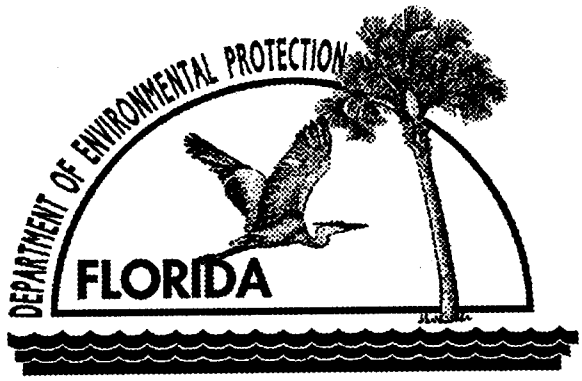


Bioassays of

Gulf Coast Recycling, Inc.

Tampa, Hillsborough County, Florida

NPDES #FL0042854

Sampled 9/16/96

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DO NOT REMOVE

November 1996

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan #870346G

Bioassays of

Gulf Coast Recycling, Inc.

Tampa, Hillsborough County, Florida

NPDES #FL0042854

Biology Section
Bureau of Laboratories
November 1996

Introduction

Gulf Coast Recycling, Inc., 1901 North 66th Street, Tampa, Hillsborough County, Florida, NPDES #FL0042854, tests performed on 17 to 24 September, 1996.

This battery recycling facility has an annual average flow of 0.04 MGD. Stormwater and water used for dust suppression in uncovered areas of the plant are collected in sumps, pumped to a stormwater tank, and then routed to a clarifier. Lime is added to the wastewater to remove metals. After clarification, the pH of the wastewater is lowered to within one pH unit of the water in the drainage ditch which routes the treated wastewater to the Palm River. Wastewater generated under roofed areas of the plant is treated on site and discharged to the City of Tampa sanitary sewer system (facility summary provided by Andrea Grainger, FDEP, Tampa).

The toxicity tests discussed in this report were performed in accordance with methods described by Peltier, 1994, *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, 3rd Edition, EPA/600/4-91/002.

Results and Discussion

The FDEP Biology Section performed a seven-day chronic-renewal definitive toxicity bioassay on samples of effluent from this facility. The samples were collected on September 16, 18, and 20, 1996, and were designated sample "A", sample "B", and sample "C", repectively. The species used for this test was the waterflea, *Ceriodaphnia dubia*. The test results showed no toxic effects, producing a no observed effect concentration (NOEC) of 100% sample (Table 1).

Total residual chlorine was not detected in any of the three samples. Total ammonia and unionized ammonia concentrations were respectively, for sample "A", 0.317 mg/L and 0.012 mg/L; sample "B", 0.355 mg/L and 0.038 mg/L; and sample "C", 0.095 mg/L and 0.003 mg/L. Further chemical analyses were performed on the sample and several metals were identified (Table 2). The cadmium (samples "A" and "B") and lead (samples "A", "B", and "C") concentrations exceeded their respective State of Florida Class III surface water criteria (FAC 62-302.530) based on the hardness of each sample measured as $CaCO_3$ (Table 3).

Conclusion

The samples of effluent collected from this facility on 16, 18, and 20 September, 1996, did not show chronic toxicity to the *Ceriodaphnia dubia* test organisms.

Table 1. Data recorded during the chronic toxicity bioassay of samples of effluent from the Gulf Coast Recycling facility, Tampa, Hillsborough County, Florida, NPDES # FL0042854, tests performed on 17 to 24 September, 1996.

