Florida
Department of Environmental Protection

Biological Assessment of

IMC - Agrico Co. Ft. Green Mine

Polk County

NPDES #FL0027600

Sampled September 1993

February 1994

Biology Section
Division of Technical Services

Department of Environmental Protection

Results of Fifth Year Inspections

Discharger: IMC-Agrico Co. Ft. Green Mine
County: Polk
NPDES Number: FL0027600
State Permit Expiration Date: 15 August, 1994

Toxics Sampling Inspection (XSI)

Date Sampled: 20 September 1993

Results: No organic pollutants were detected in the discharge. Iron (14 µg/L) and aluminum (320 µg/L) were measured in the effluent but were well within water quality standards.

Compliance Biomonitoring Inspection (CBI)

Date Sampled: 20 September 1993

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: 20 September 1993

Results: Measures of benthic macroinvertebrate community health indicated no degradation resulting from the IMC-Agrico Ft. Green Mine discharge. Macroinvertebrate taxa richness, the Florida Index, and Shannon-Weaver diversity were considerably better at the test site than at the reference site. Overall, the data indicate that the discharge was beneficial to the macroinvertebrate population, and that the reference site was of poor quality. Some measurements of periphyton community health indicated degradation associated with the discharge. The periphyton chlorophyll *a* was 2000% greater at the test site compared with the reference site. Percent contribution of dominant taxon increased from 16% at the reference site to 74.3% at the test site, due to dominance at the test site by the diatom, *Cocconeis placentula,* an indicator of eutrophy. Abundance of this diatom is also the reason for the large increase in the periphyton diatom/blue-green algae ratio at the test site.

Water Quality Inspection (WQI)

Date Sampled: 20 September 1993

Results: Dissolved oxygen at both sites was below Class the III water quality standard (Rule 17-302.530(31) FAC). Total phosphorus at the reference and test sites was higher than those values found in 88% and 95%, respectively, of all other Florida streams. Ammonia values at all stations were average to below average, while nitrate-nitrite was undetected at the test and reference sites. Reference site TKN (1.2 mg/L) was higher than that observed at the test site (0.89 mg/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

The IMC-Agrico Co. Ft. Green 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 above-ground settling impoundments prior to discharge into the Class III Payne Creek, which flows to the Peace River. The average flow to Payne Creek is 4.61 MGD for the spillway structure outfall (001) and 6.2 MGD for the Parshall flume outfall (002).

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), and total phosphorus (daily maximum of 5 mg/L, monthly average of 3 mg/L).

The only problem reported for this facility was a berm collapse on September 1, 1993, which resulted in the discharge of turbid stormwater into the South Prong of the Alafia River. Monthly Operating Report results indicate that the discharges at both outfalls have been well within permit limits and water quality standards for Class III surface waters.

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 Payne Creek a few miles upstream of the spillway structure outfall) and a test site (just downstream of the Parshall flume 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 organ-

Major characteristics of community structure of control and test sites.

	Reference Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	42	39
Florida Index	3	17
% Contribution of Dominant Taxon	23.2	10.5
% Oligochaeta	43.7	8.1
% Diptera	20.8	12.8
% Ephemeroptera	0.3	16.3
% Trichoptera	0	16.3
% Gastropoda	1.2	12.8
% Malacostraca	11.7	10.4
% Coleoptera	8.8	10.5
% Odonata	6.2	5.8
% Other	7.4	7.1
% Predator/Carnivores	14.7	16.3
% Above Surface Deposit Feeders	17.1	21.9
% Below Surface Deposit Feeders	44.6	8.1
% Suspension Feeders	6.9	14.0
% Scavengers	4.0	4.4
% Scrapers	2.0	25.6
% Shredders	9.9	8.0
% Other	0.8	1.7
Macroinvertebrate Hester-Dendy		
Number of Taxa	2	40
Florida Index	0	18
Shannon-Weaver Diversity	0.72	3.64
% Contribution of Dominant Taxon	80	41.9
% Malacostraca	80.0	2.8
% Diptera	20.0	22.4
% Ephemeroptera	0	53.9
% Trichoptera	0	3.7
% Gastropoda	0	2.8
% Coleoptera	0	10.8
% Other	0	3.6
% Predator/Carnivores	0	7.0
% Above Surface Deposit Feeders	33.0	52.2
% Suspension Feeders	7.0	1.0
% Scrapers	0	36.0
% Shredders	33.0	3.4
% Scavengers	27.0	0.4

Major characteristics of community structure, continued.

