

Biological Assessment of

Reichhold Chemicals, Inc.

Duval County

NPDES #FL0000060

Sampled February 1994

October 1994

Biology Section

Division of Administrative and Technical Services

Department of Environmental Protection

Results of Fifth Year Inspections

Discharger: Reichhold Chemicals, Inc.
County: Duval
NPDES Number: FL0000060
State Permit Expiration Date: 9 February 1995

Toxics Sampling Inspection (XSI)

Date Sampled: 14 February 1994

Results: No organic pollutants or metals were detected in the discharge at levels above quantitation limits.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 14 February 1994

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

Impact Bioassessment Inspection (IBI)

Date Sampled: Measures of macroinvertebrate health indicated that both receiving water sites were impaired. Low scores for the Florida Index, the EPT index, and the Stream Invertebrate Index for Florida (SIIF) were found at both the reference and test sites. The similarity in invertebrate populations between the two sites suggests that the discharge is having no additional adverse effects upon the receiving water biota, which were already impaired due to non-point sources. The facility did not appear to be negatively impacting the periphyton community, although a substantial increase in algal biomass was noted at the test site.

Water Quality Inspection (WQI)

Date Sampled: 14 February 1994

Results: Although ammonia enrichment was observed in the receiving waters (0.56 mg/L and 0.39 mg/L at reference and test sites, respectively), the facility appeared to be only a minor contributor. The algal growth potential of all samples was above the "problem threshold", however, AGP decreased from the reference site (29.2 mg dry wt/L) to the test site (11.8 mg dry wt/L), and was lowest in the effluent (9.8 mg dry wt/L).

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

Reichhold Chemical, Inc. is located in Duval County, Florida. The wastewater from this industrial facility consists of once-through non-contact cooling water, cooling tower blowdown, boiler blowdown, and stormwater runoff. The facility, with a design flow of 1.0 MGD, discharges from a retention pond into an unnamed tributary to the Cedar River. Average flow from the facility has been 0.293 MGD, and was 0.171 MGD during the current study.

Permit limits are as follows: flow (1.0 MGD maximum), temperature (daily maximum of 100 °F, daily average not to exceed 96 °F), pH (6.0-8.5 SU's), total organic carbon (monitor and report), zinc (monitor and report when used in treatment process, and must not exceed Class III standards) and total residual chlorine (monitor and report). Additionally, the facility is required to perform chronic toxicity tests on the effluent.

Some plant upsets have been documented. In January, 1991, approximately 10,000 pounds of styrene was spilled, but only 20 gallons were discharged into the receiving waters. In February, 1993, a phthalic anhydride spill occurred, but none reached surface or ground waters.

No permit violations have occurred in the past year. A warning notice was issued in May, 1991, due to elevated zinc levels. The permit was later modified to require monitoring of zinc only if it was added to the waste stream.

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	20	17
Florida Index	7	2
SIIF Index	11	13
Shannon-Weaver Diversity	3.1	2.9
E-P-T Index	0	0
% Contribution of Dominant Taxon	41.6	43.2
% Oligochaeta	59	32
% Gastropoda	5	48
% Hirudinea	0	10
% Pelecypoda	6	1
% Odonata	6	1
% Other	0	3
% Predators/ Carnivores	12.6	1.2
% Deposit feeders (above surface)/ Collector-Gatherers	70.0	37.0
% Suspension feeders/ Collector-Filterers	6.0	1.8
% Scrapers	4.8	48.1
% Shredders	6.5	1.8
% Parasites	0	9.8
Macroinvertebrate Hester-Dendy		
Number of Taxa	12	20
Florida Index	5	3
E-P-T Index	0	0
Shannon-Weaver Diversity	3.1	3.0
% Diptera	81.7	63.0
% Gastropoda	6.0	30.0
% Amphipoda	0	3.0
% Oligochaeta	7.0	1.0
% Odonata	2.0	1.5
% Other	0	0.5
% Predators/ Carnivores	7.9	3.5
% Deposit feeders (above surface)/ Collector-Gatherers	58.6	53.5
% Suspension feeders/ Collector-Filterers	21.7	1.7
% Scavengers	0	1.1
% Scrapers	7.4	31.6
% Shredders	7.9	3.0
% Parasites	0	0.2
Periphyton Algae		
Number of Taxa	28	24
% Contribution of Dominant Taxon	23.5	26.7
Chlorophyll a (mg/sq. m)	9.9 Q	48.6 Q
Diatom/Diatom + B-G Abundance Ratio	0.95	0.96
% Blue-green	4.5	4.0
% Green	1.6	4.0
% Diatoms	93.7	91.4
Algal Growth Potential (mg dry wt/L)	29.2	11.8

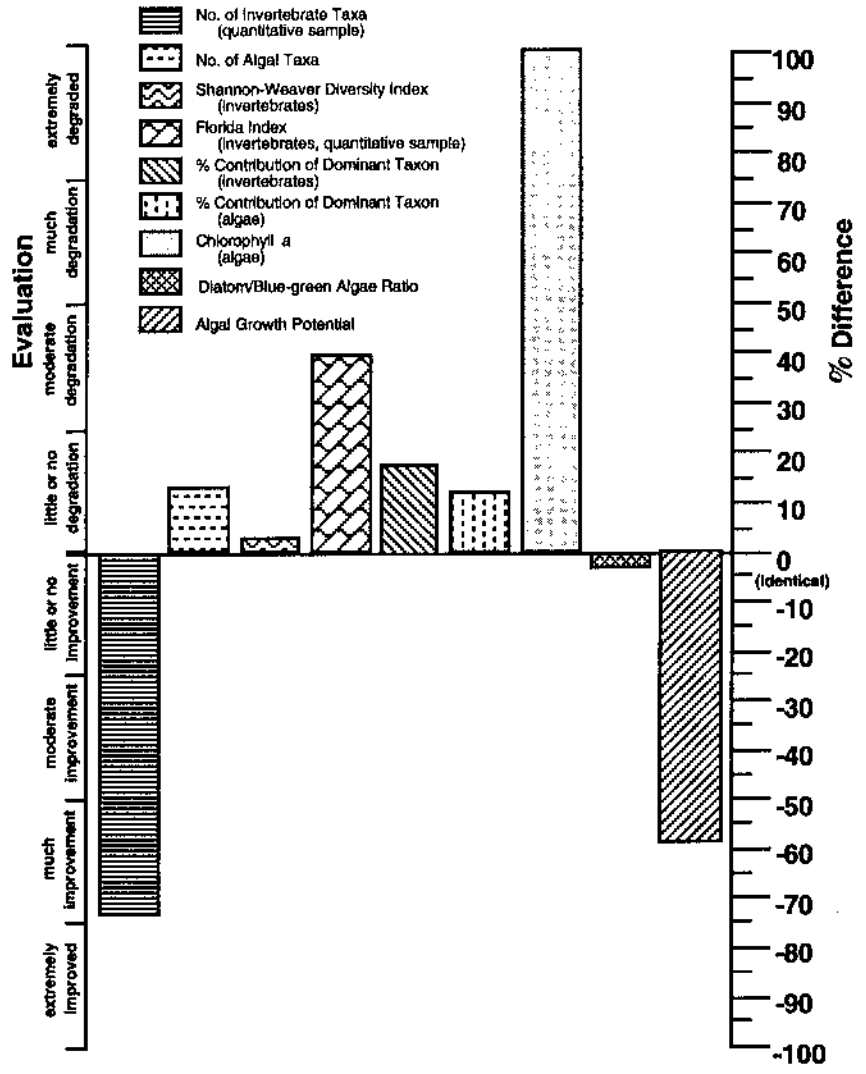
Q - Sample held beyond normal holding time

