

Biological Assessment of

Iron Bridge Water Pollution Control Facility

Seminole County

NPDES #FL0037966

Sampled August 1992

December 1992

Biology Section
Division of Technical Services

Department of Environmental Regulation
Results of Fifth Year Inspections

Discharger: Iron Bridge Water Pollution Control Facility
County: Seminole
NPDES Number: FL0037966
State Permit Expiration Date: 15 November 1995

Toxics Sampling Inspection (XSI)	
Date Sampled:	25 August 1992
Results:	No organic priority pollutants were detected in the effluent sample. The following metals were detected above quantitation limits: aluminum (247 µg/L), calcium (37 mg/L), iron (42 µg/L), magnesium (6.8 mg/L), and zinc (29 µg/L). None of these values represents a violation of Class III standards.

Compliance Biomonitoring Inspection (CBI)	
Date Sampled:	25 August 1992
Results:	Not toxic to *Ceriodaphnia dubia* or *Notropis leedsi.*

Impact Bioassessment Inspection (IBI)	
Date Sampled:	25 August 1992
Results:	Neither benthic macroinvertebrate nor phytoplankton communities demonstrated symptoms of stress that could be associated with the discharge. Algal growth potential was somewhat elevated below the outfall, although background AGP was relatively high for an unenriched system.

Water Quality Inspection (WQI)	
Date Sampled:	25 August 1992
Results:	Nutrient levels in the receiving waters above and below the outfall were nearly identical, and did not indicate enrichment problems. Effluent nutrients were generally lower than those found at the study sites. Dissolved oxygen was less than the Class III Standard of 5 mg/L at both receiving water stations.

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 Iron Bridge Road Water Pollution Control Facility (WPCF) is located in Oviedo, Seminole County, Florida. This 40 MGD (design capacity) advanced secondary treatment facility consists of two wastewater treatment plants as follows: 1) a 16 MGD Rotating Biological Contactor plant with flow equalization, denitrification, tertiary filtration, and post-aeration; and 2) two 12 MGD Bardenpho treatment trains with chemical feed additions, tertiary filtration, and post-aeration. The effluent from both plants is chlorinated. The facility treats mostly domestic wastes, as well as several sources of industrial wastes, including uniform cleaning services and a dairy. Following dechlorination, effluent is discharged either to the Little Econlockhatchee (limited to 28 MGD), or to a 1,220 acre manmade wetland which flows into a 660 acre natural wetland (see diagram in Appendix). Discharge via these wetland systems, which ultimately enters the St. Johns River, is limited to 16 MGD.

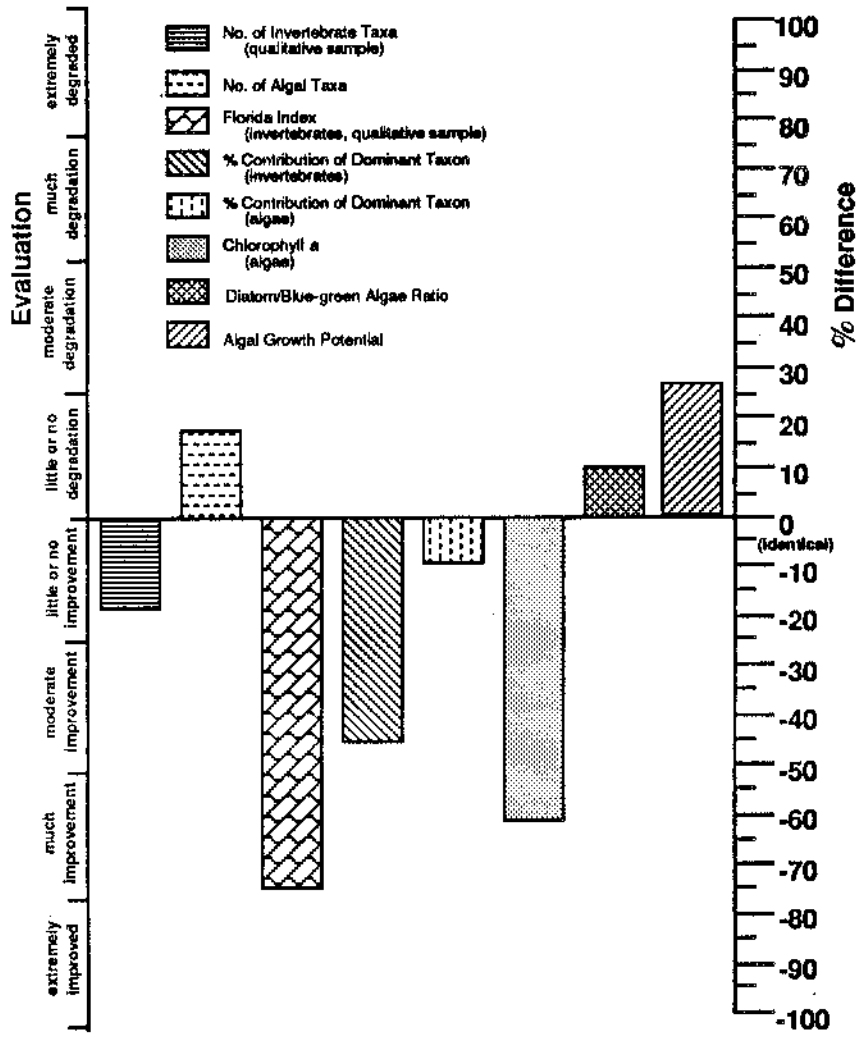
The Iron Bridge WPCF discharge has proven to be toxic to invertebrates on several occasions. The FDER Biology Section reported acute toxicity of dechlorinated effluent to *Daphnia pulex* in April, 1984, and again in February, 1985. Acute toxicity to *Ceriodaphnia dubia* was detected in June, 1992, but no toxicity was found when the tests were repeated. Aside from the above toxicity problems, wastewater treatment and effluent quality has improved over the past year, with reductions in $CBOD_5$, TSS, Total P, TKN, and Total N (see facility summary in Appendix).