Facility:	Gulf Coast Recycling	Test Beginning Date: 9/17/96	Time: 1400	Facility Type:	Battery Recycling
NPDES #	FL0042854	Test Ending Date: 9/24/96	Time: 1400	Chlorination Type:	N/A
Location:	Tampa				
County:	Hillsborough	Sample "A" Collection Date: 9/16/96	Time: 1425	Receiving Water:	Unnamed ditch to
Contact/District:	Andrea Grainger	Sample "B" Collection Date: 9/18/96	Time: 0910		the Palm River
LIMS Sample #'s:	sample "A" 152772, sample "B" 153288, sample "C"153560	Sample "C" Collection Date: 9/20/96	Time: 0850		Page 1 of 2

Total Residual Cl2	mg/l
Sample "A" Field:	not measured
Sample "A" Lab:	<0.03
Sample "B" Field:	not measured
Sample "B" Lab:	<0.03
Sample "C" Field:	not measured
Sample "C" Lab:	<0.03

Ammonia	Total (mg/l)	Unionized (mg/l)
Diluent Batch #40:	<0.017	<0.017
Diluent Batch #41:	<0.017	<0.017
Sample "A":	0.317	0.012
Sample "B":	0.355	0.038
Sample "C":	0.095	0.003

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)	Salinity
Diluent Batch #40:	69	86	0
Diluent Batch #41:	75	85	0
Sample "A":	15	174	0
Sample "B":	14	169	0
Sample "C":	15	190	0

Diluent Batch Use	Days Used
Diluent Batch #40:	4
Diluent Batch #41:	3

NOEC:	100%	LOEC:	n/a
SURVIVAL			
Concentrations	# surviving adults	Young/adult	
Control	9	20.4	
6.25%	10	14.3	
12.5%	10	14.1	
25%	10	23.8	
50%	10	28.8	
100%	10	24.4	

		pH	Temp	DO	Cond
Day 1	Control	8.0	23.9	7.8	165
New Sample "A"	6.25%	8.1			210
	12.5%	8.1			250
	25%	8.1			330
	50%	8.0			480
	100%	7.8	23.9	7.8	785
Day 2	Control	8.0	23.4	8.5	165
New Sample "A"	6.25%	8.1			210
	12.5%	8.1			255
	25%	8.1			330
	50%	8.0			500
	100%	7.7	23.7	8.4	810
Old Sample "A"	Control	8.1		8.3	
	6.25%	8.2		8.3	
	12.5%	8.2		8.3	
	25%	8.2		8.3	
	50%	8.1		8.3	
	100%	7.8		8.3	
Day 3	Control	8.1	23.2	8.1	170
New Sample "B"	6.25%	8.1			205
	12.5%	8.1			245
	25%	8.1			310
	50%	8.1			450
	100%	8.3	23.3	7.9	720
Old Sample 'A"	Control	8.1		8.3	
	6.25%	8.1		8.0	
	12.5%	8.1		8.0	
	25%	8.1		8.0	
	50%	7.9		8.0	
	100%	7.6		8.0	

		pH	Temp	DO	Cond
Day 4	Control	8.1	23.3	8.1	340
New Sample "B"	6.25	8.0			370
	12.5%	8.1			385
	25%	8.1			390
	50%	8.0			430
	100%	7.9	23.4	8.1	520
Old Sample 3"	Control	8.1		8.0	
	6.25%	8.1		7.9	
	12.5%	8.1		7.9	
	25%	8.1		7.9	
	50%	8.0		8.0	
	100%	7.8		8.0	
Day 5	Control	8.0	23.3	8.0	165
New Sample "C"	6.25	8.0			215
	12.5%	8.0			265
	25%	8.0			350
	50%	7.9			525
	100%	7.8	23.3	8.1	860
Old Sample 3"	Control	8.1		8.2	
	6.25%	8.1		8.0	
	12.5%	8.1		8.0	
	25%	8.1		8.0	
	50%	8.0		7.9	
	100%	7.8		7.8	
Day 6	Control	7.9	23.1	7.8	175
New Sample "C"	6.25	7.9			220
	12.5%	7.9			265
	25%	7.9			355
	50%	7.9			535
	100%	7.7	23.6	7.8	860
Old Sample 3"	Control	7.9		7.7	
	6.25%	7.9		7.8	
	12.5%	7.9		7.8	
	25%	7.8		7.7	
	50%	7.8		7.8	
	100%	7.7		7.9	

continued

Table 1. Concluded. Data recorded during the chronic toxicity bioassay of samples of effluent from the Gulf Coast Recycling facility, Tampa, Hillsborough County, Florida, NPDES # FL0042854, tests performed on 17 to 24 September, 1996.