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a reference site (located in the unnamed tributary to the Cedar River, upstream of the facility), and a test site (the area downstream of the discharge).

A habitat assessment was performed *in situ* to establish comparability between sites. Supplemental physical/chemical data were also collected on the effluent and study sites. Acute screening toxicity bioassays, using *Ceriodaphnia dubia* and *Cyprinella leedsi* as test organisms, were performed on an effluent sample (Weber 1993). The effluent was analyzed for metals and for organic constituents (base neutral and acid extractables, and pesticide extractables). Additionally, nutrient analyses were performed on effluent, reference, and test sites. Methods used for all chemical analyses are on file at the Tallahassee DEP 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. Additionally, Hester-Dendy multiplate samplers were incubated for 28 days (Ross 1990). Periphyton was sampled at both reference and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Chlorophyll a was also determined for algal communities (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).



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

Explanation of Measurements of Community Health

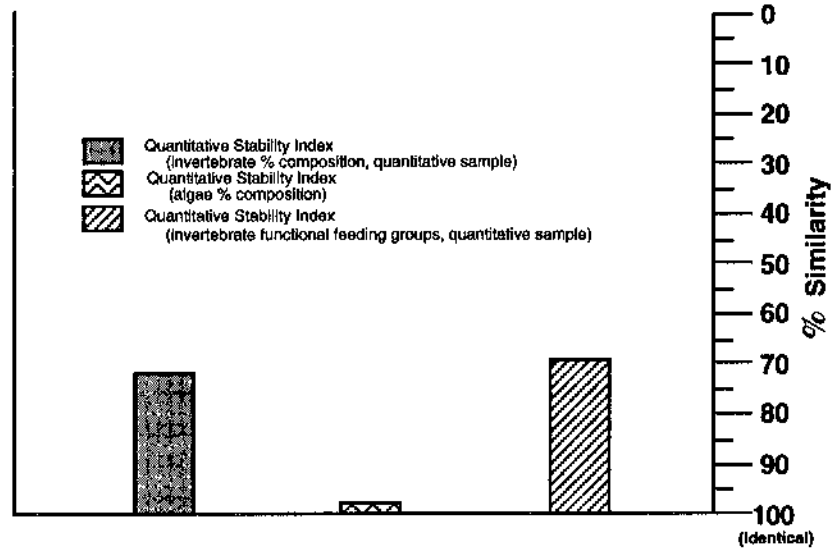
Several different measurements of macroinvertebrate and algal community health have been employed in this report. Many of these, such as the number of taxa and chlorophyll *a* are well known. Others are briefly explained here. The Florida Index assigns points to stream-dwelling macroinvertebrates based on their sensitivity to pollution (see Ross 1990). A site with a high Florida Index score is considered healthy (*i.e.*, many clean-water organisms are present). The Ephemeroptera/Plecoptera/Trichoptera (EPT) Index is calculated by summing the number of distinct taxa of EPT's represented in a sample. A higher EPT Index is associated with good water quality. 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 selected, and their cumulative total is the QSI. A QSI (for % composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (for functional feeding groups). The Stream Invertebrate Index for Florida (SIIF) is a composite metric which is based upon the macroinvertebrate communities found at Florida eco-regional reference sites sampled with dip net sweeps (EA Engineering 1994). The SIIF assigns 5, 3, or 1 point(s) to a variety of invertebrate parameters, depending on how closely that parameter approaches the expected eco-regional reference condition (5 points indicating a close match). The following parameters are used in calculating the SIIF for the Panhandle: taxa richness, EPT Index, % contribution of the dominant taxa, % Diptera, Florida Index, % suspension feeders/filterers, and % shredders (EA Engineering 1994). In the panhandle, 23-29 SIIF points indicates no impairment, 15-22 points indicates moderate impairment, and 7-14 points is clear evidence of severe degradation. In the Florida peninsula, these same parameters, along with the number of crustacean and mollusk taxa and the % of crustacean and mollusk taxa, are used to calculate the SIIF. In the Peninsula, 27-33 SIIF points indicates no impairment, 17-26 points indicates moderate impairment, and 9-16 points is evidence of severe degradation. Although the SIIF is based on samples collected during the summer, similar relationships should apply in other seasons.

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, the 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: Jan Brewer and Lindy Payne, (DEP NE District) and Chris Barge, Lyn Burton, Marshall Faircloth, Russel Frydenborg, Christy LeDuc, Kathleen Lurding, Elizabeth Miller, Urania Quintana, Landon Ross, Greg Wynn, and David Young (Tallahassee Biology Laboratory). The report was reviewed by the Point Source Bioassessment Review Committee, consisting of Jan Mandrup-Poulsen, Wayne Magley, and Mike Tanski, as well as District representatives.

Results



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

Habitat at the study sites was virtually identical, with the reference and test sites both scoring 55 points. Each site had an ample coverage of substrates (*i.e.*, snags, roots, leaf packs, and emergent vegetation) for benthic community success. The unnamed, channelized stream in which the study took place was 3.5 m wide and 0.3 m deep at both the reference and test sites. Velocity was surprisingly swift (0.5 m/sec) at both sites. Surrounding land use was predominately industrial (75%) and commercial (25%).

