Biological Assessment of

IMC - Agrico Port Sutton Terminal

Hillsborough

NPDES #FL0000264

Sampled May 2000

December 2001

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan No. 870346G

Department of Environmental Protection

Results of Fifth Year Inspection

Discharger:	IMC - Agrico Port Sutton Terminal
County:	Hillsborough
NPDES Number:	FL0000264
NPDES Permit Expiration Date:	September 11, 2002

Toxics Sampling Inspection **(XSI)**

Date Sampled: 8 May 2000

Results: Nickel (13 µg/L) and zinc (582 µg/L) were detected in the effluent at concentrations that exceeded Class III standards for marine waters (Rules 62-302.530 (45) and (71) FAC, respectively). Elevated levels of cadmium were detected in the sediment samples at the test sites. No organic pollutants were detected in the effluent sample.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: 8 May 2000

Results: The effluent sample was not toxic to *Mysidopsis bahia* and *Menidia beryllina* during the 48 hour static screening bioassay test.

Impact Bioassessment Inspection **(IBI)**

Date Sampled: 8 May 2000

Results: The macroinvertebrate data indicated degradation at test site 1 compared to the control site or test site 2. The community measures were consistently lower at test site 1 compared to the control site; taxa richness declined 33%, polychaete taxa richness declined 29%, and percent Pelecypoda decreased 19%. Diversity was 29% lower at test site 1 compared to the control site and is a violation of the biological integrity criterion (Rule 62-302.530(11) FAC). The elevated levels of nickel and zinc in the effluent as well as elevations in sediment metals and nutrients in the effluent and at the test sites may have contributed to this degradation. The degree to which the facility is responsible for the sediments cannot be readily determined. The phytoplankton community also had somewhat lower taxa richness and diversity values at test site 1 compared to the other study sites.

Water Quality Inspection **(WQI)**

Date Sampled: 8 May 2000

Results: Most *in situ* physical/chemical measures were comparable and complied with Class III water quality standards at the three study sites. Dissolved oxygen was lower at test site 1 (4.9 mg/L) compared to the control site (5.3 mg/L) or test site 2 (5.5 mg/L). Nutrients were low and similar among the study sites. As expected from the nutrient data, algal growth potential values were well below the EPA "problem threshold" of 10.0 mg dry wt/L for marine waters at all three study sites (Ron Raschke, USEPA, pers. comm.). AGP in the effluent sample was 32.1 mg dry wt/L.

Biological assessments are prepared by FDEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions.

Introduction

The IMC-Agrico Port Sutton facility, is engaged in the transfer, storage, and shipping of phosphate rock, phosphate fertilizers, and ammonia. The facility is located in the northeast corner of Hillsborough Bay on the Port Sutton Shipping Channel (see map in Appendix). Phosphate rock and fertilizers enter the facility on trucks and rail cars and are then loaded onto freighters. The ammonia arrives on ships and is transported off-site via pipeline.

Contaminated storm water runoff from the operations is pumped through a series of storm water treatment ponds prior to overflowing into a two-cell detention pond. Contaminated and non-contaminated storm water from the ammonia storage area, scrubber overflow, and bag-house wash area, along with non-contact cooling water, is also routed to the two-cell detention pond. Overflow from this pond is discharged to Port Sutton Shipping Channel, a highly industrial waterway that is connected to Hillsborough Bay. The design flow of the wastewater treatment system is 10.0 MGD. The actual flow during this survey was 3.0 MGD.

Although the facility is required to measure and report several parameters, the only effluent limitations are as follows: fluoride (5.0 mg/L), dissolved oxygen (4.0 mg/L minimum, 5.0 mg/L as a daily average), combined radium (5.0 pCi/L), and pH (6.5 SU to 8.5 SU). The facility has been granted a mixing zone for combined radium (see Facility Summary in Appendix).

There is no record of past permit violations, but in a previous bioassessment report (FDEP 1997), there was an unexplained high level of copper that exceeded Class III marine water quality standards at test site 1.

Methods

The focus of this investigation was to determine the effluent's effects on the receiving waters. A comparison of biological community health was made between a control site and two test sites. The control site was located in a shallow channel just north of, and running parallel to, the Port Sutton Shipping Channel. Test site 1 was located in the Port Sutton Shipping Channel, a few meters west of the discharge. Test site 2 was located a few meters to the east of the discharge (see map in Appendix). A habitat assessment was performed *in situ* to establish comparability between sites, and supplemental physical/chemical data were also collected on the effluent and study sites on May 8, 2000.

The IMC Agrico-Port Sutton effluent was sampled for acute toxicity, metals, organic pesticides and nutrients during this survey. Acute toxicity bioassays, using *Mysidopsis bahia* and *Menidia beryllina* as test organisms, were performed on water samples from effluent discharge. Effluent was also analyzed for nutrients, metals, and organic constituents (base, neutral, and acid extractables, and pesticides). Additionally, nutrient analyses were performed on the control site and test sites 1 and 2.

Benthic macroinvertebrate communities were evaluated at control and test sites. Invertebrates were collected from three replicate petite Ponar grabs that were sieved using a US standard Number 30 sieve and then combined to form one composite sample in the field. Phytoplankton was sampled at both control and test sites. Several different measurements of macroinvertebrate and algal community health were employed to determine the effects of the discharge (see *Explanations of Community Measures* in the Appendix).

Chlorophyll *a* was also determined for the phytoplankton samples. Algal Growth Potential tests, using *Dunaliella tertiolecta* for the marine receiving water sites, followed EPA (1974). Sediment samples from control and test sites were analyzed for grain size and percent organic matter. Field and laboratory methods followed the Bureau of Laboratories Standard Operating Procedures and can be viewed at http://www.floridadep.org/labs/sop/index.htm

The following personnel from the DEP Southwest District were involved in this investigation: Dennis Klemm, Charles Kovach, J. Michel, and Edmund Hughes. Staff from the DEP Central Biology and Chemistry Laboratory in Tallahassee analyzed the samples and data associated with this investigation and prepared the report. The members of the Point Source Studies Review Committee that reviewed this report were; Dr. Wayne Magley, Chuck Ziegmont, Michael Tanski, and District representatives.

