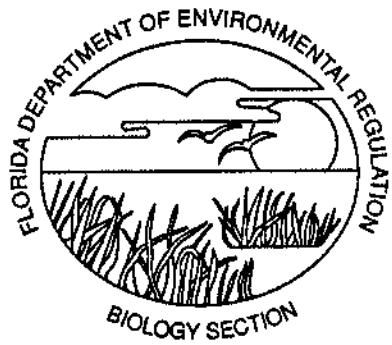


Biological Assessment of

S.O. Purdom Electric Generating Plant

Wakulla County, Florida

NPDES #FL0025526

Sampled August 21, 1990

November 1990

Biology Section
Division of Administrative and Technical Services

Introduction

The Tallahassee S. O. Purdom Electric Generating Plant is located on the St. Marks River in Wakulla County. This facility is a steam turbine (oil fired) electric generating station that discharges pre-treated wastewater into the St. Marks River. Sources of discharge include boiler blowdown, air preheater wash and other minor process streams, as well as condenser cooling water and dimineralized wastewater. The permit limitations are as follows:

Parameter	Mean *	Maximum
Temperature	32.2 C	35 C
TSS	30 mg/l	100 mg/l

*monthly average

All wastewaters other than non-contact cooling water enter the wastewater treatment pond. The water is pumped into a treatment tank for lime addition, neutralization, and metal removal. Discharge from the tank flows back into the pond for settling and pH adjustments. Pond water is discharged into the inlet sump and circulated back through condensers before discharge at the outfall. The remaining wastewater discharge at another outfall consists of dimineralizer effluent from cooling water units. The plant's discharge design capacity is 198.4 MGD. It is reported that 21.6% of the St. Marks River flow is utilized as coolant.

In November, 1985 the DER Biology Section performed two 48 hour static screening tests on a sample of the cooling water. The sample was not toxic to test organisms, *Daphnia pulex* or *Notropis leedsi*. Results of inspections conducted on September, 1988 and March, 1989, indicated that effluent permit limits were being satisfied.

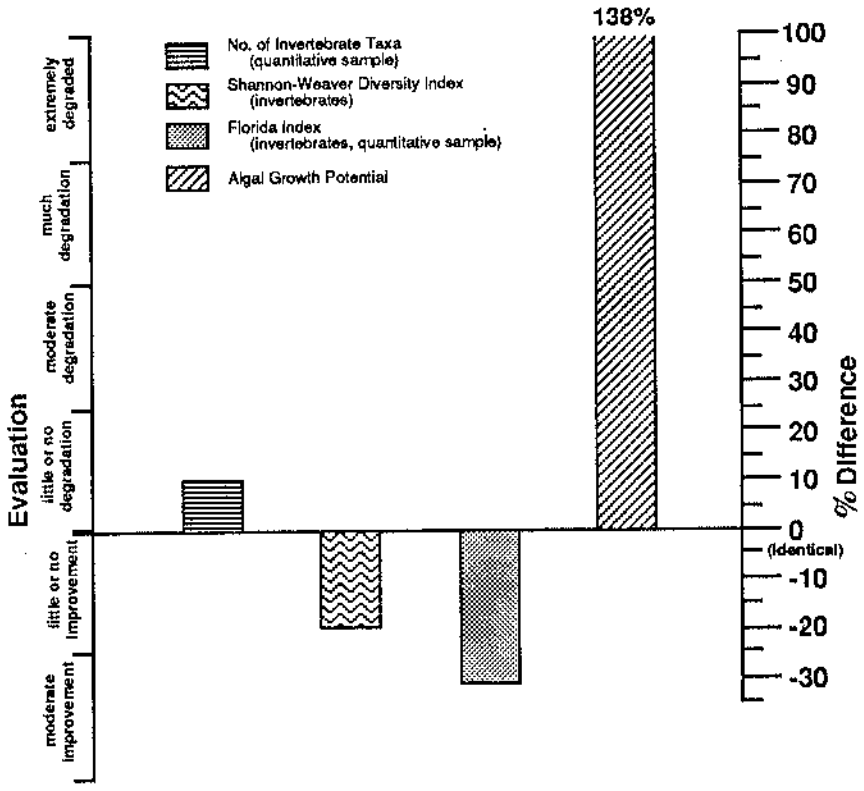
In October, 1989 the boiler water discharge was contaminated when the incorrect surfactants (polyoxyethylene and polyoxypropylene) were added. The contaminated cooling water was removed as soon as the problem was identified. No toxicity was observed at that time.

Methods

The focus of this investigation was to determine the discharger's effects on the receiving waters. A comparison of biological community health was made between a control site (located in the St.Marks River upstream of the discharge) and a test

Major characteristics of community structure of control and test sites.

	Control Site	Test Site
Macroinvertebrate Qualitative		
Number of Taxa	47	40
Florida Index	10	14
% Contribution of Dominant Taxon	33.6	33.6
% Gastropoda	33.6	46.8
% Malacostraca	51.1	27.8
% Diptera	6.8	17.8
% Odonata	1.2	2.2
% Ephemeroptera	1.7	0
% Trichoptera	1.0	0.8
% Other	4.6	4.6
% Predators	5.2	6.2
% Collector-Gatherers	54.7	34.1
% Collector-Filterers	1.8	3.3
% Scrapers	35.7	47.1
% Shredders	2.0	9.3
% Parasites	0.4	0
Macroinvertebrate Hester-Dendy		
Number of Taxa	20	18
Florida Index	5	6
Shannon-Weaver Diversity	1.3	1.7
% Thoracica	81.4	71
% Gastropoda	7	12.9
% Malacostraca	8.7	11.6
% Diptera	2.3	3.7
%Pelecypoda	0.3	0.2
% Other	0.3	0.6
% Predators	0.6	1.1
% Collector-Gatherers	10	14.7
% Collector-Filterers	82	71.1
% Scrapers	7	13
% Shredders	0.4	0
Algal Growth Potential (mg dry wt/l)	2.1	5.0



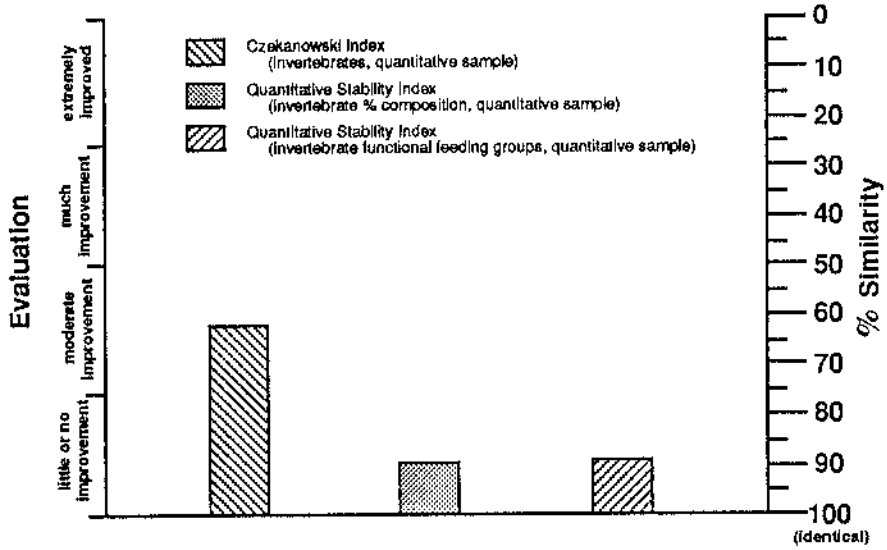
Effect of discharge on receiving stream
(measured as difference between control and test sites).