Periphyton Algae		
Number of Taxa	30	25
% Contribution of Dominant Taxon	16.0	74.3
Chlorophyll a (mg/sq. m)	1.1	23.1
Diatom/Diatom + B-G Abundance Ratio	0.56	0.97
% Blue-green	42.3	3.0
% Green	2.1	1.1
% Diatoms	54.3	95.6
% Euglenophytes	1.1	0.2
Free Water Chlorophyll a (µg/L)	1.50	1.47
Algal Growth Potential (mg dry wt/l)	11.0	14.6

isms, were performed on an effluent sample (Weber 1991). The effluent was analyzed for metals and for organic constituents (base neutral and acid 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. 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). 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 (see Ross 1990). A site with a high Florida Index score is considered healthy (*i.e.*, many clean-water organisms are present). Excessive numerical dominance of a single type of organism (a high % contribution of dominant taxon) is usually associated with disturbance. A decreased diatom to blue-green algae ratio (calculated by dividing the number of individuals in the Bacillariophyta by the number of individuals in the Bacillariophyta + Cyanophyta) is often indicative of nutrient enriched conditions. The determination of the Quantitative Stability Index (for taxonomic % composition) is a two step process. First, the relative proportions of major taxonomic groups are calculated for each site. Then, the lesser of the two percentages for each discrete taxonomic group is totaled. A QSI (for % composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (for functional feeding groups).

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

The following personnel were involved in this investigation: Pat Fricano and Jim Snitgen (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.

Results

Habitat quality was better at the test site (with 83 points) than at the reference site (scoring 48 points). Water velocity (0.25 m/s) was more favorable at the test site (reference site had no visible flow). Aquatic vegetation and detritus were the major

substrates at the reference site, while snags, leaf packs, and undercut banks were the dominant substrates at the test site. While both stations were fairly shallow (1.5 m deep at the reference site, and 1.0 deep at the test site), the reference site was wider (up to 13 m) than was the test site (up to 7 m). Other habitat attributes were fairly similar between the reference site and the test site, such as bank stability and riparian zone vegetation. Water was acidic at the reference site (5.6 SU's, reflecting the swampy nature of the area) and almost neutral at the test site (6.7 SU's). Conductivity increased from 177 µmhos/cm (reference site) to 219 µmhos/cm (test site). Dissolved oxygen was extremely low at the reference site (0.4 mg/L), probably due to the swampy, stagnant conditions there, or to some other source of organic loading. Dissolved oxygen was also low (3.9 mg/L) at the test site, although much improved compared to the reference site. Dissolved oxygen at both sites was below the Class III water quality standards (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.

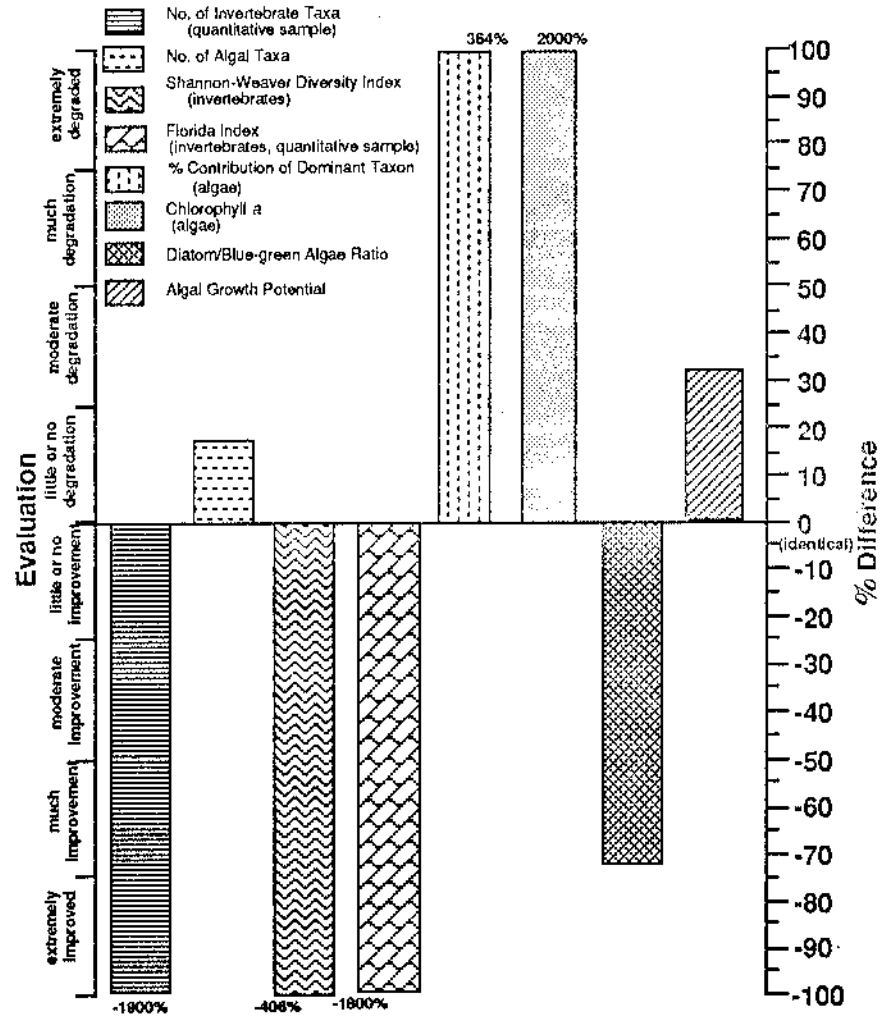
No organic pollutants were detected in the discharge. Iron (14 µg/L) and aluminum (320 µg/L) were measured in the effluent but were well within water quality standards.