Results and Discussion

The test sites and outfall were situated in the highly industrial, dredged, Port Sutton Shipping Channel (see map in Appendix). Test site 1 was located a few meters west of the outfall and test site 2, a few meters east of the outfall. The control site was located in a shallow channel just north of, and running parallel to, the Port Sutton Shipping Channel outfall and test sites (see map in Appendix). The habitat quality at the control site (with 20 points) was somewhat better than that of test site 1 (12 points) or test site 2 (12 points), however all sites were in the "poor" category (see Habitat Assessment Field Data Sheets in Appendix).

Sediment particle sizes at the control site were in general, finer than those at either

test sites 1 or 2 (Table 3). Sixty-nine percent of the control site sample consisted of particles between 0.063 - 0.25 mm in diameter, while the two test sites were composed primarily of particles between 0.25 - 2.0 mm (55% of test site 1 and 49% of test site 2). Results of the sediment chemistry data showed elevations in nearly all metals and nutrients at the test sites compared to the control site (Table 3). When normalized against aluminum, cadimium increased from fairly typical levels at the control site to above the threshold effect level at both test sites (Gail Sloane, FDEP, pers. com.). Phosphate fertilizers are a source of cadmium and may account for the elevated levels at the test sites. These elevated cadmium levels coupled with elevations of other metals, increase the probability for biological effects and may explain some of the impairment in the biological communities at test site 1.

Bottom values for dissolved oxygen (4.9 mg/L – 5.5 mg/L), pH (7.6 SU - 7.8 SU) and salinity (27.3 ppt - 27.6 ppt) were nearly identical among the study sites and complied with Class III marine water quality standards (Table 1).

Nickel (13.0 µg/L) and zinc (582 µg/L) were detected in the effluent sample at concentrations that exceeded the Class III standards (8.3 µg/L for nickel and 86.0 µg/L for zinc) for marine waters (Rules 62-302.530 (45) and (71) FAC, respectively). No organic pollutants were detected in the effluent sample.

The effluent was not acutely toxic to the fish, *Menidia beryllina*, or to the mysid shrimp, *Mysidopsis bahia* in the 48-hour static acute bioassay tests (Appendix).

Ammonia (0.74 mg/L) and total phosphorus (0.16 mg/L) were somewhat elevated in the effluent sample, but were not elevated at the test sites (Table 1). Total phosphorus at the control site (0.20 mg/L), and test sites 1 and 2 (0.18 mg/L and 0.15 mg/L, respectively) were higher than those found in approximately 65% of typical Florida estuaries (see *Typical*

Table 1. Effluent limits and summary of chemistry data.

IMC-Agrico Port Sutton	Effluent Limits	Effluent Samples	Control Site	Test Site 1	Test Site 2
Organic Constituents (µg/L)					
None Detected	-	-	-	-	-
Metals (µg/L)					
Aluminum	1500 **	1800 U	-	-	-
Arsenic	36 **	40 U	-	-	-
Cadmium	9.3 **	0.40 U	-	-	-
Chromium	50 **	7.0 U	-	-	-
Copper	2.9 **	1.5 U	-	-	-
Iron	300 **	100 U	-	-	-
Lead	5.6 **	2.5 U	-	-	-
Magnesium	-	110	-	-	-
Nickel	8.3 **	13	-	-	-
Silver	2.3 **	0.30 U	-	-	-
Zinc	86 **	582	-	-	-
Nutrients (mg/L)					
Ortho-phosphate	-	0.070 J	0.023 I	0.040 I	0.023 I
Total phosphorus	-	0.16	0.20	0.18	0.15
Ammonia	-	0.74	0.010 U	0.018 I	0.010 U
Nitrate+Nitrite	-	0.004 U	0.004 U	0.004 U	0.004 U
TKN	-	1.2	0.64	0.66	0.64
Organic Nitrogen	-	0.46	0.63	0.642	0.63
Total Nitrogen	-	1.204	0.644	0.664	0.644
General Phys-Chem Parameters					
Habitat Assessment	-	-	20	12	12
DO (mg/L) - bottom	4.0 *	4.2	5.3	4.9	5.5
pH (SU) - bottom	6.5-8.5 *	6.5	7.8	7.6	7.7
Salinity (ppt) - bottom	-	30.5	27.5	27.3	27.6
Temperature (°C) - bottom	-	15.0	26.1	28.3	28.4
Hardness (mg $CaCO_3$)	-	750.12	-	-	-
AGP (mg dry wt/L)	-	32.1	0.1	1.7	1.9
Oil And Grease (mg/L)	-	5.0	-	-	-
Combined radium (µg/L)					
Fluoride (mg/L)	≤ 5.0 *	0.33 J	-	-	-
Flow (MGD)	10	3	-	-	-
Turbididty (NTU)	Report	0.9	-	-	-
TSS (mg/L)	Report	33 JQ	-	-	-
Toxicity					
Bioassay - Fish	-	Not Toxic	-	-	-
Bioassay - Invertebrate	-	Not Toxic	-	-	-

A - Value is the mean of two or more determinations
I - Value is < the MQL and ≥ the MDL
J - Estimated value
L - Actual value is known to be greater than value given
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value is the MDL
* Permit Limit
** Class III water quality standard

Table 2. Community structure of control and test sites.

IMC-Agrico Port Sutton	Control Site	Test Site 1	Test Site 2
Macroinvertebrate Quantitative			
Number of Taxa	18	12	17
Number of Individuals	151	135	177
Shannon-Weaver diversity	2.17	1.53	1.94
No. Polychaete Taxa	7	5	8
Community Composition			
% Amphipoda	5.3	0.7	1.1
% Gastropoda	2.7	1.5	1.1
% Pelecypoda	24.5	5.9	15.3
% Polychaeta	63.6	71.9	76.3
% Oligochaeta	0.0	20.0	4.5
% Other	3.9	0.0	2.7
Functional Feeding Groups			
% Browsers-grazers	2.3	0.4	0.6
% Burrowing Deposit Feeders	0.0	20.7	5.7
% Predators/Carnivores	8.0	2.2	8.2
% Scavengers	2.3	0.4	0.9
% Scrapers	2.7	0.7	0.0
% Surface Deposit Feeders	56.6	68.9	68.1
% Suspension Feeders	26.2	6.7	16.7
% Unknown	2.0	0.0	0.0
Phytoplankton Algae			
Number of Taxa	17	13	16
Number Diatom Taxa	14	8	11
Number Algae Taxa	3	5	5
Shannon-Weaver diversity	2.83	2.13	2.57
Chlorophyll *a* (µg/L)	1.0 U	1.0 U	1.0 U
Algal Density (#/mL)	26,712	20,862	23,605
% Blue-green	0.1	0.0	0.0
% Cryptophytes	0.4	0.2	0.3
% Diatoms	99.5	99.5	99.2
% Dinoflagellates	0.0	0.2	0.4
% Green	0.0	1.0	1.0
AGP (mg dry wt/L)	0.1 IA	1.7	2