site (in the St. Marks River downstream of the discharge). A habitat assessment was performed *in situ* to establish comparability between sites (Appendix). Supplemental physical/chemical data were also collected on the effluent and study sites (Appendix). Acute screening toxicity tests using *Ceriodaphnia dubia* and *Notropis leedsi* as test organisms were performed on an effluent sample (Peltier and Weber 1985, FDER 1985). The effluent was also analyzed for organic constituents (base neutral, acid extractables, and pesticide extractables), metals, and nutrients. Methods used for all chemical analyses are on file at the Central DER Chemistry Laboratory.

Benthic macroinvertebrate communities were evaluated at reference and test sites. Collection methods consisted of a timed (one hour per site) multi-substrate (e.g., snags, vegetation, sediment) semi-quantitative effort. Additional invertebrate collections were accomplished using Hester-Dendy multiplate samplers which were incubated for 28 days (Ross 1990). Bacterial populations were analyzed for total and fecal coliform according to APHA (1989). 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 community health have been employed. Many of these, such as the number of taxa and Shannon-Weaver Diversity Index, 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). Czekanowski's Similarity Index is a multivariate ordination procedure which compares organism abundance and taxonomic structure between sites. The determination of the Quantitative Similarity Index (for taxonomic % contribution) is a



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

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 (% composition) of 100% means that the two sites being compared are identical. This same type of procedure is used for calculating the QSI (functional feeding groups).

For graphical purposes, the percent differences between the reference and test sites involving the number of taxa, the diversity index, and the Florida Index are measured as the control site minus test site divided by the control site. The percent differences between sites involving algal growth potential are measured as the test site minus control site divided by the control site.

Results and Discussion

Habitat quality at the test site (Habitat Score = 75) was comparable to that of the upstream control site (Habitat Score = 82, Appendix). Water at both sites was characteristic of Floridan aquifer dominated stream systems with clear, slightly basic (pH = 7.9) water. Dissolved oxygen was adequate at both sites (above 5 mg/l), but conductivity was slightly higher below the discharge (control site = 275 μmhos/cm², test site = 300 μmhos/cm²).

All effluent organic and metal constituents determined from a single grab sample were below detection limits (Appendix). Slightly elevated concentrations of phosphorus, but not bioreactive nitrogen, were found in the effluent (orthophosphate = 0.08 mg/l, total phosphorus = 0.17 mg/l, Appendix). These phosphorus levels undoubtedly contributed to the 138% increase in algal growth potential observed between the control and test sites (see Table). While not exceedingly high, the 5.0 mg/l of algal standing crop produced by water collected at the test site is equivalent to the AGP problem threshold level. Raschke and Schultz (1987) report that when AGP exceeds 5.0 mg/l, the likelihood of algal blooms and their environmental consequences (e.g., low D.O., fish kills) are significantly increased.

Fecal coliform levels were within Class III standards at both the control (150 colonies/100 ml) and test sites (100 colonies/100 ml). However, total coliform levels exceeded Class III standards at the control site (3,100 organisms/100 ml) but were within limits downstream of the discharge (1,100 organisms/100 ml).

The treated wastewater did not cause mortality to either the fish, *Notropis leedsi*, or the invertebrate, *Ceriodaphnia dubia*, in 48 hour static acute toxicity tests (Appendix).

Measures of macroinvertebrate health indicated that the discharge was not adversely affecting this community (see Table and Figures). The upper left figure indicates the degree of difference between the control and test sites. Larger differences (that is, higher percentages) correspond with greater degrees of degradation. Negative values mean that the test site is better than the control. The lower right figure summarizes similarities between the sites. Smaller similarities (lower percentages) generally correspond with greater degradation. In this case, though, the smaller similarities observed between the control and test sites are indicative of moderate improvement. While there was a slight decrease in the number of taxa below the discharge, both the Florida Index and Shannon-Weaver Diversity Index showed modest increases. Diversity was lower than anticipated at both sites due to the colonization of the barnacle, *Balanus improvisus*, in relatively high numbers. The Quantitative Stability Indices for both community composition and functional feeding groups showed that the test site was similar to the control. There was a smaller degree of similarity using Czekanowski's Index, most likely due to the greater number of individuals (predominantly barnacles) recovered from the control site. This is probably a sampling artifact, which is related to the use of Hester-Dendy samplers in close proximity to estuarine waters.

Conclusions

The discharge from the Purdom Electric Generating Plant was found to have few negative effects on the receiving waters, which possessed healthy biological communities. The treated wastewater was not acutely toxic, nor were deleterious levels of priority pollutants found. Phosphorus in the effluent contributed to an increase in the algal growth potential observed downstream of the discharge. The AGP measured below the discharge is considered to be at a threshold, above which algal blooms and their negative consequences are more likely to occur.