While elevated phosphorus levels were associated with this discharge (0.67 mg/L in the effluent and 1.1 at the test site), the reference site (0.65 mg/L) was also elevated. Total phosphorus at the reference and test sites was higher than those concentrations found in 88% and 95%, respectively, of all other Florida streams (see Table of Typical Water Quality Values in Appendix). Ammonia values at all stations were average to below average, and the ammonia in the effluent (0.01 mg/L) was lower than that found at the reference site (0.024 mg/L) or the test site (0.056 mg/L). Nitrate-nitrite was undetected at the test and reference sites. Reference site TKN (1.2 mg/L) was higher than that observed at the test site (0.89 mg/L).

Fluoride levels in the effluent (2.9 mg/L) were within Class III water quality standards.

Algal growth potential (AGP) was elevated at the reference site (11 mg dry wt/L). AGP was slightly higher at the test site (14.6 mg dry wt/L) and highest in the effluent (25.3 mg dry wt/L). All these AGP values were 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).

Quantitative measures of benthic macroinvertebrate community health indicated no degradation resulting from the IMC-Agrico Ft. Green Mine discharge. The figure on this page indicates the degree of difference between the reference and



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

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 this page summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation.

Based on Hester-Dendy samples, macroinvertebrate taxa richness at the reference site (with 2 taxa) was very poor for a Florida stream. Taxa richness increased to 40 taxa at the test site, which is better than 90% of other Florida streams (see Table of Typical Water Quality Values in Appendix). The Florida Index was zero at the reference site, increasing to the value expected for a healthy stream in this part of the state (20 points) at the test site. The reference site community was dominated by *Hyalella azteca* (80% of the total), while the ephemeropteran, *Stenacron interpunctatum*, was most abundant (42% of the total population) at the test site. The QSI for % composition showed that the macroinvertebrate assemblages at the reference and test sites were not very similar. Only the amphipod (*Hyalella azteca)* and one midge were found at the reference site, while the test site had a diverse assemblage of organisms. Shannon-Weaver diversity at the reference site (0.7) was lower than 95% of all other streams in Florida, while diversity at the test site was 3.7, considered to indicate healthy conditions. This further suggests that conditions were more favorable at the test site.

In the dip net collections, the Florida Index increased from 3 at the reference site to 17 at the test site . Pollution sensitive organisms, such as ephemeropterans and trichopterans, were rare at the reference site, but quite common at the test site. Overall, the data suggest that the discharge is beneficial to the receiving water macroinvertebrate populations. The poor biological health at the upstream station may be due to the anoxic, stagnant conditions there.

Some measurements of periphyton community health indicated degradation associated with the discharge. Periphyton taxa richness was decreased by 16.7%, comparing the reference site to the test site. Percent contribution of dominant taxon increased from 16% at the reference site to 74.3% at the test site. The test site was dominated by the diatom *Cocconeis placentula*, which is a well known indicator of eutrophic conditions (EPA 1974). While periphyton chlorophyll *a* was 2000% more at the test site, the free water chlorophyll *a* was about the same at both sites (1.50 and 1.47 µg/L at the reference and test sites respectively). The periphyton diatom/blue green ratio was increased by 73.2% at the test site compared to the reference site, due to the dominance of the diatom *Cocconeis placentula* at the test site. The QSI for algal percent composition indicated moderate similarity between the two sites.

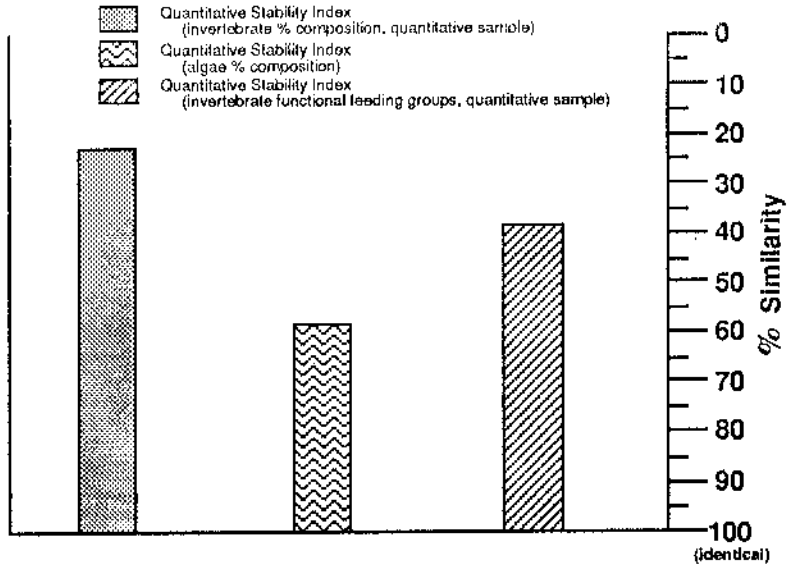
Conclusions

Dissolved oxygen at both the reference site and the test site was below Class III water quality standards (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 (14 µg/L) and aluminum (320 µg/L) were measured in the effluent at levels well within water quality standards.

