#208



Biological Assessment of

Tenneco Packaging Corporation

Hamilton County

NPDES #FL0000281

Sampled July 1997

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January 1998

Biology Section
Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection

Results of Biological Assessments

Discharger: Tenneco Packaging Corporation
County: Hamilton
NPDES Number: FL0000281
State Permit Expiration Date: 18 July 2001

Toxics Sampling Inspection (XSI)

Date Sampled: 28 July 1997

Results: With the exception of non-problem level concentrations of anionic surfactants (0.13 mg/L), no organic compounds were found in the effluent. No metals in the effluent or receiving water samples exceeded Class III water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 28 July 1997

Results: The effluent was not acutely toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*.

Impact Bioassessment Inspection (IBI)

Date Sampled: 28 July 1997

Results: Measures of macroinvertebrate community health indicated no degradation at the test site. The Stream Condition Index (SCI) score at the reference site (23 points) placed it in the "good" category, while the test site SCI value (31 points) classified it as "excellent". The periphyton community was dominated by diatoms at both study sites, and chlorophyll *a* values were somewhat elevated. The elevated periphyton biomass was probably related to nitrate-nitrite enrichment upstream of the Tenneco discharge.

Water Quality Inspection (WQI)

Date Sampled: 28 July 1997

Results: There was no nutrient enrichment at the test site associated with the effluent. Nitrate-nitrite enrichment at the reference site and test site was apparently due to inputs upstream of the Tenneco discharge. Algal Growth Potential (AGP) exceeded the 5 mg dry wt/L "problem threshold" at both the reference site (21.5 mg dry wt/L) and at the test site (22.1 mg dry wt/L). The effluent AGP result was (15.9 mg dry wt/L).

These 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

Tenneco Packaging Corporation is located near Clyattville, Lowndes County, Georgia (see maps in Appendix). This facility, which produces unbleached Kraft liner board, discharges its wastewater via a pipeline to the Withlacoochee River in Hamilton County, Florida. Wastewater at this 14 MGD facility receives primary and secondary treatment. First, solids are removed in a sedimentation clarifier and associated sludge ponds. Next, the wastewater flows through a series of seven ponds (with a combined surface area of approximately 850 acres) with nutrient addition (to enhance microbial treatment) to the first and fourth ponds. There are four anaerobic/facultative ponds, followed by an aerated stabilization basin, a 350 acre facultative impoundment, and a polishing pond. Wastewater then flows through a concrete effluent control structure with a mechanical bar screen, Parshall flume, and flow meter, into a final aeration basin. Finally, the effluent is pumped approximately two miles through a 48-inch diameter transmission pipe, through a submerged diffuser, and into the Withlacoochee River at the confluence with Jumping Gully Creek.

State permit limits are as follows: flow (less than 15% of the ratio of the average daily effluent flow divided by the daily flow of the Withlacoochee River downstream of the discharge), pH (6.0 to 9.0 SU), total suspended solids (10,760 lbs/day as a daily maximum, 16,140 lbs/day as a monthly average) and BOD$_5$ (5,550 lbs/day as an annual average, 12,869 lbs/day as a monthly average, and 6,434 lbs/day as a daily maximum), specific conductance (2,210 µmhos/cm maximum), dissolved oxygen (1.5 mg/L minimum), unionized ammonia (0.134 mg/L maximum), oil and grease (12 mg/L maximum), turbidity (80 NTU maximum), cadmium (1.4 µg/L maximum), copper (14 µg/L maximum), lead (9.6 µg/L maximum), zinc (571 µg/L maximum), and fecal coliforms (800 organisms/100 mL maximum). Temperature and color are to be reported.

The facility has been granted mixing zones for eleven parameters (see Facility Summary in Appendix). These mixing zones vary in length downstream from the discharge, and are as little as 98 feet

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	38	48
Florida Index	15	19
SCI	23	31
EPT Index	3	10
% Contribution of Dominant Taxon	15.2	20.6
% Oligochaeta	15.2	3.4
% Diptera	16.4	36.8
% Ephemeroptera	15.8	9.4
% Trichoptera	1.8	3.7
% Odonata	1.2	0.6
% Coleoptera	9.7	15.9
% Amphipoda	15.2	15.6
% Isopoda	5.5	3.4
% Gastropoda	9.7	3.4
% Acarina	5.4	4.6
% Other	4.1	3.1
% Predators	14.9	8.4
% Above Surface Deposit Feeders	34.9	24.0
% Below Surface Deposit Feeders	12.7	3.1
% Suspension Feeders	0.6	37.4
% Scrapers	17.0	12.9
% Shredders	9.1	8.4
% Scavengers	6.7	3.9
Periphyton Algae		
Number of Taxa	28	13
Shannon-Weaver Diversity	3.2	1.9
Algal Density (#/sq. cm)	493822	152251
Chlorophyll a (mg/sq. m)	32.5 A	13.5
Diatom/Diatom + B-G Abundance Ratio	.98	.99
% Blue-green	1.9	0.6
% Green	0.4	0.2
% Diatoms	97.7	99.2
% Other	0	0
Algal Growth Potential (mg dry wt/l)	21.5	22.1