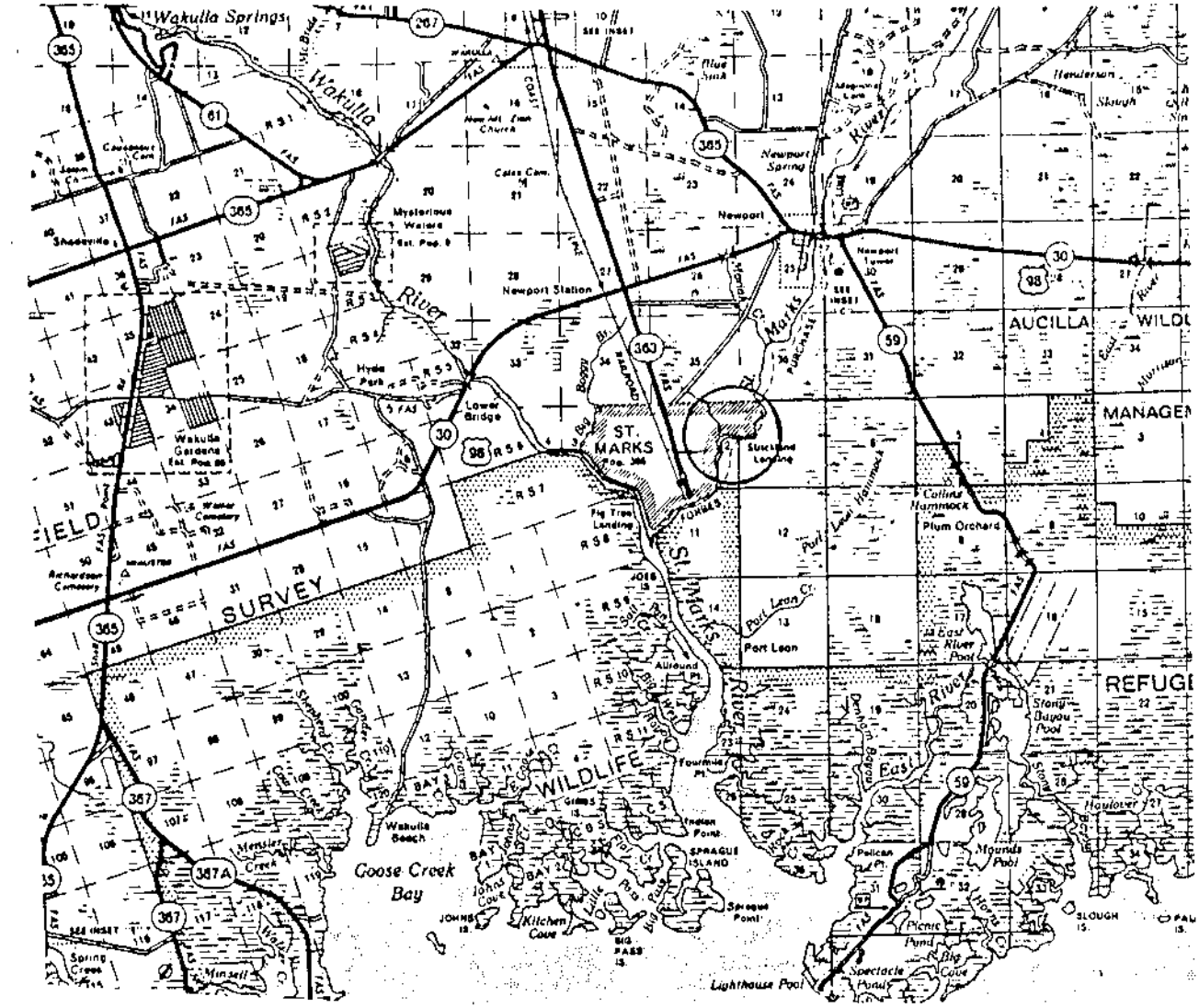
Literature Cited

American Public Health Assoc., American Water Works Assoc., and Water Pollution Control Federation. 1989. Standard Methods for the Examination of Water and Wastewater, 17th ed. New York, N.Y. 1268 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.



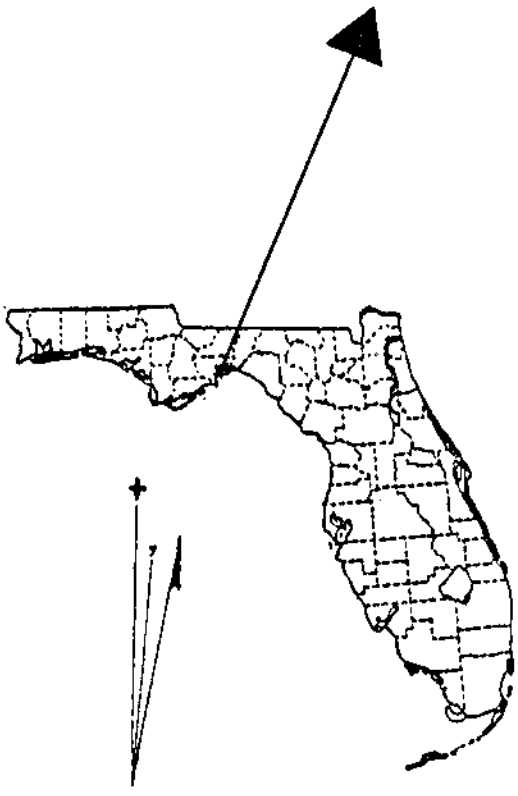


Figure 1. Portions of St. Marks, Wakulla County, Florida, including location of Purdom Power Plant.

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:
		8/21/90	St Marks River

REMARKS:	LOCATION:	FIELD ID/NAME:
Dredging tide	Talla. S.O. Purdom Plant	001 UPSTREAM

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 20	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 23	Max. observed; >0.3 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 **0-7 points**
Artificial Channel/ Flow Alteration 15	No artificial channelization. Little activity (impervious surface) in watershed which would cause scouring during spates. **12-15 points**	—	—	Artificially channelized, or scouring present during spates because of excess impervious surface in watershed. **0-3 points**
Bank Stability 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 10	Over 80% of streambank surfaces consist of native plants, classified as: bottomland hardwoods, understory shrubs, or non-woody macrophytes. **9-10 points**	50% to 80% of riparian zone is vegetated, but one class of plants is not represented. **6-8 points**	25% to 50% of riparian zone is vegetated, but one or two classes of plants are not represented. **3-5 points**	Less than 25% of streambank surfaces are vegetated. Poor plant community (e.g. grass monoculture) present. **0-2 points**

Adjustments		TOTAL SCORE
5	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	92

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8/21/90	K. LURDING	

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): 8/21/90	RECEIVING BODY OF WATER: St. [illegible]

REMARKS:	LOCATION:	FIELD ID/NAME:
Tidally Influenced	Purdom Plant downstream	002 DOWNSTREAM

Habitat Parameter score	Excellent	Good	Fair	Poor
Bottom Substrate/ Available Cover 20	Greater than 40% snags, logs, tree roots, emergent vegetation, leaf packs, undercut banks, rubble, or other stable habitat. **23-30 points**	20% to 40% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Adequate habitat. **16-22 points**	5% to 20% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Less than desirable habitat. **8-15 points**	Less than 5% snags, logs, tree roots, emergent vegetation, leaf packs, etc. Lack of habitat is obvious. **0-7 points**
Water Velocity 25	Max. observed; >0.3 m/sec. **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 **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 7	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		TOTAL SCORE
5	Add **5 points** if cross-sectional area of flow is estimated to be greater than one square meter during periods of normal flow.	73

COMMENTS:

ANALYSIS DATE:	ANALYST:	SIGNATURE:
8-21-90	R. FRYDENBORG	[signature]

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		8/21/90	St Marks River 9:15 AM

REMARKS:	LOCATION:	FIELD ID/NAME:
Tide going out	upstream Tallahassee So. Purdom Plant	001 - UPSTREAM

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
70%					20%	10% Swamp

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

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

Point-Source Pollution (list location and describe): Seminole Asphalt just above Purdom. Upstream of pt. source just above from Seminole NPS

Estimated Stream Width (range, m):	30	Estimated Stream Depth (range, m):	2.8	yes
High Water Mark (Tidal) (m above bed):	.5	Velocity (range, m/s):	0.3	Impounded ☐ Channelized ☐

Canopy Cover % (check box): Open: ☑ Lightly Shaded: ☑ 5-10% Moderately Shaded: ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

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

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

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

Substrate Types (estimated % surface coverage):

Limestone: ✓	20%	Sand/Silt/Clay Mix:	
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell		Coarse Organic Debris:	5%
Sand:		Mud/Muck (organic): ✓	75%

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):	
Top	21.0	6.0	Secchi Depth (m): Bottom 2.8
Mid-depth	20.5	5.8	pH (SU): 7.1
Bottom	21.0	5.6	Conductivity (µmho/cm): Surface 37
			Other Parameters:

Stream Type (check box): Blackwater: ☐ Deep Aquifer Fed: ☐ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☐

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

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

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

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

Weather Conditions: Recent rainy

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

ANALYSIS DATE:	ANALYST:	SIGNATURE:
		Russell Anderson

11:00 AM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD DATA SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y):	RECEIVING BODY OF WATER:
		8/21/90	St. Marks River

REMARKS:	LOCATION:	FIELD ID/NAME:
Rip-rap on west bank	Tallahassee S.O. Power Plant Downstream	002 - DOWNSTREAM

RIPARIAN ZONE/INSTREAM FEATURES

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

Forest	Field/Pasture	Agricultural	Residential	Commercial	Industrial	Other
50					40	10%

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

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

Point-Source Pollution (list location and describe):
Cooling water from plant

Estimated Stream Width (range, m):	30	Estimated Stream Depth (range, m):	4.1	yes
High Water Mark (m above bed):		Velocity (range, m/s):	0.35	Impounded ☐ Channelized ☐

Canopy Cover % (check box): Open: ☑ Lightly Shaded: ☐ Moderately Shaded: ☐ Heavily Shaded: ☐

SEDIMENT/SUBSTRATE

Sediment Odors: Normal: ☐ Sewage: ☐ Petroleum: ☐ Chemical: ☐ Anaerobic: ☑ Other: ☐ H2S

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

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

Substrate Types (estimated % surface coverage):

Limestone:	20%	Sand/Silt/Clay Mix:	
Consolidated Clay:		Clay/Silt (inorganic):	
Gravel/Shell		Coarse Organic Debris:	10%
Sand:		Mud/Muck (organic):	70%

WATER QUALITY

	Temp. (°C):	D.O. (mg/l):		
Top	23°	5.4	Secchi Depth (m): > bottom	4.1
Mid-depth	22	5.2	pH (SU):	6.0
Bottom	21.5	5.0	Conductivity (µmho/cm): bottom	340
			Other Parameters:	

Stream Type (check box): Blackwater: ☐ Deep Aquifer Fed: ☑ Surficial Aquifer Fed: ☐ Alluvial: ☐ Other: ☐

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

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

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

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

Weather Conditions:
Cloudy, then raining

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

ANALYSIS DATE:	ANALYST:	SIGNATURE:
		[illegible]

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

2846 Industrial Plaza Drive • Tallahassee, FL 32301 • (904) 878-3994 • Fax (904) 878-9504

LOG NO: T0-08431

Received: 22 AUG 90

Dr. Yuh-Hsu Pan
DER-Chemistry Section
2600 Blairstone Road
Tallahassee, Florida 32399-2400

Ross Wydenkorg
Project: T089/County Auto Ranch

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
08431-3	#3350	Client
08431-4	#3351	

PARAMETER	08431-3	08431-4
BN-A Extractables (625)		
Acenaphthene, ug/l	<10	<10
Acenaphthylene, ug/l	<10	<10
Anthracene, ug/l	<10	<10
Aldrin, ug/l	<10	<10
Benzo(a)Anthracene, ug/l	<10	<10
Benzo(b)fluoranthene, ug/l	<10	<10
Benzo (b,k) Fluoranthene, ug/l	<10	<10
Benzo(a)pyrene, ug/l	<10	<10
Benzo(g,h,i)perylene, ug/l	<10	<10
Benzyl butyl phthalate, ug/l	<10	<10
beta-BHC, ug/l	<10	<10
delta-BHC, ug/l	<10	<10
bis(2-Chloroethyl) ether, ug/l	<10	<10
bis(2-Chloroethoxy) methane, ug/l	<10	<10
bis(2-Ethylhexyl) phthalate, ug/l	<10	<10
Bis(2-chloroisopropyl)ether, ug/l	<10	<10
4-Bromophenyl-phenyl-ether, ug/l	<10	<10
Chlordane, ug/l	<20	<20
2-Chloronaphthalene, ug/l	<10	<10
4-Chlorophenyl-phenyl ether, ug/l	<10	<10
Chrysene, ug/l	<10	<10
4,4'-DDD, ug/l	<10	<10

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

2846 Industrial Plaza Drive • Tallahassee, FL 32301 • (904) 878-3994 • Fax (904) 878-9504

LOG NO: T0-08431

Received: 22 AUG 90

Dr. Yuh-Hsu Pan
DER-Chemistry Section
2600 Blairstone Road
Tallahassee, Florida 32399-2400

Project: T089/County Auto Ranch

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
08431-3	#3350	Client
08431-4	#3351	

PARAMETER	08431-3	08431-4			
4,4'-DDE, ug/l	<10	<10			
4,4'-DDT, ug/l	<10	<10			
Dibenz (a,h)anthracene, ug/l	<10	<10			
Di-n-butylphthalate, ug/l	<10	<10			
1,3-Dichlorobenzene, ug/l	<10	<10			
1,2-Dichlorobenzene, ug/l	<10	<10			
1,4-Dichlorobenzene, ug/l	<10	<10			
3,3'-Dichlorobenzidine, ug/l	<20	<20			
Dieldrin, ug/l	<10	<10			
Diethyl Phthalate, ug/l	<10	<10			
Dimethyl phthalate, ug/l	<10	<10			
2,4-Dinitrotoluene, ug/l	<10	<10			
2,6-Dinitrotoluene, ug/l	<10	<10			
Di-n-octylphthalate, ug/l	<10	<10			
Endosulfan sulfate, ug/l	<10	<10			
Endrin Aldehyde, ug/l	<10	<10			
Fluoranthene, ug/l	<10	<10			
Fluorene, ug/l	<10	<10			
Heptachlor, ug/l	<10	<10			
Heptachlor epoxide, ug/l	<10	<10			
Hexachlorobenzene, ug/l	<10	<10			
Hexachlorobutadiene, ug/l	<10	<10			
Hexachloroethane, ug/l	<10	<10			

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

2846 Industrial Plaza Drive • Tallahassee, FL 32301 • (904) 878-3994 • Fax (904) 878-9504

LOG NO: T0-08431

Received: 22 AUG 90

Dr. Yuh-Hsu Pan
DER-Chemistry Section
2600 Blairstone Road
Tallahassee, Florida 32399-2400

Project: T089/County Auto Ranch

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
		Client
08431-3	#3350	
08431-4	#3351	

