Florida
Department of Environmental Protection

Biological Assessment of

IMC-Agrico Payne Creek Mine

Polk County

NPDES #FL0000353

Sampled July and August 1993

December 1993

Biology Section
Division of Technical Services

Department of Environmental Protection
Results of Fifth Year Inspections

Discharger: IMC-Agrico Payne Creek Mine
County: Polk
NPDES Number: FL0000353
State Permit Expiration Date: 30 November 1994

Toxics Sampling Inspection (XSI)

Date Sampled: 12 July 1993

Results: No organic pollutants were detected in the discharge. Iron (49 µg/L) and zinc (8 µg/L) were measured in the effluent, but both values were well within water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 12 July 1993

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

Impact Bioassessment Inspection (IBI)

Date Sampled: 9 August 1993

Results: Measures of benthic macroinvertebrate community health generally indicated no degradation resulting from the IMC-Agrico Payne Creek Mine discharge. Macroinvertebrate taxa richness and Florida Index were better at the test site than at the reference site. Some measurements of periphyton community health indicated degradation associated with the discharge, probably due to the effects of the impoundment of Little Payne Creek. The free water chlorophyll *a* was 383.3% greater at the test site than the reference site. This appeared to be due to the export of phytoplankton algae from the nutrient-rich impoundment. The diatom/blue green ratio was reduced by 51.6% at the test site compared to the reference site. This was associated with a large increase in the abundance of pollution-tolerant cyanophytes at the test site, which again was related to the export of blue-greens from the impoundment. The algal data provide evidence that the discharge was in violation of Rule 17-302.530(48)(b) FAC, imbalances of flora or fauna.

Water Quality Inspection (WQI)

Date Sampled: 12 July 1993

Results: Dissolved oxygen at the test site was below the Class III water quality standard (Rule 17-302.530(31) FAC). Elevated phosphorus concentrations were found in the discharge, and at the reference and test sites, at levels higher than those found in 88% of all other Florida streams. Ammonia in the effluent and at the test site was higher than 90% of other Florida streams, but nearly average at the Troublesome Creek reference site. In contrast, nitrate-nitrite was undetected in the effluent and at the test site, but extraordinarily elevated (3.8 mg/L) at the reference site. The nitrate-nitrite at the reference site was probably associated with the cattle ranching activities or citrus groves in the area, while the elevated ammonia at the test site was clearly associated with the effluent. Algal growth potential was extraordinarily elevated at the reference site (269.8 mg dry wt/L). AGP was considerably less at the test site (20.5 mg dry wt/L) and in the effluent (20.9 mg dry wt/L), but still above the 5 mg dry wt/L "problem threshold".

Introduction

The IMC-Agrico Payne Creek Mine is located in Polk County, Florida (see map in Appendix). This facility functions as a phosphate mine and beneficiation plant. Process wastewater is clarified in settling basins prior to discharge into the Class III Little Payne Creek, which flows to Payne Creek, and then to the Peace River. The average flow to Little Payne Creek is 21.6 MGD.

State permit limits for the effluent are as follows: total non-filterable residue (daily maximum of 60 mg/L, monthly average of 30 mg/L), total non-volatile, non-filterable residue (daily maximum of 25 mg/L, monthly average of 12 mg/L), pH (6 to 9 SU's), and total phosphorus (daily maximum of 5 mg/L, monthly average of 3 mg/L).

Prior to this bioassessment, no problems had been reported for this facility. During a field inspection on August 18, 1993, the rupture of a pipeline transporting phosphate clay slurry was discovered. Wastewater was discharged to adjacent wetlands and to Little Payne Creek, resulting in elevated levels of turbidity, total suspended solids, and non-volatile suspended solids. Measures are currently underway to resolve issues relating to this upset.

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 Troublesome Creek, roughly 10 miles east of the facility) and a test site (in Little Payne Creek approximately 0.5 miles downstream of the discharge). No reference site was available upstream of the outfall since the facility's settling ponds form the headwaters of Little Payne Creek. 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, pesticide extractables, and volatile organic compounds). 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 20 discrete dip net sweeps. Hester-Dendy multiplate samplers were incubated for 28 days (Ross 1990), but the samplers were not recovered. Therefore, data from the dip net samples will be used in this report. Periphyton was sampled at both reference and test sites by incubating glass microscope slides in a standard periphytometer for 28 days (Ross 1990). Phytoplankton was sampled via subsurface grabs. Chlorophyll *a* and phaeophytin were also determined for algal communities (Ross 1990). Algal Growth Potential tests, using *Selenastrum capricornutum* as the test organism, followed Miller *et al.* (1978).

Explanation of Measurements of Community Health

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

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, Florida Index and the diatom to blue-green algae ratio

are measured as the reference site minus test site divided by the reference site. The percent differences between sites involving the percent contribution of dominant taxon, chlorophyll *a*, and algal growth potential are measured as the test site minus reference site divided by the reference site.

The following personnel were involved in this investigation: Pat Fricano, Jim Snitgen, and Kathy Hicks (DEP Southwest District) and Chris Barge, Lyn Burton, Marshall Faircloth, Russel Frydenborg, Christy LeDuc, Kathy Lurding, Liz 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.

Major characteristics of community structure of control and test sites.

	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	23	26
Florida Index	10	15
% Contribution of Dominant Taxon	21	14
% Oligochaeta	1.0	4.3
% Diptera	25.0	57.3
% Ephemeroptera	18.0	1.2
% Trichoptera	2.0	11.6
% Odonata	4.0	1.2
% Coleoptera	22.0	9.2
% Pelecypoda	21.0	0.7
% Gastropoda	6.0	8.5
% Malacostraca	0	5.5
% Acarina	1.0	0
% Predators/ Carnivores	12.0	16.3
% Deposit feeders (above surface)/ Collector-Gatherers	29.7	28.1
% Deposit feeders (below surface)	1.0	4.5
% Suspension feeders/ Collector-Filterers	27.1	21.0
% Scavengers	0	1.9
% Scrapers	27.1	14.5
% Shredders	3.1	10.3
% Parasites	0	3.4
Periphyton Algae		
Number of Taxa	26	22
% Contribution of Dominant Taxon	29.4	29.6
Chlorophyll a (mg/sq. m)	19.3	3.9
Diatom/Diatom + B-G Abundance Ratio	0.95	0.46
% Blue-green	5.2	43.7
% Green	2.9	19.7
% Diatoms	91.9	36.6
Phytoplankton Algae		
Number of Taxa	9	22
% Contribution of Dominant Taxon	37.9	33.8
Chlorophyll a (ug/L)	1.7	8.7
Diatom/Diatom + B-G Abundance Ratio	0.9	0.04
% Blue-green	3.5	77.0
% Green	65.5	19.3
% Diatoms	31.0	3.3
Algal Growth Potential (mg dry wt/L)	269.8	20.5