Facility:	Gulf Coast Recycling	Test Beginning Date:	9/17/96	Time: 1400	Facility Type: Battery Recycling
NPDES #	FL0042854	Test Ending Date:	9/24/96	Time: 1400	Chlorination Type: N/A
Location:	Tampa				
County:	Hillsborough	Sample "A" Collection Date:	9/16/96	Time: 1425	Receiving Water: Unnamed ditch to the Palm River
Contact/District:	Andrea Grainger	Sample "B" Collection Date:	9/18/96	Time: 0910	
LIMS Sample #'s:	sample "A" 152772, sample "B" 153288, sample "C"153560	Sample "C" Collection Date:	9/20/96	Time: 0850	

Total Residual Cl2	mg/l
Sample "A" Field:	not measured
Sample "A" Lab:	<0.03
Sample "B" Field:	not measured
Sample "B" Lab:	<0.03
Sample "C" Field:	not measured
Sample "C" Lab:	<0.03

Ammonia	Total (mg/l)	Unionized (mg/l)
Diluent Batch #40:	<0.017	<0.017
Diluent Batch #41:	<0.017	<0.017
Sample "A":	0.317	0.012
Sample "B":	0.355	0.038
Sample "C":	0.095	0.003

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)	Salinity
Diluent Batch #40:	69	86	0
Diluent Batch #41:	75	85	0
Sample "A":	15	174	0
Sample "B":	14	169	0
Sample "C":	15	190	0

Diluent Batch Use	Days Used
Diluent Batch #40:	4
Diluent Batch #41:	3

NOEC:	100%	LOEC:	n/a
SURVIVAL			
Concentrations	# surviving adults	Young/adult	
Control	9	20.4	
6.25%	10	14.3	
12.5%	10	14.1	
25%	10	23.8	
50%	10	28.8	
100%	10	24.4	

		pH	Temp	DO	Cond
Day 7	Control	8.0	23.1	8.0	170
New Sample "C"	6.25%	8.1			220
	12.5%	8.1			265
	25%	8.1			355
	50%	8.0			520
	100%	7.9	22.6	7.9	820
Old Sample "C"	Control	8.2		7.8	
	6.25%	8.2		7.8	
	12.5%	8.2		7.9	
	25%	8.2		7.9	
	50%	8.0		7.9	
	100%	7.9		7.9	

		pH	Temp	DO	Cond
Day 8	Control	8.2		7.7	
Old Sample "C"	6.25	8.2		7.8	
	12.5%	8.2		7.8	
	25%	8.2		7.8	
	50%	8.0		7.7	
	100%	7.9		7.7	

Table 2. Results of chemical analyses on the samples of effluent from the Gulf Goast Recycling facility sampled on September 16, 18, and 20, 1996.

Metals

Sample "A"

Aluminum	44	µg/L[I]
Cadmium	2.11	µg/L
Calcium	70.5	mg/L
Copper	2	µg/L
Iron	87	µg/L
Lead	58	µg/L
Magnesium	3.19	mg/L
Sulfate	370	mg/L
Zinc	none detected	

Sample "B"

Aluminum	95	µg/L[I]
Cadmium	1.86	µg/L[A]
Calcium	62.7	mg/L[A]
Copper	none detected	
Iron	4	µg/L[I]
Lead	48	µg/L[A]
Magnesium	2.82	mg/L[A]
Sulfate	330	mg/L
Zinc	29	µg/L[A]

Sample "C"

Aluminum	94	µg/L
Cadmium	0.80	µg/L[A]
Calcium	58.7	mg/L[A]
Copper	1.9	µg/L
Iron	10	µg/L
Lead	47	µg/L
Magnesium	2.15	mg/L
Sulfate	290	mg/L
Zinc	3	µg/L[I]

Base, Neutral, & Acid Extractable Organics

none detected

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

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

Table 3. Cadmium and lead concentrations detected in samples of effluent collected from the Gulf Coast Recycling facility with the respective State of Florida Class III surface water criteria for cadmium and lead for each sample (FAC 62-302.530).