PARAMETER	08431-3	08431-4
Indeno (1,2,3-cd)pyrene, ug/l	<10	<10
Isophorone, ug/l	<10	<10
Naphthalene, ug/l	<10	<10
Nitrobenzene, ug/l	<10	<10
N-Nitrosodi-N-Propylamine, ug/l	<10	<10
Aroclor-1016, ug/l	<100	<100
Aroclor-1221, ug/l	<100	<100
Aroclor-1232, ug/l	<100	<100
Aroclor-1242, ug/l	<100	<100
Aroclor-1248, ug/l	<100	<100
Aroclor-1254, ug/l	<100	<100
Aroclor-1260, ug/l	<100	<100
Phenanthrene, ug/l	<10	<10
Pyrene, ug/l	<10	<10
Toxaphene, ug/l	<200	<200
1,2,4-Trichlorobenzene, ug/l	<10	<10
4-Chloro-3-methylphenol, ug/l	<10	<10
2-Chlorophenol, ug/l	<10	<10
2,4 Dichlorophenol, ug/l	<10	<10
2,4 Dimethylphenol, ug/l	<10	<10
2,4-Dinitrophenol, ug/l	<50	<50
2-Methyl-4,6-dinitrophenol, ug/l	<50	<50
2-Nitrophenol, ug/l	<10	<10
4-Nitrophenol, ug/l	<50	<50
Pentachlorophenol, ug/l	<50	<50
Phenol, ug/l	<10	<10
2,4,6-Trichlorophenol, ug/l	<10	<10

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LOG NO: T0-08431

Received: 22 AUG 90

Dr. Yuh-Hsu Pan
DER-Chemistry Section
2600 Blairstone Road
Tallahassee, Florida 32399-2400

Project: T089/County Auto Ranch

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
08431-3	#3350	Client
08431-4	#3351	

PARAMETER	08431-3	08431-4
Chlorinated Pesticides (608)		
Aldrin, ug/l	<0.010	<0.010
Alpha-BHC, ug/l	<0.010	<0.010
Beta-BHC, ug/l	<0.010	<0.010
Delta-BHC, ug/l	<0.010	<0.010
Gamma-BHC, ug/l	<0.010	<0.010
Chlordane, ug/l	<0.10	<0.10
4,4'-DDD, ug/l	<0.020	<0.020
4,4'-DDE, ug/l	<0.020	<0.020
4,4'-DDT, ug/l	<0.050	<0.050
Dieldrin, ug/l	<0.020	<0.020
Endosulfan I, ug/l	<0.020	<0.020
Endosulfan II, ug/l	<0.050	<0.050
Endosulfan Sulfate, ug/l	<0.10	<0.10
Endrin, ug/l	<0.020	<0.020
Endrin Aldehyde, ug/l	<0.10	<0.10
Heptachlor, ug/l	<0.010	<0.010
Heptachlor Epoxide, ug/l	<0.020	<0.020
Toxaphene, ug/l	<1.0	<1.0
PCB-1016, ug/l	<0.50	<0.50
PCB-1221, ug/l	<0.50	<0.50
PCB-1232, ug/l	<0.50	<0.50
PCB-1242, ug/l	<0.50	<0.50
PCB-1248, ug/l	<0.50	<0.50
PCB-1254, ug/l	<0.50	<0.50
PCB-1260, ug/l	<0.50	<0.50

Sample Number: 90-AUG-21-10-01
Sample Location: Purdom Power Plant
Field ID: Effluent
Date/Time Collected: 21-AUG-1990 10:30:29.27
Comments:

Sample Status: Authorized by Tim Fitzpatrick
Matrix: Effluent
Storet Station Number:

Sample Number: 90-AUG-21-10-01
Analysis Id: AS-G-W

Test status: Authorized by Liang T. Lin
Analysis Description: arsenic by graphite furnace for water samples

Storet Number	Analyte	Result	Units
01002	Arsenic	4 U	ug/L

Sample Number: 90-AUG-21-10-01
Analysis Id: AG-G-W

Test status: Authorized by Liang T. Lin
Analysis Description: Silver in water by furnace AA

Storet Number	Analyte	Result	Units
01077	Silver	0.1 U	ug/L

Sample Number: 90-AUG-21-10-01
Analysis Id: HG-H-W

Test status: Authorized by Tim Fitzpatrick
Analysis Description: Mercury by cold vapor using hydride sys.-water

Storet Number	Analyte	Result	Units
71900	Mercury	0.1 U	ug/L

Sample Number: 90-AUG-21-10-01
Analysis Id: PB-G-W

Test status: Authorized by Jack Merritt
Analysis Description: Lead by furnace AA in water

Storet Number	Analyte	Result	Units
01051	Lead	2 U	ug/L

Sample Number: 90-AUG-21-10-01
Analysis Id: CD-G-W

Test status: Authorized by Jack Merritt
Analysis Description: Cadmium by graphite furnace for water saple

Storet Number	Analyte	Result	Units
01027	Cadmium	0.2 U	ug/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the minimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-AUG-21-10-01 Test status: Authorized by Tim Fitzpatrick
Analysis Id: SE-G-W Analysis Description: Selenium in water by furnace AA

Storet Number	Analyte	Result	Units
01147	Selenium	4 U	ug/L

Sample Number: 90-AUG-21-10-02 Sample Status: Authorized by Tim Fitzpatrick
Sample Location: Purdom Power Plant Matrix: Field Blank
Field ID: Blank Storet Station Number:
Date/Time Collected: 21-AUG-1990 10:30:29.27
Comments:

Sample Number: 90-AUG-21-10-02 Test status: Authorized by Liang T. Lin
Analysis Id: AG-G-W Analysis Description: Silver in water by furnace AA

Storet Number	Analyte	Result	Units
01077	Silver	0.1 U	ug/L

Sample Number: 90-AUG-21-10-02 Test status: Authorized by Tim Fitzpatrick
Analysis Id: HG-H-W Analysis Description: Mercury by cold vapor using hydride sys.-water

Storet Number	Analyte	Result	Units
71900	Mercury	0.1 U	ug/L

Sample Number: 90-AUG-21-10-02 Test status: Authorized by Jack Merritt
Analysis Id: PB-G-W Analysis Description: Lead by furnace AA in water

Storet Number	Analyte	Result	Units
01051	Lead	2 U	ug/L

Sample Number: 90-AUG-21-10-02 Test status: Authorized by Jack Merritt
Analysis Id: CD-G-W Analysis Description: Cadmium by graphite furnace for water saple

Storet Number	Analyte	Result	Units
01027	Cadmium	0.2 U	ug/L

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-AUG-21-10-02 Test status: Authorized by Tim Fitzpatrick
Analysis Id: SE-G-W Analysis Description: Selenium in water by furnace AA

Storet Number	Analyte	Result	Units
01147	Selenium	4 U	ug/L

Sample Number: 90-AUG-21-10-02 Test status: Authorized by Liang T. Lin
Analysis Id: AS-G-W Analysis Description: arsenic by graphite furnace for water samples

Storet Number	Analyte	Result	Units
01002	Arsenic	4 U	ug/L

End of Report

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-AUG-21-12-01 Sample Status: Authorized by Yuh-Hsu Pan
Sample Location: Tallahassee S.O. Purdom Plant Matrix: Effluent
Field ID: Effluent Storet Station Number:
Date/Time Collected: 21-AUG-1990 10:30:05.49
Comments:

Sample Number: 90-AUG-21-12-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-PO4 Analysis Description: Orthophosphate analysis for water samples

Storet Number	Analyte	Result	Units
70507	Orthophosphate-P	0.08	mg P/L

Sample Number: 90-AUG-21-12-01 Test status: Authorized by Yuh-Hsu Pan
Analysis Id: W-TP Analysis Description: Analysis for total phosphorus in water

