

18190/91-APR-25-02-02 Continued on Page 5

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Indian River South County Water, Sytsm
Address/City: 1550 Southwest 9th Ave, Vero Beach, Florida
County: Indian River
Contact/District: Phil Kane Central
NPDES Permit #: FL0037940 Outfall #: 001

Sample Collection: Date 4/23/91 Time 1055
Test Beginning: Date 4/24/91 Time 1000
Test Ending: Date 4-26-91 Time 0930
Test Organism: P promelas
Life Stage/Age: 14 days old

Test Number: 2 of 2 Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Remarks:
Rotten egg odor - gone @ 24 hrs
NEW D.O. MEMBRANE AFTER 24 HR READINGS

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7,9@9	8.7@23.0	1401@24.3 @1389	22@24.1
24 hr	7@7,9@9	8.9@21.5	1386@24.0	21@23.8
48 hr	7@7,9@9	8.8@22	1396@24.5	22@24.3

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
Control	57	5	5	5	8.6	10.1	7.6	7.6	8.2	8.0	21.1	21.0	21.0	[illegible]		
Control	87	5	5	5	8.6	10.3	7.7	7.6	8.1	8.0				239	250	255
100%	62	5	5	5	6.5	10.7	7.3	6.9	7.7	7.9	21.0	21.0	21.0	3090	3130	
100%	38	5	5	5	6.5	[illegible]	7.4	6.9	7.7	8.0						3200
Measured/Loaded by		MF	MF	KP	MF	KP	KP	MF	KP	KP	MF	KP	KP	MF	KP	KP
Recorded by		MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP

Investigators' Signatures
Marshall Faulk
Kim Pearce

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			—	—	—
Lab Tot. Resid. Cl2:			0.0	Hach	MF
Alkalinity:	114	58	132	Hach	MF
Hardness:	20	72	320	Hach	MF
Total Ammonia:	0.0	0.0	0.68	Hach	MF

Ammonia meter slope: _____

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Indian River South County Water Syst. **Sample Collection:** Date 4/23/91 Time 1055
Address/City: 1550 Southwest 9th Ave Vero Beach Fl **Test Beginning:** Date 4/24/91 Time 1000
County: Indian River **Test Ending:** Date 4-26-91 Time 0930
Contact/District: Phil Kane Cental **Test Organism:** Ceriodaphnia dubia
NPDES Permit #: FL0037940 **Outfall #:** 001 **Life Stage/Age:** < 24hr

Test Number: 1 of 2 **Test Type:** Screening | Definitive
Static | Static Renewal | Flow-through

Remarks:
NEW D.O. MEMBRANE AFTER 24-HR READINGS
Strong Sulfur dioxide odor noted Eggs

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7,9@9	8.7@23°C	1406@24.3°C 1389	22.0°C@24.1°C
24 hr	7@7,9@9	8.9@21.5	1386@24.0	21.0@23.8
48 hr	7@7,9@9	8.8@22	1396@24.5	22@24.3

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
Control	A	5	5	4	8.3	10.5	8.3	8.3	8.3	8.2	21.8	21.5	22.0	194	203	237
Control	B	5	5	4												
Control	C	5	5	5												
Control	D	5	5	5												
100%	A	5	5	5	2.0	10.9	8.1	7.0	8.2	9.4	21.3	21.5	22.0	2880	2790	2800
100%	B	5	5	5												
100%	C	5	5	5												
100%	D	5	5	4												
Measured/Loaded by:		MF	MF	MF	MF	KP	KP	MF	KP	KP	MF	KP	KP	MF	KP	KP
Recorded by:		KP	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP

Investigators' Signatures
Marina Haidak
Kim Pearce

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl:			—	—	—
Lab Tot. Resid. Cl:			0.0	Hach	MF
Alkalinity:	118	58	132	Hach	MF
Hardness:	120	22	650	Hach	MF
Total Ammonia:	0.0	0.0	0.28	Hach	MF

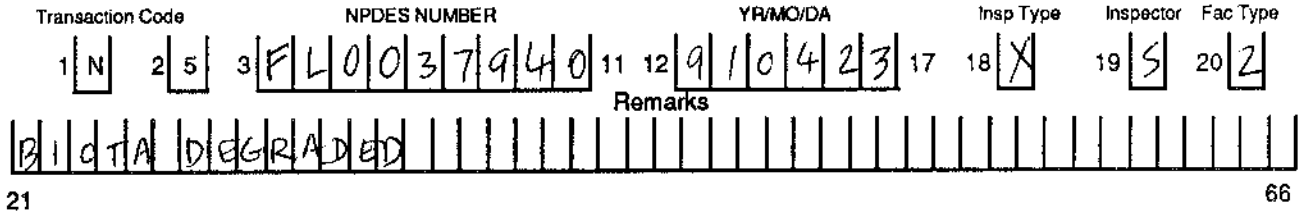
Ammonia meter slope: Chlorine Blank 0.0

Macroinvertebrate taxa list for Indian River South County Water System, collected on 23 April, 1991, above and below the discharge, via ponar dredge and timed qualitative methods combined.

	Control Site	Test Site
Coleoptera		
Dineutus sp.	7	3
Dubiraphia bivittata	–	1
Peltodytes sexmaculata	15	–
Decopoda		
Callinectes sapidus	1	–
Diptera		
Chironomus decorus grp.	320	40
Cladotanytarsus sp.	16	–
Cricotopus bicinctus	–	8
Cricotopus/Orthocladius grp. sp.	–	8
Dicrotendipes modestus	16	24
Goeldichironomus amazonicus	8	–
G. holoprasinus	136	40
Paracladopelma sp.	8	–
Polypedilum illinoense	56	344
Undetermined dipteran pupae	32	40
Tanytarsus sp.	144	8
Thienemanniella fusca	–	8
T. xena	–	8
Ephemeroptera		
Acerpenna pygmaeus	–	1
Caenis sp.	142	13
Callibaetis floridanus	22	–
Gastropoda		
Gyraulus parvus	1	–
Hebetancyclus excentricus	1	20
Littordinops tenuipes	3	3
Melanoides tuberculata	2	1
Physella heterostropha pomila	2	2
Pyrogophorus platyrachis	2	–
Hemiptera		
Abedus sp.	1	2
Ranatra sp.	–	1
Malacostraca		
Gammarus sp.	–	14
Hyalella azteca	6	–
Palaemonetes paludosus	10	3
Odonata		
Argia sp.	–	1
Enallagma cardenium	1	2
E. signatum	9	3
Ischnura posita	3	–
I. ramburii	1	–

Oligochaeta		
Limnodrilus hoffmeisteri	3	–
Pristina longiseta	–	1
Pelecypoda		
Corbicula manilensis	2	–
Musculium sp.	2	–
Undetermined sphaeriid	1	–

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



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