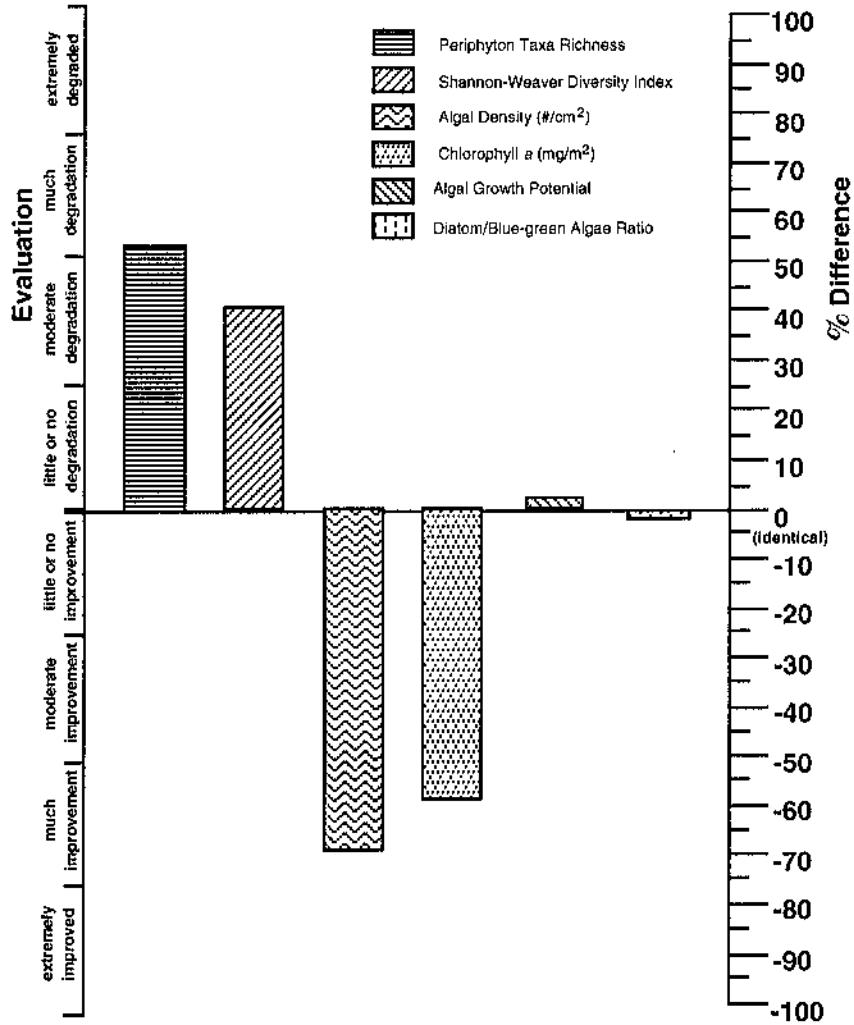
for cadmium and up to 1,171 feet for dissolved oxygen, zinc, toxicity, pH, and lead. Additionally, a Site Specific Alternative Criterion for dissolved oxygen was granted, which allows for a lower D. O. limit of 4 mg/L between river miles 25 and 19 for the months of June through October. The requirement that the receiving stream shall at no time have in excess of 15 percent mill effluent supersedes the other mixing zone relief.

All effluent parameters for the past year were in compliance with permit limits. A previous bioassessment (FDEP 1995) indicated that both the Jumping Gully Creek test site and the Withlacoochee River test site were relatively unimpaired by the discharge.

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 approximately 30 m upstream of the outfall in the Withlacoochee River) and a test site (located approximately 550 m downstream of the outfall). The effluent sample was collected at the headworks of the discharge pipe, at the last point before entry into the river. 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 *Cyprinella 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 the effluent and study sites. Methods used for all chemical analyses are on file at the Tallahassee DEP Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at the study sites. Invertebrates were collected from multiple substrates (*e.g.*, snags, leaf packs, vegetation) using discrete dip net sweeps. Hester-Dendy samplers were not successfully recovered. Periphyton was sampled via glass slides housed in standard diatometers. 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).



Effect of discharge on the benthic macroinvertebrate community.

Explanation of Measurements of Community Health

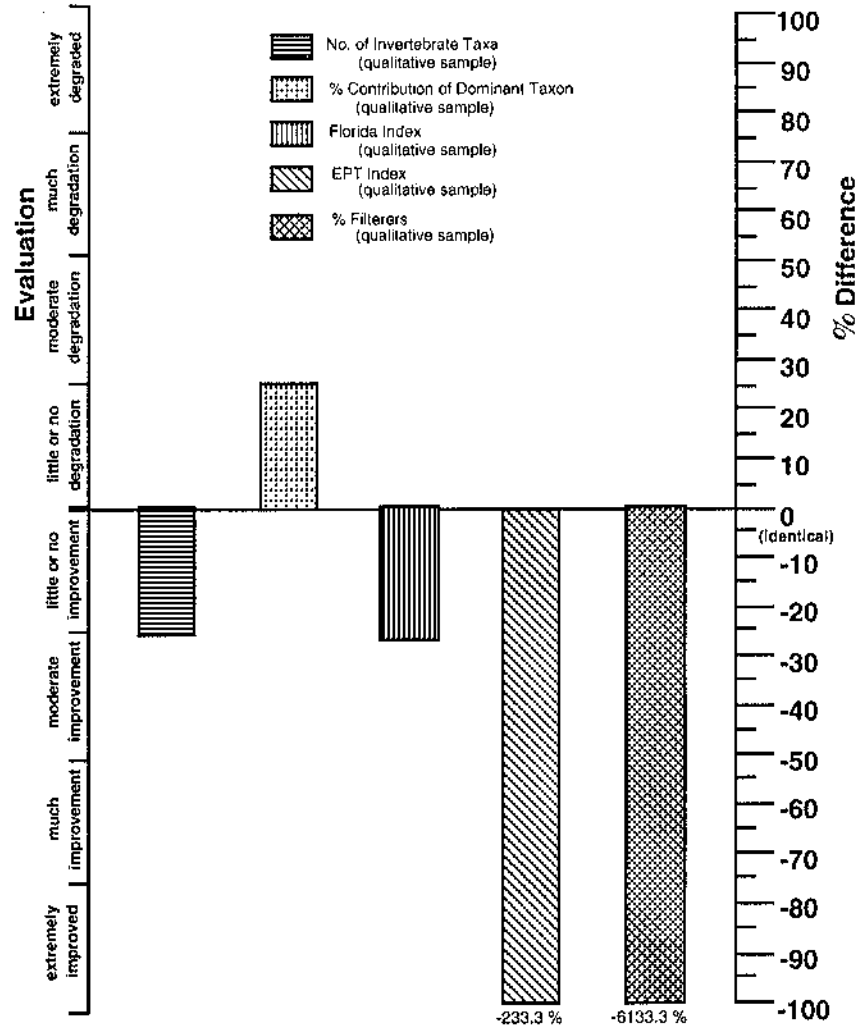
Several different measurements of macroinvertebrate and algal community health have been employed to determine the effects of a discharge. These are briefly discussed here.5

Habitat Assessment: Seven attributes known to have potential effects on the stream biota were evaluated and scored, with 20 possible points for each factor. Based on the sum of these individual scores, overall habitat quality is assigned to one of four categories: Optimal (105-140 points); Suboptimal (70-104 points); Marginal (35-69 points); and Poor (0-34 points).

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

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

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



Effect of discharge on the algal community.

Ephemeroptera/Plecoptera/Trichoptera Index: This index is the sum of the number of EPT taxa present. Higher EPT values are associated with healthier systems.