Storet Number	Analyte	Result	Units
00665	Total Phosphorus	0.17	mg P/L

End of Report

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the mimimum detection limit
N/A - Not applicable NR - Not requested

Sample Number: 90-AUG-21-11-01
Sample Location: Purdom Power Plant
Field ID: Effluent
Date/Time Collected: 21-AUG-1990 10:30:14.12
Comments:

Sample Status: Authorized by Yuh-Hsu Pan
Matrix: Effluent
Storet Station Number:

Sample Number: 90-AUG-21-11-01
Analysis Id: W-TKN
Test status: Authorized by Yuh-Hsu Pan
Analysis Description: TKN for water sample

Storet Number	Analyte	Result	Units
00625	N KJEL TOT	0.35	mg N/L

Sample Number: 90-AUG-21-11-01
Analysis Id: W-NO3
Test status: Authorized by Yuh-Hsu Pan
Analysis Description: NO3 analysis for water samples

Storet Number	Analyte	Result	Units
00620	Nitrate-N	0.020 U	mg N/L

Sample Number: 90-AUG-21-11-01
Analysis Id: W-NO2
Test status: Authorized by Yuh-Hsu Pan
Analysis Description: NO2 analysis for water samples

Storet Number	Analyte	Result	Units
00615	Nitrite-N	0.020 U	mg N/L

Sample Number: 90-AUG-21-11-01
Analysis Id: W-NH3
Test status: Authorized by Yuh-Hsu Pan
Analysis Description: Analysis for ammonia in water

Storet Number	Analyte	Result	Units
00610	Ammonia-N	0.020 U	mg N/L

End of Report

A - Value reported is the mean of two or more determinations
E - Scientific notation
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Not analyzed for this compound
T - Value reported is less than the practice quantiation limit
U - Material was analyzed for but not detected; The value reported is the minimum detection limit
N/A - Not applicable NR - Not requested

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
CENTRAL LABORATORY REPORT FORM

LAB ID: 1

TIME A — GRAB SAMPLE:

TIME B — COMPOSITE SAMPLE
BEGIN:
END:

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 8/21/90	RECEIVING BODY OF WATER:	DEPTH, FEET:

REMARKS:

LOCATION: Pinellas Generating Plant

FIELD ID/NAME: Downstream

WATER	SOIL/SEDIMENT	TISSUE	CHEMICAL WASTE
☐ SURFACE (FRESH) ☐ GROUND ☐ SURFACE (SALT) ☐ EFFLUENT ☐ DRINKING ☐ TRIP BLANK ☐ FIELD BLANK ☐ EQUIPMENT BLANK	☐ SOIL ☐ FRESHWATER SEDIMENT ☐ MARINE SEDIMENT	☐ PLANT ☐ FISH ☐ SHELLFISH ☐ OTHER	☐

PROGM. MOD. #	NPDES NUMBER. (required for all discharge related samples)	WELL #

FIELD PARAMETERS MEASURED BY (NAME):

(SIGNATURE):

SAMPLED BY (NAME): Kathy Furbeck

(SIGNATURE):

FIELD REPORT PREPARED BY (NAME):

(SIGNATURE):

FIELD PARAMETERS	UNITS	CODE*	VALUE
CHLORINE, TOTAL RESIDUAL	mg/l	50060	
DISSOLVED OXYGEN (PROBE)	mg/l	00299	
pH	stnd. units	00400	
SALINITY	PPTH	00480	
SECCHI DEPTH	m	00078	
SPECIFIC CONDUCTANCE	µmho/cm	00094	
TEMPERATURE	°C	00010	

✓	LAB PARAMETERS	UNITS	CODE	VALUE
	CHLOROPHYLL-a (CORRECTED)	µg/l	32223	
	CHLOROPHYLL-a (NON-CORRECTED)	µg/l	32210	
	CHLOROPHYLL-b	µg/l	32212	
	CHLOROPHYLL-c	µg/l	32214	
	PHAEOPHYTIN-a	µg/l	32218	
	BOD, 5-DAY CARBONACEOUS	mg/l	80082	
	BOD, 5-DAY N-INHIBITED	mg/l	00314	
✓	FECAL COLIFORMS, MEMBRANE	no./100 ml	31616	100
	FECAL COLIFORMS, TUBE	no./100 ml	31615	
✓	TOTAL COLIFORMS, MEMBRANE	no./100 ml	31501	4400
	TOTAL COLIFORMS, TUBE	no./100 ml	31505	
	FECAL STREPTOCOCCI, MEMBRANE	no./100 ml	31673	
	HETEROTROPHIC PLATE COUNT	no./1 ml	31751	
	SEDIMENT PARTCL SIZE, >2.0mm	%	82053	
	SEDIMENT PARTCL SIZE, 0.5-2.0mm	%	82054	
	SEDIMENT PARTCL SIZE, 0.25-0.5mm	%	82051	
	SEDIMENT PARTCL SIZ, 0.062-0.25mm	%	82051	
	SEDIMENT PARTCL SIZE, 0.25-0.5mm	%	82053	
	SEDIMENT PARTCL SIZE, 0.125-0.25mm	%	82052	
	SEDIMENT ORGANIC FRACTION	%	80036	
	ALGAL ASSAY, LIMITING NUTRIENT	—		REPORT
	ALGAL ASSAY, GROWTH POTENTIAL	mg/l	85203	

✓	LAB PARAMETERS	UNITS	CODE	VALUE
	INVERT, DIVERSITY INDX, ANT SUBST	—	61455	
	INVERT, DI, AS, 95% CONF INT	—	61456	
	INVERT, DIVERSITY INDX, NAT SUBST	—	61453	
	INVERT, DI, NS, 95% CONF INT	—	61454	
	INVERT, ANT SUBST, NO. SPP.	—	61457	
	INVERT, NAT SUBST, NO. SPP.	—	61458	
	INVERT, FLORIDA INDEX	—	—	
	INVERT, SPECIES ID/COUNT	—	—	REPORT
	PERIPHYTON, SPECIES ID/COUNT	—	—	REPORT
	PHYTOPLNKTN, SPECIES ID/COUNT	—	—	REPORT
	TOXICITY ASSAY, MICROTOX	—	—	REPORT
	TOXICITY ASSAY, ACUTE, SCRNG	—	—	REPORT
	TOXICITY ASSAY, ACUTE, DEFNTV	—	—	REPORT
	TOXICITY ASSAY, FLOW THROUGH	—	—	REPORT
	TOXICITY ASSAY, CHRONIC, SCRNG	—	—	REPORT
	TOXICITY ASSAY, CHRONIC, DFNTV	—	—	REPORT

E = ESTIMATED VALUE
K = ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
G = ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
U = MATERIAL WAS ANALYZED FOR BUT NOT DETECTED; THE NUMBER IS THE MINIMUM DETECTION LIMIT

ANALYST:

QA VERIFIED BY:

LAB REPORT VERIFIED BY:

DATE: 8/31/90

*STORET CODES MAY ONLY APPLY TO FIELD MEASUREMENTS

☐ SUBMITTING OFFICE FILL IN SHADED AREAS

✓ MARK DESIRED ANALYSIS

8/24/90

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
CENTRAL LABORATORY REPORT FORM