Total phosphorus at the reference and test sites was higher than those concentrations found in 88%



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

and 95%, respectively, of all other Florida streams. Ammonia values at all stations were average to below average, while nitrate-nitrite was undetected at the test and reference sites. Reference site TKN (1.2 mg/L) was higher than that observed at the test site (0.89 mg/L).

Fluoride levels in the effluent (2.9 mg/L) were within Class III water quality standards.

Algal growth potential at the reference site and test site was approximately two and three times higher, respectively, than the 5 mg dry wt/L "problem threshold".

Measures of benthic macroinvertebrate community health indicated no degradation resulting from the IMC-Agrico Ft. Green Mine discharge. Macroinvertebrate taxa richness, the Florida Index, and Shannon-Weaver diversity were considerably better at the test site than at the reference site. Samples collected with the dip net showed similar trends in Florida Index and community composition. Overall, the data indicate that the discharge was beneficial to the macroinvertebrate population, and that the reference site was of poor quality.

Some measurements of periphyton community health indicated degradation associated with the discharge. The periphyton chlorophyll *a* was 2000% greater at the test site compared with the reference site. Percent contribution of the dominant taxon increased from 16% at the reference site to 74.3% at the test site, due to dominance at the test site by the diatom, *Cocconeis placentula,* an indicator of eutrophy. Abundance of this diatom is also the reason for the increase in the periphyton diatom/blue-green algae ratio at the test site.

Literature Cited

Aquatic Toxicity Information Retrieval Data Base (AQUIRE). 1991. U.S. EPA Environmental Research Laboratory, Duluth, Mn.

United States Environmental Protection Agency. 1974. Environmental Requirements and Pollution Tolerance of Freshwater Diatoms. EPA-670/4-74-005. Office of Research and Development, Cincinnati, Ohio.

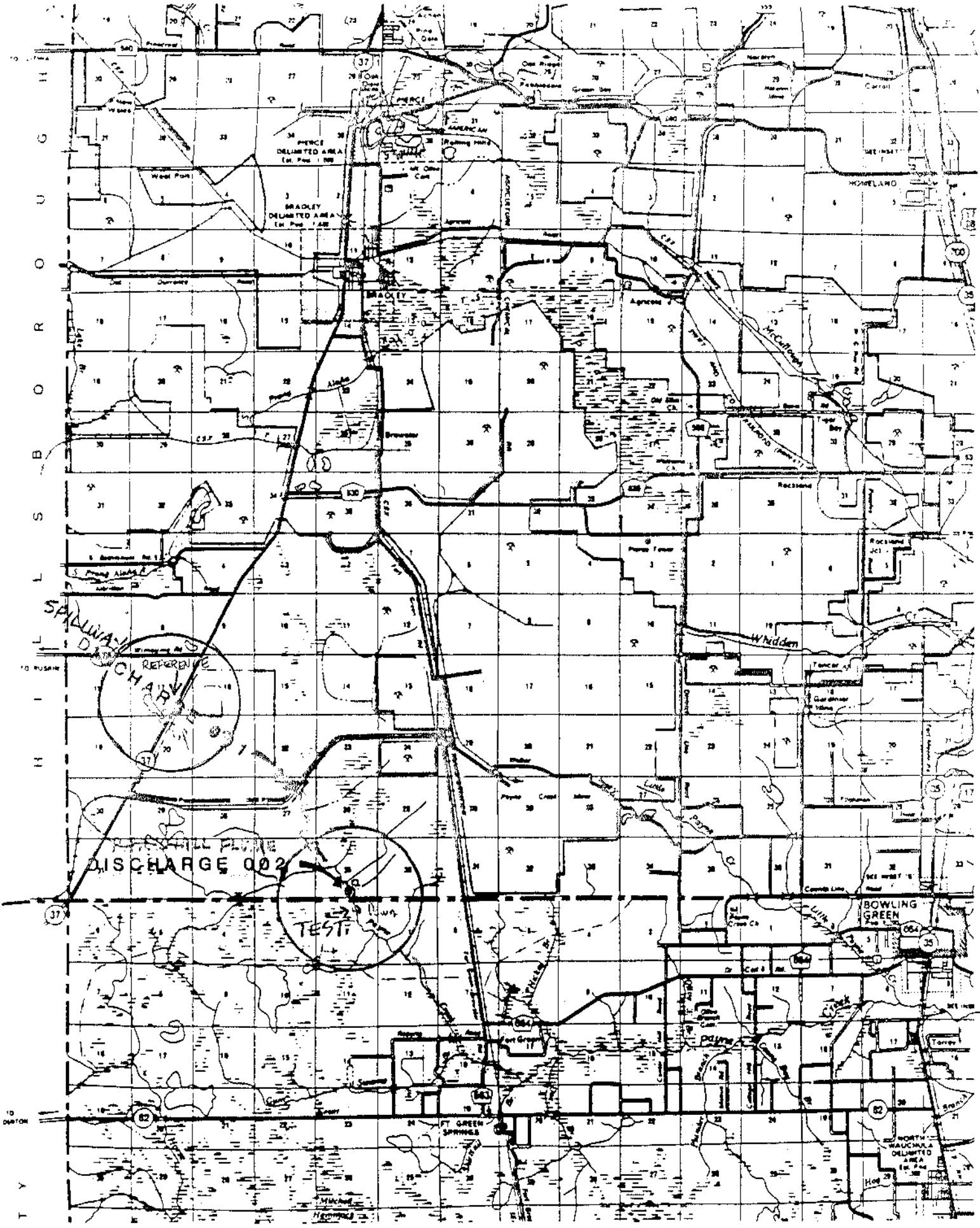
FDER. 1986. Stream impoundments: An investigation of effects on water quality in North Florida. Florida Dept. Environmental Regulation. Biology Section. 360 p.