U - undetected

Values for Selected Parameters in Florida Waters in Appendix). Algal Growth Potential (AGP) values were well below the EPA "problem threshold" of 10.0 mg dry wt/L for marine waters at all three study sites (Ron Raschke, USEPA, pers. comm.). The effluent AGP value was 32.1 mg dry wt/L.

Phytoplankton taxa richness was 24% higher at the control site (with 17 taxa) compared to test site 1 (with 13 taxa). Test site 2, with 16 taxa, was similar to the control site. Diversity was low at all sites, however test site 1 (2.13) was 25% lower than the control site. Diversity at test site 2 (2.57) was 9% lower than the control site. Algal density and chlorophyll *a* were similar among the study sites (Table 2).

All macroinvertebrate community health measures suggested impairment at test site 1 compared to the control site or test site 2 (Table 2). Taxa richness at the control site (18 taxa) and test site 2 (17 taxa) were fairly typical for a Florida estuary (approximately 50% of other estuaries have higher values), however taxa richness at test site 1 (with 12 taxa), was 20% lower than either of these values. Shannon-Weaver diversity at the control site (2.17) was less than 70% of other Florida estuaries, and at test site 1 (1.53) and test site 2 (1.94) it was less than 90% of other typical Florida estuaries. The 29% reduction in diversity between the control site and test site 1 is a violation of the biological integrity criterion (Rule 62-302.530 (11) FAC).

Polychaete taxa richness was highest at test site 2 (8 taxa), slightly lower at the control site (7 taxa) and lowest at test site 1 (5 taxa). A further indication of impairment at test site 1 was the decrease in the percentage of Pelecypods. Pelecypods represented 24.5% of the control site community, 15.3% of the test site 2, and 5.9% of test site 1. Some pollution-sensitive marine taxa, such as *Cyclaspis* sp., and *Eteone* sp., were found only at the control site while other sensitive taxa (*Ampelisca* spp) were found in reduced numbers at test sites 1 and 2. Other taxa known to be tolerant of polluted conditions (*Capitella* sp. and Tubificidae) were found in greater numbers at test site 1 (Farrell 1992). The macroinvertebrate community data consistently indicated degradation at test site 1 compared to test site 2 or the control site. The elevated levels of nickel, zinc, and cadmium may have contributed to this degradation; however, the degree to which the facility is responsible for these alterations versus the highly altered nature of the shipping channel cannot be readily determined.

Literature Cited

American Public Health Assoc., American Water Works Assoc., and Wa-

Table 3. Results of the Sediment Chemistry.

IMC Agrico - Port Sutton	Control Site	Test Site 1	Test Site 2	Percent Difference	
				Cntrl : Test Site 1	Cntrl : Test Site 2
Metals (mg/Kg)					
Aluminum	643 J	4430 J	5630 J	589%	776%
Arsenic	0.79 U	1.8 I	1.6 I	128%	103%
Cadmium	0.056 I	1.80	1.40	3114%	2400%
Calcium	17700 J	127000 J	64800 J	618%	266%
Chromium	2.70	17.50	19.00	548%	604%
Copper	2.3 J	4.00	9.50	74%	313%
Iron_271	789 J	2520 J	3010 J	219%	281%
Lead	3.5 J	6.3 J	8.6 J	80%	146%
Magnesium	669.0	2060.0	2070.0	208%	209%
Nickel	0.75 I	3.9 I	3.7 I	420%	393%
Selenium	1.2 U	0.57 U	0.58 U	-53%	-52%
Silver	0.03 U	0.18	0.41	500%	1267%
Zinc	16 U	28 I	41 I	75%	156%
Nutrients (mg/Kg)					
Ammonia-N	3.5 A	4.20	3.80	20%	9%
NO2NO3-N	0.25 U	0.26 U	0.29 U	4%	16%
N_KJEL_TOT	200 A	340.0	470.0	70%	135%
O-Phosphate-P	2.5 A	3.00	3.30	20%	32%
Total-P	460 J	3100 J	2000 J	574%	335%
Particle Size (%)					
<0.063 mm	7.02	16	22	474%	389%
0.063-0.125 mm	22.3	9.4	15.6	2188%	2160%
0.125-0.25 mm	47.0	19	33	4660%	4630%
0.25-0.5 mm	13.3	23	16.2	1157%	1208%
0.5-2.0 mm	10.3	32	13.2	719%	902%
>2.0 mm	3.0	19	16	-333%	-233%

I - Value reported is < the minimum quantitation limit, and ≥ the minimum detection limit

J - Estimated value

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

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

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

Chang, S., F. W. Steimle, R. N. Reid, S. A. Fromm, V. S. Zdanowicz, and R. A. Pikanowski. 1992. Association of benthic macrofauna with habitat types and quality in the New York Bight. Mar. Ecol. Prog. Ser. 89: 237-251.

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

Environmental Protection Agency. 1974. Marine algal assay procedure: Bottle test. Nat'l Environ. Res. Center, Office of Res. and Dev., U.S. EPA, Corvallis, Oregon. 43 p.

Engle, V. D., J. K. Summers, and G. R. Gaston. 1994. A benthic index of environmental condition of Gulf of Mexico estuaries. Estuaries 17(2): 372-384.

Farrell, D. H. 1992. A community based metric for marine benthos. Fla. Dept. Environ. Reg. SW Dist. Office. Unpublished rept. 15 p.

Hudson, P. L., D. R. Lenat, B. A. Caldwell, and D. Smith. 1990. Chirono-

midae of the Southeastern United States: A checklist of species and notes on biology, distribution, and habitat. U. S. Fish Wildl. Serv., Fish. Wildl. Res. 7. 46 pp.