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

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

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

The Stream condition Index for Florida (SCI) is a composite macroinvertebrate metric (Barbour *et al.* 1996). The SCI assigns points to a variety of parameters, depending on how closely each parameter approaches an expected reference condition (see SCI calculation table in Appendix).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the Florida Index, the EPT Index, the diatom to blue-green algae ratio, the % filter-feeders are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving algal density, 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: Tim McKelvey and Pat O'Conner (DEP Northeast District) and Lyn Burton, Ken Espy, Jennifer Eichelberger, Marshall Faircloth, Russel Frydenborg, Joy Jackson, Scott Lashbrook, Kathleen Lurding, Elizabeth Miller, Urania Quintana, John Richardson, Lisa Tamburello, David Whiting, and Vicki Whiting (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Studies Review Committee, consisting of Wayne Magley, Jan Mandrup-Poulsen, and Michael Tanski, as well as District representatives.

Results and Discussion

Habitat quality was in the "optimal" range at both sites, with 125 points at the reference site and 120 points at the test site. The maximum water velocity observed (0.1 m/sec) was identical at both sites. Dissolved oxygen was 5.3 mg/L and 4.8 mg/L at the reference and test sites, respectively. Because of the location of the test site and the time of year of sampling, the D. O. level at the test site did not violate ambient standards, according to the facility's site specific alternative criterion. Water had a near neutral pH (7.2 SU) at both receiving water stations. Specific conductance was 195 µmhos/cm at the reference site and 240 µmhos/cm at the test site. Since the effluent specific conductance (1,559 µmhos/cm) greatly exceeded the test site value, this suggests substantial dilution in the Withlacoochee River.

The effluent did not show acute toxicity to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi,* in the dechlorinated samples (Appendix).

With the exception of 0.13 mg/L of anionic surfactants, no organic compounds were found in the effluent. Since anionic surfactants are typically toxic only when concentrations exceed 100 mg/L (Dye and Frydenborg 1980), the level found in the effluent is not considered to be problematic.

Aluminum (643 µg/L) and iron (93 µg/L) were detected in the effluent. Copper (2.5 µg/L), lead (0.3 µg/L), and silver (0.07 µg/L) were found in the effluent at concentrations below practical quantitation limits. Silver contamination (0.06 µg/L) was observed in the trip blank, making the silver concentration in the effluent and receiving water samples invalid. At an effluent hardness of 164 mg $CaCO_3$/L), none of the above mentioned metals exceeded Class III water quality standards. Similarly, no metals violations were observed at the reference or test sites (see Chemistry Summary Table).

There was no nutrient enrichment at the test site associated with the effluent. With one exception, nutrients in the Withlacoochee River were relatively average for a Florida stream. Nitrate-nitrite was 0.26 mg/L at the reference and test sites alike, a value higher than those found in approximately 70% of other Florida streams (see Table of Typical Water Quality Values in Appendix). This nitrate-nitrite enrichment was apparently due to inputs upstream of the Tenneco discharge.

Algal Growth Potential (AGP) exceeded the 5 mg dry wt/L "problem threshold" at both the reference site (21.5 mg dry wt/L) and at the test site (22.1 mg dry wt/L) (Raschke and Schultz 1987). The effluent AGP result was 15.9 mg dry wt/L.

Measures of macroinvertebrate community health indicated no degradation at the test site. The figure on p. 2 indicates the degree of difference between the invertebrate

populations of the reference and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean the test site is better than the reference site.

Based upon the results of the dip net collections, community health was somewhat improved at the test site, compared with the reference site. Taxa richness increased from 38 taxa at the reference site, to 48 taxa at the test site. The Florida Index increased from 15 points at the reference site to 19 points at the test site. Further, the EPT Index increased from 3 at the reference site to 10 at the test site. Filter-feeders were also less common at the at the reference site (0.6%) than the test site (37.4 %). The Stream Condition Index (SCI) score at the reference site (23 points) placed it in the "good" category, while the test site SCI value (31 points) classified it as "excellent" (see SCI calculation sheet in Appendix).

The figure on p. 3 represents changes in the periphyton algal community. As was noted with the macroinvertebrates, larger differences (that is, higher percentages) correspond with greater degrees of degradation. Periphyton chlorophyll *a* values at the reference site (32.5 mg/m^2) and at the test site (13.5 mg/m^2) were higher than those found in approximately 88% and 74% of other Florida streams, respectively. These elevated chlorophyll values are most likely related to the observed nitrate-nitrite enrichment at both sites. The diatom/diatom + blue green algal ratio was 0.98 or higher at the reference and test sites, indicating the dominance of diatoms at both sampling locations. The reference site was dominated by the diatom *Gomphonema parvulum*, which is an indicator of organic enrichment. While this diatom was also present in small numbers below the discharge, the test site was dominated by the diatom *Cocconeis fluviatilis*, which is not known to indicate organic enrichment. While the reference site did appear to be better than the test site with respect to taxa richness and diversity, the test site was comparable to or better than the reference site with respect to all other measures of algal community health. The test site did not appear to be adversely affected by the facility

Conclusions

The effluent did not show acute toxicity to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*.

With the exception of non-problem level concentrations of anionic surfactants (0.13 mg/L), no organic compounds were found in the effluent.

No metals in the effluent or receiving water samples exceeded Class III water quality standards.

There was no nutrient enrichment at the test site associated with the effluent. Nitrate-nitrite enrichment at the reference site and test site was apparently due to inputs upstream of the Tenneco discharge.

Algal Growth Potential (AGP) exceeded the 5 mg dry wt/L "problem threshold" at both the reference site (21.5 mg dry wt/L) and at the test site (22.1 mg dry wt/L). The effluent AGP result was 15.9 mg dry wt/L.

Measures of macroinvertebrate community health indicated no degradation at the test site. The Stream Condition Index (SCI) score at the reference site (23 points) placed it in the "good" category, while the test site SCI value (31 points) classified it as "excellent".

While the periphyton community had higher values for taxa richness and diversity at the reference site, both stations were strongly dominated by diatoms. Periphyton biomass was elevated at both sites, probably a result of nitrate-nitrite inputs upstream of the facility's discharge.

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Chemistry Summary Table for Tenneco Packaging Corporation.