The pH at each receiving water station was circum-neutral (7.0 at the reference site and 7.5 at the test site). Temperature was the same at both sites (20 °C). Conductivity increased slightly from 550 µmhos/cm at the reference site to 600 µmhos/cm at the test site. Dissolved oxygen at both the reference and test sites (5.2 mg/L), was just above the minimum (5.0 mg/L) provided for by Class III standards.

The effluent sample was not toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*, exposed to the full strength sample (Appendix).

No organic pollutants or metals were detected in the discharge at levels above quantitation limits.

Although nutrient enrichment was observed in the receiving waters, the facility appeared to be only a minor contributor. Ammonia was extremely high in the receiving waters (0.56 mg/L and 0.39 mg/L at reference and test sites, respectively), exceeding the levels found in 90% of other Florida streams (see Table of Typical Water Quality Values in Appendix). In contrast, ammonia in the effluent was 0.061 mg/L. Total phosphorus was found to be 0.15 mg/L at the reference site and 0.13 mg/L at the test site, which is average for a Florida stream. In contrast, total phosphorus was lower (0.078 mg/L) in the effluent. Nitrate-nitrite and ortho-phosphate concentrations were below practical quantitation limits at both receiving water sites.

Algal growth potential (AGP) decreased from 29.2 mg dry wt/L at the reference site to 11.8 mg dry wt/L at the test site. AGP of the effluent was 9.8 mg dry wt/L. All the samples were above the 5 mg algal dry wt/L "problem threshold" (Raschke and Schultz 1987).

Measures of macroinvertebrate health indicated that both sites studied were moderately impaired, but that the facility was not responsible for any increased adverse effects. 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 site. The relative abundance of each individual taxon appears in the Appendix. The figure on page 3 summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

Hester-Dendy sampling indicated that taxa richness was very low at both sites. Twelve taxa were recovered from the upstream site (less than that of 90% of other Florida streams), while the test site yielded 20 (less than 70%). The Florida Index decreased from 5 points (an abnormally low value) at the reference site to 3 points at the downstream station. The Shannon-Weaver diversity was similar at both sites (3.0 at the reference and 3.1 at the test site). The EPT index was 0 at both sites, suggesting very stressed conditions. Dominant taxa at the reference site included the dipterans, *Dicrotendipes simpsoni*, *Monopelopia boliekae*, and *Polypedilum illinoense*. The most abundant taxa found at the test site were the dipteran, *Goeldichironomus carus*, and the gastropod, *Laevapex* sp. Neither assemblage of organisms was indicative of very healthy conditions, probably due to the widespread watershed disturbance (complete industrial or commercial use).

The Stream Invertebrate Index for Florida (SIIF) results, which are based upon dip net sampling, were consistent with the above findings. The reference site received a SIIF score of 11 (severe impairment) while the test site received 13 SIIF points (also indicative of severe degradation). The similarity in SIIF scores between the two sites suggests that the discharge is having no additional adverse effects upon the receiving water biota, which was already quite impaired due to non-point sources (urban runoff).

Most measures of the periphyton communities indicated very little difference between the two sites. Twenty-eight taxa were collected from the reference site, while 24 were found at the test site. The percent contribution of the dominant taxon was 23.5% at the reference site and 26.7% at the test site (consisting of the diatom, *Achnanthes exigua*, at both sites). Both sites were represented by chlorophytes, chrysophytes, blue-green algae, and diatoms, with the diatom fraction most abundant. The diatom to blue-green algae ratio was essentially the same at both sites. The QSI for algal percent composition (97.5%) indicated a high degree of similarity between the two stations. Chlorophyll *a*, however, increased from 9.9 mg/m^2 at the upstream site to 48.6 mg/m^2 downstream of the discharge.

Conclusions

The effluent sample was not toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*, exposed to the full strength sample.

No organic pollutants or metals were detected in the discharge at levels above quantitation limits.

Although ammonia enrichment was observed in the receiving waters (0.56 mg/L and 0.39 mg/L at reference and test sites, respectively), the facility appeared to be only a minor contributor. The algal growth potential of all samples was above the "problem threshold", however, AGP decreased from the reference site (29.2 mg dry wt/L) to the test site (11.8 mg dry wt/L), and was lowest in the effluent (9.8 mg dry wt/L).

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The facility did not appear to be negatively impacting the periphyton community, although a substantial increase in algal biomass was noted at the test site.

Literature Cited

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

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. 1993. Methods for measuring the acute toxicity of effluents and receiving waters to freshwater and marine organisms. 5th edition. EPA/600/4-90/027F. 216 p.

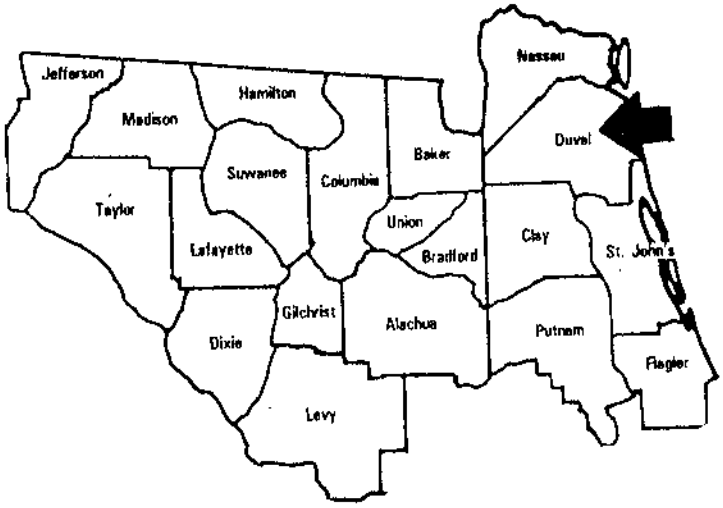
Chemistry summary table for

Reichhold Chemicals, Inc.	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
none detected			
Metals (ug/L)			
Aluminum	100 U		
Arsenic	20 U		
Cadmium	0.08 U		
Copper	5 U		
Chromium	10 U		
Iron	86		
Lead	15 U		
Mercury	0.10 U		
Nickel	10 U		
Silver	0.05 U		
Zinc	10 U		
Nutrients (mg/L)			
Ortho-phosphate	0.056	0.034 I	0.037 I
Total phosphorus	0.078	0.15	0.13
Ammonia	0.061	0.56 A	0.39
Nitrate+Nitrite	0.044	0.029 I	0.027 I
TKN	0.53	1.2	1.1
Other Parameters			
Habitat Assessment		55	55
D.O. (mg/L)	2.4	5.2	5.2
pH (SU's)	7.0	7.0	7.5
Conductivity (µmhos/cm)	1000	550	600
Temperature (°C)	25.0	20.0	20.0
Hardness (mg CaCO3/L)	317.5		
Total Organic Carbon (mg C/L)	6.7		
AGP (mg dry wt/L)	9.8	29. 2	11.8
Bioassay Fish	not toxic		
Bioassay Invertebrate	not toxic		

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.