Lenat, D. R. 1993. A biotic index for the southeastern United States: derivation and list of tolerance values, with criteria for assigning water-quality ratings. J. N. Am. Benthol. Soc. 12(3): 270-290.

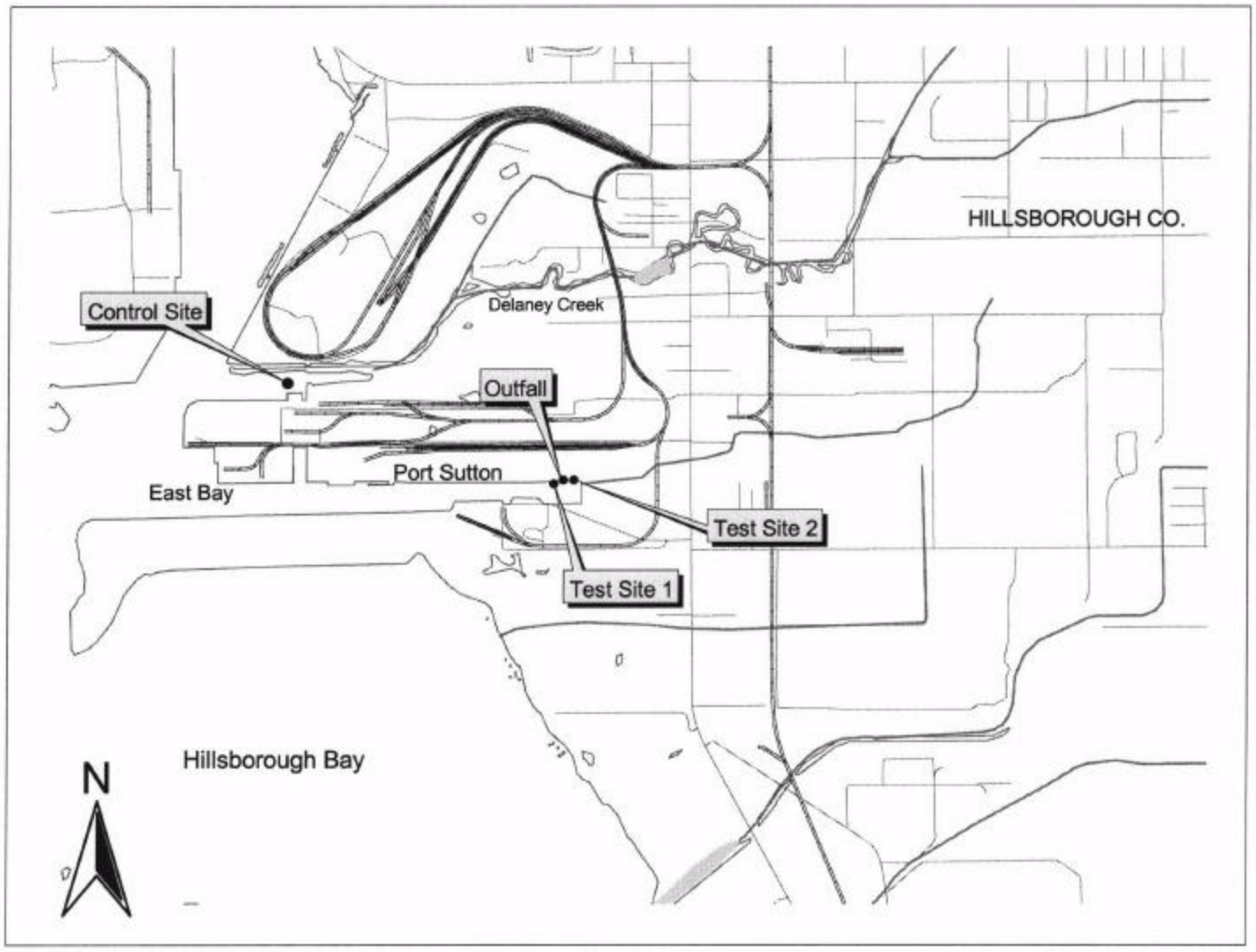
Miller, W. E., T. E. Maloney, and J. C. Greene. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. U. S. Environ. Prot. Agency, EPA-600/9-78-018. 126 p.

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.

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 pp.

Whitmore, T. J. 1989. Florida diatom assemblages as indicators of trophic state and pH. Limnol. Oceanogr. 34(5): 882-895.

IMC Agrico - Port Sutton



0.9 0 0.9 Mile

USGS Roads (24K)
Railroads (24K)
Water Lines
Water Bodies
Water

BoundaryFlorida Counties with Shoreline

Explanation of Measurements of Community Health

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

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

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

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

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

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

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

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

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%
ESTUARIES (690 stations)											
Phytoplankton Chlorophyll *a*	2.14	3.28	4.49	5.13	6.00	6.93	7.94	9.60	12.40	17.60	22.20
Dredge Diversity	1.34	1.53	1.91	2.28	2.56	2.90	3.15	3.59	4.01	4.53	4.98
Dredge Taxa Richness	4.00	6.00	9.00	11.00	15.00	18.50	25.00	35.00	41.00	62.00	90.00
TKN	0.26	0.34	0.42	0.50	0.59	0.69	0.76	0.82	0.95	1.30	1.49
NH3+NH4	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09	0.13	0.22	0.28
NO2-NO3	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.05	0.08	0.17	0.23
Total Phosphorus	0.01	0.02	0.06	0.07	0.10	0.11	0.14	0.17	0.23	0.43	0.59
Ortho-Phosphate	0.01	0.02	0.03	0.04	0.04	0.05	0.07	0.09	0.12	0.21	0.44
Turbidity	3.50	4.00	4.50	5.05	5.40	5.60	6.30	6.80	8.00	11.40	11.75

Units:

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

Pg 1/4

Facility Summary Sheet for FYI-5

Facility Name: IMC-Agrico Nichols Chemical Plant (FL0000264)

Date Summary Prepared: 5/03/00

Location (Attach Detail Map) County: Hillsborough District: SWD

Federal Permit Data and Expiration Date: FL0000264 (expires September 11, 2002)

DEP Permit Data and Expiration Date: same as Federal

Facility Type: Major Industrial

Function of Facility: Warehouse and terminal for phosphate rock and final fertilizer products (diammonium phosphate, mono-ammonium phosphate, granular triple super phosphate, and animal feed ingredients) as well as an unloading, storage, and distribution terminal for anhydrous ammonia.