LAB ID: 2

TIME B — COMPOSITE SAMPLE
BEGIN:
END:

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 8/21/90	RECEIVING BODY OF WATER:	DEPTH, FEET:

REMARKS:	LOCATION: Purdom Dewatering Plant upstream	FIELD ID/NAME:

WATER	SOIL/SEDIMENT	TISSUE	CHEMICAL WASTE
☐ SURFACE (FRESH) ☐ GROUND ☐ SURFACE (SALT) ☐ EFFLUENT ☐ DRINKING ☐ TRIP BLANK ☐ FIELD BLANK ☐ EQUIPMENT BLANK	☐ SOIL ☐ FRESHWATER SEDIMENT ☐ MARINE SEDIMENT	☐ PLANT ☐ FISH ☐ SHELLFISH ☐ OTHER	☐

PROJ. NO.: #	NPDES NUMBER: (required for all discharge related samples)	WELL #

FIELD PARAMETERS MEASURED BY (NAME):

(SIGNATURE):

SAMPLED BY (NAME): Kathy Sandling

(SIGNATURE):

FIELD REPORT PREPARED BY (NAME):

(SIGNATURE):

FIELD PARAMETERS	UNITS	CODE*	VALUE
CHLORINE, TOTAL RESIDUAL	mg/l	50060	
DISSOLVED OXYGEN (PROBE)	mg/l	00299	
pH	stnd. units	00400	
SALINITY	PPTh	00480	
SECCHI DEPTH	m	00078	
SPECIFIC CONDUCTANCE	µmho/cm	00094	
TEMPERATURE	°C	00010	

✓	LAB PARAMETERS	UNITS	CODE	VALUE
	CHLOROPHYLL-a (CORRECTED)	µg/l	32223	
	CHLOROPHYLL-a (NON-CORRECTED)	µg/l	32210	
	CHLOROPHYLL-b	µg/l	32212	
	CHLOROPHYLL-c	µg/l	32214	
	PHAEOPHYTIN-a	µg/l	32218	
	BOD, 5-DAY CARBONACEOUS	mg/l	80082	
	BOD, 5 DAY N INHIBITED	mg/l	00314	
✓	FECAL COLIFORMS, MEMBRANE	no./100 ml	31616	150
	FECAL COLIFORMS, TUBE	no./100 ml	31615	
✓	TOTAL COLIFORMS, MEMBRANE	no./100 ml	31501	3,100
	TOTAL COLIFORMS, TUBE	no./100 ml	31505	
	FECAL STREPTOCOCCI, MEMBRANE	no./100 ml	31673	
	HETEROTROPHIC PLATE COUNT	no./1 ml	31751	
	SEDIMENT PRTCL SIZE, >2.0mm	%	80256	
	SEDIMENT PRTCL SIZE, 0.5-2.0mm	%	80254	
	SEDIMENT PRTCL SIZE, 0.125-0.5mm	%	46531	
	SEDIMENT PRTCL SIZE, 0.063-0.125mm	%	80251	
	SEDIMENT PRTCL SIZE, 0.25-0.5mm	%	80253	
	SEDIMENT PRTCL SIZE, 0.125-0.25mm	%	80252	
	SEDIMENT ORGANIC FRACTION	%	00096	
	ALGAL ASSAY, LIMITING NUTRIENT	--	--	REPORT
	ALGAL ASSAY, GROWTH POTENTIAL	mg/l	65209	

✓	LAB PARAMETERS	UNITS	CODE	VALUE
	INVERT, DIVERSITY INDX, ART SUBST	--	61455	
	INVERT, DI, AS, 95% CONF INT	--	61456	
	INVERT, DIVERSITY INDX, NAT SUBST	--	61453	
	INVERT, DI, NS, 95% CONF INT	--	61454	
	INVERT, ART SUBST, NO. SPP.	--	61457	
	INVERT, NAT SUBST, NO. SPP.	--	61453	
	INVERT, FLORIDA INDEX	--	--	
	INVERT, SPECIES ID/COUNT	--	--	REPORT
	PERIPHYTON, SPECIES ID/COUNT	--	--	REPORT
	PHYTOPLNKTN, SPECIES ID/COUNT	--	--	REPORT
	TOXICITY ASSAY, MICROTOX	--	--	REPORT
	TOXICITY ASSAY, ACUTE, SCRNG	--	--	REPORT
	TOXICITY ASSAY, ACUTE, DFNTV	--	--	REPORT
	TOXICITY ASSAY, FLOW-THROUGH	--	--	REPORT
	TOXICITY ASSAY, CHRONIC, SCRNG	--	--	REPORT
	TOXICITY ASSAY, CHRONIC, DFNTV	--	--	REPORT

J = ESTIMATED VALUE
K = ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN
L = ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
U = MATERIAL WAS ANALYZED FOR BUT NOT DETECTED; THE NUMBER IS THE MINIMUM DETECTION LIMIT

ANALYST:	QA VERIFIED BY:	LAB REPORT VERIFIED BY:	DATE:
	29 Aug. 1990		8/29/90

*STORET CODES MAY ONLY APPLY TO FIELD DATA

☐ SOME FLAGGING OF DATA IS CHECKED AND/OR

✓ MARKS DESIRED ANALYSES

8/29/90

Sample Source: ~~SUNSHINE METALS~~ PURDOM Power Plant

Address/City: _____

County: _____

Contact/District: _____

NPDES Permit #: _____ Outfall #: _____

Sample Collection: Date 8/21/90 Time 11:00

Test Beginning: Date 8/22/90 Time 11:30

Test Ending: Date 8/24/90 Time 1110

Test Organism: Notropis leedsi

Life Stage/Age: 12 days

Test Number: 2 of 2 Test Type: Screening (Definitive)

(Static) Static Renewal | Flow-through

Remarks:

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
Control	14	5	5	5	7.7	7.4	7.8	7.8	8.1	8.3	23.5	23.0	23.0	240		245
"	118	5	5	5	7.9	7.4	7.8	7.9	8.1	8.3						
100%	17	5	5	5	8.1	7.3	7.6	7.9	8.1	8.3	23.2	23.0	22.9	320		325
"	153	5	5	5	8.1	7.3	7.6	7.9	8.2	8.3						
Measured/Loaded by:		SW	SW	MF	SM	SM	SW	SM	SM	SW	SM	SM	SW	SM		SW
Recorded by:		SW	SW	MF	SW	SW	MF	SW	SW	MF	SW	SW	MF	SW		MF

Investigators' Signatures

Steven H Wolfe

Sandy McClure

Marshall Fairbett

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:					
Alkalinity:					
Hardness:					
Total Ammonia:					

Ammonia meter slope: _____

DER Biology Section — Acute Bioassay Sheet

Sample Source: ~~SUNSHINE METALS~~ PURDOM POWER PLANT
Address/City: ST. MARKS
County: WAKULLA
Contact/District: JEANETTE CURTIS/City of TALLAHASSEE
NPDES Permit #: FL0025526 **Outfall #:** 001