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.



AGRICO FORT GREEN MINE

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

FACILITY SUMMARY

Facility Name: IMC-AGRICO CO., FT GREEN MINE		Date Summary Prepared: 1-10-92
Location (attach detailed map): Ft Green Mine Rd. Mulberry, FL	County: Polk.	District: Southwest
Federal Permit # FL0002700 and expiration date: 10-31-89	State GMS # and 405317200097 State expiration date: Does-167757 Aug 15, 1994	Facility Type: Industrial ✓ Municipal Federal Agricultural Other (list):

Function of facility: Phosphate ore mining & beneficiation

Description of treatment process:
Settling of clay slimes in above-ground impoundments followed by discharge of clear water through permitted outfalls.

Receiving waters: Payne Creek	Classification: I II (III)	
Design Flow: 7.5 MGD-001 10 MGD-002	Mean Flow: 4-6 MGD-001 6.2 MGD-002	Flow during survey:

Discharge is: Continuous Intermittent Seasonal Rainfall dependent
Other (describe) Dependent on both production rate & rainfall
therefore, the best time to sample is: Summer (June - Sept)

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

NA

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

	Parameter	Limit (units)
1.	Tot. Non-filt Residue (max/ave)	60/30 mg/L
2.	Tot Non-Vol. nonFilt (max/ave) Residue	25/12 mg/L
3.	Total Phosphorus (max/ave)	5/3 mg/L
4.	pH (max/min)	9/6 S.U.

Describe special permit conditions and permit modifications:

Permit was transferred from Agrico Chemical Company to IMC-AGRICO COMPANY on August 19, 1993

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

IMC-AGRICO CO. FT GREEN MINE (Facility)

FACILITY SUMMARY

Description of permitted outfall(s):

Outfall 001 - Spillway structure

Outfall 002 - Parshall Flume

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

- No MOR violations.
- On Sept 1, 1993, there was a berm collapse that resulted in discharge of limited stormwater into the south prong of the Alafia river.

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

- No previous IBI
- No WQBEL performed
- No current enforcement

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

MOR results indicate that the discharge at outfalls 001 & 002 have consistently been well within water quality standards & permit limits for class III surface waters.

Additional information:

—

Staff contributing to this review (signature):

Pat Fricano (Biologist)

James K. Autry (Inspector)

(Engineer)

( )

( )

( )

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: DEP - Tampa	STORET STATION NUMBER:	DATE (M/D/Y): 9/12/93	TIME	RECEIVING BODY OF WATER:

REMARKS: Upper area really more a swampy stream than a lake.	LOCATION: Approx. 1/4 mile - [illegible]	FIELD ID/NAME: [illegible]

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
15	40					45

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 known other than a large created wetland for [illegible] reclamation.

Estimated System Width (range, m): 15	Estimated System Depth (range, m): 1.5	yes
High Water Mark (m above bed): 0.0	Velocity (range, m/s): 0	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: ☐ detritus

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Riffles			
Leaf Packs				Sand			
Aquatic Vegetation	30	14		Mud/Muck/Silt			
Rock or Shell Rubble				Benthic leaf mats			
Undercut Banks/Roots				Other: Detritus	50	6	

WATER QUALITY

	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (µmho/cm):			Secchi (m):
Top		28.6	5.1	6.6				
Mid-depth								
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 + Hot 93+°

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

SAMPLING TEAM: Jim Snitzer, Pat Fricano	SIGNATURE: Pat Fricano	DATE: 9/12/93

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 9/30/93	RECEIVING BODY OF WATER: Payne Creek

REMARKS: Ecosystem Study Mixed with Salinity	LOCATION: Acreage - Ft. Green - Payne Creek	FIELD ID/NAME: Site 2 Upstream

Habitat Parameter / score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 16	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 0	Max. observed: >0.3 m/sec. 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 12	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 9	Stable. No evidence of erosion or bank failure. Little potential for future problems. **9-10 points**	Moderately stable. Infrequent or small areas of erosion, mostly healed over. **6-8 points**	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. **3-5 points**	Unstable. Many raw, eroded areas. Obvious bank sloughing. **0-2 points**
Riparian Zone Vegetation Quality 6	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** 48

COMMENTS: Peripheryton Rock Cyanophyta Salinity. Fish seen were Gambusia. Water was 1 foot higher than last date, also, when H.D.'s were deployed.