Description of Treatment Process: Contaminated stormwater runoff from the phosphate rock, fertilizer unloading, storage, and loading areas are pumped through a series of stormwater treatment ponds prior to overflowing into a two-cell detention pond. Contaminated and non-contaminated stormwater along with non-contact cooling water from the ammonia storage area is also routed to the two-cell detention pond. Scrubber underflow water and baghouse wash water is treated with a flocculant prior to being routed to two scrubber settling ponds. Wastewater from the second settling pond is returned to the scrubber for reuse In the event of mechanical failure or excessive rainfall, wastewater from the second settling pond may overflow into the two-cell detention basin. Overflow from the two-cell detention basin is discharged via Outfall 001. In the event of an emergency or upset conditions the permittee may discharge contaminated and non-contaminated stormwater from various areas of the facility via Outfalls S004 and S006.

Receiving Waters: Outfall 001 and the two emergency outfalls (S004 and S006) discharge into the Port Sutton Shipping Channel and then to Hillsborough Bay and Tampa Bay.

Water Classification: III- Marine

Design Flow: >10 mgd Mean Flow: approx. 3.3 mgd Flow During Survey: approx. 3 mgd

Discharge is: [Continuous] Intermittent Seasonal Rainfall Dependent
Other (describe)

Therefore the Best Time to Sample is: any time (continuous discharge)

If the facility has a mixing zone, give details (size, parameters affected, etc.): Combined Radium 226+228 mixing zone, extending as a radius of a semicircle, 122 meters upstream and downstream from the point of discharge from Outfall 001. Sampling is performed monthly at the downstream edge of the mixing zone and the value shall not exceed 5 pCi/l.

List Effluent Limits (If necessary, attached relevant paperwork): See attached [redacted]
Describe special permit conditions and permit modifications: The permit for this facility is currently in the draft phase of a modification for nitrogen reporting requirements. The current nitrogen concentration limits are being changed to report only, with exceedance of the previous limit triggering a report on why the value was exceeded. An annual nitrogen loading value is being incorporated into the permit based upon historical flow and nitrogen concentration data. Phosphate loading reporting is also being added to the permit.

The facility is currently undergoing special toxicity testing procedures and ion-imbalance testing to determine if they can apply for variances and mixing zones for toxicity. The reason for this is the regular failure of the invertebrate portion of the toxicity tests possibly resulting from the use of hypersaline deep-well water as non-contact heating water in the ammonia heat exchangers.

Description of permitted outfall(s): Outfall 001 discharges continuously. Water level and flow are recorded continuously. Outfalls S004 and S006 discharge only in emergency situations.

List permit violations (from MOR data or other source) and plant upsets that occurred within past 3 years: This facility has had numerous toxicity failures (invertebrate only) over the years, and are now performing an ion-imbalance test because the toxicity is suspected to be a result of the ion-imbalance and/or hyper-salinity of the deep-well water used in the ammonia heat exchangers.

On February 11, 2000 a pipeline carrying non-contact ammonia heat exchanger water was ruptured and discharged directly into the shipping channel. No environmental impacts occurred, as the water is the same as that going through the outfall on a continuous basis. The pipeline was repaired and then rebuilt further away from the channel. A warning letter was written and a meeting was held with the facility, but no penalties were assessed.

Describe previous impact bioassessments, WQBELs, and previous or current enforcement actions: See above for previous and current enforcement actions.

Discuss comparability of MOR results to past DEP results and whether there are trends (improving, declining) in the data set: The ongoing toxicity problems are being addressed, and the proper variances/mixing zones will be established if appropriate. Other permit parameters are not showing declining trends.

Additional information:

Staff contributing to this review (signature):

Biologist: Dennis Klemm
Inspector:
Engineer:

I. Effluent Limitations and Monitoring Requirements:

A. Surface Water Discharges

1. During the period beginning on the effective date and lasting through the expiration date of this permit, the permittee is authorized to discharge from Outfall 001 contaminated and uncontaminated storm water along with non-contact heating water from various areas of the facility. Such discharge shall be limited and monitored by the permittee as specified below:

	Discharge Limitations			Monitoring Requirements	
Parameters [units]	**Daily Minimum**	**Monthly Average**	**Daily Maximum**	**Frequency**	**Sample Type**
Flow [MGD]	N/A	Report	Report	Continuous	Recorder
Water Temperature [° C]	N/A	Report	Report	1/ week	Grab
Total Phosphorus as P [mg/l]	N/A	Report	Report	1/ week	24-hr composite
Total Phosphorus Loading as P [lbs./day]	N/A	Report	Report	1/week	Calculation
Total Fluoride as F [mg/l]	N/A	Report	5.0	1/ week	24-hr composite
Dissolved Oxygen [mg/l]	4.0 (see I.A.6)	Report	N/A	1/ week	Grab
Total Nitrogen as N [mg/l] **See I.A.13 and I.A.14**	N/A	Report	Report	1/ week	24-hr composite
Total Nitrogen Loading as N [lbs./day] **See I.A.13 and I.A.14**	N/A	Report	Report	1/week	Calculation
Total Ammonia as N [mg/l]	N/A	Report	Report	1/ week	Grab
Un-ionized Ammonia as NH_3 [mg/l]	N/A	Report	Report	1/ week	Calculation
Specific Conductance [mhos/cm]	N/A	Report	Report	1/ week	Grab
pH [standard units]	6.5	N/A	8.5	1/week	Grab/In-situ
Combined Radium 226 & 228 [pCi/l]	N/A	N/A	5.0 (See I.A.9)	1/ month	Grab
Turbidity [NTU]	N/A	Report	See I.A.12	1/week	Grab
Total Non-volatile, Non-filterable Residue (FS) [mg/l]	N/A	Report	Report	1/ week	24-hr composite
Total Suspended Solids [mg/l]	N/A	Report	Report	1/ week	24-hr composite
Toxicity	See I.A.10 and I.A.11				

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	TIME	RECEIVING BODY OF WATER:
FDEP-PM	24040008	5/8/00	12:05	