Sample	Hardness[A]	Ln(H)	Cadmium Standard [B]	Cadmium Concentration	Lead Standard [C]	Lead Concentration
"A"	174	5.16	1.75	2.11[D]	6.44	48[D]
"B"	169	5.13	1.71	1.86[D]	6.21	47[D]
"C"	190	5.25	1.88	0.80	7.20	58[D]

All standards in µg/L.

[A] ppm as $CaCO_3$

[B] The Cadmium standard is derived from the formula $Cd \leq e^{(0.7852[\ln H]-3.490)}$.

[C] The Lead standard is derived from the formula $Pb \leq e^{(1.273[\ln H]-4.705)}$.

[D] Exceeds standards.

Sample Source: Gulf Coast Recycling

NPDES Permit #: ~~FL00~~ 0GC-93-7339 District:: Southwest

LIMS #: IS 2712 YCT Batch #: 3 Algae Batch #: 2

B 153288 96-Sep-19-26

C 153560-96-Sep-23-04

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BIOLOGY LABORATORY CHRONIC BIOASSAY

Ceriodaphnia dubia BENCH SHEET - *REPRODUCTION*

Sample Collection A: Date 9-16-96 Time 1425
B: Date 9-18-96 Time 0910
C: Date 9-20-96 Time 0850

Begin Test: Date 9-17-96 Time 1400
End Test: Date 9-24-96 Time 1400

Conc.	Day	Replicate Number 1	2	3	4	5	6	7	8	9	10	# Young	# Adults	Young Adult
Control	T 1												10	
	W 2												10	
	Th 3	0	0	0	0	0	0	0	0	0	0	0	10	0
	Fri 4	0	0	0	0	0	0	0	0	0	0	0	10	0
	Sat 5	0	1	1	0	2	2	0	0	4	1	11	10	1.1
	Sun 6	10	10	5	0	3	5	1	6	1	0	41	10	4.1
	Mon 7	4	13	14	0	13	12	1	X2	2	3	86	10	8.6
	T 8	18	0	0	9	0	15	2	X	15	0	59	9/10	6.6
	Total	32	24	20	9	18	34	4	8	33	15	197	10	20.7
6.25%	1												10	
	2												10	
	3	0	0	0	0	0	0	0	0	0	0	0	10	0
	4	0	0	0	0	0	0	0	0	0	0	0	10	0
	5	3	1	0	3	0	0	4	0	0	2	13	10	1.3
	6	3	3	0	5	0	4	1	0	0	0	16	10	1.6
	7	0	13	0	12	12	15	3	4	15	0	74	10	7.4
	8	10	0	12	0	M0D	10	0	0	0	8	40	10	4.0
	Total	16	17	12	20	12	29	8	4	15	10	143	10	14.3
12.5%	1												10	
	2												10	
	3	0	0	0	0	0	0	0	0	0	0	0	10	0
	4	0	0	0	0	0	0	0	0	0	0	0	10	0
	5	0	3	2	1	0	1	0	3	1	0	11	10	1.1
	6	0	6	8	2	2	5	8	0	12	1	44	10	4.4
	7	0	11	12	4	0	13	1	10	9	0	60	10	6.0
	8	1	0	11	0	0	0	3	11	0	13	39	10	3.9
	Total	1	17	23	7	5	22	4	36	11	15	154	10	15.4
25%	1												10	
	2												10	
	3	0	0	0	0	0	0	0	0	0	0	0	10	0
	4	0	0	0	0	0	0	0	0	0	0	0	10	0
	5	2	4	3	3	4	1	1	1	3	2	24	10	2.4
	6	5	8	8	3	1	4	10	1	4	4	48	10	4.8
	7	14	12	8	9	0	10	15	0	10	0	78	10	7.8
	8	14	0	12	15	13	0	10	12	0	12	88	10	8.8
	Total	35	24	31	30	17	15	36	14	17	18	238	10	23.8
50%	1												10	
	2												10	
	3	0	0	0	0	0	0	0	0	0	0	0	10	0
	4	0	0	0	0	3	0	0	0	0	0	3	10	.3
	5	4	2	2	4	0	2	3	3	1	4	25	10	2.5
	6	5	7	7	9	11	9	3	8	0	3	62	10	6.2
	7	13	14	6	13	15	13	0	10	5	0	94	10	9.4
	8	6	9	0	17	13	11	13	16	11	8	104	10	10.4
	Total	28	32	15	43	42	35	19	37	17	15	288	10	28.8
100%	1												10	
	2												10	
	3	0	0	0	0	0	0	0	0	0	0	0	10	0
	4	0	0	0	0	0	0	0	0	0	0	0	10	0
	5	2	3	3	3	3	1	1	3	4	4	27	10	2.7
	6	8	10	1	8	4	5	8	7	6	7	64	10	6.4
	7	9	12	10	11	5	0	13	0	0	0	60	10	6.0
	8	14	14	0	11	0	8	15	12	11	8	93	10	9.3
	Total	33	39	14	33	12	14	37	22	21	19	244	10	24.4
Day:		1		2		3		4		5		6	7	8
Counted by:		mf/DW		mf		mf		mf		mf		mf	mf	mf