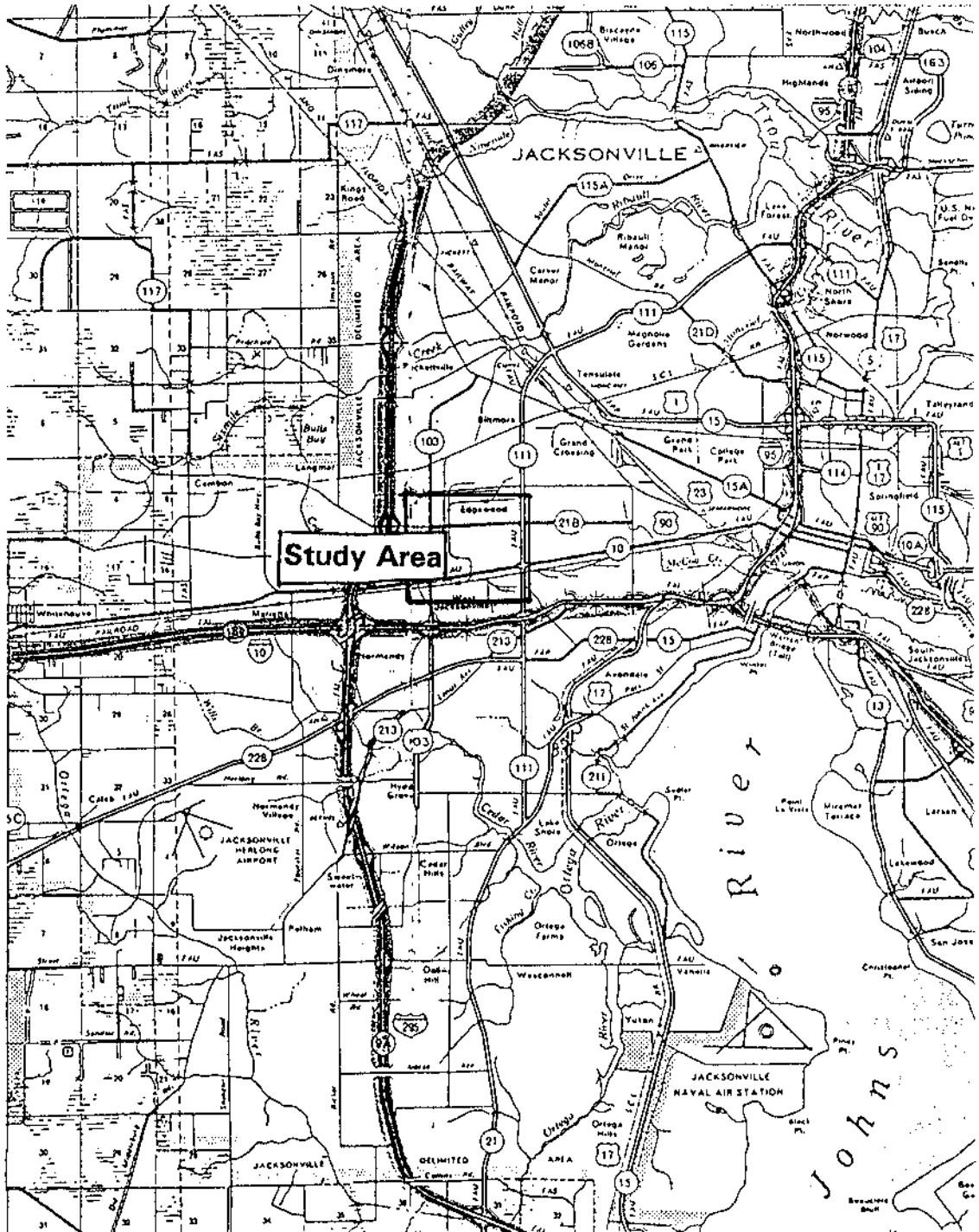
U- Material analyzed for but not detected; value reported is the minimum detection limit



