

Biological Assessment of

Cross City Sewage Treatment Plant

and

Cross City Correctional Institution STP

Dixie County

NPDES #FL0027791

Sampled September 1991

March 1992

Biology Section
Division of Technical Services

Department of Environmental Regulation
Results of Fifth Year Inspections

Discharger: Town of Cross City Sewage Treatment Plant
Cross City Correctional Institution STP
County: Dixie
NPDES Number: FL0027791
State Permit Expiration Date: 6 June 1992

Toxics Sampling Inspection (XSI)

Date Sampled: 23 September 1991

Results: **Cross City STP:** Aluminum (38 µg/L), Cadmium (0.11 µg/L), Copper (17 µg/L), Iron (32 µg/L), Silver (0.17 µg/L), and Zinc (23 µg/L). The silver concentration is in violation of Class III Standards. **Cross City Correctional Institution STP:** Aluminum (79 µg/L), Cadmium (0.12 µg/L), Copper (30 µg/L), Iron (45 µg/L), Silver (0.21 µg/L), and Zinc (51 µg/L). The silver and zinc concentrations are in violation of Class III Standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 23 September 1991

Results: Neither facility was acutely toxic to *Ceriodaphnia dubia* or *Notropis leedsi* in 48 hour bioassays.

Impact Bioassessment Inspection (IBI)

Date Sampled: 23 September 1991

Results: Benthic macroinvertebrate communities stressed at both the control and test sites but were most degraded below the combined discharge. This was demonstrated by significant decreases in species richness, Florida Index, and Shannon-Weaver diversity. The diversity reduction was in violation of the Biological Integrity Criterion. The phytoplankton community shifted from a blue-green/diatom assemblage to one dominated by euglenophytes. This can be interpreted as a "Nutrient Induced Imbalance in Aquatic Flora and Fauna". Taxa richness was also decreased at the test site.

Water Quality Inspection (WQI)

Date Sampled: 23 September 1991

Results: Nutrients were extraordinarily high in effluent samples from both facilities, but more so in the Cross City STP discharge. Nitrate-nitrite in the grab sample of the Cross City STP discharge exceeded the facility's yearly average permit limit. Phosphorus containing compounds and nitrate-nitrite at both Belly Deep Creek sites were higher than 95% of typical Florida streams. Excessive macrophyte growth and extremely elevated algal growth potential was also observed at both sites. Violations of dissolved oxygen standards occurred at both sites. Bacteriological populations were severely elevated in both effluent samples and at both stream sites, in excess of Class III standards and permit limits. During very low flow conditions, it appears that the effluent backs up into Belly Deep Creek above the discharge. The enrichment problems observed at the reference site are probably due to influence from this combined discharge.

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

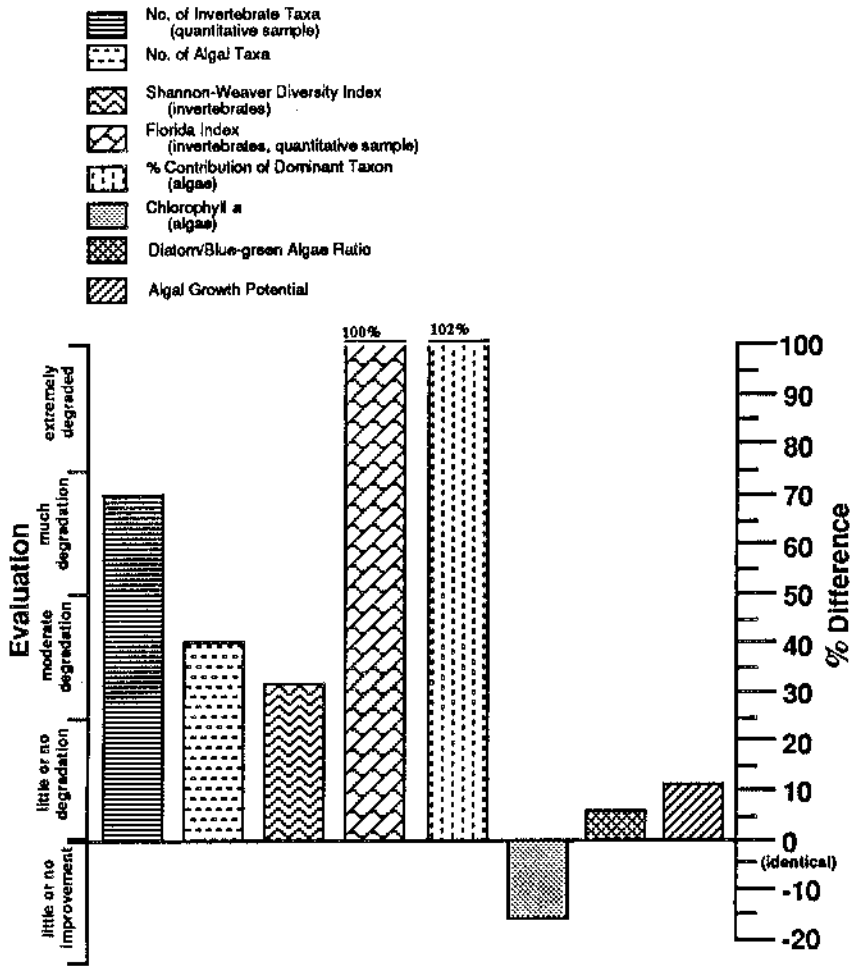
The Town of Cross City Sewage Treatment Plant and the Cross City Correctional Institute STP are both located off Hill Street in Cross City, Dixie County, Florida (see map in Appendix). Effluents from the two extended aeration facilities are combined and then discharged to Belly Deep Creek, which flows south to California Swamp. The Cross City STP has a design capacity of 0.15 MGD, while the Cross City Correctional Institute STP's design capacity is 0.25 MGD. Permit limits for both plants are listed in the Appendix. Historically, the Cross City STP and the Cross City Correctional Institute STP have been in compliance with permit parameters. Some operational problems have caused excess solids to settle in the chlorine contact chamber at the Cross City STP. Dechlorination of the final effluent is scheduled for March 1992.