REMARKS:	COUNTY:	LOCATION:	FIELD ID/NAME:
	Hillsb.	Channel Just North of Port Sutton Channel	Reference

RIPARIAN ZONE/INSTREAM FEATURES

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

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

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

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

Width of riparian vegetation (m) on least buffered side: 0

List & map dominant vegetation on back

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

Artificially Impounded ☐ yes

High Water Mark: - (m above present water level) + (present depth in m) = (m above bed)

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

m wide

m/s m/s m/s

m deep m deep m deep

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

SEDIMENT/SUBSTRATE

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

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

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

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

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (umho/cm) or (Salinity (ppt)):			Secchi (m):
Top	0.2	27.02	7.87	6.34	27.73			
Mid-depth	2.0	26.09	7.84	5.73	27.69			
Bottom	4.1	26.05	7.82	5.29	27.54			

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

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): ☑ Sea water Clear: ☐ Other: ☐

Weather Conditions/Notes:

Sunny, Breezy

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

SAMPLING TEAM:	SIGNATURE:	DATE:
D. Klemm, C. Kovach, J. Michel, E. Hughes		

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: FDEP - PM	STORET STATION NUMBER: 24040009	DATE (M/D/Y): 5/8/00	TIME: 10:30	RECEIVING BODY OF WATER: Port Sutton Channel

REMARKS:	COUNTY: Hillsb.	LOCATION: Just west of outfall pool	FIELD ID/NAME: Test 1

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
						100%	

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

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

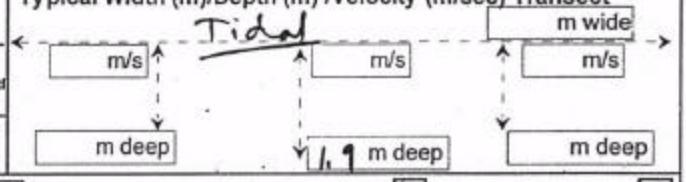
Width of riparian vegetation (m) on least buffered side: 0 — *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: - (m above present water level) + (present depth in m) = (m above bed)

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



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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt	95%		
Aquatic Vegetation				Other:			
Rock or Shell Rubble	5%			Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (umho/cm) or (Salinity (ppt)):			Secchi (m):
Top	0.2	28.37	7.71	5.97	# 27.71			
Mid-depth	1.1	28.39	7.69	5.53	27.79			
Bottom	1.7	28.32	7.62	4.93	27.29			

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

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

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

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

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

Weather Conditions/Notes:

Sunny, breezy

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

SAMPLING TEAM:	SIGNATURE:	DATE:
Dennis Klemm, Charles Kovach, Jason Michel, Julie Hughes		5/8/00

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: FDEP-PM	STORET STATION NUMBER: 24040010	DATE (M/D/Y): 5/8/00	TIME: 11:40	RECEIVING BODY OF WATER: Port Sutton Channel

REMARKS:	COUNTY: Hills.	LOCATION: West East of outfall 001	FIELD ID/NAME: Test 2

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest/Natural	Silviculture	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other (Specify)
						100	

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

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

Width of riparian vegetation (m) on least buffered side: 0 — *List & map dominant vegetation on back*

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

Artificially Impounded ☐ yes

High Water Mark: [-] (m above present water level) + [ ] (present depth in m) = [ ] (m above bed)

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

Tidal

m wide			
m/s	m/s	m/s	
m deep	5.1 m deep	m deep	

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

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types	% coverage	# times sampled	method	Substrate Types	% coverage	# times sampled	method
Woody Debris (Snags)				Sand			
Leaf Packs or Mats				Mud/Muck/Silt	95		
Aquatic Vegetation				Other:			
Rock or Shell Rubble	5			Other:			
Undercut banks/Roots				*Draw aerial view sketch of habitats found in 100 m section*			

WATER QUALITY	Depth (m):	Temp. (°C):	pH (SU):	D.O. (mg/l):	Cond. (umho/cm) or Salinity (ppt):			Secchi (m):
Top	0.2	28.72	7.79	6.24	27.72			
Mid-depth	2.5	28.55	7.76	6.08	27.71			
Bottom	5.1	28.43	7.73	5.52	27.64			

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

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): ☑ Sediment Clear: ☐ Other: ☐

Weather Conditions/Notes:

Sunny, Breezy

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

SAMPLING TEAM:	SIGNATURE:	DATE:
D. Klemm, C. Horvath, J. Michel, E. Hughes		5/8/00

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: FDEP-PM	STORET STATION NUMBER: 24040008	DATE (M/D/Y): 5/8/00	RECEIVING BODY OF WATER: shallow channel just north of Port Sutton C

REMARKS:	LOCATION:	FIELD ID/NAME: Reference

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations 3	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6-8 points**	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed 6	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three communities observed from those listed. **26-37 points**	One community observed from those listed. **13-25 points**	No communities observed from those listed. **0-12 points**
Tidal Fluctuation 3	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations 2	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action 2 ~~3~~ 04	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type 4	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE ~~27~~ 20 04

COMMENTS:

ANALYSIS DATE: 5/8/00	ANALYST: D. Klemm	SIGNATURE: Dem Kl

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: FDEP-EM	STORET STATION NUMBER: 24040009	DATE (M/D/Y): 5/8/00	RECEIVING BODY OF WATER: Port Sutton channel

REMARKS:	LOCATION: Just west of D001	FIELD ID/NAME: Test 1

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations 0	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6-8 points**	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed 3	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three communities observed from those listed. **26-37 points**	One community observed from those listed. **13-25 points**	No communities observed from those listed. **0-12 points**
Tidal Fluctuation 3	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations 1	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action 1	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	—	—	Heavy wave action ~~sometimes present~~ even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type 4	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 12

COMMENTS:

ANALYSIS DATE: 5/8/00	ANALYST: D. Klemm	SIGNATURE: Dan Klemm

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
MARINE BENTHIC HABITAT ASSESSMENT FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME: FDEP - PM	STORET STATION NUMBER: 24040010	DATE (M/D/Y): 5/8/00	RECEIVING BODY OF WATER: Port Sutton Channel