	Effluent	Reference Site	Test Site
Organic Constituents (mg/L)			
Anionic Surfactants	0.13		
Metals (ug/L)			
Aluminum	643	87	68 A
Arsenic	40 U	40 U	40 U
Cadmium	0.05 U	0.05 U	0.05 U
Copper	2.5 I	1.0 U	1.0 U
Chromium	10 U	10 U	10 U
Iron	93	571	592 A
Lead	0.3 I	0.53 I	0.52 I
Nickel	6 U	6 U	6 U
Selenium	50 U	50 U	50 U
Silver	0.07 I	0.05 I	0.05 I
Nutrients (mg/L)			
Ortho-phosphate	0.36 A	0.088 A	0.095
Total phosphorus	0.54	0.097	0.12 A
Ammonia	0.17 A	0.013 I	0.020 I
Nitrate+Nitrite	0.056	0.26	0.26
TKN	2.2	0.29	0.33 A
General Phys-Chem Parameters			
Habitat Assessment		125	120
Dissolved Oxygen (mg/L)	7.0	5.3	4.8
pH (SU)	7.7	7.3	7.2
Conductivity (µmhos/cm)	1559	195	240
Temperature (°C)	29.0	26.8	26.4
Total Suspended Solids (mg/L)	7	1	1 U
Biochemical Oxygen Demand (mg/L)	6	2 U	2 U
Color (PCU's)	300 A	40 A	60
Hardness (mg CaCO3)	164.19		
Algal Growth Potential (mg dry wt/L)	15.9	21.5	22.1
Toxicity			
Bioassay Fish	Not toxic		
Bioassay Invertebrate	Not toxic		
Microbiological Communities (org/100 mL)			
Fecal coliform	190	20	10
Total coliform	960	150	150

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

I - Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit

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

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 Phosphate	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-Phosphate	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-Phosphate	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

Units:
Phytoplankton Chlorophyll *a* (ug/L), Periphyton Chlorophyll *a* (mg/m^2), Nutrients (mg/L), Turbidity (NTU), Taxa richness and diversity values are for macroinvertebrates

State of Florida
Department of Environmental Protection
Facility Summary

Facility Name: Tenneco Packaging Corporation	**Prepared By:** Teresa Valdespino **Date:** 6/18/97

Location: (See Attached Map)	**County:** 24 - Hamilton	**District:** Northeast

Federal Permit No.: FL0000281 **Expiration Date:** 7/18/01	**State GMS #:** 3124P00101 **State Expiration Date:** 7/18/01	**Facility Type:** Industrial

Function of Facility: Unbleached kraft liner board production facility

Description of treatment process: Operation of a 14 MGD (design) industrial wastewater treatment system for an unbleached kraft liner board production facility. Existing treatment consists of primary treatment for settleable solids removal in a sedimentation clarifier and associated sludge ponds. Secondary treatment is nutrient addition to the first and fourth ponds. There are four anaerobic/facultative ponds, followed by an aerated stabilization basin, a 350 acre facultative impoundment, a final polishing pond, then to a concrete effluent control structure with mechanical bar screen, parshall flume flow meter, final aeration basin and pumping station before entering a 55 MGD maximum flow 13,000 L.F., 48-inch HDPE transmission pipe with final discharge through a control structure and submerged diffuser into the Withlacoochee River at the confluence with Jumping Gully Creek.

Receiving Waters: Withlacoochee River	**Classification**: Class III
Design Flow: 55.0 MGD	**Actual Mean Flow: (From DMR's of May 1995 to Dec. 1996)**
(Design Flow reported is for the outfall structure, the mill has a design flow of 14.0 MGD, extra capacity at outfall structure is for rainfall over 850 acres of ponds)	15.5 MGD Average Monthly Average 28.5 MGD Average Daily Maximum

Discharge is: **Continuous *** Intermittent Seasonal RainfallDependent Other

Facility Mixing Zone Details: Mixing Zones are established for the following parameters based on the maximum instream waste concentration of the permittee's discharge into the Withlacoochee River. The receiving stream shall at no time have in excess of 15 percent mill effluent:

Length Downstream from Outfall 001

a)	Dissolved Oxygen (June 1 thru October 31)	1,171 ft.
b)	Dissolved Oxygen (November thru May 31)	1,171 ft.
c)	Specific Conductance	198 ft.
d)	Cadmium	98 ft.
e)	Copper	113 ft.
f)	Zinc	1,171 ft.
g)	Oil & Grease	362 ft.
h)	Toxicity	1,171 ft.
i)	pH	1,171 ft.
j)	Turbidity	360 ft.
k)	Unionized Ammonia	369 ft.
l)	Lead	1,171 ft.

List effluent limits:

PARAMETER	**LIMIT (unit)**	**Describe special permit conditions and permit modifications**
Effluent Flow (MGD)	<15% RWC	RWC = (average daily effluent flowrate) ˆ (daily

		downstream river flow rate)
BOD5 (daily max)	6,434 lbs/day	The maximum allowable loading of BOD5
BOD5 (monthly avg)	12,869 lbs/day	(lb/day) discharged in any one day shall not exceed
BOD5 (annual avg)	5,550 lbs/day	12.0 lb/day for each cfs of river flow
TSS (daily max)	10,760 lbs/day	
TSS (monthly avg)	16,140 lbs/day	If the upstream D.O. is less than 4.6 mg/l, then the
pH minimum	6.0 S.U.	following BOD5 loading will apply:
pH maximum	9.0 S.U.	
Specific Conductivity	2,210 1mhos/cm	Upstream D.O. (mg/l) Loading (lb/day/river cfs)
Dissolved Oxygen	1.5 mg/l	4.5 10
Temperature	Report	4.4 8
Unionized Ammonia	0.134 mg/l	4.3 6
Color (True)	Report	4.2 4
Oil & Grease	12 mg/l	<4.1 2
Turbidity	80 NTU	
Cadmium	1.4 1g/l	Permit was issued in conjunction with an amended
Copper	14 1g/l	variance from the Class III water quality criterion
Lead	9.6 1g/l	for transparency in the Withlacoochee River (DEP
Zinc	571 1g/l	File No. VE 24-667) for a 27-month period. Until
Fecal Coliform	800 #/100ml	a color removal system (CRS) is approved,
Acute Toxicity	<100%effluent	constructed and operating, the permittee shall
Chronic Toxicity	<15%effluent	sample the effluent once per week and report (only)
		the results on the monthly discharge monitoring
Upstream Monitoring	No Limits	reports. After the CRS is implemented, daily color
Downstm Monitoring	No Limits	monitoring of upstream and effluent shall not cause
		an increase of 50 NTU above natural background
		color.

Description of permitted outfall:
Final discharge is from the pipeline, through a control structure and then through a submerged diffuser into the Withlacoochee River at the confluence with Jumping Gully Creek.