Results

Habitat quality was fairly similar between the reference site (with 78 points) and the test site (with 82 points). Both sites were fairly shallow (0.3 m to 1 m deep at the reference site, and 0.5 m to 1 m deep at the test site). The test site in Little Payne Creek was wider (up to 10 m) than was the Troublesome Creek station (up to 3 m). Water velocity was lower at the reference site (0.25 m/sec) than at the test site (0.5 m/sec). A hydrogen sulfide/anaerobic odor was detected in sediments from the test site. Aquatic vegetation and undercut banks/roots were the major important substrates at the test site, while snags and leaf packs were the dominant important substrates at the reference site. Dissolved oxygen was adequate at the reference site (7.1 mg/L), but was considerably lower (2.5 mg/L) at the test site. Dissolved oxygen at the test site was below the Class III water quality standard (Rule 17-302.530(31) FAC). Water was slightly acidic at both stations (6.8 at both). Specific conductance increased from 311 µmhos/cm

(reference site) to 371 µmhos/cm (test site).

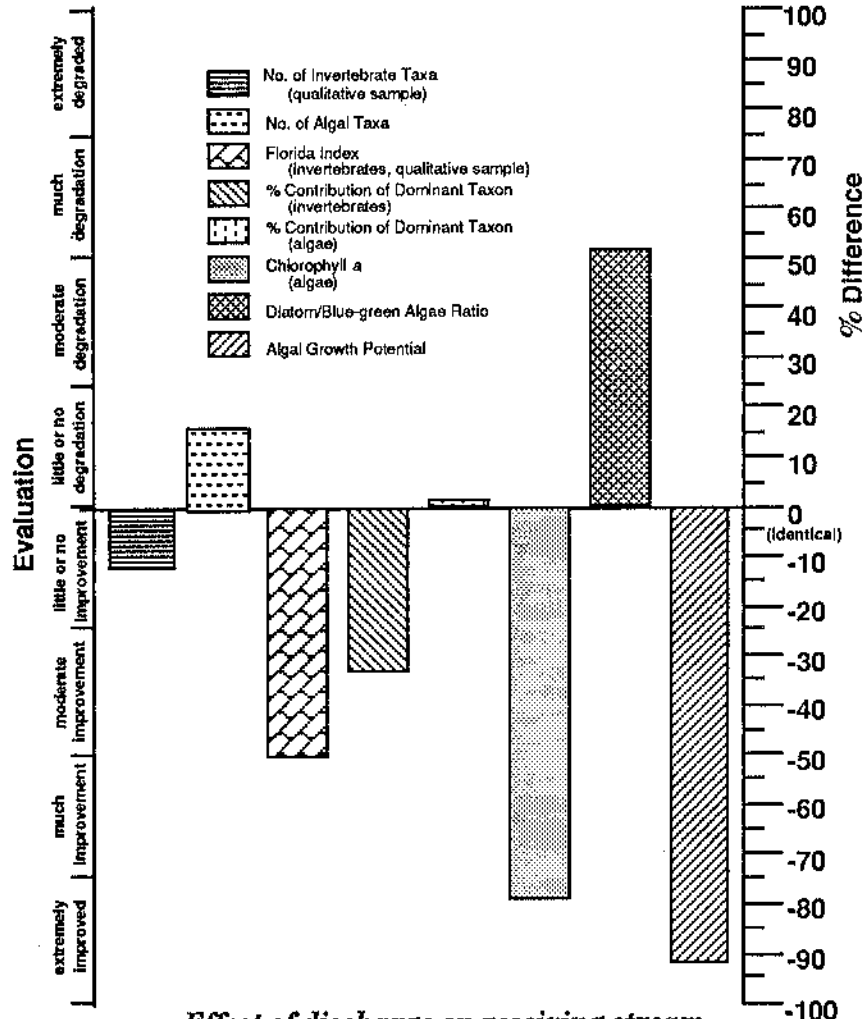
The effluent sample was not toxic to the water flea, *Ceriodaphnia dubia*, or to the fish, *Cyprinella leedsi*, exposed to the full strength sample.

No organic pollutants were detected in the discharge. Diazinon (less than 0.13 µg/L) was found in the blank.

Iron (49 µg/L) and zinc (8 µg/L) were measured in the effluent, but both values were well within water quality standards.

While elevated total phosphorus levels were associated with this discharge (0.72 mg/L in the effluent and 0.64 at the test site), the reference site (0.9 mg/L) had an even higher phosphorus concentration. These phosphorus values are higher than those found in 88 % of all other Florida streams (see Table of Typical Water Quality Values in Appendix). While ammonia in the effluent (0.36 mg/L) and at the test site (0.36 mg/L) was higher than 90% of other Florida streams, it was nearly average (0.07 mg/L) at the Troublesome Creek reference site. In contrast, nitrate-nitrite was undetected in the effluent and at the test site, but extraordinarily elevated (3.8 mg/L) at the reference site. This nitrate-nitrite level at the reference site is considerably higher than those in 95% of other Florida streams, probably associated with the cattle ranching activities or citrus groves in the area. The elevated ammonia at the test site was clearly associated with the effluent.

Receiving water nutrient concentrations, especially bio-reactive nitrogen levels, appeared directly related to algal growth potential results. Algal growth potential was extraordinarily elevated at the reference site



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

(269.8 mg dry wt/L). AGP was considerably less at the test site (20.5 mg dry wt/L) and in the effluent (20.9 mg dry wt/L). All these AGP values were well above the 5 mg dry wt/L "problem threshold", which usually indicates excessive macrophyte growth, algal blooms, lowered D.O., and fish kills (Raschke and Schultz 1987).