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 above the outfall in the Little Econlockhatchee River) and a test site (the area down gradient of the discharge) (see map in Appendix). 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 (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DER Chemistry Laboratory.

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	16	19
Florida Index	4	7
% Contribution of Dominant Taxon	31.5	17.3
% Gastropoda	33.3	19.2
% Coleoptera	14.8	21.2
% Malacostraca	13.0	21.2
% Diptera	11.1	15.4
% Pelecypoda	5.6	9.6
% Odonata	5.6	1.9
% Oligochaeta	0	7.7
% Other	16.8	3.8
% Predators	16.0	18.7
% Collector-Gatherers	31.1	41.7
% Collector-Filterers	5.6	10.0
% Scrapers	42.5	29.0
% Shredders	1.9	0.7
% Parasites	2.8	0
Phytoplankton Algae		
Number of Taxa	17	14
% Contribution of Dominant Taxon	23.3	21.1
Chlorophyll a (µg/L)	5.45	2.14
Diatom/Diatom + B-G Abundance Ratio	0.50	0.45
% Blue-green	16.7	28.9
% Green	63.3	47.4
% Diatoms	16.7	23.7
% Euglenophytes	3.3	0



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

Benthic macroinvertebrate communities were evaluated at reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Phytoplankton was sampled at both reference and test sites via subsurface grabs. Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). 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 in this report. Many of these, such as the number of taxa, and chlorophyll *a* 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. A decreased diatom to blue-green algae ratio (calculated by dividing the number of individuals in the Bacillariophyta by the number of individuals in the Bacillariophyta + Cyanophyta) is often indicative of nutrient enriched conditions. 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 (for % composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI for functional feeding groups.

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, Florida Index and the diatom to blue-green algae ratio are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving the percent contribution of dominant taxon, chlorophyll *a*, and algal growth potential are measured as the test site minus reference site divided by the reference site.

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

Results and Discussion

Habitat scores for the reference and test sites were essentially identical, at 88 and 87, respectively (Appendix). Both areas had excellent substrate available for macroinvertebrate colonization and success, as well as favorable water velocity, bank stability, and vegetation quality. This stretch of the Little Econlockhatchee was completely forested, and no evidence of non-point source pollution or erosion was apparent. Physical/chemical measurements were fairly similar at both study areas, with the exception of pH (Appendix). At the reference site the waters were acidic (pH = 6.2), while downstream the surface pH was 8.2. Dissolved oxygen was less than the Class III Standard of 5 mg/L at both receiving water stations (3.3 mg/L and 3.7 mg/L at reference and test sites, respectively). The warm water temperature (approximately 27°C) and partly cloudy conditions at the time of sampling could have contributed to the low dissolved oxygen.

No organic priority pollutants or pesticides were present in the effluent at levels above detection limit, except for the tentative identification of aromatic compounds at an estimated concentration of 3 µg/L. The following metals were present in concentrations above the practical quantitation limit: aluminum (247 µg/L), calcium (37 mg/L), iron (42 µg/L), magnesium (6.8 mg/L), and zinc (29 µg/L). None of these values represents a violation of Class III standards.

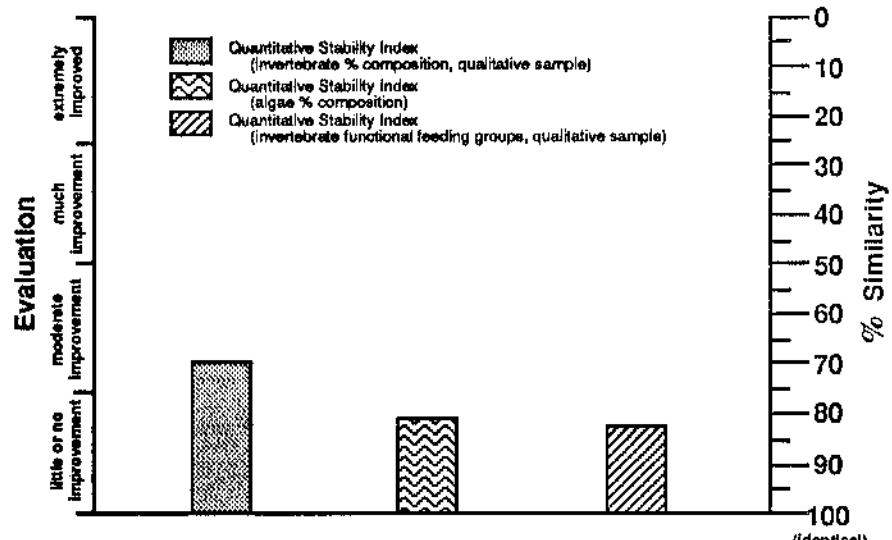
The discharge sample collected from the outfall to the Little Econlockhatchee River was not toxic to the invertebrate, *Ceriodaphnia dubia* or to the fish, *Notropis leedsi*. No mortality occurred in either 48 hour static acute bioassay (Appendix).