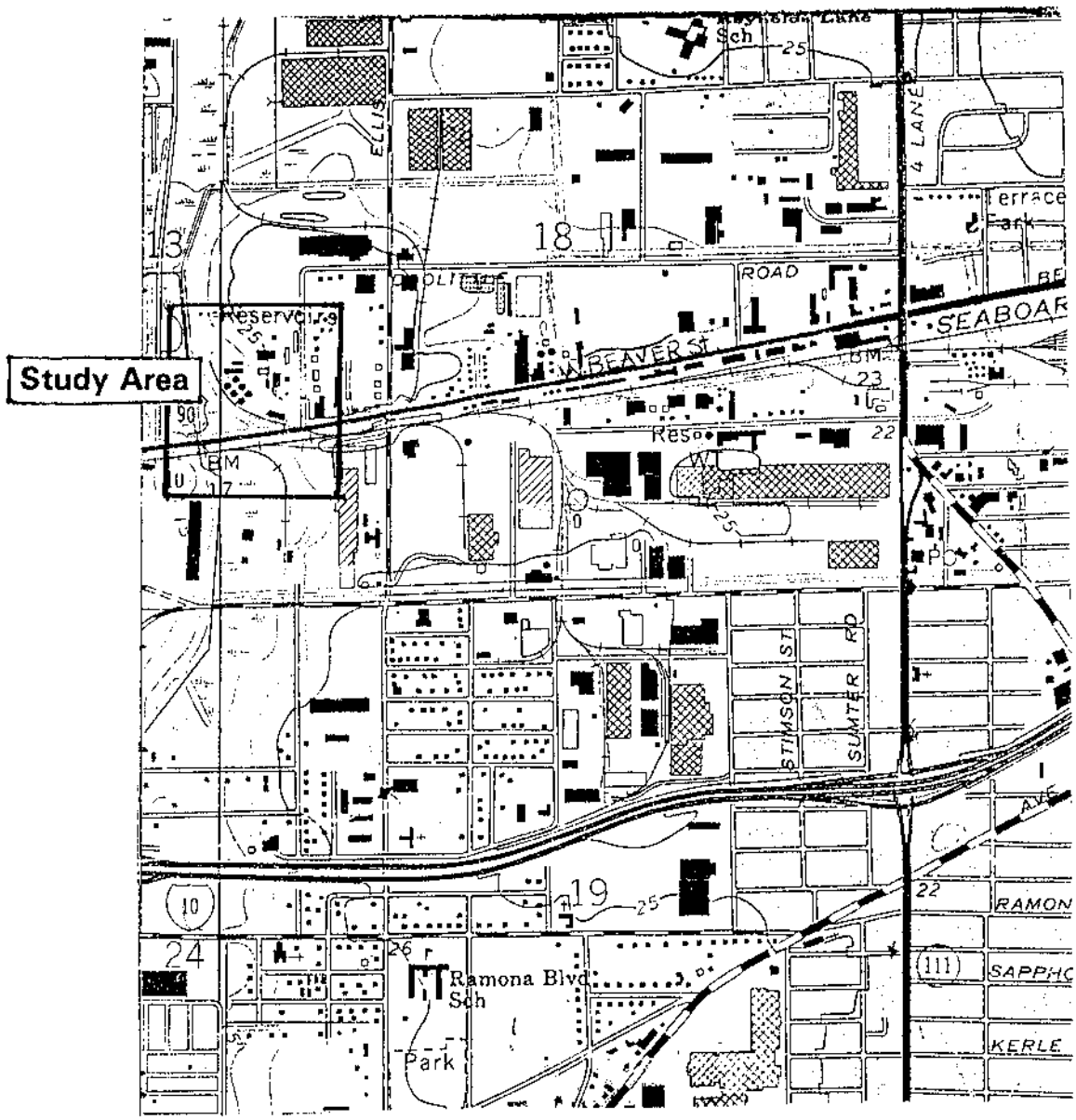
State of Florida

Department of Environmental Protection

Northeast District



Reichhold Chemicals, Inc. FYI



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: Reichhold Chemical Co.		Date Summary Prepared: May 9, 1994
Location (attach detailed map): 54 Wamsley Road Jacksonville, FL	County: Duval County	District: NE District
Federal Permit # FL0000060 and expiration date: January 31, 1995	State GMS # and 31116P00005 State expiration date: February 9, 1995	Facility Type: (Industrial) Municipal Federal Agricultural Other (list):

Function of facility: industrial, wastewater facility to treat once-through non-contact cooling water, cooling tower blowdown, boiler blowdown and stormwater.

Description of treatment process: Permitted for the operation of a once-through non-contact cooling water, cooling tower blowdown, boiler blowdown and stormwater system with a design flow of 1.0MGD, discharging to a retention pond to an unnamed creek to the Cedar River.

Receiving waters: unnamed creek to the Cedar River	Classification: I II (III)	
Design Flow: 1.0 MGD	Mean Flow: .293 MGD	Flow during survey: .171 MGD

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

therefore, the best time to sample is: Anytime

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

Facility has no mixing zone.

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

Parameter	Limit (units)
See attachments detailing required parameters A. State Permit B. NPDES Permit	

Describe special permit conditions and permit modifications:
State permit #IO11e-170338 modified 05-18-92.
Zinc shall be monitored if it is added to the waste stream.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
FACILITY SUMMARY

Reichhold Chemical Co.
(Facility)

Description of permitted outfall(s): Reichhold Chemicals effluent exits a retention pond over a weir into a narrow ditch that drains into an unnamed creek. The unnamed creek flows into the Cedar River.

List permit violations (from MOR data or other source) and plant upsets that occurred within past year: A review of MOR data indicates no permit violations. Plant upsets within the past year include a phthalic anhydride spill which occurred on 02-21-93. A gasket ruptured at the product transfer line, spilling product into a concrete containment area. The product immediately turned into a crystalline solid mass. Because the spill did not reach the ground or surface water no PCAP was required and no further action was taken. In addition, a styrene spill occurred on 07-01-92. Approximately 10,000 lbs. of styrene overflowed the containment area and discharged into the railcar spill collection system and onto the ground. Approximately 20 gallons were discharged into the creek. Tests showed no groundwater contamination occurred

Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions: Warning Notice # WN91-0020-IW16-NED was issued on 05-13-91 due to violations of permit limits for the parameter zinc. Studies were conducted and it was never determined exactly where the zinc came from. The company requested that the permit be modified to reflect no zinc parameters because they do not use zinc in their process. The permit was modified effective May 18, 1992 to reflect this. (See attachment)

Discuss comparability of MOR results to past DER results and whether there are trends (improving, declining) in the data set: MOR results and past DEP results indicate that Reichhold Chemicals has no apparent serious problems. They appear to respond to problems in a very timely manner and they have been very cooperative with the Department.

Additional information: Refer to RQ-94-FEB-14-02,03
See attached Inspection Summary

Staff contributing to this review (signature):

Jan Brewer JBrewer	ES II (Biologist)
Lindy Payne Lindy Payne	ES I (Inspector)
Mike Dunbar	(Engineer)
	( )
	( )
	( )

MITTEE:

Reichhold Chemicals, Inc.
Non-Contact Cooling Water, Cooling Tower & Boiler Blowdown & Stormwater

I.D. Number: 3116P00459
Permit Number: IO16-170338
Date of Issue: February 9, 1990
Expiration Date: February 9, 1995
Modification Date: May 18, 1992

SPECIFIC CONDITIONS:

1. Drawings, plans, documents, or specifications submitted by the Permittee to support the renewal application, not attached hereto, but retained on file at the Department's Northeast District Office, are made a part hereof.