List permit violations (MOR data) and plant upsets that occurred at the plant within the past year:

- The monitoring station in Jumping Gully Creek (prior to the pipeline transition) showed Dissolved Oxygen falling below the permitted limit of 5.0 mg/l, although the low D.O. corresponded with low D.O.'s naturally occurring at upstream sampling locations during the same monitoring periods.
- The primary clarifier had a significant leak, but the bypassed water entered directly into the pond system and did not cause the facility to exceed any permitted effluent limits.

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions: There are many past studies for this facility related to mixing zones, SSAC, the reclassification of Jumping Gully Creek and engineering studies concerning the removal of color. The only enforcement action is from OGC#91-2109 and a variance (DEP File No. VE 24-667) was granted for a 27-month period concerning the Class III water quality criterion for transparency.

Additional Information: none.

RECEIVED
S. R. W. M. D.
MAR 24 1994
Original To File
Copies To

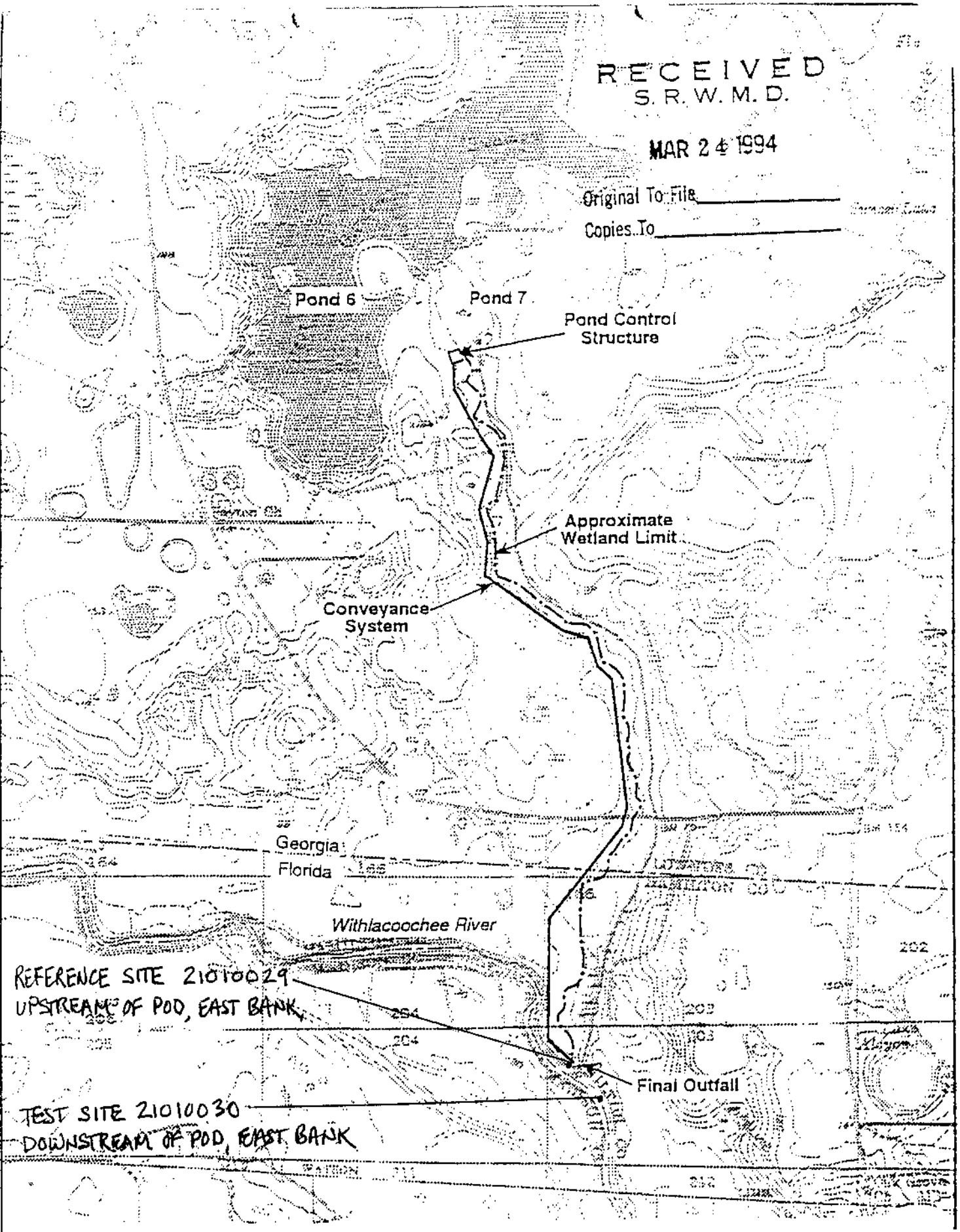


FIGURE 1.
Alternate Conveyance System Route.

CH2MHILL

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 21FL0029	DATE (M/D/Y): 7-28-97	TIME: 1330	RECEIVING BODY OF WATER: WITHLACOOCHEE RIVER

REMARKS: water lower (4ft) than 28 days ago	COUNTY: HAMILTON	LOCATION: ~~300FT~~ ABOVE P.O.D	FIELD ID/NAME: ~~REFERENCE~~ REFERENCE SITE

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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

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

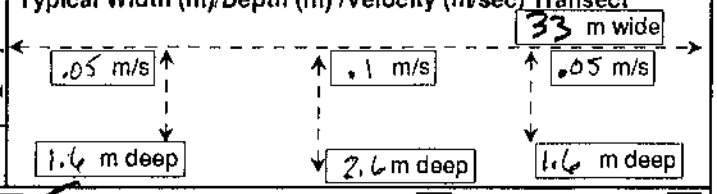
Width of riparian vegetation (m) on least buffered side: 18 m+ — *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes — more sinuous

High Water Mark: 5M (m above present water level) + 2.6 (present depth in m) = 7.6 (m above bed)

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



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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	30	5	dipnet	Sand	10	5	dipnet
Leaf Packs or Mats	0	0		Mud/Muck/Silt	0	0	
Aquatic Vegetation	0	0		Other:	0	0	
Rock or Shell Rubble	20	5	"	Other:	0	0	
Undercut banks/Roots	40	5	"	*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								
Mid-depth	1.6	26.76	7.25	5.31	195			1.6L
Bottom	3.2							

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

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

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

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

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

Weather Conditions/Notes: HOT 95°F

water 4-5' lower than when tester-dendys set out 28 days ago.