Concentrations of nutrients in the effluent were generally lower than those found at the study sites. Nitrate-nitrite was the only exception, but the observed value of 0.86 mg/L was still low for a sewage treatment plant discharge. None of the nitrogen or phosphorus-containing compounds measured in the river were present at problem levels. STORET data from 1617 Florida stream stations, for the period of 1980 to 1989, have been compiled into a percent distribution, found in the Appendix (Joe Hand, personal communication). Data from this present investigation were compared to these values. Concentrations of orthophosphate, total phosphorus, ammonia, nitrate-nitrite, and TKN collected from reference and test sites all fell within the 30-70% percentile range for these representative Florida streams.

Algal growth potential (AGP) was 7.5 mg dry wt/L at the upstream site and 9.5 mg dry wt/L at the test site. AGP appeared to be associated with the nitrate-nitrite concentrations of the samples.

Measures of benthic macroinvertebrate community health indicated no degradation resulting from the Iron Bridge discharge. The figure on p. 2 indicates the degree of difference between the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the reference, as demonstrated by the increases in species richness, Florida Index, and a decreased % contribution of dominant taxon. The relative abundance of each individual taxa appears in the Appendix. The figure on this page summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation. In this particular case, though, the greater similarities between macroinvertebrate communities at the two sites is indicative of slight improvement or very little change.

Phytoplankton populations were sparse, as would be expected in a flowing system (see taxa list, Appendix). Both sites were dominated by green algae, with smaller proportions of blue-greens and diatoms. Chloro-



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

phyll *a* was higher above the outfall, but was not considered excessive. Although fewer taxa were collected from the test site, community metrics generally indicated little or no degradation. As was noted for macroinvertebrate communities, the QSI for % composition indicated nearly analogous phytoplankton assemblages.

Conclusions

The effluent sample collected from the Iron Bridge Water Pollution Control Facility was not toxic to either test organism, *Ceriodaphnia dubia* or *Notropis leedsi*, in 48 hour static acute bioassays. No organic priority pollutants were detected, although the tentative identification of aromatic compounds at an estimated concentration of 3.0 µg/L was reported. The metals measured in the discharge, aluminum (247 µg/L), calcium (37 mg/L), iron (42 µg/L), magnesium (6.8 mg/L), and zinc (29 µg/L), did not exceed ambient standards.

Nutrients were present in low concentrations in the effluent, and at both the study areas. Algal growth potential was slightly elevated at the test site as compared to the reference, but both were higher than would be expected, considering the nutrient levels. The cause of the relatively high background AGP was not apparent.

Benthic macroinvertebrate communities collected via discrete dip net samples showed no signs of degradation below the plant discharge. Some measurements, such as species richness, Florida Index, and the percent contribution of dominant taxon, indicated healthier populations at the test site. Phytoplankton communities were sparse in the receiving waters, and were dominated by green algae. Differences in the attributes of the algal populations observed between the reference and test sites were minimal, and could not be associated with the facility's discharge.

Literature Cited

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.

Weber, C. I. 1991. 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.