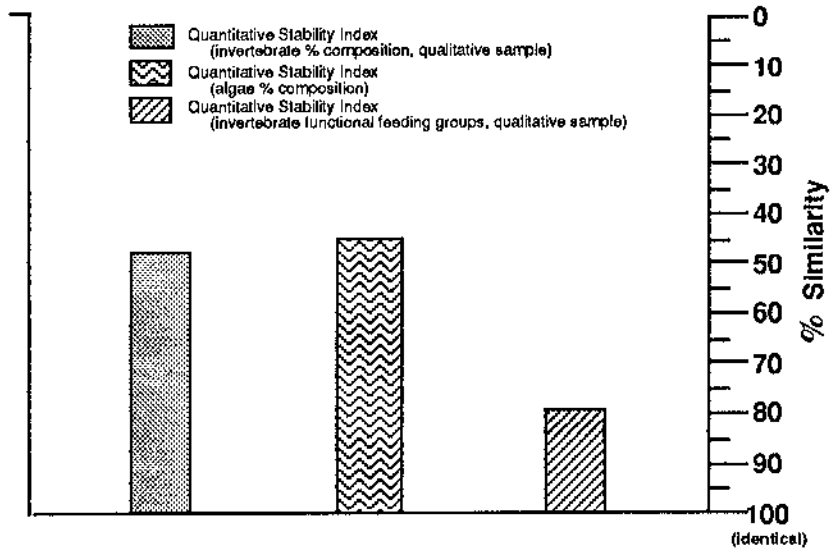
Measures of benthic macroinvertebrate community health generally indicated no degradation resulting from the IMC-Agrico Payne Creek Mine discharge. The figure on this page indicates the degree of difference between the reference and test sites. Larger differences (that is, higher percentages) correspond 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 p. 4 summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

Macroinvertebrate taxa richness at the reference site (23 taxa) was fairly average for a Florida stream, increasing at the test site to 26 taxa, which is better than 60% of other Florida streams (see Table of Typi-

cal Water Quality Values in Appendix). The Florida Index was below normal at the reference site (with 10 points), increasing to the value expected for this part of the state (15 points) at the test site. The percent contribution of the dominant taxon was 21% (*Sphaerium* or *Musculium* sp.) at the reference site, decreasing to 14% (*Polypedilum convictum*) at the test site. This further suggests that conditions were more favorable at the test site. The QSI for percent composition showed that the macroinvertebrate assemblages at the reference and test sites were not very similar. The reference site had a higher proportion of clams, beetles, and mayflies, but fewer midges, compared with the test site. The QSI for functional feeding groups, however, indicated that the benthos inhabiting the study sites were functioning in a similar manner. Overall, the data indicate that the facility is causing no adverse effects to the macroinvertebrate population.

Some measurements of periphyton community health indicated degradation associated with the discharge, probably due to the effects of the impoundment of Little Payne Creek. Comparing the reference site to the test site, periphyton taxa richness was decreased by 15.4%, while the percent contribution of the dominant taxon was essentially equal. Interestingly, while periphyton chlorophyll *a* was 79.7% less at the test site, the free water chlorophyll *a* was 383.3% greater. Since the headwaters of Little Payne Creek have been impounded, and now serve as a settling basin for the IMC-Agrico discharge, the higher free water chlorophyll *a* at the test site appeared to be due to the export of phytoplankton algae from this nutrient-rich pond. An increase in algal biomass below such stream impoundments has been shown to be a typical condition in Florida (FDER 1986). The reduction in periphyton chlorophyll *a* may have been due to shading caused by the increased phytoplankton.

The periphyton diatom/blue green ratio was reduced by 51.6% at the test site compared to the reference site, due to the large increase in pollution tolerant-cyanophytes, such as *Microcystis* spp., *Chroococcus* sp. and *Oscillatoria* sp., at the test site. Again, this appeared to be directly related to the export of limnobiontic blue-greens from the impoundment. The QSI for algal percent composition was extremely reduced, indicating an abnormal algal population (high cyanophyte proportions) at the test site. The algal data provide evidence that the discharge was in violation of Rule 17-302.530(48)(b) FAC, imbalances of flora or fauna.



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

Conclusions

Dissolved oxygen at the test site was below the Class III water quality standard (Rule 17-302.530(31) FAC).

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 were detected in the discharge. Iron (49 µg/L) and zinc (8 µg/L) were measured in the effluent, but both values were well within water quality standards.

Elevated total phosphorus concentrations were found in the discharge, and at the reference and test sites, at levels higher than those found in 88% of all other Florida streams. Ammonia levels in the effluent and at the test site were higher than 90% of other Florida streams, but fairly average in Troublesome Creek. In contrast, nitrate-nitrite was undetected in the effluent and at the test site, but extraordinarily elevated (3.8 mg/L) at the reference site. The nitrate-nitrite at the refer-

ence site was probably associated with the cattle ranching activities or citrus groves in the area, while the elevated ammonia at the test site was clearly associated with the effluent.

Algal growth potential was extraordinarily elevated at the reference site (269.8 mg dry wt/L). AGP was considerably less at the test site (20.5 mg dry wt/L) and in the effluent (20.9 mg dry wt/L), but still above the 5 mg dry wt/L "problem threshold".

Measures of benthic macroinvertebrate community health generally indicated no degradation resulting from the IMC-Agrico Payne Creek Mine discharge. Macroinvertebrate taxa richness and Florida Index were better at the test site than at the reference site. Overall, the data indicate that the facility is causing no adverse effects to the macroinvertebrate population.

Some measurements of periphyton community health indicated degradation associated with the discharge, most likely due to the effects of the impoundment of Little Payne Creek. The free water chlorophyll *a* was 383.3% greater at the test site compared with the reference site. This appeared to be due to the export of phytoplankton algae from this nutrient-rich impoundment. The diatom/blue green ratio was reduced by 51.6% at the test site compared to the reference site. This was associated with a large increase in the abundance of pollution-tolerant cyanophytes at the test site, which again was related to the export of bluegreens from the impoundment. The algal data provide evidence that the discharge was in violation of Rule 17-302.530(48)(b) FAC, imbalances of flora or fauna.

Literature Cited

FDER. 1986. Stream impoundments: An investigation of effects on water quality in North Florida. Florida Dept. Environmental Regulation. Biology Section. 360 p.

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

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

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

Weber, C. I. 1991. Methods for measuring the acute toxicity of effluents to freshwater and marine organisms. 4th edition. EPA/600/4-90/027. U. S. EPA, Cincinnati, Ohio. 216 p.

Chemistry summary table for

IMC-Agrico Payne Creek Mine	Effluent	Reference Site	Test Site
Organic Constituents (ug/L)			
None detected, but Diazinon in blank at 0.13 K			
Metals (ug/L)			
Aluminum	100 U		
Antimony	15 U		
Arsenic	2 U		
Cadmium	0.4 U		
Copper	5 U		
Chromium	10 U		
Iron	49 A		
Lead	15 U		
Mercury	0.1 U		
Nickel	5 U		
Selenium	30 U		
Zinc	8 T		
Nutrients (mg/L)			
Ortho-phosphate	0.60	0.74	0.60 A
Total phosphorus	0.72	0.90	0.64
Ammonia	0.36 A	0.07	0.36
Nitrate+Nitrite	0.02 U	3.8	0.02 U
TKN	0.96 A	1.1	0.91
Other Parameters			
Habitat Assessment		78	82
D.O. (mg/L)		7.1	2.5
pH (SU's)	6.8	6.8	6.8
Conductivity (µmhos/cm)	374	311	371
Temperature (°C)	29.3		
Hardness (mg CaCO3)	123.9		
TSS (mg/L)	2 U		
Bioassay Fish	Not toxic		
Bioassay Invertebrate	Not toxic		
Algal Growth Potential (mg dry wt/L)	20.9	269.8	20.5