Sample Collected Date 8/21/90 Time 11:00
Test Beginning: Date 8/22/90 Time 11:00
Test Ending: Date 8/24/90 Time 1100
Test Organism: Ceriodaphnia dubia
Life Stage/Age: < 24 hr

Test Number: 1 of 2 **Test Type:** Screening (Definitive)
(Static) | Static Renewal | Flow-through

Remarks: UNCHLORINATED
* probe faulty, suspect values

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	SAME AS SUNSHINE METALS			
24 hr		8/21/90		
48 hr				

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
CONTROL	1	5	5	5	7.7		8.2	8.3		8.6	23.9		23.5	340		405
"		5	5	5			8.3			8.6						
"		5	5	5			8.4			8.6						
"		5	5	5			8.3			8.6						
100%		5	5	5	7.8		8.2	8.1		8.6	23.9		23.7	315		370
"		5	5	5			8.3			8.6						
"		5	5	5			8.3			8.6						
"		5	5	5			8.3			8.6						
Measured/Loaded by:		MF	MF	MF	SH		SW	SH		SW	SH		SW	SH		SW
Recorded by:		MF	MF	MF	SW		MF	SW		MF	SW		MF	SW		MF

Investigators' Signatures

Steven A Wolfe
Sandy McClure
Marshall Faircloth

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:					
Alkalinity:	121	Batch 1C	122	Hach	SW
Hardness:	118	"	132	Hach	SW
Total Ammonia:	0.00	"	.45 *	Orion probe	SMS LCB

Ammonia meter slope: -49.3 *

Macroinvertebrate taxa list for Purdom Electric Generating Plant, Wakulla County , Florida, collected from Hester-Dendy samplers above and below the discharge on 18 September 1990.

	Control Site	Test Site
Decopoda		
Rhithropanopeus harrisii	1	1
Diptera		
Ablabesmyia parajanta	1	1
Dicrotendipes neomodestus	1	1
Labrundinia neopilosella	0	1
Nanocladius distinctus	0	1
Polypedilum illinoense	1	0
Undetermined dipteran pupae	0	1
Tribelos fuscicorne	1	0
Ephemeroptera		
Baetis propinquus	0	1
Gastropoda		
Littoridinops ? sp.	1	1
Neretina reclivata	1	1
Undetermined gastropod sp.	1	0
Malacostraca		
Corophium lacustre	1	1
Gammarus sp.	1	1
Grandidierella bonnieroides	1	1
Hyalella azteca	1	1
Munna reynoldsi	1	1
Sphaeroma tenebrans	1	0
Odonata		
Argia moesta	0	1
Pelecypoda		
Undtermined mytillid sp.	1	1
Polychaeta		
Neanthes succinea	0	1
Undetermined polychaete sp.	1	0
Thoracica		
Balanus improvisus	1	1
Trichoptera		
Oxyethira sp.	1	0
Undetermined tricoptera sp.	1	0
Total	**20**	**18**

Macroinvertebrate taxa list for Purdom Electric Generating Plant, Wakulla County, Florida, collected via timed qualitative methods (dip net etc.) above and below the discharge on 27 August 1990.

	Control Site	Test Site
Acarina		
Arrenurus sp.	1	0
Lebertia(pilolebertia) sp.	1	0
Coleoptera		
Berosus exiguus	0	1
Enochrus sp.	0	1
Haliplus sp.	0	1
Decopoda		
Rhithropanopeus harrisii	1	0
Diptera		
Ablabesmyia mallochi	0	1
Ablabesmyia parajanta	1	1
Ablabesmyia peleensis	1	0
Chironomus sp.	1	0
Cricotopus/Orthocladius grp. sp.	1	1
Undetermined Culicid	0	1
Dicrotendipes modestus	0	1
Dicrotendipes neomodestus	1	1
Ajalmabatista sp.	1	0
Hexatoma sp.	1	0
Labrundinia neopilosella	1	1
Larsia lurida	1	0
Nanocladius distinctus	1	0
Nimbocera pinderi	1	0
Odontomesa sp.	0	1
Palpomyia grp. sp.	1	0
Polypedilum halterale grp.	1	0
Polypedilum illinoense	1	1
Procladius bellus	1	1
Pseudochironomus richardsoni	0	1
Paratanytarsus sp.	0	1
Undetermined Dipteran pupae	1	1
Rheotanytarsus exiguus grp.	1	0
Undetermined Tabanid sp.	0	1
Tanytarsus sp.	1	1
Tribelos fuscicorne	0	1
Zavreliella prob. *varipennis*	1	0
Ephemeroptera		
Baetis pygmaeus	1	0
Baetis sp.	1	0
Gastropoda		
Elimia floridensis	0	1
Gyraulus parvus	0	1

Undetermined Hydrobiid	0	1
Littoridinops ? sp.	0	1
Neretina reclivata	1	1
Physella heterostropha pomila	0	1
Hemiptera		
Immature Corixidae	1	0
Mesovelia mulsanti	0	1
Malacostraca		
Argulus sp.	1	0
Corophium lacustre	1	0
Cyathura polita	1	1
Gammarus sp.	1	1
Grandidierella bonnieroides	1	1
Hyalella azteca	1	1
Munna reynoldsi	1	0
Palaemonetes paludosus	0	1
Odonata		
Enallagma sp.	1	1
Erythrodiplax connata minuscula	1	0
Undetermined Odonate sp.	1	0
Oligochaeta		
Limnodrilus angustipenis	1	0
Lumbriculus inconstans ?	1	0
Lumbriculus variegatus	1	1
Nais variabilis	1	1
UndeterminedTubificid w/o capilliform setae	1	0
Pelecypoda		
Corbicula manilensis	1	0
Undtermined Mytillid sp.	1	1
Undetermined Pelecypod sp.	0	1
Sphaerium occidentale	0	1
Tellina sp.	1	1
Polychaeta		
Hobsonia florida	1	0
Laenoneveis culveri	1	0
Neanthes succinea	0	1
UndeterminedPolychaete sp.	1	1
Stenoninerais martini?	1	0
Trichoptera		
Cheumatopsyche sp.	1	0
Nectopsyche sp.	1	0
Oxyethira sp.	1	1
Total	**47**	**40**

Department of Environmental Regulation

Results of Fifth Year Inspections

Discharger	S.O. Purdom Electric Generating Plant
County:	Wakulla
NPDES Number:	FL0025526
State Permit Expiration Date:	January 1991?

Toxics Sampling Inspection (XSI)

Date Sampled:	August 21, 1990
Results:	No deleterious levels of priority pollutants found.

Compliance Biomonitoring Inspection (CBI)

Date Sampled:	August 21, 1990
Results:	No toxicity observed.

Impact Bioassessment Inspection (IBI)

Date Sampled:	August 21 and September 18, 1990
Results:	Biological communities in receiving waters were healthy.

Water Quality Inspection (WQI)

Date Sampled:

Results:

These fifth year inspections provide the necessary information to evaluate the facility's impact on its receiving waters and to provide specific condition recommendations for permit renewal to resolve any concerns.