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

Chemistry summary table for

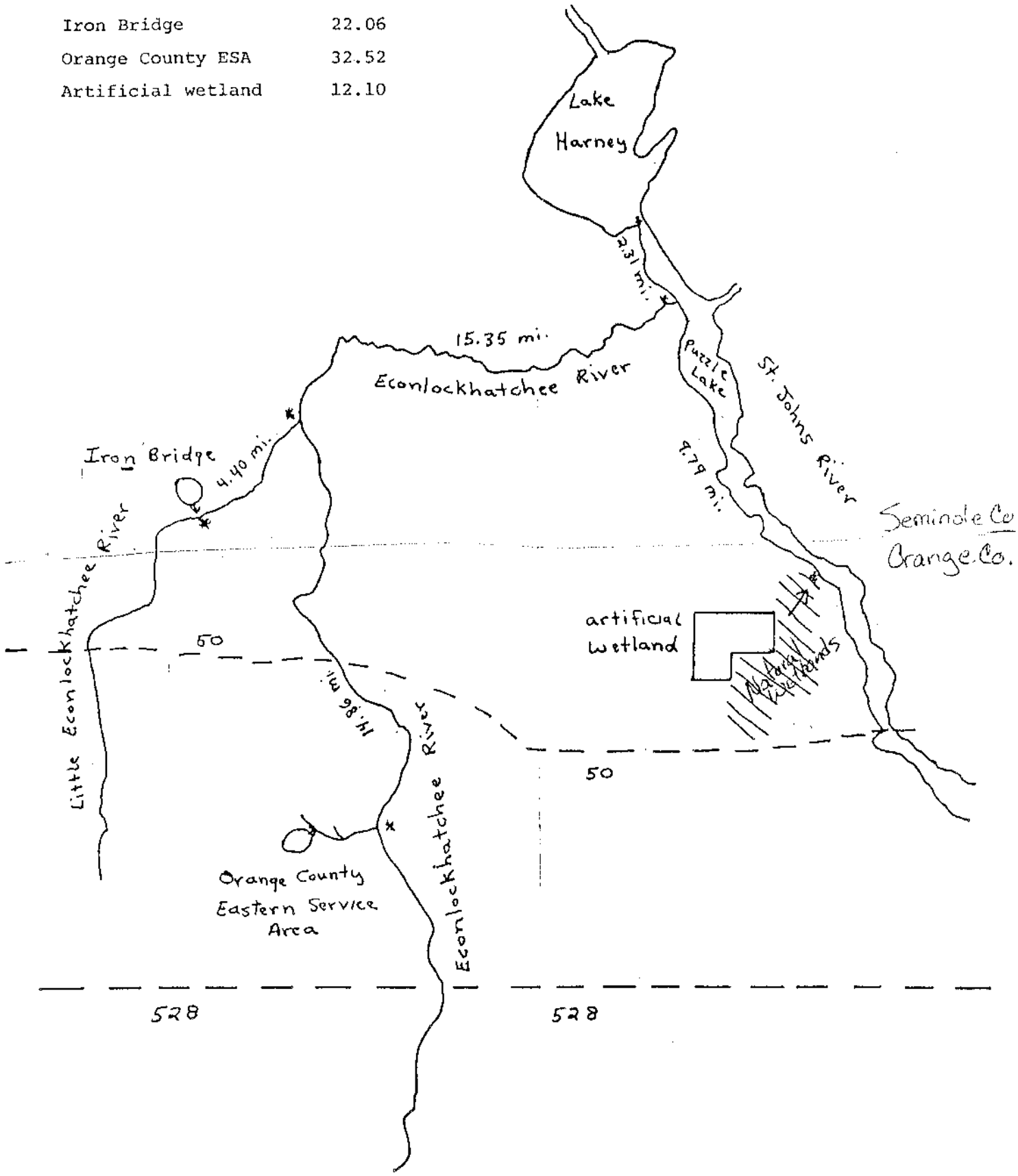
Orlando Iron Bridge STP	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
Tentative ID & Estimated Conc.:			
Aromatics	3.0		
Metals (ug/L)			
Aluminum	247		
Antimony	15 U		
Arsenic	20 U		
Cadmium	0.09 T		
Calcium (mg/L)	37		
Copper	5 U		
Chromium	10 U		
Iron	42		
Lead	15 U		
Magnesium (mg/L)	6.8		
Mercury	0.1 U		
Nickel	5 U		
Selenium	30 U		
Silver	0.07 U		
Zinc	29		
Nutrients (mg/L)			
Ortho-phosphate	0.033 T	0.11 A	0.11 A
Total phosphorus	0.083	0.12	0.14
Ammonia	0.056	0.058	0.057
Nitrate+Nitrite	0.86	0.14	0.19
TKN	0.78	1.0	1.0
Other Parameters			
Habitat Assessment		88	87
D.O. (mg/L)	8.1	3.3	3.7
pH (SU's)	7.8	6.2	8.2
Conductivity (µmhos/cm)	474	112	145
Temperature (°C)		26.9	27.2
Hardness (mg CaCO3)	125		
Algal Growth Potential (mg dry wt/L)	35.6	7.5	9.5
Bioassay Invertebrate-Chlorinated	Not Toxic		
Bioassay Invertebrate-Dechlorinated	Not Toxic		

A - Value reported is the mean of two or more determinations
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 - Presumptive evidence of presence of material
O - Sampled, but analysis lost or not performed
Q - Sample held beyond normal holding time
T - Value reported is less than the practical quantitation limit
U - Material analyzed for but not detected; value reported is the minimum detection limit
NR - Not requested

Figure 1. General locations of major point sources.

Estimated distances to Lake Harney (miles)

Iron Bridge	22.06
Orange County ESA	32.52
Artificial wetland	12.10



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: Iron Bridge Water Pollution Control Facility		Date Summary Prepared: 9/11/92
Location (attach detailed map): Seminole & Orange Co. - See attached maps.	County: Seminole	District: Central
Federal Permit # FL0037966 and expiration date: 6/30/97	State GMS # and 3059M00254 State expiration date: 11/15/95 D059-183046	Facility Type: Industrial (Municipal) Federal Agricultural Other (list):

Function of facility: Domestic Wastewater Treatment Plant (advance secondary)

Description of treatment process: A 40 MGD (total design capacity) domestic wastewater treatment facility consisting of 1) A 16 MGD Rotating Biological Contactor wastewater treatment plant with flow equalization, denitrification, tertiary filtration and post-aeration and 2) 2 - 12 MGD dual train Bardenpho treatment plants with Chemical Feed facilities, tertiary filtration and post-aeration. The disinfected reclaimed water is discharged to the Little Econlockhatchee River, after dechlorination (limited to 28 MGD), and to a 1,220 ± Acre man made wetlands which then discharges through 660 ± Acres of natural cypress lands and ultimately to the ST. John's River. The wetlands system is presently limited to 16 MGD capacity.