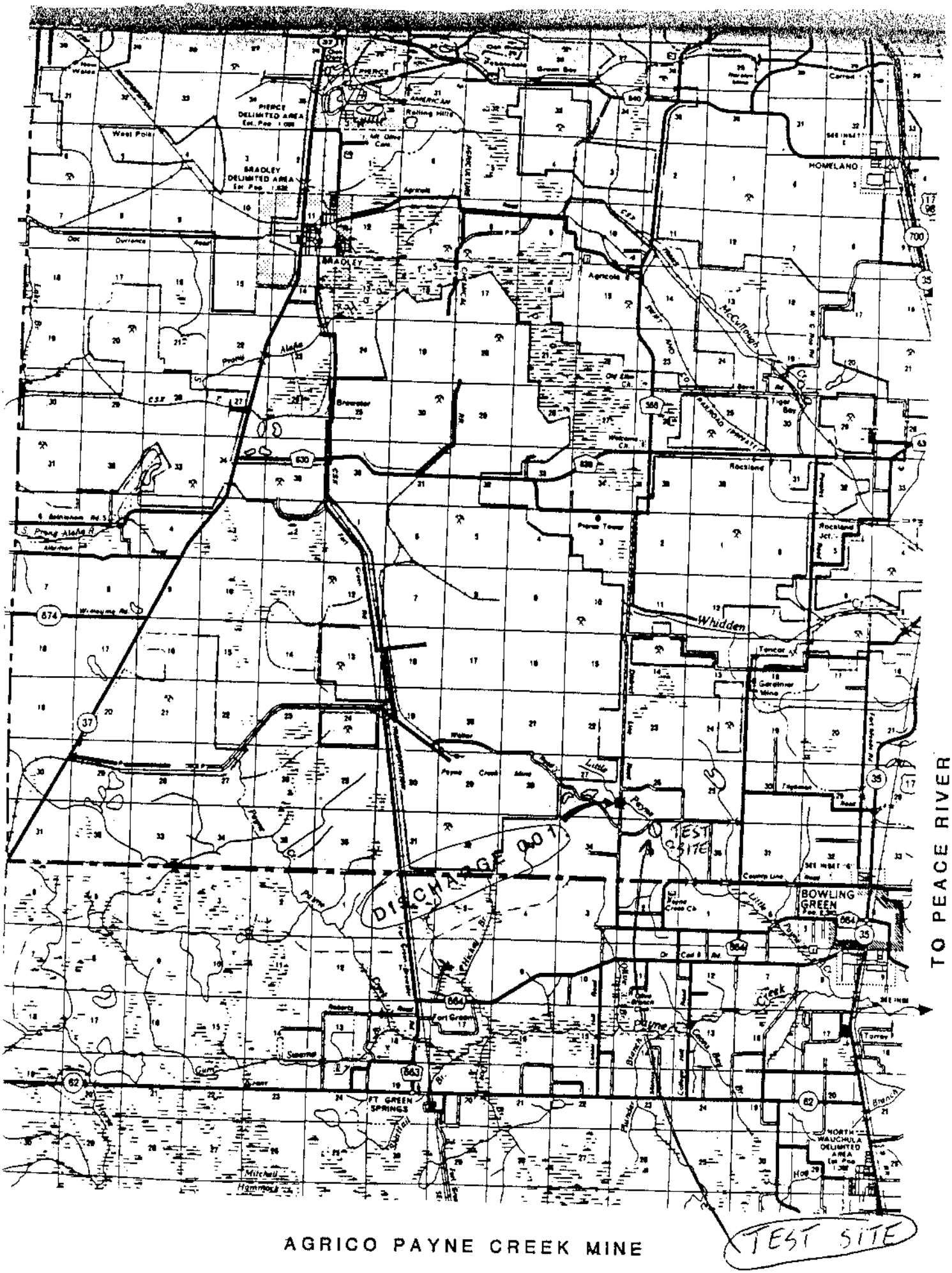
A - Value reported is the mean of two or more determinations
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
T - Value reported is less than the criterion of detection
U - Material analyzed for but not detected; value reported is the method detection limit

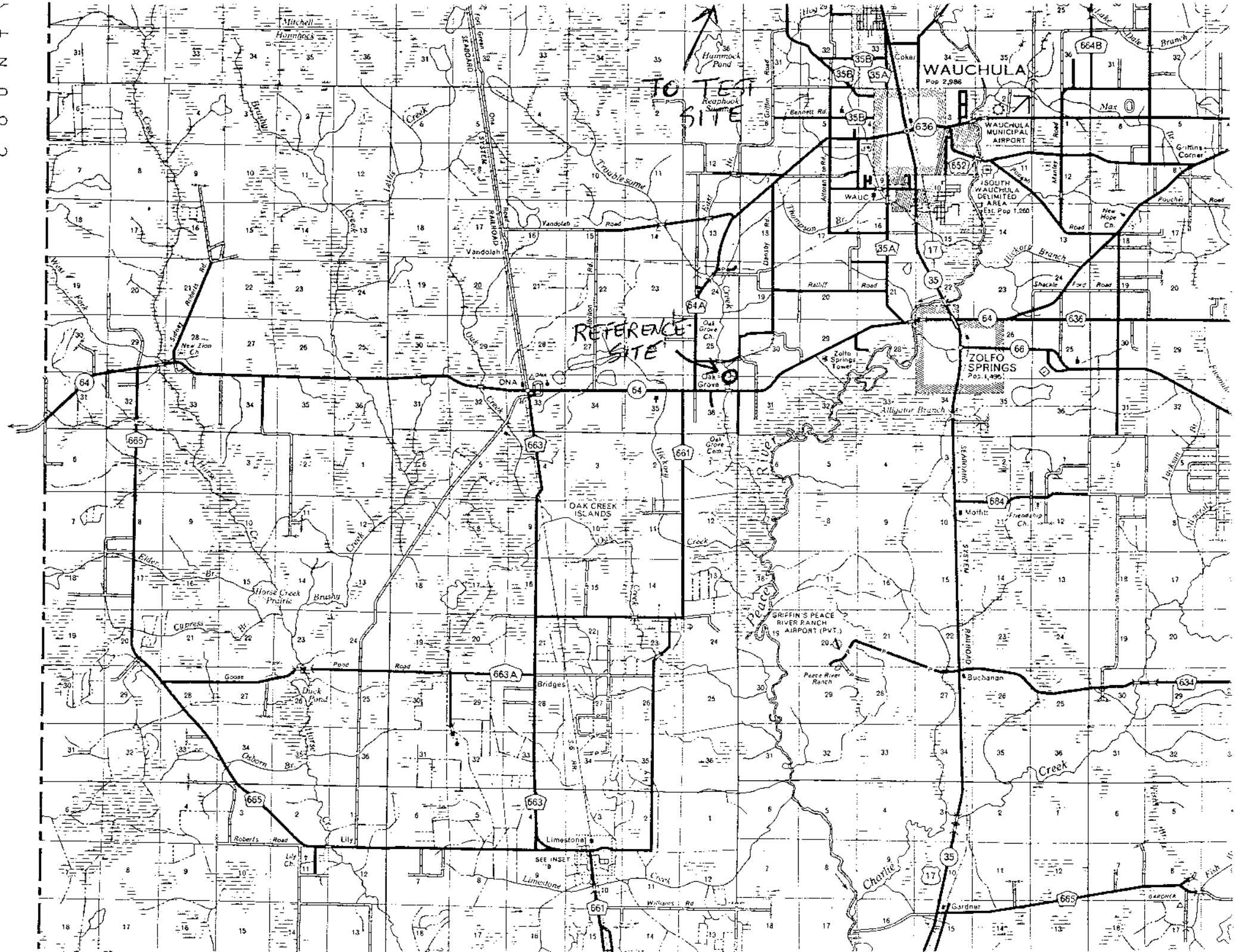
Typical Values for Selected Parameters in Florida Waters