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

SAMPLING TEAM:	SIGNATURE:	DATE:
McKelvey / O'Connor	Tom McKelvey	7/28/97

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (4-22-96)

SUBMITTING AGENCY CODE: 8051 / SUBMITTING AGENCY NAME: NEP	STORET STATION NUMBER: 21010129	DATE (M/D/Y): 7-28-97	RECEIVING BODY OF WATER: WITHLACOOCHEE RIVER

REMARKS:	COUNTY: HAMILTON	LOCATION: ~~300 FT.~~ ABOVE P.O.D 100 - 300 FT.	FIELD ID/NAME: ~~TEST SITE~~ REFERENCE SITE

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Substrate Types & Availability [20]	Greater than 30% snags, logs, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock, or other stable habitat. (20) 19 18 17 16	16% to 30% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 15% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Water Velocity [15]	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec (15) 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
Artificial Channelization [20]	No artificial channelization or dredging. Stream with normal, sinuous pattern (20) 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box-cut banks, straight, instream habitat highly altered 5 4 3 2 1
Habitat Smothering [15]	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation (15) 14 13 12 11	Smothering of 50%-80% of habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools absent 5 4 3 2 1
Bank Stability [10]	Stable. No evidence of erosion or bank failure. Little potential for future problems. 20 19 18 17 16	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 15 14 13 12 11	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. (10) 9 8 7 6	Unstable. Many (60%-80%) raw, eroded areas. Obvious bank sloughing. 5 4 3 2 1
Riparian Buffer Zone Width [20]	Width of native vegetation (least buffered side) greater than 18 m (20) 19 18 17 16	Width of native vegetation (least buffered side) 12 m to 18 m 15 14 13 12 11	Width of native vegetation 6 to 12 m, human activities still close to system 10 9 8 7 6	Less than 6 m of native buffer zone due to intensive human activities 5 4 3 2 1
Riparian Zone Vegetation Quality [20]	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions. (20) 19 18 17 16	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 15 14 13 12 11	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 10 9 8 7 6	Less than 25% of streambank surfaces are vegetated and/or poor plant community (*e.g.* grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less. 5 4 3 2 1

[5] Add **5 points** if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

[125] **TOTAL SCORE**

Comments better habitat at lower water.

ANALYSIS DATE: 7/28/97	ANALYST: McKelvey / Corvisé	SIGNATURE: Tim McKelvey

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: NED	STORET STATION NUMBER: 210030	DATE (M/D/Y): 7-25-97	TIME: 1500	RECEIVING BODY OF WATER: WITHLACOOCHEE RIVER
REMARKS: water level down 4'	COUNTY: HAMILTON	LOCATION: 1800 FT. DOWNSTREAM P.O.D.		FIELD ID/NAME: TEST SITE

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
75	25						

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

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

Width of riparian vegetation (m) on least buffered side: +18m

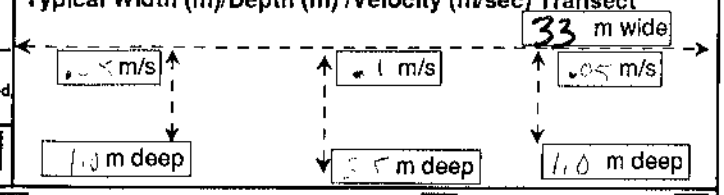
List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark: 5M (m above present water level) + 3.5 (present depth in m) = 8.5 (m above bed)

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



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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	5	5	dipnet	Sand	10	5	dipnet
Leaf Packs or Mats	0	0		Mud/Muck/Silt	0	0	
Aquatic Vegetation	0	0		Other:	0	0	
Rock or Shell Rubble	30	5	dipnet	Other:	0	0	
Undercut banks/Roots	55	5	dipnet	Draw aerial view sketch of habitats found in 100 m section			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm) or Salinity (ppt):			Secchi (m):
Top								
Mid-depth	4'	26.4	7.2	4.64	240			1.32
Bottom	8'							

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

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

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

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

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

Weather Conditions/Notes: HOT! 95°F

water level 41.5 ft. lower than 28 days ago

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

SAMPLING TEAM:	SIGNATURE:	DATE:
McKelvey / O'Connor	Tim McKelvey	7/28/97

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRESHWATER BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET (4-22-96)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
	21010030	7-28-97	WITHLACOOTCHEE RIVER

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	HAMILTON	1700 FT. DOWNSTREAM P.O.D.	TEST SITE

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Substrate Types & Availability [19]	Greater than 30% snags, logs, tree roots, aquatic vegetation, leaf packs (partially decayed), undercut banks, rock, or other stable habitat. 20 (19) 18 17 16	16% to 30% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Adequate habitat. Some substrates may be new fall (fresh leaves or snags). 15 14 13 12 11	5% to 15% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Less than desirable habitat, frequently disturbed or removed. 10 9 8 7 6	Less than 5% snags, logs, tree roots, aquatic vegetation, leaf packs, etc. Lack of habitat is obvious, substrates unstable or smothered. 5 4 3 2 1
Water Velocity [11]	Max. observed at typical transect: >0.25 m/sec. but < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 (11)	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect <0.05 m/sec, or spate occurring; > 1 m/sec 5 4 3 2 1
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[5] Add **5 points** if cross-sectional area of flow is estimated to be > one square meter during periods of normal flow.

Comments

[120] **TOTAL SCORE**

ANALYSIS DATE:	ANALYST:	SIGNATURE:
7/28/97	McKelvey / O'Connor	Sam McKelvey

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Tenneco
County: Duval
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0000281
LIMS Sample #: 184655 LIMS Job #: 97-Jul-29-16
sample log: 8/4/97 DW
Test Type: Screening / Definitive
Static / Static Renewal / Flow-through
Temperature range: room 25.0-26.0°C
incubator 25.0-26.0°C
Test Number: 1 of 2
Remarks: D = dead, M = missing

Sample Collection: Date 7/28/97 Time 1100
Test Beginning: Date 7/28/97 Time 1440
Test Ending: Date 7/31/97 Time 1430
Organism Batch #: 27 Diluent Batch #: 28
Organism Age: <24 hr
Test Organism: Ceriodaphnia dubia

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	25.3 @ 25.5	8.1 @ 25.8 °C	106.0 @ 101.0 1010 @ 1003 @ 25.7 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	25.1 @ 25.0	8.1 @ 26.0 °C	106.3 @ 101.0 1015 @ 1003 @ 25.7 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.9 @ 25.0	8.1 @ 25.9 °C	106.0 @ 101.0 998 @ 1003 @ 26.4 °C