Receiving waters: Little Econlockhatchee River and the St. John's River (via Artifical/natural wetlands)	Classification: I II (III) - natural wetlands and St. John's River OFW - Little Econ River	
Design Flow: 40 MGD	Mean Flow: Total (2/91 - 6/92) 25.44 MGD L.Econ = 10.97 MGD Art. wetlands 12.53 MGD	Flow during survey: L.Econ = 27.63 MGD Artificial wetlands = 13.09 MGD

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

therefore, the best time to sample is:

If facility has a mixing zone, give details (size, parameters affected, etc.):

N/A

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

Parameter	Limit (units)
See Attached Sheets	

Describe special permit conditions and permit modifications:

- TN + TP loading limits for the combined discharge were reduced in the new NPDES permit issued 5/22/92, they now agree w/ FDER permit limits.
  TN was 1104 Now 780 #/day
  TP was 253 Now 220
- CBOD5 & TSS Conc. req. by EPA going into the artificial wetlands are the same as FDER limits for effluent from the artificial wetlands.

2 of
Econ Bridge W.P.C.F.
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Description of permitted outfall(s): Little Econlockhatchee River: Open concrete outfall channel from facility to the River. wetlands / ST. John's River: Reclaimed water is transmitted via force main to a 1,640 Acre multicell artificial wetland (1,220 acres wetted area) then conveyed through a series of wetland cells and to an plugged unamed ditch to allow sheetflow through 660 ± Acres of natural wetlands and to the ST. Johns River. The Artificial wetlands are located in Eastorange County, 0.8 miles west of the River.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year:

No MOR violations within the last 12 months.

No plant upsets noted for the last 12 months.

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

NPDES: Biomonitoring -

- control failed in 12/91 7day Chronic (Ceriodaphnia) were not able to retest until the next sampling period, all results were satisfactory. (EPA notified)
- Failed 96hr. Acute. (Ceriodaphnia) 6/92 - resampled as directed by NPDES permit - all samples satisfactory.

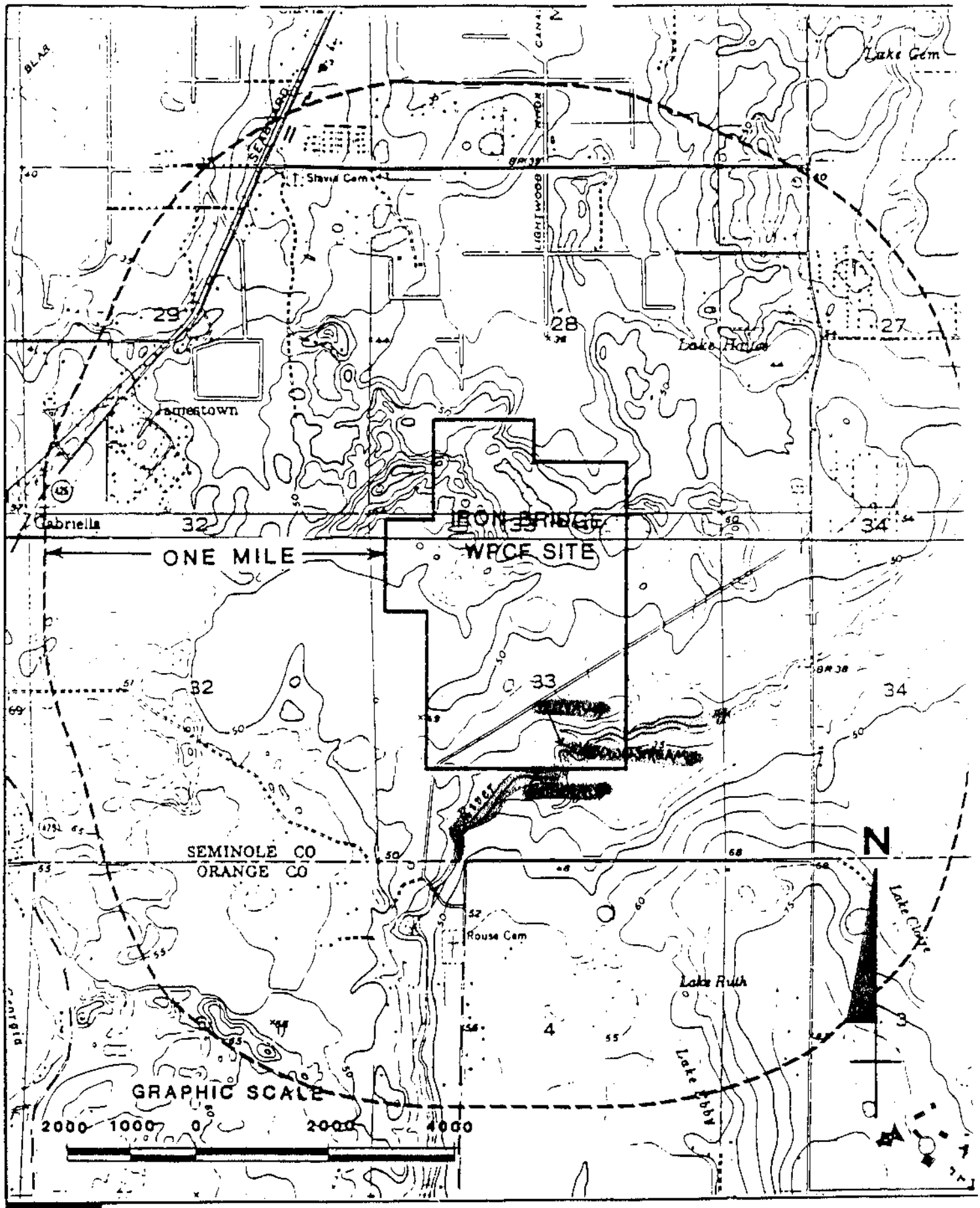
There are no previous or current enforcement actions against this facility.