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

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
					Percentile Distribution						
STREAMS (1617 stations)											
Phytoplankton Chlorophyll *a*	0.22	0.52	0.94	1.60	3.02	4.63	6.72	9.87	14.68	27.35	48.70
Periphyton Chlorophyll *a*	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85
H-D Diversity	0.84	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90
Qualitative Taxa Richness	9.00	12.00	17.00	20.00	22.00	24.50	26.00	28.00	31.00	37.00	53.00
H-D Taxa Richness	6.00	6.50	9.00	11.50	13.00	15.00	17.00	21.50	26.00	29.00	32.00
TKN	0.30	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80
Ammonia	0.02	0.02	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60
NO2-NO3	0.01	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05
Total Phosphorus	0.02	0.03	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51
Ortho Phosphorus	0.01	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37
Turbidity	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30
LAKES (477 stations)											
Phytoplankton Chlorophyll *a*	0.80	1.71	2.88	4.28	10.06	13.40	20.00	30.10	47.20	65.44	113.90
Dredge Diversity	0.71	0.97	1.43	1.74	1.98	2.12	2.21	2.59	2.85	3.15	3.17
Dredge Taxa Richness	3.00	5.00	6.50	7.00	9.00	10.00	11.00	13.00	15.00	17.00	21.00
TKN	0.36	0.49	0.67	0.83	1.08	1.26	1.40	1.51	1.68	2.11	3.46
NH3+NH4	0.01	0.02	0.02	0.03	0.04	0.06	0.08	0.12	0.15	0.21	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.04	0.05	0.10	0.14	0.23
Total Phosphorus	0.01	0.02	0.02	0.03	0.05	0.07	0.09	0.11	0.14	0.23	0.42
Ortho-Phosphorus	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.21	0.32
Turbidity	1.00	1.25	1.55	2.05	2.75	4.50	6.45	9.60	14.10	26.00	40.00
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphorus	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

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


PIERCE
DELIMITED AREA
BRADLEY
DELIMITED AREA
HOMELAND
Agrico
McCullough
Whidden
Rockland
Tiger Bay
Tenoar
Payne Creek
Little
DISCHARGE
TEST SITE
BOWLING GREEN
FT GREEN SPRINGS
NORTH WAUCHULA DELIMITED AREA
TO PEACE RIVER
TEST SITE
AGRICO PAYNE CREEK MINE


TO TEST SITE
REFERENCE SITE
WAUCHULA
Pop 2,986
WAUCHULA MUNICIPAL AIRPORT
SOUTH WAUCHULA DELIMITED AREA
Est. Pop 1,260
ZOLFO SPRINGS
Pop. 1,496
OAK CREEK ISLANDS
GRIFFIN'S PEACE RIVER RANCH AIRPORT (PVT.)
Bridges
Limestone
Lily
Gardner
Buchanan
Molfitt
Oak Grove
Zolfo Springs Tower
Hammock Pond
Reaphook Swamp
Peace River
Charlie Creek
Horse Creek Prairie
Duck Pond
Oak Grove Cem.
Oak Grove Ch.
New Zion Ch.
Lily Ch.
Friendship Ch.
New Hope Ch.
Shackle Ford Road
Griffins Corner
Vandolah
Mitchell Hammock
Troublesume
Ratliff Road
Bennett Rd.
Roberts Road
Williams Rd.
Peace River Ranch
SEABOARD SYSTEM RAILROAD
SEE INSET
ONA
Max O
Coker
Griffin
Thompson
Alligator Branch
Hickory Branch
Duke Branch
Lake Duke
Lelles Creek
Brushy Creek
Elder Br.
Cypress Br.
Osborn Br.
Fish Br.
Kissimmee R.
West Fork
Sebring
Roberts Rd.
Hardee
Hilliard
Manley
Pouchet
Alfonso Rd.
Jerry
Dansby
Griffin
Goose Pond
Oak Creek
Hickory Br.
Jackson Br.
Fish Creek
Gardner
35B
35A
64A
64B
17
35
64
66
636
652
663
663A
665
661
684
634

Agrico Chemical - Payne Creek
(Facility)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Description of permitted outfall(s):

Permit 105316755 – Outfall 001 ⇒ discharged cleaned water to Little Payne Creek

105316955 – None

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

1993 ⇒ No Violations
1992 ⇒ No Violations

Outfall 001 to Payne Creek

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

—

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

—

Additional information:

—

Staff contributing to this review (signature):

(Biologist)

(Inspector)

(Engineer)

( )

( )

( )

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: Agrico Chemical- Payne Creek Mine		Date Summary Prepared: 7/15/93
Location (attach detailed map): East of Fort Green Springs on SR 640 in Polk Co.	County: Polk	District:
Federal Permit # FL0003353 and expiration date:	State GMS # and State expiration date: Permit #1053167785A exp 11/30/94 1053-169-DSS 12/08/94	Facility Type: Industrial Municipal Federal Agricultural Other (list):

Function of facility: Phosphate Mine and beneficiation plant

Description of treatment process:

Treatment process is clarification of process water in setting areas.