2. During the period of operation allowed by this permit the Permittee shall furnish one copy of the monthly operation report on the operation of the pollution control plant. The reports shall include all data required in Specific Condition No. 3. Such reports shall also contain information on the daily quantities of sludge generated at the source (if any), type and degree of its treatment and the site of its ultimate disposal. Reports shall be submitted on a monthly basis to the Florida Department of Environmental Regulation, Northeast District Office, 7825 Baymeadows Way, Suite 200B, Jacksonville, Florida 32256 and the City of Jacksonville Water Quality Division, 421 West Church Street, Suite 412, Jacksonville, Florida 32202.

3. The Permittee shall sample and analyze the wastewater at the location listed below for the following parameters:

Sample Location	Parameters	Effluent Limitations Min.	Max.	Frequency	Sample Type
Effluent immediately prior to discharge to creek	Flow (MGD)	- -	1.0	Continuous	Flow Meter
	Temperature (°F)	See Note 1		Continuous	Recorder
	pH (S.U.)	6.0	8.5	1/month	Grab
	TOC (mg/L)	- -	- -	1/month	Grab
	Chronic Toxicity	See Note 2			
	Zinc (ug/L)	See Note 4		1/month	Grab
	TRC (mg/L)	See Note 3		1/month	Grab

Note 1 = The daily average temperature shall not exceed 96°F, the daily maximum temperature shall not exceed 100°F.
Note 2 = Bioassays must be performed pursuant to Rule 17-3.061(3)(p), FAC. The measurement frequency and sample method/type is specified in Specific Condition No. 4.
Note 3 = Report method used for TRC analysis.
Note 4 = Zinc shall be monitored if it is added to the waste stream. Hardness as mg/L $CaCO_3$ must be monitored for at the same time and at a place in the Receiving Body of Water (RBW) that is unaffected by the effluent discharge to the RBW. The hardness value must be used to determine compliance with the standard in Rule 17-302.560(45), FAC, ug/L zinc = $e^{(0.8413(lnH)+.7614)}$, where lnH is the natural logarithm of the total hardness expressed as mg/L $CaCo_3$.

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning on the effective date and lasting through the expiration date of this permit, the permittee is authorized to discharge from outfall serial number 001, non-contact cooling water, boiler blowdown, cooling tower blowdown and stormwater runoff.

   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETERS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Daily Average	Daily Maximum	Measurement Frequency	Sample Type
Flow, (MGD)	Report	Report	Continuous	Flowmeter
Temperature (^{O}F)	95	100	Continuous	Temperature Meter/Recorder
Carbon, Total Organic (mg/l)	--	Report	1/Month	Grab
The pH shall not be less than 6.0 nor greater than 8.5 standard units.			1/Month	Grab

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

3. The effluent sample shall not cause a visible sheen on the receiving water.

4. Samples taken in compliance with the monitoring requirements specified above shall be taken at the nearest accessible point after final treatment but prior to actual discharge or mixing with the receiving waters.

5. The effluent shall not be chronically toxic to, or produce adverse physiological or behavioral responses in aquatic animals. An effluent no observable effect level (NOEL) of less than 100% will constitute a violation of FAC Section 17-3.061(2)(p) and the terms of this permit.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FDEP NE District	STORET STATION NUMBER:	DATE (M/D/Y): 02/14/94	TIME: 1230	RECEIVING BODY OF WATER: unnamed creek to Cedar River

REMARKS:	LOCATION: Reichhold Chemical Co.	FIELD ID/NAME: Test Site #1 / 25 yds upstream of effluent outfall

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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

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

Point-Source Pollution (list location and describe): transient camp trucking company wood preservation company

Estimated System Width (range, m): 3.5	Estimated System Depth (range, m): .30	yes
High Water Mark (m above bed): 1.5	Velocity (range, m/s): .5 m/sec	Impounded ☐ Channelized ☒

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

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☒ (slight) Anaerobic: ☐ Other: ☐

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

Sediment Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☐ Sand: ☐ Shell: ☐ Other: ☒ None

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	5	5	dipnet	Riffles	N/A	N/A	N/A
Leaf Packs	N/A	N/A	N/A	Sand	70	3	dipnet
Aquatic Vegetation	N/A	N/A	N/A	Mud/Muck/Silt	10	2	dipnet
Rock or Shell Rubble	N/A	N/A	N/A	Benthic leaf mats	15	5	dipnet
Undercut Banks/Roots	5	5	dipnet	Other:	N/A	N/A	N/A

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top N/A (too shallow)								.3L
Mid-depth	.75 ft	20	7.00	5.2	550			
Bottom N/A (too shallow)								

System Type : Stream: ☒ (Sand Bottomed / Sand Bot w/ Spring / Swamp & Bog / Calcareous / Alluvial / Misc) 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): Slightly Tannic: ☒ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions: sunny, Low 70's

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Jan Brewer / Lindy Payne	J Brewer / L Payne	02/14/94

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

SUBMITTING AGENCY CODE: 9003 / SUBMITTING AGENCY NAME: FDEP/ NE District	STORET STATION NUMBER:	DATE (M/D/Y): 02/14/94	RECEIVING BODY OF WATER: unnamed creek to Cedar River

REMARKS:	LOCATION: Reich Hold Chemical Co.	FIELD ID/NAME: Test site #1/25yds upstream of effluent ditch

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 7	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 22	Max. observed: >0.3 m/sec. but < 1 m/sec **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 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 6	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 10	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments 5	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	**TOTAL SCORE** 55

COMMENTS: Study area is a small strip of undeveloped woodlands within a highly industrialized area of Jacksonville.

ANALYSIS DATE: 02/14/94	ANALYST: J. Brewer L. Payne	SIGNATURE: J. Brewer L. Payne

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 5031 / SUBMITTING AGENCY NAME: FDEP / NE Dist	STORET STATION NUMBER:	DATE (M/D/Y): 02/14/94	TIME: 1200	RECEIVING BODY OF WATER: unnamed creek to Cedar River
REMARKS:	LOCATION: Reichhold Chemical Co.	FIELD ID/NAME: Test site #2 (10 yds downstream of effluent ditch		

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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

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

Point-Source Pollution (list location and describe): transient camp trucking company wood preservation company

Estimated System Width (range, m): 3.5	Estimated System Depth (range, m): .30	yes
		Impounded ☐
High Water Mark (m above bed): 1.5	Velocity (range, m/s): .5 m/sec	Channelized ☒

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

SEDIMENT/SUBSTRATE

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

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

Sediment Deposits: Sludge: ☐ Paper Fiber: ☐ Mud: ☐ Sand: ☐ Shell: ☐ Other: ☒ None