Entry error 9/23/96 mf

Entry error 9-24-96 mf

Instrument Calibrations:

	Day 1 Tuesday	Day 5 Sat.
pH	7.0@7.0, 9.0@9.0	7.0@7.0 9.0@9.0
Temp	25.4@25.4	23.8°C @ 23.8°C
D.O.	8.2@25.0°C	8.6 @ 23.0°C
Cond	101.4@101.3	108.4@101.3
	1410@1409@24.6°C	1390 @ 1409 @24

	Day 2 Wed	Day 6 Sun
pH	7.0@7.0, 9.0@9.0	7.0@7.0, 9.0@9.0
Temp	24.2@24.3	23.4@23.4
D.O.	8.4@24.2	8.4@24.0
Cond	101.0@101.3	106.9@101.3
	1358@1409@24.2°C	1384@1409@23.8°C

	Day 3 Thurs.	Day 7 Mon
pH	7.0@7.0, 9.0@9.0	7.0@7.0, 9.0@9.0
Temp	23.6°C@23.6°C	23.3@23.3°C
D.O.	8.4 @ 23.4	8.4@24.0°C
Cond	106.6@101.3	104.5@101.3
	1384@1409@24.0°C	1360@1409@23.3°C

	Day 4 Fri.	Day 8 Tuesday
pH	7.0@7.0, 9.0@9.0	7.0@7.0, 9.0@9.0
Temp	24.2°C@24.2°C	23.6°C@23.7°C
D.O.	8.4@23.8°C	8.3@24.4°C
Cond	107.7@101.3	105.4@101.3
	1389@1409@24.3	1354@1409@23.5

Meter #

pH ~~mf~~ 7.0 model 10 C9005:39

DO/Temp DER 29061

Cond DER 28149

Remarks:

Entry error mf 9/26/96

NOEC = 100%

Investigators' Signatures

Marshall Faircloth

Reviewer

revised 9/15/93

Sample Source: Gulf Coast Recycling
NPDES Permit #: FL0006793-7339 District: Southwest
LIMS #: 15277 Start Date: 7-17-96
96Sep1720B (153288-96Sep19-26)
C(153560 - 96-Sep-23-04)

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BIOLOGY LABORATORY CHRONIC BIOASSAY
Ceriodaphnia dubia BENCH SHEET - *CHEMISTRY*