Methods

The focus of this investigation was to determine the dischargers' effects on the receiving waters. A comparison of biological community health was made between a reference site (located about 0.25 miles upstream of the facility in Belly Deep Creek) and a test site (located about 0.4 miles downstream of the discharge) (see map in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	26	19
Florida Index	2.0	0.0
% Contribution of Dominant Taxon	24	44.3
% Diptera	68.0	36.0
% Odonata	20.8	3.2
% Malacostraca	0.0	44.3
% Gastropoda	5.3	5.1
% Hirudinea	0.6	4.4
% Hemiptera	2.1	0.6
% Other	3.2	6.3
% Predators	47.1	11.8
% Collector-Gatherers	33.2	113.0
% Collector-Filterers	0.2	0.7
% Scrapers	7.4	8.7
% Shredders	11.8	19.3
% Parasites	0.3	3.5
Macroinvertebrate Hester-Dendy		
Number of Taxa	30	9
Florida Index	5.0	0
Shannon-Weaver Diversity	3.8	2.6
% Gastropoda	33.9	5.4
% Diptera	38.7	16.2
% Odonata	14.3	0
% Hirudinea	1.2	70.3
% Ephemeroptera	6.0	0
% Hemiptera	4.8	0
% Other	1.2	8.1
% Predators	24.1	36.5
% Collector-Gatherers	33.3	19.8
% Collector-Filterers	0.7	0.9
% Scrapers	38.0	6.3
% Shredders	3.2	1.4
% Parasites	0.6	35.1
Phytoplankton Algae		
Number of Taxa	21	15
% Contribution of Dominant Taxon	16.7	33.8
Chlorophyll a (µg/L)	10.3	8.6
Diatom/B-G Abundance Ratio	0.32	0.30
% Blue-greens	55.6	10.3
% Euglenophytes	2.8	47.1
% Diatoms	26.4	4.4
% Greens	8.3	13.2
% Cryptophytes	6.9	11.8
Algal Growth Potential (mg dry wt/l)	58.08	64.43



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

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 effluent samples from both facilities (Weber 1991). The effluents were analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on 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 reference and test sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers which were incubated for 28 days (Ross 1990). Phytoplankton was sampled at both reference and test sites via sub-surface grab samples. Chlorophyll *a* was also determined for phytoplankton communities (Ross 1990). Bacterial populations were analyzed for total and fecal coliforms following the methods of APHA (1989). 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, Shannon-Weaver Diversity Index, 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 (% 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).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, 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: Lyn Burton, Russel Frydenborg, Kathleen Lurding, and Sandy McClure (Tallahassee Biology Laboratory).

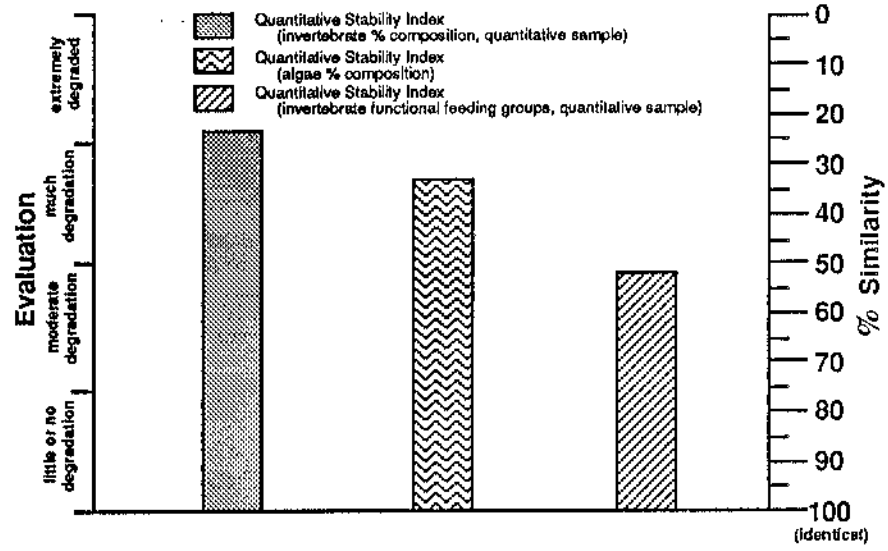
Results and Discussion

Habitat quality was better at the downstream site (habitat scores were 50 and 66 for reference and test sites, respectively, Appendix). Both sites had ample bottom substrate and riparian zone vegetation, and good to excellent bank stability. The upstream site had essentially no flow, and water velocity at the test site was characterized as fair (0.1 m/s). Both areas of Belly Deep Creek were channelized. The pH at both sites was slightly alkaline (7.4 at reference; 7.5 at test), and conductivity was a bit higher at the upstream station (700 and 610 µmhos/cm at reference and test sites, respectively). Dissolved oxygen was only 0.8 mg/L at the reference site. It is likely that respiration from the abundant macrophytes present, as well as lack of flow, contributed to this condition (the D.O. measurement was taken fairly early in the day). Below the discharge, where water velocity had increased and the measurement was taken later in the day, dissolved oxygen was 2.1 mg/L. The water quality standard for dissolved oxygen was violated at both sampling sites.