Receiving waters: Payne Creek which leads to Peace River		Classification: I II III
Design Flow: 200 MGD	Mean Flow: 21.61 MGD	Flow during survey: —

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.): None

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

Parameter	Monthly Max Limit (units)
Permit 1053167785A	
TSS (mg/l)	—
FS (mg/l)	—
Total Phosphorus (mg/l)	—
PH	—

*See attachments FOR BOTH PERMITS

Describe special permit conditions and permit modifications:

Permit
Agrico

Effluent Limits

WATER QUALITY TEST RESULTS

TESTSITE ID: 4053X12950 — PERMIT ID: 1053-167788
OUTFALL: 001 — GMS ID NO: 4053P20008
AGRICO CHEMICAL COMPANY
EFFLUENT POINT SAMPLE — PAYNE CREEK MINE

SAMPLE MONTH __ YEAR __ CHECK IF NO-FLOW MONTH: __

(SIGNATURE, TITLE AND TELEPHONE OF PERSON COMPLETING THIS FORM)
I CERTIFY THAT I AM FAMILIAR WITH THE INFORMATION CONTAINED IN THIS REPORT AND THAT TO MY KNOWLEDGE AND BELIEF SUCH INFORMATION IS TRUE, COMPLETE AND ACCURATE.

PARAMETER NAME	STORET #	RESULT	UNITS	REMARK
FLOW, MO MAX	900187		MGD	
FLOW, MO AVG	050053		MGD	
TOTAL NON-FILT RESIDUE, MO MAX	900145	30.	MG/L	
TOTAL NON-FILT RESIDUE, MO AVG		DAILY MX 60	MG/L	
TOTAL NON-VOL, NON-FILT RES, MO MAX	900148	MON 30 AVG 12.	MG/L	
TOTAL NON-VOL, NON-FILT RES, MO AVG		D MAX 25	MG/L	
TOT PHOSPHORUS, MO MAX	000665	AVE 3	MG/L	
TOT PHOSPHORUS, MO AVG		MAX 5	MG/L	
PH, MO MAX	000400		STD UN	
PH, MO MIN		6-9	STD UN	
PH, MO AVG			STD UN	
DISSOLVED OXYGEN	000300		MG/L	

STATE PERMIT

Kemwel Agrico

Effluent Limits

3. The permittee shall sample and analyze the sand tailings waters annually, for the period this permit is valid, for the volatile (purgeable) compounds as listed below at the closest point possible to a sand tailings discharge pipe.

PURGEABLE (VOLATILE) COMPOUNDS

NUMBER	COMPOUND	EPA TEST METHOD	LIMIT OF DETECTION UG/L
1.	Acrolein	624	50
2.	Acrylonitrile	624	50
3.	Benzene	624	1
4.	Bromodichloromethane	624	5
5.	Bromoform	624	5
6.	Bromomethane	624	5
7.	Carbon Tetrachloride	624	3
8.	Chlorobenzene	624	5
9.	Chloroethane	624	5
10.	2-Chloroethylvinylether	624	5
11.	Chloroform	624	5
12.	Chloromethane	624	5
13.	Dibromochloromethane	624	5
14.	Dichlorodifluoromethane	624	5
15.	1,1-Dichloroethane	624	5
16.	1,2-Dichloroethane	624	3
17.	1,1-Dichloroethylene	624	5
18.	T-1,2-Dichloroethene	624	5
19.	1,2-Dichloropropane	624	5
20.	CIS-1,3-Dichloropropene	624	5
21.	T-1,3-Dichloropropene	624	5
22.	Ethylbenzene	624	5
23.	Methylene Chloride	624	5
24.	1,1,2,2-Tetrachloroethane	624	5
25.	Tetrachloroethene	624	3
26.	1,1,1-Trichloroethane	624	5
27.	1,1,2-Trichloroethane	624	5
28.	Trichloroethene	624	3
29.	Trichlorofluoromethane	624	5
30.	Toluene	624	5
31.	Vinyl Chloride	624	1
32.	1,2-Dibromoethane (EDB)	DER/Gc/EC	0.02

4.a. If the analyses of the sand tailings water ever shows one or more of the above listed compounds, at or above limit of detection, then the permittee has the option to immediately resample the discharge for verification purposes. A decision to not resample shall constitute verification. Upon verification, the Department will determine the need for monitor wells based upon the level of organic compounds verified, current environmental health standards, Department regulations and impact on ground water quality based on any prior ground water monitoring data obtained as a requirement to meet these permit conditions.

4.b. Should the Department determine that ground water monitoring is not required at this time, the permittee shall continue the surface water sampling and analyses as outlined in Specific Condition No. 3.

4.c. If the Department determines the need for monitor wells, the permittee will meet with the Department to determine the location and construction details for two wells to be installed downgradient from an active sand tailings area. Upon receiving Department approval the permittee shall them locate and construct these two wells according to Department directives.

4.d. Upon completion of construction of the Ground Water Monitoring System, the permittee shall complete and submit to the Department the attached Monitor Well Construction Data form (Attachment B).

4.e. The permittee shall submit the monitor well data report quarterly for twelve months. The Department shall evaluate the reports and may amend the discharger's permit to reflect additional requirements (subject to administrative and judicial review), including the implementation of cost-effective management practice or technological advances which reduce or eliminate the contaminant in the discharge to the maximum extend practicable.

After twelve months, if the data showing non-detection in all analyses, the permittee shall discontinue the ground water sampling and continue the surface water sampling on an annual basis for the life of the permit.

4.f. Should the above listed compounds be reported and verified (through a second sample) in ground water samples, th permittee shall contact the Department immediately. Further decisions will be resolved at that time by the Department.

DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: SCHS SUBMITTING AGENCY NAME: FDEP SWD - TAM - WTP	STORET STATION NUMBER:	DATE (M/D/Y): 8-9-93	TIME 2:00	RECEIVING BODY OF WATER: Troublesome Creek

REMARKS: Sunfish, (Bluegill)	LOCATION: Upstream Agrico Chemical - Payne Creek	FIELD ID/NAME: 001 (Troublesome Creek)

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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): none

Estimated System Width (range, m): 2-3	Estimated System Depth (range, m): 0.3-1.0	yes
High Water Mark (m above bed): 2.5	Velocity (range, m/s): 0.2-0.25	Impounded ☐ Channelized ☐

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	25%	4 5	Sweep	Riffles			
Leaf Packs	5%	4 5		Sand	55%	4 5	Sweep
Aquatic Vegetation				Mud/Muck/Silt	5%	4 5	Sweep
Rock or Shell Rubble				Benthic leaf mats	5%	4 5	
Undercut Banks/Roots	5%	4	Sweep	Other:			

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top								
Mid-depth								
Bottom		28		7.1				

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): Tannic: ☑ Green (algae): ☐ Clear: ☐ Other: ☐ _____