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	N/A	N/A	N/A	Riffles	N/A	N/A	N/A
Leaf Packs	5	5	dipnet	Sand	70	3	dipnet
Aquatic Vegetation	N/A	N/A	N/A	Mud/Muck/Silt	10	2	dipnet
Rock or Shell Rubble	N/A	N/A	N/A	Benthic leaf mats	10	5	dipnet
Undercut Banks/Roots	5	5	dipnet	Other:	N/A	N/A	N/A

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top N/A	N/A							.3L
Mid-depth	.5ft	20	7.5	5.2	0.00			
Bottom N/A	N/A							

too shallow

System Type : Stream: ☒ (Sand Bottomed / Swamp & Bog / Alluvial / Sand Bot w/ Spring / Calcareous / Misc.) 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): slightly Tannic: ☒ Green (algae): ☐ Clear: ☐ Other: ☐

Weather Conditions: sunny, low 70's

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

SAMPLING TEAM: Jan Brewer / Lindy Payne	SIGNATURE: J. Brewer / L. Payne	DATE: 02/14/94

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

SUBMITTING AGENCY CODE: 8031 / SUBMITTING AGENCY NAME: FDER/ NE District	STORET STATION NUMBER:	DATE (M/D/Y): 02/14/94	RECEIVING BODY OF WATER: unnamed creek to Cedar River

REMARKS:	LOCATION: Reichhold Chemical Co.	FIELD ID/NAME: Test site #2/ 10yr downstream of effluent ditch

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 7	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 22	Max. observed: >0.3 m/sec. but < 1 m/sec **23-30 points**	Max. observed; 0.1 to 0.3 m/sec **16-22 points**	Max. observed; 0.05 to 0.1 m/sec **8-15 points**	Max. observed; <0.05 m/sec, or spate occurring; > 2 m/sec **0-7 points**
Artificial Channel/ Flow Alteration 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 8	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 10	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments 5	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	**TOTAL SCORE** 56

COMMENTS: Study area is small strip of undeveloped woodlands within a highly industrialized area of Jacksonville.

ANALYSIS DATE: 02/14/94	ANALYST: J Brewer L. Payne	SIGNATURE: J Brewer L. Payne

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

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Reich Hold Chemicals, INC.
Location:
County: Duval
Contact/District: LINDY PAYNE NE
NPDES Permit #: FL00 00060 Outfall #:

Sample Collection: Date 2/14/94 Time 1045
Test Beginning: Date 2/15/94 Time 1400
Test Ending: Date 2/17/94 Time 1500
Organism Batch #: 5 Diluent Batch #: 6
Organism Age: < 24hrs.
Test Organism: Ceriodaphnia dubia

94-FEB-15-15 69895

Test Type: Screening | Definitive
Static | Static Renewal | Flow-through

Test Number: 1 of 2

Remarks: Initial Sample Parameters after warming to Test Temperature
pH - 7.6
Temp. 23.4 °C
D.O. 5.4 mg/L
Cond. 945 umhos

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	20.5@20.6	8.6@20.9	950@1,000 9895 9220@~~10,000~~@22.1 °C
24 hr	7.0@7.0 9.0@9.0	22.0@22.1	8.7@22.1	990@1,000 9895 9590@~~10,000~~@22.8 °C
48 hr	7.0@7.0 9.0@9.0	22.6@22.7	8.8@21.1	970@1,000 9895 9410@~~10,000~~@22.9 °C

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED ~~Cond. (mmhos/cm)~~ Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	A	5	5	5	8.0		8.4	21.7		23.7	8.5		8.6	180		185
Control	B	5	5	5			8.4			23.7			8.6			185
Control	C	5	5	5			8.4			23.6			8.7			190
Control	D	5	5	4			8.4			23.5			8.7			190
100%	A	5	5	5	7.8		8.6	21.7		23.6	6.2		8.7	880		920
100%	B	5	5	5			8.6			23.6			8.7			930
100%	C	5	5	5			8.6			23.5			8.7			950
100%	D	5	5	5			8.6			23.3			8.7			950
Measured/Loaded by:		MF	TM	MF	MF		MF	MF		MF	MF		MF	MF		MF
Recorded by:		TR	TM	MF	OW		OW	OW		OW	OW		OW	OW		OW

Investigators' Signatures

Paul White
Marshall Faircloth
Robin C. Rader
Tina Mikulski
Reviewer

Water Quality Parameters	~~Salt Water~~/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			0.2	—	LP
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-IW	TR
Alkalinity:	125	70	125	Hach	TR
Hardness:	120	80	295	Hach	TR
Total Ammonia:	<0.017	<0.017	0.04	Hach	MF

Ammonia Meter #98136 Ammonia Meter Slope: -56.2 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 7/8/93

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Reich Hold Chemicals, INC.
Location:
County: Duval
Contact/District: LINDY PAYNE / NE
NPDES Permit #: FL0000060 Outfall #:

Sample Collection: Date 2/14/94 Time 10Y
Test Beginning: Date 2/15/94 Time 1700
Test Ending: Date 2/17/94 Time 1500
Organism Batch #: 6 Diluent Batch #: WS
Organism Age: 10 days
Test Organism: Cyprinella leedsi

94-FEB-15-15 69985

Test Type: Screening | Definitive
Static | Static Renewal | Flow-through

Test Number: 2 of 2

Remarks:

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	20.5 @ 20.6	8.6 @ 20.9	9?? @ 1,000 9220 @ ~~40,000~~ 9545 @
24 hr	7.0 @ 7.0 9.0 @ 9.0	22.0 @ 22.1	8.7 @ 22.1	990 @ 1,000 9540 @ ~~10,000~~ 9555 @
48 hr	7.0 @ 7.0 9.0 @ 9.0	22.6 @ 22.7	8.8 @ 21.1	970 @ 1,000 9410 @ ~~10,000~~ 9545 @

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (~~mmhos/cm~~ 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
control	74	5	5	5	7.9	8.3	8.5	21.1	21.7	22.1	8.4	8.5	9.2	230	235	24
Control	79	5	5	5	7.9	8.3	8.5	21.1		22.0	8.4	8.5	9.2	230	235	24
100%	65	5	5	5	7.7	8.2	8.3	21.8	21.7	22.0	5.5	7.9	8.6	920	920	92
100%	163	5	5	5	7.7	8.2	8.4	21.7		22.1	5.5	7.9	8.6	920	930	95
Measured/Loaded by:		DW	TM	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	M
Recorded by:		TR	TM	MF	DW	TM	DW	DW	TM	DW	DW	TM	DW	DW	TM	D