Neither the effluent from the Cross City STP nor that from the Cross City Correctional Institution was toxic to the test organisms, *Ceriodaphnia dubia* and *Notropis leedsi* (Appendix). No mortality occurred in the 48 hour static acute bioassays.

No organic constituents were detected in either effluent sample. In the Cross City STP sample, the metals aluminum (38 µg/L), cadmium (0.11 µg/L), copper (17 µg/L), iron (32 µg/L), silver (0.17 µg/L), and zinc (23 µg/L) were found. The following metals were measured in the Cross City Correctional Institution effluent sample: aluminum (79 µg/L), cadmium (0.12 µg/L), copper (30 µg/L), iron (45 µg/L), silver (0.21 µg/L), and zinc (51 µg/L). The values reported for silver from both facilities are in violation of Class III standards (silver standard ≤ 0.07 µg/L). The zinc levels in the Cross City Correctional Institution STP discharge also exceeded ambient standards.

Nutrients were extremely high in the effluent discharges, particularly the phosphorus-containing compounds (from both facilities) and nitrate-nitrite (from Cross City STP) (see chemistry summary table in appendix). Nitrate-nitrite in the grab sample of the Cross City STP discharge exceeded the facility's yearly average permit limit. Nutrient concentrations were also extraordinarily elevated at both test stations. STORET data from 1617 Florida stream stations, for the period of 1980 to 1989, have been compiled into a percent distribution table, found in the Appendix (Joe Hand, personal communication). Data from this present investigation were evaluated against these values. Total phosphorus was 2.4 and 2.6 mg/L at reference and test sites, respectively. These values measured at Belly Deep Creek are higher than 95% of all other streams in the state. Orthophosphorus levels were nearly identical. Nitrate-nitrite concentrations, 6.0 mg/L at the reference site and 4.4 mg/L downstream, were also higher than 95% of typical Florida streams. Levels of TKN and ammonia were also very high, and percentile rankings ranged from 60 to 91%. The unnaturally high nutrient concentrations measured at the reference site are probably due to the low flow conditions observed at the time of sam-



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

pling. Without sufficient volume from upstream, the discharge would tend to backup in the creek.

Algal growth potential (AGP) also demonstrated the severe nutrient enrichment present in Belly Deep Creek (see table). Reference site AGP was 58.08 mg dry wt/L, and that of the test site was 64.43 mg dry wt/L. According to Raschke and Schultz (1987), at AGP levels above 5 mg dry wt/L, enrichment problems such as excessive algal growth and D.O. sags are likely to occur. Both areas of the stream were choked with aquatic vegetation, and the D.O. was extremely low. Effluent AGP was also extremely elevated, 50.56 mg dry wt/L at the Cross City STP and 23.27 mg dry wt/L at the Cross City Correctional Institution STP.

Bacteriological populations were extraordinarily high. Fecal and total coliforms at the Cross City STP were 600,000 organisms/100 ml and 1,500,000 org/100 ml, respectively. Those at the prison STP were 45,000 org/100 ml for fecal and 400,000 org/100 ml for total coliforms. Coliform bacteria counts at reference and test sites, respectively, were as follows: 4,500 org/100 ml fecal, 40,000 org/100 ml total, and 11,000 org/100 ml fecal, 30,000 org/100 ml total. These levels constitute violations of ambient standards and permit limits for both facilities. No chlorine residual was measured in either discharge.

Quantitative measures of benthic macroinvertebrate community health indicated that the stream was degraded throughout the study area, but to a greater extent downstream of the effluent (see table and figures). 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. The figure on p. 3 summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

Species richness was significantly decreased at the test site, from 30 to 9 individuals see taxa list in Appendix). Although the Florida Index was lower than expected at the reference site (5), no pollution sensitive organisms at all were recovered from the downstream site in Hester-Dendy or dip net samples (Florida Index = 0). Shannon-Weaver diversity was reduced by 31.6%, a violation of the biological integrity criterion, 17-302.560(7) FAC. Quantitative Stability Indices for percent composition and functional feeding groups also represented degraded conditions.

Phytoplankton algae were affected by the addition of effluent as well. Twenty-one taxa were collected from the upstream site, while only 15 were found at the test site (see taxa list in Appendix). The percent contribution of dominant taxon doubled from reference to test site, also an indication of disturbance. The algal community upstream was dominated by blue-green algae, (particularly two species of the filament *Oscillatoria*), and secondarily by diatoms. This assemblage does not represent the most healthy and undisturbed conditions, and is probably a result of the low flow and intermittent effluent backup. Downstream, where the exposure to wastewater discharge is constant, conditions are even worse. The population is strongly dominated by euglenophytes, chiefly *Euglena* sp. Members of this division are very tolerant of organic enrichment. This shift in community structure is interpreted as a violation of 17-302.560(19) FAC, "Nutrient Induced Imbalances in Aquatic Flora and Fauna". The QSI for percent composition also indicated a low similarity.

Conclusions

The combined effluent discharge from the Town of Cross City STP and the Cross City Correctional Institution STP was harmful to the water quality and biota in Belly Deep Creek. Although neither effluent was acutely toxic to the bioassay organisms, the combined discharge was shown to have significant detrimental effects on the receiving waters. Violations of Class III silver standards were noted at both facilities, and zinc standards were also exceeded in the Correctional Institution discharge. Nutrient concentrations were extraordinarily high in both effluent samples, particularly the phosphorus containing compounds. Nitrate-nitrite in the grab sample of the Cross City STP discharge exceeded the facility's yearly average permit limit. Severe enrichment and its consequences were evident at both test stations, in the form of nutrient concentrations, excessive macrophyte growth, low dissolved oxygen, and extremely elevated algal growth potential. Nutrient enrichment at the reference site can be attributed to the backing up of effluent during low rainfall, and essentially, no flow conditions.