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set: Comparison of MOR results for 7/91-6/92 to 7/90-6/91 indicate significant improvement in the treatment process. CBODs & TSS were both reduced by more than half as an annual average at 56% and 54% respectively. Total P was reduced by 42%, TKN by 17% and TN by 6% as annual averages. Effluent quality from the artificial wetlands has also improved somewhat. [CBODs was reduced by 33%, TSS by 4% and TN by 10%. TP did not change as an annual average.]

Additional information:
Ground Water Monitoring Requirements are being met at this time.

Staff contributing to this review (signature):

	(Biologist)
Sue Jarrell	(Inspector)
Al Coates	(Engineer)
	( )
	( )
	( )



ATTACHMENT A

USGS LOCATION MAP

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

SUBMITTING AGENCY CODE: 30 / SUBMITTING AGENCY NAME: FDER CENTRAL D.STRICT	STORET STATION NUMBER:	DATE (M/D/Y): 08/25/92	RECEIVING BODY OF WATER: LITTLE ECON

REMARKS:	LOCATION: CITY OF ORLANDO IRON BRIDGE STP 601 IRON BRIDGE CIRCLE OVIEDO, FLORIDA 32765	FIELD ID/NAME:
UPSTREAM		IRON BRIDGE STP

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 28	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 23	Max. observed: >0.3 m/sec, but < 1 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, or spate occurring; > 2 m/sec 0-7 points
Artificial Channel/ Flow Alteration 14	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 9	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 9	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
5	Add 5 points if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	88

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
08/25/92	Philip N. Kane, Ed.D.	Philip N. Kane, Ed.D.

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

SUBMITTING AGENCY CODE: 30 SUBMITTING AGENCY NAME: FDER CENTRAL DISTRICT	STORET STATION NUMBER:	DATE (M/D/Y): 08/25/92	RECEIVING BODY OF WATER: LITTLE ECON

REMARKS:	LOCATION: CITY OF ORLANDO IRON BRIDGE STP 601 IRON BRIDGE CIRCLE OVIEDO, FLORIDA 32765	FIELD ID/NAME:
DOWNSTREAM		IRON BRIDGE STP

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 28	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 23	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 14	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 8	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 9	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 5	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	**TOTAL SCORE** 87

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
08/25/92	Philip N. Kane, Ed.D.	Philip N. Kane, Ed.D.

30 CENTRAL DISTRICT | 08/25/92 1000 | LITTLE ECON

UPSTREAM | CITY OF ORLANDO IRON BRIDGE STP 601 IRON BRIDGE CIRCLE OVIEDO, FLORIDA 32765 | IRON BRIDGE STP

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

Forest	Field/Pasture	Agriculture	Residential	Commercial	Industrial	Other (Specify)
100%						

Local Watershed Erosion (check box): None ✓ SLIM | Moderate | Heavy

Local Watershed NPS Pollution (check box): No Evidence ✓ | Some Potential Sources | Obvious Problems

Estimated System Width (range, m): 10M | Estimated System Depth (range, m): 3.1 M | N/A

High Water Mark (range, m): 4M | Velocity (range, m/s): 0.3M/S

Canopy Cover: Open | Partly Shaded (11-50%) | Moderately Shaded (51-85%) | Heavily Shaded ✓ DENSE

SEDIMENT/SUBSTRATE

Sediment Odors: Normal ✓ | Sewage | Petroleum | Chemical | Anaerobic | Other

Sediment Oils: Absent ✓ | Slight | Moderate | Profuse

Evidence of Dredging: Straight | Spoil | Dense ✓ | Spoil

Substrate Class	% coverage in cross section	% coverage in stream	Substrate Types	% coverage	Artifacts	
Woody Debris (Snags)	25	5	Rock or Shell Rubble	0		NET
Leaf Packs	5	2	Sand	50	50	
Aquatic Vegetation	5	1	Mud/Muck	0		
Submerged Logs	10	5	Clay			
Undercut Banks	5	2	Other			

WATER QUALITY

	Temp. (°C)	D.O. (mg/l)	pH (SU)	Cond. (umhos/cm)			Depth (m)
Top	26.9	3.3	6.2	112			0.5M
Middle	26.9	3.3	6.2	112			
Bottom	27.0	3.3	6.2	112			

Sediment Type: ✓ Sand | Silt | Clay | Detritus | Organic | Other

Water Color (check box): Normal ✓ | Tea | Tannic | Chemical | Other

Water Surface Oils (check box): Slick | Sheen | Globs | None ✓

Clarity (check box): Clear ✓ | Slight Turbidity | Turbid | Opaque

Color (check box): Normal ✓ | Brown Tannic | Dark | Other

Weather Conditions: SUN / PARTLY CLOUDS

Abundance	Absent	Present	Common	Abundant
Periphyton		✓		
Algae				
Aquatic Macrophytes		✓		
Iron Reducer Bacteria	✓			

Analysis Date: 08/25/92 | Analyst: PHILIP N. KANE, Ed.D. | Signature: Philip N. Kane, Ed.D.