ANALYSIS DATE: 9/30/93	ANALYST: Tricano	SIGNATURE: Tricano

→ Note: Payne Creek is really just a swampy slough at this location.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET (Version 4)

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

REMARKS:	LOCATION:	FIELD ID/NAME:

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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):

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

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)				Riffles			
Leaf Packs				Sand			
Aquatic Vegetation				Mud/Muck/Silt			
Rock or Shell Rubble				Benthic leaf mats			
Undercut Banks/Roots				Other:			

WATER QUALITY

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

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

SAMPLING TEAM:	SIGNATURE:	DATE:

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		9/26/03	[illegible]

REMARKS:	LOCATION:	FIELD ID/NAME:
	Augusta - Ft. Green	[illegible]

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover [illegible]	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 10	Max. observed: >0.3 m/sec. 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 [illegible]	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 [illegible]	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 [illegible]	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments		TOTAL SCORE
[illegible]	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	83

COMMENTS: [illegible] - generally buffered (2/3 way in restoration). Creek pretty low. Only forested floodplain is in natural condition.

ANALYSIS DATE:	ANALYST:	SIGNATURE:
9/26/03	[illegible]	

Sample Source: Agrico Chem Ft. Green Mine
Location:
County: POLK
Contact/District: PAT FRICANO SW
NPDES Permit #: FL00 27600 Outfall #:

Sample Collection: Date 9-20-93 Time 1100
Test Beginning: Date 9-21-93 Time 1300
Test Ending: Date 9-23-93 Time 1300
Organism Batch #: 110 Diluent Batch #: 24
Organism Age: <24hrs
Test Organism: Ceriodaphnia dubia

62385 93-SEP-21-25

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

Test Number: 1 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	24.6 @ 24.7	8.3 @ 24.5	1005 @ 1,000 9720 @ 10,000 @ 24.7°
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.4 @ 24.5	8.3 @ 24.5	990 @ 1,000 9590 @ 10,000 @ 24.5°
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.9 @ 24.0	8.4 @ 24.0	1005 @ 1,000 9730 @ 10,000 @ 24.5°

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	A	5	5	5	8.4		8.2	24.1		23.9	8.5		8.3	175		175
Control	B	5	5	5			8.2			23.9			8.2			175
Control	C	5	5	5			8.2			23.9			8.2			175
Control	D	5	5	5			8.2			23.9			8.2			175
100%	A	5	5	5	7.8		8.5	23.7		24.0	6.0		8.5	550		535
100%	B	5	5	5			8.5			24.0			8.5			540
100%	C	5	5	5			8.5			24.0			8.5			545
100%	D	5	5	5			8.9			24.1			8.5			540
Measured/Loaded by:		MT	KP	TM	MF		TM	MF		TM	MF		TM	MF		TM
Recorded by:		MT	KP	TM	TR		TR	TR		TR	TR		TR	TR		TR

Investigators' Signatures

Tonia C. Reder
Marshall Faircloth
Kim Pearce
Tina Mikulski

Reviewer

form updated 7/8/93

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	TR
Alkalinity:	125	70	210	Hach	TR
Hardness:	120	80	80	Hach	TR
Total Ammonia:	<0.017	<0.017	0.05	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -57.6 Ammonia Blank: <0.017 Control Salinity: 10 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Agrico Chem Ft Green Mine
Location:
County: POLK
Contact/District: PAT FRICANO 540
NPDES Permit #: FL0027600 Outfall #:

Sample Collection: Date 9-20-93 Time 1100
Test Beginning: Date 9-21-93 Time 1300
Test Ending: Date 9-23-93 Time 1300
Organism Batch #: 39 Diluent Batch #: [illegible]
Organism Age: 9 days old

Test Organism: Cyprinodon [illegible]

623385 93-3EP-21-25

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	24.6 @ 24.7	8.2 @ 24.5	1005 @ 1,000 9720 @ 10,000 @ 24.7 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	24.4 @ 24.5	8.3 @ 24.5	990 @ 1,000 9590 @ 10,000 @ 24.5 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	23.9 @ 24.0	8.4 @ 24.0	1005 @ 1,000 9730 @ 10,000 @ 24.5 °C

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control A	44	5	5	5	7.8	8.2	8.3	24.1	24.4	24.4	8.2	7.6	7.8	245	250	250
Control B	333	5	5	5	7.8	8.2	8.3			24.4	8.2	7.6	8.0	245	250	250
100% A	891	5	5	5	7.8	8.3	8.4	24.1	24.5	24.4	6.3	6.9	7.9	585	590	590
100% B	15	5	5	5	7.8	8.3	8.4			24.2	6.3	6.9	7.7	585	590	590
Measured/Loaded by:		TR	KP	TM	MF	MF	TM	MF	MF	TM	MF	MF	TM	MF	MF	TM
Recorded by:		MF	KP	TM	TR	TM	TR	TR	TM	TR	TR	TM	TR	TR	TM	TR

Investigators' Signatures

Tobin C. Rader
Marshall Faircloth
Kim Pearce
Ting Mikulski
Reviewer

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	TR
Alkalinity:	125	70	210	Hach	TR
Hardness:	120	80	80	Hach	TR
Total Ammonia:	<0.017	<0.017	0.05	own	MF