Bacteriological populations were high, orders of magnitude above Class III standards and both facilities' permit limits. These violations occurred in both effluent samples, as well as at both receiving water sites.

No chlorine residual was measured in either discharge.

Benthic macroinvertebrate communities were stressed at both Belly Deep Creek stations, but were most degraded below the combined discharge. Species richness and Florida Index were significantly decreased, and the reduction in Shannon-Weaver diversity violated biological integrity criterion. The increased flow observed at the test site should have resulted in a better macroinvertebrate population there, but the opposite was true. The reduced numbers of taxa, the low diversity, and the lack of sensitive organisms below the discharge demonstrate the overriding effect of poor water quality.

Phytoplankton algal populations were also stressed in the receiving waters. Above the discharge, the community was dominated by blue-green algae and diatoms. At the downstream site the population had shifted to one dominated by euglenophytes, which are commonly found in organically enriched situations. Species richness was decreased, also indicating poor community health.

Literature Cited

American Public Health Assoc., American Water Works Assoc., and Water Pollution Control Federation. 1989. Standard Methods for the Examination of Water and Wastewater, 17th ed. New York, N.Y. 1268 p.

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.

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

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

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 p.

Chemistry summary table for

Cross City STP & Cross City Correctional Institution STP	C. C. STP Effluent	C. C. Corr. Effluent	Reference Site	Test Site
Metals (ug/L)				
Aluminum	38 T	79		
Arsenic	20 U	20 U		
Cadmium	0.11 T	0.12 T		
Copper	17	30		
Chromium	10 U	10 U		
Iron	32 A	45		
Lead	1.0 U	1.0 U		
Mercury	0.2 U	0.2 U		
Nickel	5.0 U	5.0 U		
Selenium	NR	3 U		
Silver	0.17 T	0.21 T		
Zinc	23 A	51		
Nutrients (mg/L)				
Ortho-phosphorus	6.1 A	4.3 A	2.7 A	2.5 A
Total phosphorus	6.3	5.0	2.4	2.6
Ammonia	0.043 A	0.047 A	0.11 A	0.37 A
Nitrate+Nitrite	22 A	3.2 A	6.0 A	4.4 A
TKN	2.1	1.2	1.3	1.6
Other Parameters				
Habitat Assessment			50	66
D.O. (mg/L)	5.9	4.1	0.8	2.1
pH (SU's)	7.7	7.6	7.4	7.5
Conductivity (µmhos/cm)	700	700	700	610
Temperature (°C)	26.0	26.0	24.5	24.1
Bioassay Fish-Dechlorinated	Not Toxic	Not Toxic		
Bioassay Invertebrate-Dechlorinated	Not Toxic	Not Toxic		
Fecal coliform (org/100 ml)	600,000	45,000	4,500	11,000
Total coliform (org/100 ml)	1,500,000	400,000	40,000	30,000

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

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: Town of Cross City #1	**Prepared by:** Kathleen H. Gerard **Date:** 9/18/91	
Location (attach detailed map): off Hill Street, Cross City Dixie County, Florida	**County** Dixie	**District** Northeast District
Federal Permit # and expiration date: FL0027791 Expires 8/31/95	**State GMS # and** 3115M01815 **State expiration date:** 6/6/92	**Facility Type:** Industrial **Municipal** Federal Agricultural **Other (list):**

Function of facility:
Wastewater treatment

Description of treatment process:
This is a 0.150 MGD extended aeration sewage treatment plant with chlorinated effluent

Receiving waters: Belly Deep Creek which flows south 7 miles then to a ditch	**Classification:** CLASS III WATERS Class, Level III treatment process
Design Flow: 0.150	**Actual Mean Flow:** 0.11975

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

therefore, the best time to sample is: When there are no heavy rainfalls that cause stream to back up in effluent line.

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

List effluent limits:

Parameter	Limit (units)
	Annual Average
BOD_5	20 mg/l
TSS	20 mg/l
NO_3-N	12 mg/l
pH	6.0-8.5
Chlorine residual	0.5 minimum mg/l 1.0 maximum mg/l
Fecal Coliform	200 no./100 ml

Describe special permit conditions and permit modifications:

Permit attached. Please refer to Specific Condition 15: By September 6,1990, the permittee shall complete and have in operation dechlorination facilitie which reduce the total residual chlorine of the effluent to 0.01 mg/l or less.

Town of Cross City #1
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Description of permitted outfall(s):

Effluent from the Town of Cross City #1 STP combines with effluent from the Cross City Correctional Institution STP and discharges to Belly Deep Creek which flows south approximately 7 miles then to a ditch for approximately 5 miles with intermittent flow to California Swamp, then to the Gulf of Mexico which is approximately 18 miles west.

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

Operational problems that resulted in a Warning Notice from the Department.