REMARKS:	LOCATION: Just East of D001	FIELD ID/NAME: Test 2

Habitat Parameter / score	Excellent	Good	Fair	Poor
Littoral Alterations 0	None—Unaltered shoreline. **9-10 points**	Mostly natural shoreline, but with occasional riprap. **6-8 points**	Shoreline consisting mostly of riprap and vertical seawalls. **3-5 points**	Shoreline consisting almost entirely of vertical seawalls. **0-2 points**
Community Types Observed 3	At least four communities observed from the following list: mangrove swamp, marsh, oyster bar, grass bed, reef, saltern, natural beach, or tidal creek. **38-50 points**	Two or three communities observed from those listed. **26-37 points**	One community observed from those listed. **13-25 points**	No communities observed from those listed. **0-12 points**
Tidal Fluctuation 3	>0.75 m. **4-5 points**	0.5 - 0.75 m. **3 points**	0.25 - 0.5 m. **2 points**	<0.25 m. **0-1 point**
Freshwater Discharges/ Alterations 1	Only natural runoff.. **9-10 points**	Mostly natural runoff, but with a few, small stormwater sources. **6-8 points**	Considerable stormwater discharge from local roads, parking lots, etc. **3-5 points**	Extensive manmade discharges, especially from canals draining large tracts of land. **0-2 points**
Flow and Wave Action 1	Light to moderate wave action present except under the harshest weather conditions. Flow unrestricted by manmade structures. **9-10 points**	—	—	Heavy wave action sometimes present even during average weather conditions, or flow restricted by manmade structures so that velocities are very high. **0-2 points**
Sediment Type 4	Combination of sand, gravel, and shell. **12-15 points**	Primarily sand, with small areas of mud. **8-11 points**	Mixture of sand and mud, or well-aerated mud only. **4-7 points**	Anaerobic mud. **0-3 points**

TOTAL SCORE 12

COMMENTS:

ANALYSIS DATE: 5/8/00	ANALYST: D Klemm	SIGNATURE:

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Port Sutton
County: HILLSBOROUGH
Contact / District: Maria de la Contra / SW-DIST
NPDES Permit #: FL0000264
LIMS Sample #: 454740 **LIMS Job #:** TZH-2000-05-10-16

Sample Collection: Date 5/9/00 Time 10:30
Test Beginning: Date 5/10/00 Time 14:00
Test Ending: Date 5/12/00 Time 14:00
Organism Batch #: 128 **Diluent Batch #:** NSW
Organism Age: 3 days **SRT toxicant batch #:** —

Test organism: A. bahia

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

Remarks:

1/8/01 * Salinity too low. Readjusted and remeasured. SG

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) 0 hr	Cond. 24 h	Cond. 48 h	Cor. Cond.
Control A	A9	5	5	5	7.7	8.0	8.1	25.2	24.0	24.5	6.2	6.6	6.8	~~41.7~~ *	45.1	48.7	46.1
B	A10	5	5	5	7.7	8.0	8.1	25.3	24.2	24.1	6.2	6.6	7.0	~~42.3~~	45.1	46.6	46.4
C	A11	5	5	5	7.7	8.0	8.1	25.2	24.3	24.1	6.3	6.6	6.9	~~42.3~~	44.9	46.5	46.7
D	A12	5	5	5	7.7	8.0	8.1	25.3	24.3	24.9	6.2	6.6	6.9	~~42.3~~	45.0	47.0	46.5
100% A	A13	5	5	4 1m	7.0	7.8	8.1	25.2	24.4	24.9	5.2	6.4	6.7	49.1	47.8	50.9	
B	A14	5	4 1m	4 1D	7.0	7.8	8.1	25.1	24.6	25.4	5.2	6.4	6.9	49.2	49.3	51.6	
C	A15	5	5	4 1D	7.0	7.9	8.1	25.0	23.9	24.6	5.3	6.6	6.8	49.2	49.7	51.5	
D	A16	5	5	5	7.0	7.8	8.1	25.0	24.2	24.0	5.3	6.7	6.8	49.1	48.6	50.1	
measured by:		KL	SG	KL	SG	KV	DPH	SG	KV	DPH	SG	KV	DPH	SG	KL	DPH	
recorded by:		SG	SG	KL	SG	SG	KL	SG	SG	KL	SG	SG	KL	SG	SG	KL	

FO = further observation

Investigators' Signatures

Shannon Gerard
Marshall Sawtelle
K P L[illegible]

Temperature Range °C
Incubator #3 25.0°-25.5°C
Room B246 25.5°-28.0°C

	(Salt Water) / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl_2 (mg/L):	[redacted]	[redacted]	N/A	N/A	N/A	SG
Lab Total Residual Cl_2 (mg/L):	<0.03		<0.03	DR100	SG	SG
Alkalinity (mg/L as $CaCO_3$):	131		232	Hach	SG	SG
Hardness (mg/L as $CaCO_3$):	—		—	Hach	—	—
Total ammonia (mg/L as N):	<0.068		0.480	Power	MF	MF
Salinity:	≈30		≈33	YSI	SG	SG

Water Quality Parameters

A H Wolf
reviewer

form updated 3/3/99

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Port Sutton
County: HILLSBOROUGH
Contact / District: Maria de la Cordera / SW-DIST
NPDES Permit #: FL0000264
LIMS Sample #: 454740 **LIMS Job #:** TIH-2000-05-10-16
sample log
Test Type: ~~Screening~~ | Definitive
Static | Static Renewal | Flow-through
Test Number: 1 of 2

Sample Collection: Date 5/9/00 Time 10:30
Test Beginning: Date 5/10/00 Time 14:15
Test Ending: Date 5/12/00 Time 14:00
Organism Batch #: 17 **Diluent Batch #:** NSW
Organism Age: 13 days SRT toxicant batch #: —
Test organism: M. beryllina