[illegible] STREAM FIELD DATA SHEET

FORM # / TAKEN BY: 30 CENTRAL FOER DISTRICT		DATE (MO/DA/YR): 08/25/92 TIME: 1200	RECEIVING WATER/SEGMENT: LITTLE ECON
TRANSECT: DOWNSTREAM	LOCATION: CITY OF ORLANDO IRON BRIDGE STP 601 IRON BRIDGE CIRCLE - OVIEDO, FLORIDA 32765		FIELD DESIGN: IRON BRIDGE STP

RIPARIAN ZONE/UPSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
100						

Local Watershed Erosion (check one): None ✓ SLIM Moderate Heavy

Local Watershed NPS Pollution Potential: Little or none ✓ Some potential sources Obvious problems

Other Notes: [illegible]

Estimated System Width (range, m):	12M	Estimated System Depth (range, m):	2M N/A (not measured)
High Water Mark (m above avg):	3M	Velocity (m/s):	0.3/M/S (not measured)
Canopy Cover: Open	Partly 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 Sand ✓ Marl Other

Substrate Types	% coverage	# times sampled	Modified	Substrate Types	% coverage	# times sampled	Modified
Woody Debris (Snags)	20	5	NET	Rock or Shell Rubble	0		NET
Leaf Packs	5	2		Sand	55	5	
Aquatic Vegetation	5	1		Mud/Muck	0		
Submerged Roots	10	5		Other:			
Undercut Banks	5	2		Other:			

WATER QUALITY

	Temp. (°C)	D.O. (mg/l)	pH (SU)	Cond. (umhos/cm)			Secchi (m)
Surface	27.1	3.7	8.2	145			0.5M
Mid-depth	27.2	3.7	7.9	143			
Bottom	27.2	3.7	7.8	143			

System Type: Stream Canal (Agricultural) Canal (Developed) Lake Wetland Estuary Other

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: SUN / PARTLY CLOUDY

Abundance:	Absent	Rare	Common	Abundant
Periphyton		✓		
Fish				✓
Aquatic Macrophytes		✓		
Iron-related Bacteria	✓			

ANALYSIS DATE: 08/25/92 ANALYST: PHILIP N. KANE, Ed.D. SIGNATURE: Philip N. Kane, Ed.D.

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: ORLANDO IRON BRIDGE STP
Address/City: _____
County: _____
Contact/District: P. KANE CENTRAL
NPDES Permit #: FL00 37966 Outfall #: _____

Sample Collection: Date 8-25-92 Time 0840
Test Beginning: Date 8-26-92 Time 1300
Test Ending: Date 8-28-92 Time 1300
Test Organism: C. DUBIA
Life Stage/Age: < 24 HRS

Test Number: 1 of 2 Test Type: (Screening) (Definitive) KP
(Static) Static Renewal | Flow-through

92-AUG-26-17 40078

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7, 10@10	8.5@24.5	24.1@ 24.3	978@1K 9680@10K
24 hr	7@7, 10@10	8.5@24	24.2@ 24.2	993 9910 @24.1
48 hr	7@7, 10@10	8.5@24	24.2@ 24.2	995 9980 @24.3

24.2

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	DO (mg/L) 0	24	48	Cond. (µmhos/cm) 0	24	48
control	A	5	5	5	8.2		8.4	23.9		24.0	8.7		8.3	164		181
control	B	5	5	5	"		8.4	"		"	"		8.3	"		"
control	C	5	5	5	"		8.4	"		"	"		8.3	"		"
control	D	5	5	5	"		8.4	"		"	"		8.3	"		"
100%	A	5	5	5	7.8		8.5	24.7		24.0	8.2		8.3	447		464
100%	B	5	5	5	"		8.5	"		"	"		8.3	"		"
100%	C	5	5	5	"		8.5	"		"	"		8.3	"		"
100%	D	5	5	5	"		8.5	"		"	"		8.3	"		"
Measured/Loaded by:		MF	MF	MF	MF		KP	MF		KP	MF		KP	MF		KP
Recorded by:		MF	MF	MF	KP		MF	KP		MF	KP		MF	KP		MF

Investigators' Signatures

Kim Pearce
Marshall Faircloth

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			0.0	Hach	PK
Lab Tot. Resid. Cl2:					
Alkalinity:	127	72	95	Hach	MF
Hardness:	122	75		Hach	MF
Total Ammonia:			0.0	Hach	MF

Ammonia Meter Slope: _____ Ammonia Blank: 0.0 Salinity Sample: _____ ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: ORLANDO IRON BRIDGE STP
Address/City: _____
County: _____
Contact/District: P. KANE C
NPDES Permit #: FL00 Outfall #: _____