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

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set:

Additional information:

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Facility Name: Cross City Correctional Institution STP	**Prepared by:** Kathleen H. Gerard **Date:** 1/30/92	
Location (attach detailed map): Hill Street, Cross City Dixie County, Florida	**County** Dixie	**District** Northeast
Federal Permit # and expiration date: **	**State GMS # and** 3115M01505 **State expiration date:** DT15-187315 expires 1/18/93	**Facility Type:** Industrial **Municipal** Federal Agricultural **Other (list):** State

Function of facility:

Wastewater Treatment Plant serving Cross City Correctional Institution

Description of treatment process:

This is a 0.250 MGD extended aeration STP with chlorinated effluent disposal to a drainage ditch. Effluent combines with effluent from Cross City #1 wastewater treatment plant and then flows Belly Deep Creek.

Receiving waters: Belly Deep Creek	**Classification:** III
Design Flow: 0.250 MGD	**Actual Mean Flow:** .15791

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.):

List effluent limits:

Parameter	Limit (units)
BOD_5	Annual Average 20 mg/l
TSS	20 mg/l
NO_3-N	12 mg/l
pH Units	6.0 - 8.5
Chlorine residual	.5 Minimum
Fecal Coliform	200 no./100 ml.

Describe special permit conditions and permit modifications:

Both TOP and Construction Permits are attached.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Cross City Correctional Institution
(Facility)

FACILITY SUMMARY

Description of permitted outfall(s):

Effluent from the Cross City Correctional Institution combines with effluent from Town of Cross City Wastewater Treatment Plant and flows to a ditch Belly Deep Creek which flows south approximately 7 miles then to a ditch for approximately 5 miles with inte intermittant flow to California Swamp, then to the Gulf of Mexico which is approximately 18 miles west.

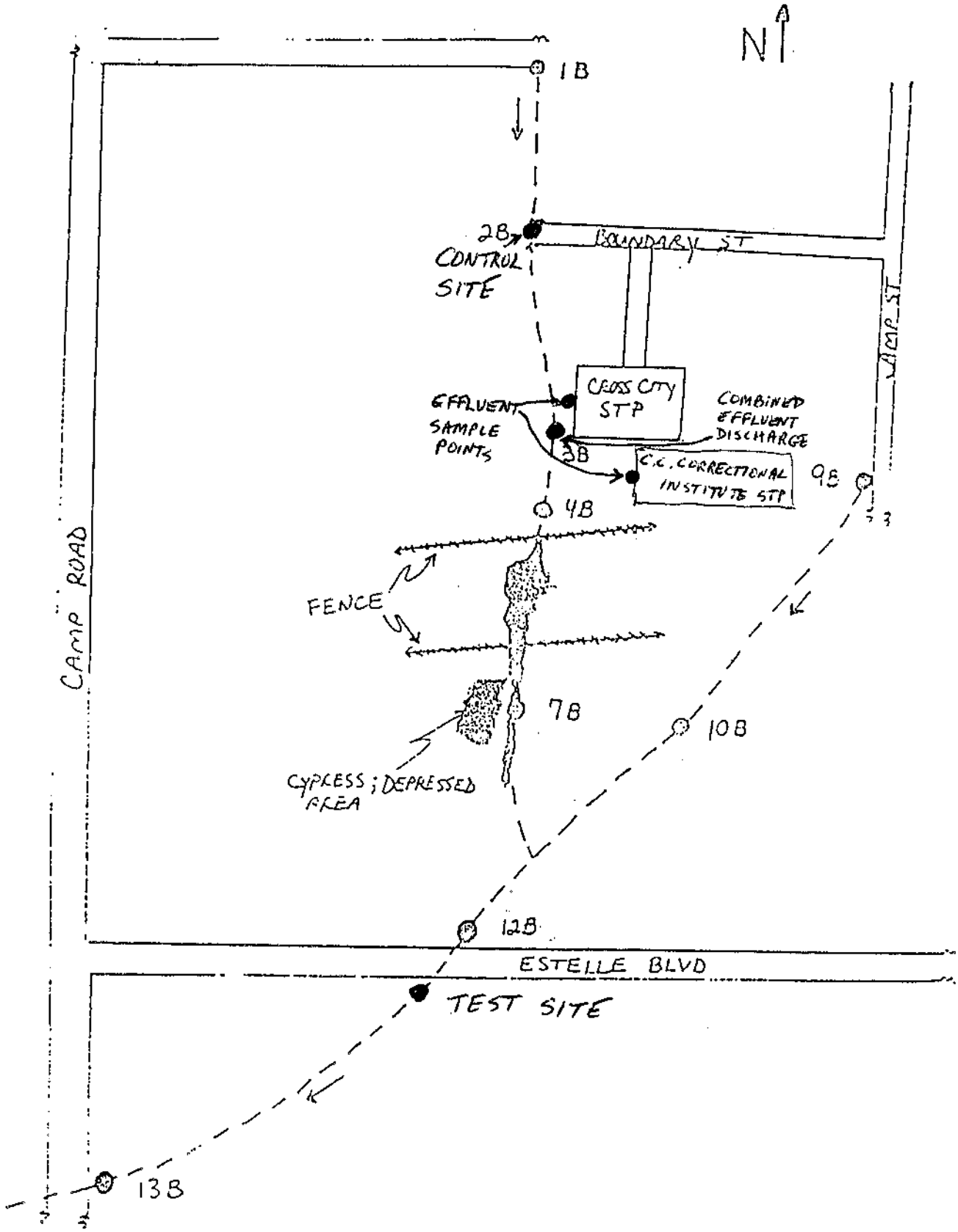
List permit violations (from MOR data or other source) and plant upsets that occurred within past year:

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

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set:

Additional information:

** Combined effluent NPDES number is FL0027791 . This permit was issued to the Town of Cross City for Cross City STP #1.


N
1B
2B
CONTROL SITE
BOUNDARY ST
LAMP ST
CROSS CITY STP
EFFLUENT SAMPLE POINTS
COMBINED EFFLUENT DISCHARGE
3B
C.C. CORRECTIONAL INSTITUTE STP
9B
4B
CAMP ROAD
FENCE
7B
10B
CYPRESS; DEPRESSED AREA
12B
ESTELLE BLVD
TEST SITE
13B

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 3 11	RECEIVING BODY OF WATER:

REMARKS:	LOCATION:	FIELD ID/NAME:

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 0	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 0	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 3	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 1	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
	Add **5 points** if cross-sectional area of NO FLOW is estimated to be greater than one square meter during periods of normal flow.	50

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE: Russell Frydenborg
3 11		

Russell Frydenborg, Biologist

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		9-23-91	

REMARKS:	LOCATION:	FIELD ID/NAME:

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 30	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 3	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.	66

COMMENTS: cotyle EICHORNNIA 10%

ANALYSIS DATE:	ANALYST:	SIGNATURE:
9		Russell Frydenborg

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:

REMARKS:	LOCATION:	FIELD ID/NAME:

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
50			45			

Local Watershed Erosion (check box): None [X] 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):	Estimated Stream Depth (range, m):	yes
High Water Mark (m above bed):	Velocity (range, m/s):	Impounded [ ] Channelized [X]

Canopy Cover % (check box): Open: [X] 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	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Rock or Shell Rubble				Woody Debris (Snags)			
Aquatic Vegetation	90	7	1 +	Leaf Packs/Roots			
Sand				Undercut Banks			
Other:				Mud/Muck			

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	Secchi Depth (m):
Top			pH (SU):
Mid-depth			Conductivity (µmho/cm):
Bottom			Other Parameters:

Stream Type (check box): Blackwater: [ ] Deep Aquifer Fed: [ ] Surficial Aquifer Fed: [ ] Alluvial: [ ] 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:

Abundance:	Absent	Rare	Common	Abundant
Periphyton	[ ]	[ ]	[ ]	[ ]
Fish	[ ]	[ ]	[ ]	[✓]
Aquatic Macrophytes	[ ]	[ ]	[ ]	[✓]
Iron/sulfur Bacteria	[✓]	[ ]	[ ]	[ ]

ANALYSIS DATE:	ANALYST:	SIGNATURE:
		Russell Frydrych

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
		9-23-91	1030	

REMARKS:	LOCATION:	FIELD ID/NAME:

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
60			15	5	20	

Local Watershed Erosion (check box): None [X] Moderate [ ] Heavy [ ]

Local Watershed NPS Pollution (check box): No evidence [ ] Some potential sources [X] Obvious sources [ ]

Point-Source Pollution (list location and describe): 500 yds. I

Estimated Stream Width (range, m): 4	Estimated Stream Depth (range, m): .5 m		yes
High Water Mark (m above bed): .5 m	Velocity (range, m/s):	Impounded [ ]	
		Channelized [X]	

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	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Rock or Shell Rubble				Woody Debris (Snags)	5	2	
Aquatic Vegetation	1	5	MET	Leaf Packs/Roots			
Sand	1			Undercut Banks			
Other:				Mud/Muck	1	1	MET

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	Secchi Depth (m):
Top	24.1	7.1	pH (SU):
Mid-depth			Conductivity (µmho/cm):
Bottom			Other Parameters:

Stream Type (check box): Blackwater: [ ] Deep Aquifer Fed: [ ] Surficial Aquifer Fed: [ ] Alluvial: [ ] 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:

Abundance:	Absent	Rare	Common	Abundant
Periphyton	[ ]	[ ]	[ ]	[✓]
Fish	[ ]	[ ]	[ ]	[✓]
Aquatic Macrophytes	[ ]	[ ]	[ ]	[✓]
Iron/sulfur Bacteria	[✓]	[ ]	[ ]	[ ]

ANALYSIS DATE:	ANALYST:	SIGNATURE: Russell Lydiard

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: CROSS CITY STP
Address/City:
County: DIXIE
Contact/District:
NPDES Permit #: FL0027791 Outfall #:

Sample Collection: Date 9-23-91 Time 0900
Test Beginning: Date 9-24-91 Time 1300
Test Ending: Date 9-26-91 Time 1400
Test Organism: C. DUBIA
Life Stage/Age: <24hours

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

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7 9@9	8.9@21.5°	20.9°@23.9°	1368 @ 24° @1385
24 hr	7@7, 9@9	8.9@21.5	20.2@23.2	1361@23.6
48 hr	7@7 9@9	8.8@22	20.5°@23.5°	1366@23.8 (1375

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		8.2	20.2		20.4	8.4		8.6	179		158
control	B	5	5	5			8.2						8.6			
control	C	5	5	5			8.2						8.6			
control	D	5	5	5			8.2						8.6			
100%	A	5	5	5	7.7		8.5	20.8		20.8	8.0		8.5	711		677
100%	B	5	5	5			8.5						8.5			
100%	C	5	5	5			8.5						8.5			
100%	D	5	5	5			8.5						8.5			
Measured/Loaded by:		MF	MF	TM	TM			TM		MF	TM		MF	TM		MF
Recorded by:		MF	MF	TM	BZ			BZ		TM	BZ		TM	BF		TM

Investigators' Signatures

Kim Pearce
Thomas Macon
Mason Jordan
Marshall Faircloth
Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:	0.0	0.0	0.0	Hach	MF
Alkalinity:	126	73	180	Hach	TM
Hardness:	130	70	200	Hach	TM
Total Ammonia:			.59	Hach	TM