Remarks: 1/8/01 ⑥ * Salinity too low. Readjusted and remeasured. SG

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) 0 hr	Cond. 24 h	Cond. 48 h	* 0 hr Cond.
Control A	A1	5	5	5	7.7	7.9	8.0	25.3	25.1	24.3	6.0	6.2	6.5	* ~~41.8~~	44.7	45.6	46.4
B	A2	5	5	5	7.7	8.0	8.0	25.3	25.4	24.2	6.2	6.2	6.6	~~42.3~~	45.0	46.2	46.6
C	A3	5	5	5	7.7	8.0	8.0	25.2	25.4	24.5	6.2	6.2	6.6	~~42.1~~	45.4	47.0	46.6
D	A4	5	5	5	7.7	8.0	8.0	25.3	24.5	24.4	6.3	6.3	6.6	~~42.0~~	44.8	46.9	46.4
100% A	A5	5	5	5	7.0	7.8	8.1	25.2	24.7	25.2	5.2	6.3	6.8	48.9	46.5	50.8	
B	A6	5	5	5	7.0	7.8	8.1	25.1	24.5	25.6	5.3	6.3	6.6	49.2	48.8	53.3	
C	A7	5	5	5	7.0	7.8	8.1	25.0	24.3	25.0	5.2	6.4	6.4	48.8	48.7	50.9	
D	A8	5	5	5	7.0	7.8	8.1	25.1	24.9	24.5	5.2	6.3	6.5	49.0	49.0	50.7	
measured by:		SG	KL	KL	SG	KL	DPH ~~KK~~	SG	KL	SG	DPH	KL	DPH	SG	KL	DPH	
recorded by:		KL	KL	KL	SG	SG	KL	SG	SG	SG	KL	SG	KL	SG	SG	KL	

FC further chlorination

Investigators' Signatures
Shannon Gerard
Marshall Faircloth
[signature]

Temperature Range °C
Incubator # 3 25.0–25.5°C
Room B246 25.5–28.0°C

Water Quality Parameters

	Salt Water (circled) / Well Water	20% Min Water	Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L):	[redacted]		N/A	MA	N/A	N/A
Lab Total Residual Cl2 (mg/L):	<0.03	/	<0.03	DR100	SG	SG
Alkalinity (mg/L as $CaCO_3$):	131	/	232	Hach	SG	SG
Hardness (mg/L as $CaCO_3$):	—	/	—	Hach	—	—
Total ammonia (mg/L as N):	<0.058	/	0.480	Denver	MF	MF
Salinity:	≈30	/	≈33	YSI	SG	SG

S H Wolfe
reviewer form updated 3/3/99

Phytoplankton taxa and densities (#/mL) for IMC Agrico Port Sutton, collected via subsurface grabs in the Port Sutton Terminal Channel on 8 May 2000.

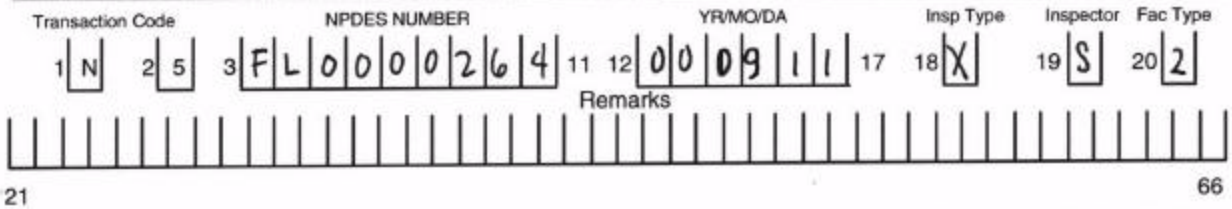
Taxon	Control Site	Test Site 1	Test Site 2
Bacillariophyceace			
Amphora sp.	-	522	-
Asterionella glacialis	45	-	45
Attheya sp.	68	45	-
Bacillaria paradoxa	431	-	-
Chaetoceros sp.	2041	454	1769
Cyclotella sp.	3810	5261	3107
Cylindrotheca closterium	159	-	159
Diploneis bombus	431	-	-
Diploneis oblongella	839	-	-
Fragilaria sp.	-	-	1156
Leptocylindrus minimus	340	-	68
Navicula sp.	-	-	385
Nitzschia reversa	-	-	385
Nitzschia sp.	2109	2630	2336
Pennales	3401	-	2336
Rhizosolenia sp.	23	-	23
Skeletonema costatum	10340	9728	9342
Synedra delicatissima	-	-	1156
Synedra sp.	1701	1587	1156
Chlorophyceae			
Chlorella sp.	-	23	23
Cryptophyceae			
Chroomonas sp.	45	23	45
Cryptomonas sp.	68	23	23
Cyanophyceae			
Oscillatoria sp.	23	-	-
Dinophyceae			
Goniodomataceae	-	23	45
Procentrum sp.	-	23	45

Benthic Macroinvertebrate taxa list for IMC Agrico Port Sutton, collected via three composite Ponar grab samples per sampling site in the Port Sutton Terminal Channel, on 8 May, 2000. Densities, in number/m^2.

Taxon	Control Site	Test Site 1	Test Site 2
Actiniaria			
Undetermined Actiniaria	28	-	-
Amphipoda			
Ampelisca sp.	56	14	28
Cerapus sp.	42	-	-
Monocorophium sp.	14	-	-
Cumacea			
Cyclaspis sp.	14	-	-
Oxyurostylis sp.	14	-	-
Decapoda			
Pinnixa sp.	-	-	28
Gastropoda			
Acteocina canaliculata	42	-	-
Crepidula sp.	-	14	14
Haminoeidae	-	-	14
Nassarius vibex	-	14	-
Natica sp.	14	-	-
Nemertea			
Undetermined Nemertea	28	-	-
Oligochaeta			
Tubificidae	-	375	111
Ophiuroida			
Undetermined Ophiuroida	-	-	14
Pelecypoda			
Amygdalum papyrium	-	14	42
Mactridae	14	-	-
Sphenia antillensis	-	-	14
Sphenia sp.	-	14	-
Tellina sp.	500	28	-
Tellinidae	-	-	319
Undetermined Pelecypoda	-	56	-
Polychaeta			
Capitellidae	-	14	28
Cirratulidae	1181	1292	1653
Eteone sp.	14	-	-
Eumida sanguinea	-	-	14
Genetyllis sp.	14	-	-
Glycera sp.	-	-	28

Glycinde solitaria	-	-	56
Glycinde sp.	-	14	-
Goniadidae	69	-	-
Hesionidae	-	14	-
Lumbrineris sp.	28	-	28
Lysidice sp.	-	14	-
Micronephthys minuta	14	-	-
Minuspio sp.	14	-	-
Paranaitis sp.	-	-	56
Sigalionidae	-	-	14

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)