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm)		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
Ctl.	A	5	5	5	8.3		8.2	25.4		24.4	7.5		8.3	175		185
Ctl.	B	5	5	5			8.2			24.5			8.3			180
Ctl.	C	5	5	5			8.3			24.6			8.2			185
Ctl.	D	5	5	5			8.3			24.8			8.3			195
100%	A	5	5	5	8.2		9.0	25.4		24.8	6.6		8.2	1640		1675
100%	B	5	5	5			9.0			24.8			8.2			1670
100%	C	5	5	5			9.0			24.8			8.1			1770
100%	D	5	5	5			9.0			25.0			8.1			1870
Measured/Loaded by:		MF	ND	ND	DW		ND	DW		ND	DW		ND	DW		ND
Recorded by:		MF	ND	ND	MA		KR	MA		KR	MA		KR	MA		KR

Investigators' Signatures

Michelle Anderson
Kellie Kalston
Marshall Faircloth
Mike Leigh
A H Wolfe
reviewer

form updated 4/01/96

Water Quality Parameters

Salt Water / Well Water — 20% Min Water — Parameter entries verified by MF

	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):	0.0	—	Pat O'Connor
Lab Total Residual Cl2 (mg/L): —	<0.03	0.03	DR-100 Kelly KR
Alkalinity (mg/L as $CaCO_3$): —	70	Alk 38543	0 Hach KJ
Hardness (mg/L as $CaCO_3$): —	90	Hard 49022	6 Hach KJ
Total ammonia (mg/L as N): —	<0.017	0.115	Orion ND

Ammonia Meter #98136 Meter Slope: -59.9 Ammonia Blank: <0.017

Control Salinity: 0 ppt (Reconstituted Seawater)

Sample Salinity: <1 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Tenneco
County: Duval
Contact / District: Tim McKelvey / Northeast
NPDES Permit #: FL0000281
LIMS Sample #: 184655 **LIMS Job #:** 97-Jul-29-16
sample log: 8/1/97 DW

Sample Collection: Date 7/28/97 Time 1100
Test Beginning: Date 7/29/97 Time 1400
Test Ending: Date 7/31/97 Time 1430
Organism Batch #: 56 **Diluent Batch #:** Lake II
Organism Age: 15 days
Test Organism: Cyprinella leedsi

Test Type: Screening | Definitive
(Static) | Static Renewal | Flow-through
Temperature range: room 25.0-26.0 °C
incubator 25.0-26.0 °C
Test Number: 2 of 2
Remarks: D = dead, M = missing

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 9.0 @ 9.0	25.3 @ 25.5	8.1 @ 25.8 °C	106.0 @ 10.0 1010 @ 1013 @ 25.7 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	25.1 @ 25.0	8.1 @ 26.0 °C	1063 @ 10.0 1015 @ 1003 @ 25.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.9 @ 25.0	8.1 @ 25.9 °C	106.0 @ 10.0 998 @ 1003 @ 25.4 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) ~~Cond. (µmhos/cm)~~ 0 hr	Cond. 24 h	Cond. 48 h
Ctr A	E17	5	5	5	8.0	8.4	8.4	25.5	24.1	23.9	7.6	7.6	7.9	255	255	260
Ctr B	E18	5	5	5	8.0	8.4	8.4	25.5	24.7	24.7	7.6	7.7	8.0	255	255	260
Ctr C	E19	5	5	5	8.0	8.4	8.4	25.5	24.8	24.4	7.6	7.7	8.0	255	255	260
Ctr D	E20	5	5	5	8.0	8.4	8.4	25.5	24.6	24.9	7.6	7.7	8.0	260	255	260
100% A	E21	5	5	5	8.1	8.6	8.7	25.6	24.2	24.5	6.6	7.3	7.9	1685	1640	1680
100% B	E22	5	5	5	8.1	8.6	8.7	25.5	24.4	24.6	6.6	7.4	7.9	1680	1665	1700
100% C	E23	5	5	5	8.1	8.6	8.7	25.5	24.6	24.0	6.6	7.3	7.8	1685	1685	1700
100% D	E24	5	5	5	8.1	8.6	8.8	25.6	24.9	24.9	6.6	7.3	8.0	1685	1695	1715
Measured/Loaded by:		DW	ND	ND	DW	ND	ND	DW	ND	ND	DW	ND	ND	DW	ND	ND
Recorded by:		KJ	ND	ND	MA	MF	KR	MA	ME	KR	MA	MF	KR	MA	ME	KR

Investigators' Signatures

Michelle Anderson
Kellie Kalstor
Marshall Faircloth
Mark Smith
AJ Wolfe
reviewer

form updated 4/01/96

Water Quality Parameters
Parameter entries verified by MF

	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			0.0	—	Pat O'Connor
Lab Total Residual Cl2 (mg/L):	<0.03	—	0.03	DR100	KR
Alkalinity (mg/L as $CaCO_3$):	130	—	MF 385 430	Hach	KJ
Hardness (mg/L as $CaCO_3$):	130	—	MF 490 220	Hach	KJ
Total ammonia (mg/L as N):	<0.017	—	0.115	Orion	MD

A entry error 7-30 97 MF

Ammonia Meter #98136 Meter Slope: -59.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: <1 ppt

Salinity: ppt

Reference site

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle				Peninsula				Northeast			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	38	≥ 31	30-16	<16	5	≥ 26	25-14	<14		≥ 22	21-12	<12	
EPT Index	3	≥ 7	6-4	<4	1	≥ 4	3-2	<2		-	≥2	<2	
# Chironomid Taxa	13	≥9	8-5	<5	5	≥7	6-4	<4		≥7	6-4	<4	
% Contribution of Dominant Taxon	15.2	≤22	23-61	>61	5	≤29	30-64	>64		≤31	32-66	>66	
% Diptera	16.4	-	≤50	>50	3	-	≤37	>37		-	≤47	> 47	
Florida Index	15	≥ 16	15-8	<8	3	≥7	6-4	<4		≥ 8	7-4	<5	
% Suspension feeders/Filterers	0.6	≥ 12	11-6	<6	1	-	≥7	<7			≥7	<7	
Total Score		Panhandle			23	Peninsula				Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