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

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: CROSS CITY STP
Address/City:
County: DIXIE
Contact/District:
NPDES Permit #: FL00 27791 Outfall #:

Sample Collection: Date 9-23-91 Time 0900
Test Beginning: Date 9-24-91 Time 1330
Test Ending: Date 9-26-91 Time 1400
Test Organism: NOTROPIS LEEDSI
Life Stage/Age: 24 DAYS

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

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@9@9	8.7@21.5°	20.9@23.9	1368@24°@ 1381
24 hr	7@7, 9@9	8.9@21.5	20.2@23.2	1361@23.6
48 hr	7@7, 9@9	8.8@22	20.5@23.5	1366@23.5 1375

* 9/24/91 error in initial

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	8.1	8.2	21.0	21.0	20.1	8.7	7.6	8.0			
control	3	5	5	5	7.9	8.1	8.2				8.7	7.8	8.0	243	246	246
100%	4	5	5	5	7.6	8.1	8.3	21.5	20.5	20.0	7.6	7.4	7.8			
100%	63	5	5	5	7.6	8.1	8.3				7.7	7.3	7.7	715	697	694
Measured/Loaded by:		MF	KP	MF	AD	KP	MF	AD	KP	MF	AD	KP	MF	AD	KP	MF
Recorded by:		MF	GD	MF	AD	GD	TM	AD	GD	TM	AD	GD	TM	AD	GD	TM

Investigators' Signatures
Kurt Pearce
Thomas Macon
Alison Jordan
Marshall Faircloth
Reviewer Lindsay Stadys

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	[illegible] 0.0				
Lab Tot. Resid. Cl2:	0.0	0.0	0.0	Hach	MF
Alkalinity:	126	73	104	Hach	TM
Hardness:	130	70	208	Hach	TM
Total Ammonia:			0.44	Hach	TM

Ammonia Meter Slope:
Ammonia Blank: 0.0
Salinity Sample:

23713

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: CROSS CITY CORRECTIONAL
Address/City:
County: DIXIE
Contact/District:
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date 9-23-91 Time 0900
Test Beginning: Date 9-24-91 Time 1330
Test Ending: Date 9-26-91 Time 1400
Test Organism: NOTROPIS LEEDSI
Life Stage/Age: 24 DAYS

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

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7.9@9	8.7@21.5	20.9@23.9	1368@24° 1358
24 hr	7@7.9@9	8.9@21.5	20.2@23.2	1361@2
48 hr	7@7.9@9	8.8@22	20.5@23.5	1366@

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	8.1	8.2	21.0	21.0	20.1	8.7	7.6	8.00			
Control	3	5	5	5	7.9	8.1	8.2				8.7	7.8	8.00	243	246	246
100%	67	5	5	5	7.7	8.3	8.4	21.6	21.0	20.0	6.6	7.1	7.4			
100%	77	5	5	5	7.7	8.3	8.5				6.6	7.7	7.4	672	653	653
Measured/Loaded by:		MF	KP	MF	AZ	KP	MF	AZ	KP		AZ	KP		AZ	KP	MF
Recorded by:		MF	GD	MF	AZ	GD	TM	AZ	GD		AZ	GD		AZ	GD	TM

Investigators' Signatures

Kim Pearce
Thomas Macon
Alison Foley
Marshall Faircloth
Audrey Hadys
Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	[illegible]				
Lab Tot. Resid. Cl2:	0.0	0.0	0.0	Hach	MF
Alkalinity:	126	73	245	Hach	TM
Hardness:	130	70	200	Hach	TM
Total Ammonia:	0.0	0.0	0.96	Hach	TM

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

Sample source: CROSS CITY CORRECTIONAL
Address/City: _____
County: DIXIE
Contact/District: _____
NPDES Permit #: FL00 Outfall #: _____

Sample Collection: Date 9-23-91 Time 0900
Test Beginning: Date 9-24-91 Time 1330
Test Ending: Date 9-26-91 Time 1400
Test Organism: C. DUBIA
Life Stage/Age: < 24 HOURS

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

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7@9	8.9@21.5	20.8@23.9	1368 @ 24° / 1381
24 hr	7@7,4@9	8.9@21.5	20.2@23.2	1361@23.6
48 hr	7@7,9@7	8.8@22	20.5@23.5	1366@23.8 / 1375

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		8.2	20.2		20.8	8.4		8.6	179		188
control	B	5	5	5			8.2						8.6			
control	C	5	5	5			8.2						8.6			
control	D	5	5	5			8.2						8.6			
100%	A	5	5	5	7.8		8.1	20.9		20.8	7.5		8.5	627		638
100%	B	5	5	5			8.1						8.5			
100%	C	5	5	5			8.1						8.5			
100%	D	5	5	5			8.1						8.5			
Measured/Loaded by:		MF	MF	MF	TM		MF	TM		MF	TM		MF	TM		MF
Recorded by:		MF	MF	MF	RJ		TM	RJ		TM	RJ		TM	RJ		TM

Investigators' Signatures

Kim Pearce
Thomas Macum
Allison Jordan
Marshall Faircloth
_____ Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	[illegible]				
Lab Tot. Resid. Cl2:	0.0	0.0	0.0	Hach	MF
Alkalinity:	126	73	245	Hach	TM
Hardness:	130	70	200	Hach	TM
Total Ammonia:	0.0	0.0	.96	Hach	TM

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)

Parameter	Percentile Distribution 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

Taxa list for Cross City STP and Cross City Correctional Institution STP, collected via timed qualitative methods (dip net) in Belly Deep Creek on 23 September 1991.