Sample Collection: Date 8-25-92 Time 0840
Test Beginning: Date 8-26-92 Time 1300
Test Ending: Date 8-28-92 Time 1300
Test Organism: N. LEEDSI
Life Stage/Age: 11 DAYS
92-AUG-26-17 40078

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

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7, 10@10	8.5@24.5	24.1 @ 24.3	978@1K 9680@10K 24.2
24 hr	7@7, 10@10	8.5@24	24.2@24.2	993 9910 @24.1
48 hr	7@7, 10@10	8.5@24	24.2@24.2	998 9850 @24.3

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	DO (mg/L) 0	24	48	Cond. (µmhos/cm) 0	24	48
control	47	5	5	5	7.9	8.4	8.4	23.9	23.3	23.5	8.4	8.6	8.2			
control	10	5	5	5	7.9	8.4	8.5				8.4	8.6	8.2	245	243	250
100%	1	5	5	5	7.8	8.2	8.3	24.8	23.3	23.0	8.1	8.5	8.3			
100%	50	5	5	5	7.8	8.2	8.3				8.1	8.5	8.3	474	453	468
Measured/Loaded by:		MKP	MK	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP
Recorded by:		MF	MF	KP	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF

Investigators' Signatures

Kim Pearce
Marshall Faircloth

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			0.0	Hach	PK
Lab Tot. Resid. Cl2:					
Alkalinity:	27	72	95	Hach	MF
Hardness:	122	75	125	Hach	MF
Total Ammonia:			0.0	Hach	MF

Ammonia Meter Slope: _____ Ammonia Blank: 0.0 Salinity Sample: _____ ppt

Typical Values for Selected Parameters in Florida Waters

Adapted from Joe Hand, FDER, personal communication, 1991
(data was collected between 1980 and 1989)

Percentile Distribution

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphorus	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphorus	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
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
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
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
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-Phosphorus	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* (ug/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates

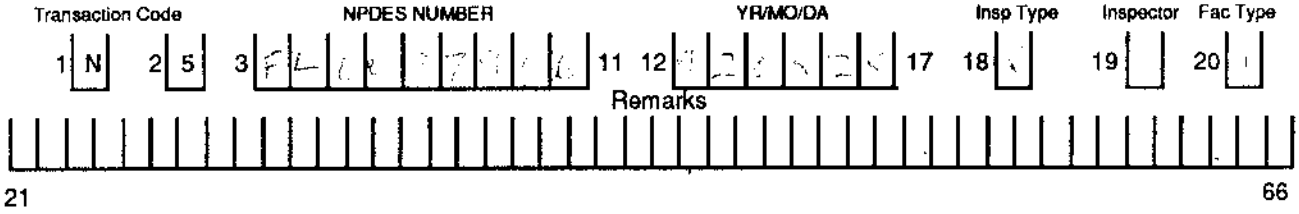
Macroinvertebrate taxa list for samples collected via discrete dip net sweeps above and below the Iron Bridge STP discharge in the Little Econlockhatchee River on August 25, 1992.

	Reference Site	Test Site
Acarina		
Lebertia(Pilolebertia) sp.	24	–
Coleoptera		
Dineutus sp.	–	16
Dubiraphia vittata	192	72
Diptera		
Ablabesmyia mallochi	–	8
A. rhamphe grp.	–	8
Atrichopogon sp.	120	–
Cryptochironomus sp.	–	8
Djalmabatista pulcher	–	8
Pagastiella orophila	24	–
Paralauterborniella nigrohalteralis	–	8
Polypedilum halterale grp.	–	8
Undetermined dipteran pupa	–	16
Ephemeroptera		
Caenis sp.	24	–
Gastropoda		
Micromenetus dilatus	24	8
Pyrgophorus platyrachis	408	64
Undetermined hydrobiid	–	8
Hirudinea		
Helobdella triserialis	72	–
Malacostraca		
Hyalella azteca	144	48
Palaemonetes paludosus	24	40
Megaloptera		
Sialis sp.	48	–
Odonata		
Aphylla williamsoni	24	–
Macromia taeniolata	24	8
Undetermined corduliid	24	–
Oligochaeta		
Eclipidrilus palustris	–	24
Limnodrilus hoffmeisteri	–	8
Pelecypoda		
Sphaerium or *Musculium* sp.	72	40
Trichoptera		
Cernotina sp.	–	16
Oecetis sp.	48	–

Phytoplankton taxa list for Iron Bridge STP, collected above and below the discharge in the Little Econlockhatchee River on August 25, 1992.

	Reference Site	Test Site
Diatoms		
Achnanthes sp.	25	–
Eunotia sp.	–	49
Melosira sp.	74	25
Navicula sp.	25	148
Chlorophyta		
Ankistrodesmus sp.	49	49
Chlamydomonas sp.	25	25
Coelastrum sp.	25	25
Cosmarium sp.	25	99
Crucigenia sp.	25	49
Unknown chlorophyte flagellate	172	49
Golenkinia sp.	25	–
Kirchneriella sp.	25	–
Scenedesmus sp.	74	148
Tetraedron sp.	25	–
Cyanophyta		
Aphanocapsa sp.	–	25
Chroococcus sp.	74	198
Gloeothece sp.	25	25
Oscillatoria sp.	25	25
Euglenophyta		
Trachelomonas sp.	25	–

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)