Ammonia Meter #98136 Ammonia Meter Slope: -57.6 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 7/8/93

Chemistry summary table for

IMC Agrico Chemical Ft. Green Mine	Effluent	Reference Site	Test Site
Organic Constituents (µg/L)			
None Detected			
Metals (ug/L)			
Aluminum	320		
Arsenic	20 U		
Cadmium	0.08 U		
Copper	5 U		
Chromium	10 U		
Iron	14		
Lead	15 U		
Mercury	0.1 U		
Nickel	5 U		
Zinc	5 U		
Silver	0.05 U		
Nutrients (mg/L)			
Ortho-phosphate	0.52	0.57	0.98 A
Total phosphorus	0.67	0.65	1.1
Ammonia	0.01	0.024 I	0.056
Nitrate+Nitrite	0.07	0.02 U	0.02 U
TKN	1.3	1.2	0.89
Other Parameters			
Habitat Assessment		48	83
D.O. (mg/L)		0.4	3.9
pH (SU's)	7.8	5.6	6.7
Conductivity (umhos/cm)	585	177	219
Temperature (°C)		26.6	26.6
Fluoride (mg/L)	2.9 A		
Sulfate (mg/L)	59		
Bioassay Fish	not toxic		
Bioassay Invertebrate	not toxic		
TSS (mg/L)	6		
TDS (mg/L)	6		
Hardness (mg/L as CaCO3)	84.42		

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

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

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

Typical Values for Selected Parameters in Florida Waters

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

Percentile Distribution

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

Units:

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

Benthic macroinvertebrate taxa list for IMC Agrico - Ft. Green Mine, collected via 20 discrete dip net sweeps in Payne Creek, on 21 October, 1993.

	Reference Site	Test Site
Acarina		
Undetermined oribatid	4	–
Coleoptera		
Dineutus sp.	–	1
Dubiraphia sp.	–	1
Hydrobiomorpha casta	1	–
Hydrovatus sp.	3	–
Scirtes sp.	5	2
Stenelmis sp.	–	5
Suphisellus sp.	3	–
S. puncticollis	6	–
Suphis inflatus	10	–
Undetermined curculionid	1	–
Undetermined coleopteran	1	–
Diptera		
Ablabesmyia sp.	1	–
A. sp. B Epler	1	–
Asheum beckae	–	1
Chaoborus sp.	–	1
Chironomus sp.	1	–
Coquillettidia/Mansonia sp.	15	–
Corynoneura sp.	1	–
Dasyhelia sp.	4	–
Goeldichironomus amazonicus	2	–
G. carus	1	–
G. natans ?	2	–
Larsia decolorata	2	–
Monopelopia boliekae	2	–
Palpomyia grp. sp.	2	–
Pentaneura inconspicua	–	2
Paralauterborniella nigrohalteralis	–	1
Polypedilum convictum grp.	–	1
P. halterale grp.	–	1
P. illinoense	–	1
Psychoda alternata	–	1
Tanytarsus sp. E Epler	1	–
T. sp. F Epler	30	–
Thienemanniella sp.	–	1
Zavreliella marmorata	–	1
Undetermined chironomid	1	–
Undetermined dipteran pupa	5	–
Ephemeroptera		
Baetis propinquus	–	8
Caenis sp.	1	–
C. diminuta	–	1
Stenonema exiguum	–	3
Stenacron interpunctatum	–	2

Gastropoda		
Hebetancyclus excentricus	–	9
Viviparus georgianus	–	2
Undetermined gastropod	4	–
Hemiptera		
Belostoma sp.	1	–
Merragata brunnea	–	1
Mesovelia mulsanti	1	–
Ranatra fusca	1	–
Immature corixid	1	–
Undetermined belostomatid	1	–
Lepidoptera		
Undetermined pyralid	1	1
Undetermined lepidopteran	15	–
Malacostraca		
Amphipoda		
Hyalella azteca	40	7
Decapoda		
Procambarus sp.	–	2
Odonata		
Argia sedula	–	2
Boyeria vinosa	–	1
Erythemis simplicicollis	10	–
Erythrodiplax sp.	1	–
Hagenius brevistylus	–	1
Ischnura sp.	8	1
Undetermined libellulid	2	–
Oligochaeta		
Allonais inaequalis	1	–
Dero digitata	2	–
D. lodeni	1	–
D. pectinata	2	–
D. trifida	13	–
Limnodrilus hoffmeisteri	–	3
Pristina aequiseta	48	–
P. leidyi	79	1
P. synclites	–	2
Tubifex tubifex	1	–
Undetermined enchytraeid	1	1
Undetermined oligochaete	1	–
Pelecypoda		
Corbicula manilensis	–	2
Sphaerium or *Musculium* sp.	–	2
Trichoptera		
Cheumatopsyche sp.	–	8
Hydroptila sp.	–	1
Nectopsyche sp.	–	1
Neotrichia sp.	–	3
Triaenodes sp.	–	1
Total	341	86

Benthic macroinvertebrate taxa list for IMC Agrico - Ft. Green Mine, collected via Hester-Dendy artificial substrates in Payne Creek, on 20 September, 1993. Densities, in number/m^2, represent the mean of three replicates.