	Reference Site	Test Site
Coleoptera		
Hydroporus sp.	1	–
Tropisternus sp.	–	3
Undetermined Curculionid	1	–
Diptera		
Ablabesmyia rhamphe grp.	2	–
Chironomus decorus grp.	18	38
Goeldichironomus amazonicus	2	5
G. holoprasinus	22	6
Kiefferulus dux	–	2
Larsia sp.	20	–
Odontomyia sp.	16	1
Palpomyia grp. sp.	34	1
Polypedilum illinoense	82	–
Pseudochironomus sp.	4	–
Tanytarsini type 1	–	2
Tanytarsus sp.	2	–
Tanypus sp.	2	–
T. carinatus	2	–
Undetermined Dipteran pupa	26	1
Undetermined Tipulid	–	1
Ephemeroptera		
Caenis sp.	5	–
Callibaetis pretiosus	2	–
Gastropoda		
Hebetancyclus excentricus	5	8
Physella sp.	13	–
Hemiptera		
Belostoma sp.	–	1
B. testaceum	1	–
Mesovelia sp.	6	–
Hirudinea		
Helobdella elongata	2	4
Mooreobdella tetragon	–	3
Lepidoptera		
Undetermined Lepidopteran	2	–
Malacostraca		
Hyalella azteca	–	70
Odonata		
Enallagma sp.	6	4
Epitheca princeps	1	–
Erythemis simplicicollis	54	1
Pachydiplax longipennis	9	–
Undetermined Odonate	1	–
Oligochaeta		
Dero digitata	–	1
D. lodeni	–	3
D. vaga	–	2
Platyhelminthes		
Dugesia sp.	–	1

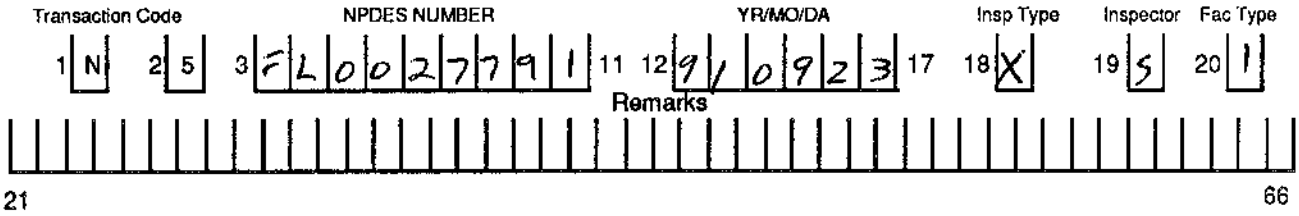
Taxa list for Cross City STP and Cross City Correctional Institution STP, collected via Hester-Dendy samplers in Belly Deep Creek on 21 October 1991.

	Reference Site	Test Site
Coleoptera		
Tropisternus sp.	1	–
Diptera		
Ablabesmyia idei	1	–
Chironomus decorus grp.	8	1
Culex erraticus	1	–
Dicrotendipes nervosus	1	–
Goeldichironomus amazonicus	–	2
G. holoprasinus	1	–
Kiefferulus dux	32	–
Labrundinia becki	1	–
L. neopilosella	1	–
L. virescens	1	–
Larsia indistincta	1	–
Odontomesa sp.	9	1
Palpomyia grp. sp.	–	1
Polypedilum illinoense	1	–
Stelechomyia perpulchra	1	–
Tanytarsini type 1	2	1
Undetermined Dipteran pupa	3	–
Undetermined Tanypod	1	–
Ephemeroptera		
Caenis sp.	10	–
Gastropoda		
Hebetancyclus excentricus	46	2
Physella sp.	11	–
Hemiptera		
Mesovelia sp.	1	–
Paravelia stagnalis	1	–
Undetermined Hemipteran	6	–
Hirudinea		
Helobdella elongata	1	12
Mooreobdella tetragon	–	8
Placobdella ornata	1	6
Lepidoptera		
Undetermined Lepidopteran	1	–
Malacostraca		
Hyalella azteca	–	3
Odonata		
Erythemis simplicicollis	2	–
Ischnura sp.	3	–
I. posita	2	–
Pachydiplax longipennis	16	–
Undetermined Odonate	1	–

Phytoplankton taxa list for Cross City STP and Cross City Correctional Institution STP, Dixie County, Florida, collected in Belly Deep Creek on 23 September 1991.

	Reference Site	Test Site
Diatoms		
Achnanthes sp.	144	–
Biddulphia sp.	72	–
Cyclotella sp.	72	–
Eunotia sp.	72	73
Hantzschia sp.	72	–
Navicula sp.	360	–
Nitzschia sp.	576	73
Nitzschia sp. 1	–	73
Chlorophyta		
Carteria sp.	–	73
Chlamydomonas sp.	72	219
Closterium sp.	–	73
Oocystis sp.	72	–
Tetraedron sp.	72	–
Unknown chlorophyte flagellate	216	292
Chrysophyta		
Amphichrysis sp.	–	657
Cryptophyta		
Cryptomonas sp. 1	288	584
Cryptomonas sp. 2	72	–
Cyanophyta		
Aphanocapsa sp.	72	–
Chroococcus sp.	216	146
Gloeocapsa sp.	648	219
Lyngbya sp.	288	–
Oscillatoria prob. *splendida*	864	–
Oscillatoria sp.	792	–
Unknown cyanophyte filament	–	146
Euglenophyta		
Euglena sp.	72	1680
Phacus sp.	–	146
Trachelomonas sp.	72	511

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



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