Investigators' Signatures

Daniel A. Whitten
John C. Rader
Marshall Faircloth
Tina M. Kulesza
Reviewer

Water Quality Parameters	~~Salt Water~~/ Well Water	20% Min Water	Sample	Method	Measure
Field Total Residual Cl2:			0.2	—	L. Pa
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TR
Alkalinity:	125	70	125	Hach	TR
Hardness:	120	60	295	Hach	TR
Total Ammonia:	<0.017	<0.017	0.04	Hach	MF

Ammonia Meter #98136 Ammonia Meter Slope: ~56.2 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity:

form updated 7/8/93

Macroinvertebrate taxa list for Reichhold Chemical Company, collected via Hester-Dendy samplers, above and below the discharge, in an unnamed tributary to the Cedar River, on 14 March 1994.

	Control Site	Test Site
Amphipoda		
Hyalella azteca	–	11
Decapoda		
Procambarus fallax	–	1
Diptera		
Asheum beckae	–	27
Chironomus sp.	8	2
Cricotopus bicinctus	4	4
Dicrotendipes simpsoni	29	10
Goeldichironomus carus	–	153
Goeldichironomus holoprasinus	3	–
Goeldichironomus sp.	–	1
Kiefferulus sp.	3	5
Monopelopia boliekae	–	2
Polypedilum illinoense	10	12
Undetermined Chironomidae	–	1
Undetermined Culicidae	–	1
Undetermined dipteran pupa	10	12
Gastropoda		
Ferrissia sp.	2	30
Laevapex sp.	–	63
Physella sp.	–	7
Pseudosuccinea columella	–	2
Undetermined Ancylidae	2	9
Undetermined Gastropoda	1	1
Hirudinea		
Placobdella papillifera	1	–
Odonata		
Argia sp.	2	–
Ischnura or *Enallagma* sp.	–	3
Ischnura hastata	–	1
Ischnura posita	–	1
Undetermined Coenagrionidae	–	1
Oligochaeta		
Dero digitata	–	1
Dero trifida	3	1
Limnodrilus hoffmeisteri	1	2
Nais communis	1	–
Undetermined Naididae	1	–
Total	81	364

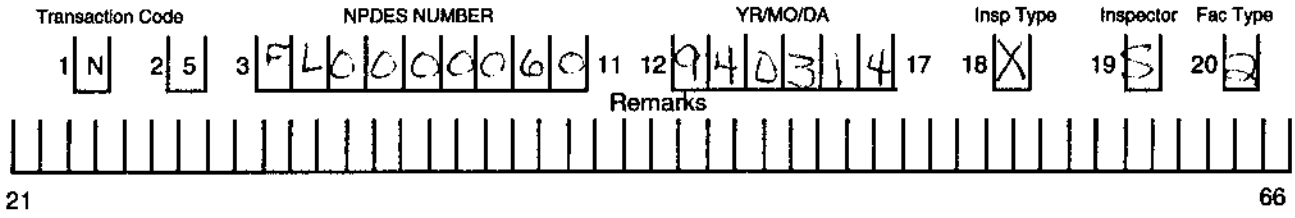
Macroinvertebrate taxa list for Reichhold Chemical Inc., collected via 20 dip net sweeps above and below the discharge, in an unnamed tributary to the Cedar River, on 14 March 1994.

	Control Site	Test Site
Collembola		
Isotomurus palustris	–	2
Diptera		
Chironomus sp.	–	1
Cricotopus bicinctus	1	2
Cryptochironomus sp.	2	–
Dicrotendipes simpsoni	–	1
Polypedilum illinoense	14	–
Polypedilum scalaenum grp.	1	–
Simulium sp.	1	–
Tanypus carinatus	1	–
Gastropoda		
Micromenetus dilatatus	1	1
Physella sp.	1	3
Undetermined Ancylidae	2	35
Hirudinea		
Undetermined Hirudinean	–	8
Odonata		
Argia sp.	2	–
Ischnura sp.	3	1
Oligochaeta		
Aulodrilus pigueti	3	–
Bratislava unidentata	3	–
Chaetogaster diaphanus	–	1
Dero lodeni	–	7
Dero pectinata	1	1
Dero trifida	2	–
Eclipidrilus sp.	1	3
Haber speciosus	–	1
Limnodrilus hoffmeisteri	35	11
Nais communis	4	–
Pristina leidyi	–	2
Undetermined Enchytraeidae	1	–
Pelecypoda		
Sphaerium or *Musculium* sp.	5	1
Total	84	81

Periphyton taxa list and densities (#/mm^2) for Reichhold Chemical Inc. collected via glass microscope slides in an unnamed tributary to Cedar River, on 14 March, 1994.

	Control Site	Test site
Bacillariophyta		
Achnanthes exigua	447	273
Achnanthes hungarica	312	8
Achnanthes hustedtii	178	130
Achnanthes pinnata	242	33
Achnanthes lanceolata v. dubia	210	22
Amphora ovalis	–	163
Cyclotella meneghiniana	108	41
Cymbella minuta	–	119
Eunotia incisa	54	58
Eunotia indica	75	30
Gomphonema gracile	59	25
Gomphonema parvulum	32	25
Melosira sp.	43	–
Navicula cryptocephala	–	33
Navicula exigua	22	–
Navicula maculata	22	–
Navicula pusilla	16	6
Navicula rhynchocephala	–	17
Nitzschia amphibia	5	11
Nitzschia palea	11	–
Pinnularia divergens	5	6
Pinnularia gibbaras linearis	5	3
Pinnularia major	5	3
Pinnularia microstauron	–	6
Surirella biseriata	–	6
Chlorophyta		
Characium sp.	5	–
Oedogonium sp.	5	–
Pteromonas sp.	5	–
Selenastrum sp.	5	–
Stigeocolonium sp.	5	–
Chrysophyta		
Dinobryon sp.	5	–
Cyanophyta		
Chroococcus sp.	5	–
Dactylococcopsis sp.	5	–
Lyngbya sp.	5	–
Microcystis sp.	–	3
Oscillatoria sp.	–	3
Phormidium sp.	–	3
Total	1896	1027

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



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