	Reference Site	Test Site
Acarina		
Undetermined oribatid	–	1
Coleoptera		
Dineutus sp.	–	4
Dubiraphia sp.	–	3
D. vittata	–	1
Macronychus glabratus	–	8
Microcylloepus pusillus	–	4
Stenelmis sp.	–	6
Diptera		
Ablabesmyia mallochi	–	1
A. rhamphe grp.	–	1
A. sp. B Epler	–	1
Chironomus sp.	–	1
Corynoneura sp.	–	6
Dicrotendipes simpsoni	–	1
Glyptotendipes sp.	1	–
Labrundinia becki	–	1
Parachironomus sp.	–	1
P. monochromus	–	1
Pentaneura inconspicua	–	3
Paralauterborniella nigrohalteralis	–	1
Polypedilum scalaenum grp.	–	3
Stenochironomus sp.	–	6
Tanytarsus sp. E Epler	–	1
Tanytarsus sp. S Epler	–	2
Thienemanniella sp.	–	2
Tribelos fuscicorne	–	17
Tribelos jucundum	–	4
Undetermined chironomid	–	1
Ephemeroptera		
Acerpenna pygmaeus	–	2
Baetis propinquus	–	2
Caenis sp.	–	16
C. diminuta	–	8
Stenacron interpunctatum	–	102
Stenonema exiguum	–	1
Gastropoda		
Hebetancyclus excentricus	–	7
Hirudinea		
Placobdella translucens	–	3

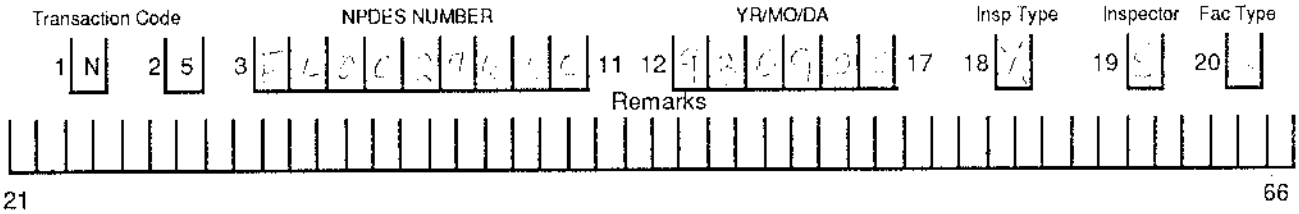
Malacostraca		
Amphipoda		
Gammarus sp.	–	4
Hyalella azteca	4	2
Decapoda		
Procambarus sp.	–	1
Megaloptera		
Corydalus cornutus	–	3
Pelecypoda		
Sphaerium or *Musculium* sp.	–	1
Trichoptera		
Cernotina sp.	–	6
Nyctiophalax sp.	–	1
Oecetis sp.	–	1
Undetermined trichopteran pupa	–	1
Total	5	242

Periphyton taxa list and densities (#/mm^2) for IMC Agrico Co. - Ft. Green Mine, collected via glass microscope slides in Payne Creek, on 20 September, 1993.

	Reference Site	Test Site
Diatoms		
Achnanthes affinis	2	–
Achnanthes exigua	2	67
Achnanthes hungarica	7	2
Achnanthes hustedtii	2	129
Achnanthes linearis	–	2
Achnanthes lanceolata v. *apiculata*	–	9
Achnanthes lanceolata v. *dubia*	–	31
Cocconeis placentula	14	937
Cyclotella meneghiniana	2	7
Cymbella lunata	–	2
Eunotia pectinalis	7	–
Eunotia sp.	–	4
Gomphonema affine	2	–
Gomphonema augur	2	–
Gomphonema parvulum	5	–
Navicula exigua	2	–
Navicula festiva	–	2
Navicula minima	21	–
Navicula pupula	7	–
Navicula confervacea	5	–
Navicula viridula	9	2
Neidium productum	2	–
Nitzschia amphibia	2	–
Nitzschia palea	16	–
Nitzschia romana	2	–
Pinnularia braunii	5	–
Rhopalodia gibba	–	2
Stephanodiscus sp.	–	2
Synedra ulna	–	7
Chlorophyta		
Ankistrodesmus sp.	2	–
Chlamydomonas sp.	–	2
Stigeocolonium sp.	2	7
Volvox sp.	–	2
Unknown chlorophyte flagellate	–	2
Chrysophyta		
Chroomonas sp.	–	2
Cyanophyta		
Aphanocapsa sp.	12	–

Aphanothece sp.	7	–
Arthrospira sp.	2	–
Chroococcus sp.	12	13
Gloeocapsa sp.	9	–
Lyngbya sp.	–	4
Microcystis sp.	16	–
Oscillatoria sp.	34	18
Spirulina sp.	–	2
Euglenophyta		
Euglena sp.	–	2
Phacus sp.	2	–
Total	214	1259

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)