Test site

Summer Index Period: Stream Condition Index for Florida (SCI) (April 1996)													
Macroinvertebrate Dip Net (20 sweeps of most productive substrates)	Value	Panhandle				Peninsula				Northeast			
		5	3	1	Score	5	3	1	Score	5	3	1	Score
Total Number of Taxa	48	≥ 31	30-16	<16	5	≥ 26	25-14	<14		≥ 22	21-12	<12	
EPT Index	10	≥ 7	6-4	<4	5	≥ 4	3-2	<2		-	≥2	<2	
# Chironomid Taxa	8	≥9	8-5	<5	3	≥7	6-4	<4		≥7	6-4	<4	
% Contribution of Dominant Taxon	20.6	≤22	23-61	>61	5	≤29	30-64	>64		≤31	32-66	>66	
% Diptera	36.8	-	≤50	>50	3	-	≤37	>37		-	≤47	> 47	
Florida Index	19	≥ 16	15-8	<8	5	≥7	6-4	<4		≥ 8	7-4	<5	
% Suspension feeders/Filterers	37.4	≥ 12	11-6	<6	5	-	≥7	<7			≥7	<7	
Total Score		Panhandle			31	Peninsula				Northeast			
Interpretation of Score		Excellent			27-33	Excellent			26-31	Excellent			25-29
		Good			21-26	Good			20-25	Good			19-24
		Poor			14-20	Poor			13-19	Poor			13-18
		Severely Degraded			7-13	Severely Degraded			7-12	Severely Degraded			7-12

Benthic macroinvertebrate taxa list for Tenneco Packaging Corporation, collected via 20 discrete dip net sweeps in the Withlacoochee River, on 28 July, 1997.

	Reference Site	Test Site
Nemertea		
Prostoma rubrum	–	1
Oligochaeta		
Allonais paraguayensis	–	2
Aulodrilus pigueti	2	2
Dero pectinata	5	–
Dero trifida	–	1
Haber speciosus	3	1
Limnodrilus hoffmeisteri	8	–
Nais elinguis	–	1
Pristina aequiseta	–	2
Pristina leidyi	1	2
Pristina proboscidea	1	–
Slavina appendiculata	3	–
Stylaria lacustris	2	–
Gastropoda		
Amnicola dalli johnsoni	–	4
Ferrissia sp.	–	2
Laevapex sp.	1	–
Micromenetus sp.	2	–
Micromenetus floridensis	–	2
Viviparus sp.	3	–
Viviparus georgianus	–	3
Planorbidae	1	–
Viviparidae	9	–
Pelecypoda		
Corbicula fluminea	–	2
Pisidiidae	–	2
Acarina		
Albia sp.	1	–
Arrenurus sp.	–	6
Frontipoda sp.	–	1
Krendowskia sp.	–	1
Lebertia sp.	–	2
Limnesia sp.	–	1
Mideopsis sp.	7	2
Torrenticola sp.	1	2
Isopoda		
Caecidotea sp.	8	11
Isopoda	1	–
Amphipoda		
Hyalella azteca	25	50

Decapoda		
Palaemonetes sp.	2	–
Palaemonetes paludosus	2	2
Procambarus sp.	–	1
Ephemeroptera		
Acerpenna pygmaeus	–	5
Caenis sp.	2	2
Isonychia sp.	–	1
Stenonema exiguum	–	5
Tricorythodes albilineatus	24	16
Ephemeroptera	–	1
Odonata		
Argia sp.	1	–
Dromogomphus spinosus	1	–
Neurocordulia virginiensis	–	2
Odonata	1	–
Coleoptera		
Dubiraphia vittata	14	16
Microcylloepus pusillus	2	25
Stenelmis sp.	–	10
Megaloptera		
Corydalus cornutus	–	2
Sisyra sp.	2	–
Trichoptera		
Cernotina sp.	–	1
Chimarra sp.	–	2
Hydropsyche sp.	–	4
Nectopsyche sp.	–	2
Neotrichia sp.	3	3
Diptera		
Ablabesmyia mallochi	3	–
Ablabesmyia rhamphe grp.	8	1
Cricotopus or *orthocladius*	1	1
Labrundinia sp.	2	–
Meropelopia sp.	1	–
Microtendipes pedellus grp.	1	–
Nanocladius sp.	2	–
Paralauterborniella nigrohalterale	1	–
Pentaneura inconspicua	1	2
Polypedilum halterale grp.	1	–
Procladius sp.	–	1
Rheotanytarsus distinctissimus grp.	–	47
Rheotanytarsus exiguus grp.	1	31
Rheotanytarsus sp.	–	31
Stelechomyia perpulchra	–	1
Stenochironomus sp.	2	–
Xestochironomus sp.	1	1
Chironomidae	1	2
Diptera	1	–

Periphyton taxa list and densities (#/cm^2) for Tenneco Packaging Corporation, collected via glass microscope slides in the Withlacoochee River on 28 July 1997.

	Reference Site	Test Site
Cyanophyceae		
Aphanocapsa sp.	959	–
Chroococcus sp.	1918	297
Gloeocapsa sp.	959	–
Merismopedia sp.	959	–
Oscillatoria sp.	4794	595
Bacillariophyceae		
Achnanthes exigua	13,424	3568
Achnanthes lanceolata apiculata	3836	595
Achnanthes lanceolata dubia	53,697	9218
Caloneis bacillum	1918	–
Cocconeis fluviatilis	23,013	66,015
Cyclotella sp.	1918	–
Cymbella minuta	17,260	–
Eunotia sp.	57,533	55,607
Eunotia pectinalis minor	–	3568
Eunotia pectinalis	3836	2379
Frustulia rhomboides crassinerva	1918	–
Frustulia rhomboides	9589	595
Gomphonema sp.	62,327	595
Gomphonema affine	7671	–
Gomphonema gracile	1918	–
Gomphonema parvulum	114,106	2379
Gyrosigma sp.	1918	–
Melosira granulata	7671	–
Melosira varians	69,998	–
Navicula cryptocephala	5753	–
Navicula minima	–	5353
Nitzschia palea	1918	595
Nitzschia sigma	1918	–
Nitzschia tryblionella	1918	–
Pinnularia acrosphaeria	1918	–
Diatomaceae	7671	595
Pennales	7671	–
Chlorophyceae		
Chlorococcum sp.	–	297
Ankistrodesmus sp.	959	–
Characium sp.	959	–

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

1 Transaction Code	2	3 NPDES NUMBER	11	12 YR/MO/DA	17	18 Insp Type	19 Inspector	20 Fac Type
N	5	FL0000281		010718		X	S	2

Remarks

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

1 Transaction Code	2	3 NPDES NUMBER	11	12 YR/MO/DA	17	18 Insp Type	19 Inspector	20 Fac Type
N	5	FL0000281		010718		B	S	2

Remarks

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