Weather Conditions: Sunny, 94° F

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

SAMPLING TEAM: Kathy Hicks Pat Fricano	SIGNATURE: Kathy A. Hicks	DATE: 8-9-93

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

SUBMITTING AGENCY CODE: 3040 / SUBMITTING AGENCY NAME: FDEP SW-TAM-WMF	STORET STATION NUMBER: —	DATE (M/D/Y): 8-9-93	RECEIVING BODY OF WATER: Troublesome Creek

REMARKS: Bluegill	LOCATION: Upstream Agrico Payne Creek	FIELD ID/NAME: 001 (Troublesome Creek)

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 24	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 20	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 15	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 5	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 9	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments 5	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	**TOTAL SCORE** 78

COMMENTS:

ANALYSIS DATE: 8-9-93	ANALYST: Pat Fricano / Kathy Hicks	SIGNATURE: Kathy Hicks

DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: 5040 / SUBMITTING AGENCY NAME: FDEP SW-TAM-WTF	STORET STATION NUMBER: —	DATE (M/D/Y): 8-9-93	TIME: 12:30	RECEIVING BODY OF WATER: Little Payne Creek

REMARKS: Bass, Bluegill	LOCATION: Downstream Agrico Payne Creek	FIELD ID/NAME: 002

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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): IMC-Agrico Payne Creek Mine is headwaters of Little Payne Creek

Estimated System Width (range, m): 5-10	Estimated System Depth (range, m): 0.5-1.0	yes
High Water Mark (m above bed):	Velocity (range, m/s): 0.5	Impounded ☐ Channelized ☐

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

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☑ Other: ☑ H_2S

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)	2%	5	dip net	Riffles			
Leaf Packs				Sand	63%	5	sieve
Aquatic Vegetation	20%	5	sieve	Mud/Muck/Silt	5%	5	
Rock or Shell Rubble				Benthic leaf mats			
Undercut Banks/Roots	10%	5	sieve	Other:			

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top	—	—	—	2.5	—			
Mid-depth	—	—	—	2.6	—			
Bottom	—	—	—	—	—			

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): Tannic: ☒ Green (algae): ☐ Clear: ☑ Other: ☐ ____

Weather Conditions: Sunny, ~90°F

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

SAMPLING TEAM: Kathryn Hicks Pat Fricano	SIGNATURE: Kathryn Hicks	DATE:

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

SUBMITTING AGENCY CODE: 8040 / SUBMITTING AGENCY NAME: FDEP Swi-Tam-wite	STORET STATION NUMBER: —	DATE (M/D/Y): 8-9-93	RECEIVING BODY OF WATER: Little Payne Creek

REMARKS:	LOCATION: Downstream Agrico Payne Creek	FIELD ID/NAME: 002

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 20	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 25	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 15	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 8	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 9	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments: 5	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	TOTAL SCORE: 82

COMMENTS:

ANALYSIS DATE: 8-9-93	ANALYST: Kathy Hicks Pat Fricano	SIGNATURE: Kathy A Hicks

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Agrico Chem
Location:
County: Polk
Contact/District: K Hicks / SW
NPDES Permit #: FL0000353 Outfall #: 001

Sample Collection: Date 7-12-93 Time 1100
Test Beginning: Date 7-13-93 Time 11:00
Test Ending: Date 7-15-93 Time 1100
Organism Batch #: 101 Diluent Batch #: 13
Organism Age: < 24 hrs
Test Organism: Ceriodaphnia Dubia

58142 93JuL 13 20

Test Type: (Screening) / Definitive — TR wrong one
(Static) | Static Renewal | Flow-through

Test Number: 1 of 2

Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
0 hr	7.0 @ 7.0 9.0 @ 9.0	24.4 @ 24.5	8.3 @ 24.6	1015 @ 1,000 @24.6 9890 @ 10,000
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.4 @ 24.0	1020 @ 1,000 @24. 10000 @ 10,000
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.7 @ 24.8	8.4 @ 23.7	1010 @ 1,000 @24 9800 @ 10,000

Conc.	Chamber #	Number Live 0	Number Live 24	Number Live 48	pH 0	pH 24	pH 48	Temperature (°C) 0	Temperature (°C) 24	Temperature (°C) 48	D.O. (mg/L) 0	D.O. (mg/L) 24	D.O. (mg/L) 48	Cond. (mmhos/cm) Cond. (µmhos/cm) 0	Cond. 24	Cond. 48
Control	A	5	5	5	7.9		7.9	24.4		24.5	8.5		7.4	165		175
Control	B	5	5	5			7.9						7.4			180
Control	C	5	5	5			7.9						7.4			180
Control	D	5	5	5			7.9						7.4			185
100%	A	5	5	5	7.3		8.2	24.4		25.6	6.3		7.3	335		345
100%	B	5	5	5			8.2						7.4			365
100%	C	5	5	5			8.2						7.4			375
100%	D	5	5	5			8.2						7.5			375
Measured/Loaded by:		TR	TR	TR	TM		TR	TM		TR	TM		TR	TM		TR
Recorded by:		TR	TR	TR	TR		TR	TR		TR	TR		TR	TR		TR

Investigators' Signatures

Tobin C. Rader

Irina Mikulski

Marshall Faircloth

Reviewer

	Salt Water/ Well Water	Water Quality Parameters: 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:					
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TM
Alkalinity:	115	605	90	Hach	TM
Hardness:	125	80	125	Hach	TM
Total Ammonia:	<0.01	<0.017	*0.60	grün	MF

*Signed wrong place on C-7 7/13/93

Cl2 Blank: _____ Ammonia Meter Slope: -56.6 Ammonia Blank: 0.017 Sample Salinity: _____ ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Agrico Chem
Location:
County: Polk
Contact/District: N Hicks / SW
NPDES Permit #: FL0000353 **Outfall #:** 001
58142 93-SW-13-20

Sample Collection: Date 7-12-93 Time 1100
Test Beginning: Date 7-13-93 Time 1100
Test Ending: Date 7-15-93 Time 1100
Organism Batch #: 29 **Diluent Batch #:** Well
Organism Age: 11 days
Test Organism: Cyprinella leedsi

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
0 hr	7.0 @ 7.0 9.0 @ 9.0	24.4 @ 24.5	8.3 @ 24.6	1015 @ 1,000 9830 @ 10,000 @ 24.6
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.8 @ 23.9	8.4 @ 24.0	1020 @ 1,000 10,000 @ 10,000 @ 24.5
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.7 @ 24.8	8.4 @ 23.7	1010 @ 1,000 9800 @ 10,000 @ 24.5

Conc.	Chamber #	Number Live 0	Number Live 24	Number Live 48	pH 0	pH 24	pH 48	Temperature (°C) 0	Temperature (°C) 24	Temperature (°C) 48	D.O. (mg/L) 0	D.O. (mg/L) 24	D.O. (mg/L) 48	Cond. (mmhos/cm) Cond. (µmhos/cm) 0	Cond. 24	Cond. 48
Control A	219	5	5	5	7.7	8.0	8.0	24.3	23.8	24.2	8.5	7.8	7.5	245	245	250
Control B	3	5	5	5	7.7	8.0	8.0				8.5	7.9	7.5	245	250	250
100% A	22	5	5	5	7.2	7.7	7.9	24.4	23.9	24.2	5.5	7.2	7.3	365	365	365
100% B	630	5	5	4	7.2	7.7	7.9				5.5	7.2	7.3	365	365	370
Measured/Loaded by:		TM	TR	TR	TM	MF	TR	TM	MF	TR	TM	MF	TR	TM	MF	TR
Recorded by:		TR	TR	TR	TR	TR	TR	TR	TR	TR	TR	TR	TR	TR	TR	TR

Investigators' Signatures

Tobin C. Redden
Tina Mikulski
Marshall Faircloth

Reviewer

form updated 10/20/92

Water Quality Parameters	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:					
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR-100	TM
Alkalinity:	115	105	90	Hach	TM
Hardness:	125	80	125	Hach	TM
Total Ammonia:	<0.017	<0.017	0.60	Orion	MF

Cl_2 Blank: _____ Ammonia Meter Slope: -56.6 Ammonia Blank: <0.017 Sample Salinity: 0 ppt

Taxa list for IMC-Agrico Chemical-Payne Creek Mine, collected via 20 dip net sweeps in Troublesome Creek (reference site) and Payne Creek (test site), on 9 August 1993.

	Reference Site	Test Site
Acarina		
Mideopsis sp.	24	–
Coleoptera		
Dubiraphia sp.	192	192
Dubiraphia vittata	120	24
Microcylloepus pusillus	168	–
Microcylloepus sp.	–	144
Stenelmis sp.	48	–
Diptera		
Ablabesmyia rhamphe grp.	–	120
Asheum beckae	–	96
Chironomus sp.	–	24
Cryptotendipes sp.	24	–
Cryptochironomus sp.	48	–
Dicrotendipes simpsoni	–	264
Palpomyia grp. sp.	24	–
Parachironomus carinatus	–	384
Paracladopelma nereis	24	–
Pentaneura inconspicua	24	48
Polypedilum convictum grp.	216	552
Polypedilum halterale grp.	–	72
Polypedilum laetum	–	216
Polypedilum tritum	–	48
Undetermined dipteran pupae	96	216
Rheotanytarsus distinctissimus grp.	–	24
Rheotanytarsus exiguus grp.	–	144
Tanytarsus sp. A Epler	144	–
Thienemanniella sp.	–	48
Ephemeroptera		
Caenis sp.	384	48
Stenonema floridense	48	–
Gastropoda		
Amnicola dalli johnsoni	–	336
Hebetancyclus excentricus	48	–
Micromenetus dilatus	96	–
Malacostraca		
Hyalella azteca	–	216
Megaloptera		
Corydalus cornutus	–	24
Odonata		
Argia sedula	–	48
Argia sp.	24	–
Arigomphus pallidus	48	–
Macromia taeniolata	24	–

Oligochaeta		
Limnodrilus hoffmeisteri	24	168
Pelecypoda		
Sphaerium or *Musculium* sp.	504	24
Trichoptera		
Cheumatopsyche sp.	48	408
Hydropsyche decalda	–	48

Periphyton taxa list and densities (#/mm^2) for IMC-Agrico Chemical, collected via glass microscope slides in Payne Creek, on 9 August, 1993.

	Reference site	Test site
Diatoms		
Achnanthes affinis	10	–
Achnanthes exigua	1139	29
Achnanthes hustedtii	131	–
Achnanthes lanceolata	141	10
Achnanthes lanceolata v. *apiculata*	10	–
Achnanthes lanceolata v. *dubia*	232	–
Achnanthes linearis	101	–
Capartogramma crucicula	10	–
Cocconeis placentula	706	48
Cyclotella meneghiniana	10	19
Cymbella minuta	10	–
Eunotia pectinalis	10	–
Gomphonema parvulum	81	–
Melosira varians	40	–
Navicula capitata	30	–
Navicula constans	10	–
Navicula cryptocephala	20	–
Navicula minima	403	19
Navicula pupula	50	10
Navicula rhynchocephala	–	10
Navicula viridula	50	10
Nitzschia amphibia	–	10
Nitzschia palea	30	86
Synedra ulna	333	–
Chlorophyta		
Ankistrodesmus sp.	–	10
Gloeocystis sp.	–	10
Kirchneriella sp.	–	10
Scenedesmus sp.	20	95
Stigeocolonium sp.	91	–
Tetraedron sp.	–	10
Cyanophyta		
Anabaena sp.	–	10
Aphanocapsa sp.	–	29
Chroococcus sp.	161	200
Gloeocapsa sp.	–	19
Lyngbya sp.	–	10
Merismopedia sp.	–	10
Microcystis sp.	–	19
Phormidium sp.	40	–
Total	3869	683

Phytoplankton taxa list and densities (#/mL) for IMC-Agrico Chemical, collected via subsurface grabs in Payne Creek, on 12 July, 1993.

	Reference Site	Test Site
Diatoms		
Achnanthes sp.	226	–
Cyclotella sp.	–	75
Gyrosigma sp.	75	–
Navicula sp.	301	–
Nitzschia sp.	75	448
Chlorophyta		
Actinastrum sp.	–	75
Chlamydomonas sp.	226	224
Chlorella sp.	–	448
Crucigenia sp.	–	224
Elakatothrix sp.	–	149
Euastrum sp.	–	75
Kirchneriella sp.	–	149
Oocystis sp.	–	299
Pteromonas sp.	–	149
Scenedesmus sp.	827	1120
Tetraedron sp.	150	75
Unknown chlorophyte flagellate	226	75
Cyanophyta		
Anabaena sp.	75	224
Chroococcus sp.	–	2538
Dactylococcopsis sp.	–	746
Merismopedia sp.	–	224
Microcystis aeruginosa	–	5375
Microcystis incerta	–	1792
Oscillatoria sp.	–	1344
Euglenophyta		
Phacus sp.	–	75
Total	2181	15903

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 FL0000353 11	12 930712 17	18 X	19 S	20 2

Remarks

21 66

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

Transaction Code	NPDES NUMBER	YR/MO/DA	Insp Type	Inspector	Fac Type
1 N 2 5	3 FL0000353 11	12 930712 17	18 5	19 S	20 2

Remarks

21 66