		New Sample				Old Sample	
	Conc.	pH (su)	Temp (°C)	DO (mg/L)	Cond (µmhos/cm)	pH (su)	DO (mg/L)
Day 1	Control	8.0	23.9	7.8	165		
Sample A	6.25%	8.1			210		
Measured by MF	12.5%	8.1			250		
	25%	8.1			330		
Recorded by MF	50%	8.0			480		
	100%	7.8	23.9	7.8	785		
Day 2	Control	8.0	23.4	8.5	165	8.1	8.3
Sample A MF	6.25%	8.1			210	8.2	8.3
	12.5%	8.1			255	8.2	8.3
Measured by MF	25%	8.1			330	8.2	8.3
Recorded by MF	50%	8.0			500	8.1	8.3
	100%	7.7	23.7	8.4	810	7.8	8.3
Day 3	Control	8.1	23.2	8.1	170	8.1	8.3
Sample B	6.25%	8.1	~~8~~	~~7.9~~	205	8.1	8.0
	12.5%	8.1			245	8.1	8.0
Measured by ND	25%	8.1			310	8.1	8.0
Recorded by DW	50%	8.1			450	7.9	8.0
	100%	8.3	23.3	7.9	720	7.6	8.0
Day 4	Control	8.1	23.3	8.1	165	8.1	8.0
Sample B	6.25%	8.0			210	8.1	7.9
	12.5%	8.1			245	8.1	7.9
Measured by MF	25%	8.1			315	8.1	7.9
Recorded by DW	50%	8.0			445	8.0	8.0
	100%	7.9	23.4	8.1	730	7.8	8.0

*Expiry point ON 7/19/96

	New Sample				Old Sample	
Conc.	pH (su)	Temp (°C)	DO (mg/L)	Cond (µmhos/cm)	pH (su)	DO (mg/L)
Day 5 Control	8.0	23.3	8.0	165	8.1	8.2
Sample C 6.25%	8.0			215	8.1	8.0
12.5%	8.0			265	8.1	8.0
Measured by MF 25%	8.0			350	8.1	8.0
Recorded by ND 50%	7.9			525	8.0	7.9
100%	7.8	23.3	8.1	860	7.8	7.8
Day 6 Control	7.9	23.1	7.8	175	7.9	7.7
Sample C 6.25%	7.9			220	7.9	7.8
12.5%	7.9			265	7.9	7.8
Measured by MF 25%	7.9			355	7.8	7.7
Recorded by DW 50%	7.9			535	7.8	7.8
100%	7.7	23.6	7.8	860	7.7	7.9
Day 7 Control	8.0	23.1	8.0	170	8.2	7.8
Sample C 6.25%	8.1			220	8.2	7.8
12.5%	8.1			265	8.2	7.9
Measured by MF 25%	8.1			355	8.2	7.9
Recorded by MF 50%	8.0			520	8.0	7.9
100%	7.9	22.6	7.9	820	7.9	7.9
Day 8 Control					8.2	7.7
6.25%					8.2	7.8
Measured by MF 12.5%					8.2	7.8
25%					8.2	7.8
Recorded by ND 50%					8.0	7.7
100%					7.9	7.7

revised 9/15/93

Remarks:

20% mineral water Batch #40 #41

	well	20%	
ND Alkalinity	120	69	75
Hardness	129	86	85
Ammonia	<0.017	<0.017	<0.017
Chlorine	<0.03 MF	<0.03	<0.03

Water-quality Parameters

	Field Cl2	Lab Cl2	Alkalinity	Hardness	NH3+NH4
Sample A:	Not measured	<0.03	15	174	0.317
Method		DR 160	Hach	Hach	Orion
Measured by		DW	ND	ND	MF

Cl2 blank: <0.03 Ammonia meter slope: -58.1

Sample B:	Not measured	<0.03	14	169	0.355
Method		DR 160	Hach	Hach	Orion
Measured by		ND	ND	ND	DW

Cl2 blank: <0.03 Ammonia meter slope: -52.8

Sample C:	Not measured	<0.03	15	190	0.095
Method		DR 160	Hach	Hach	Orion
Measured by		ND	ND	ND	MF

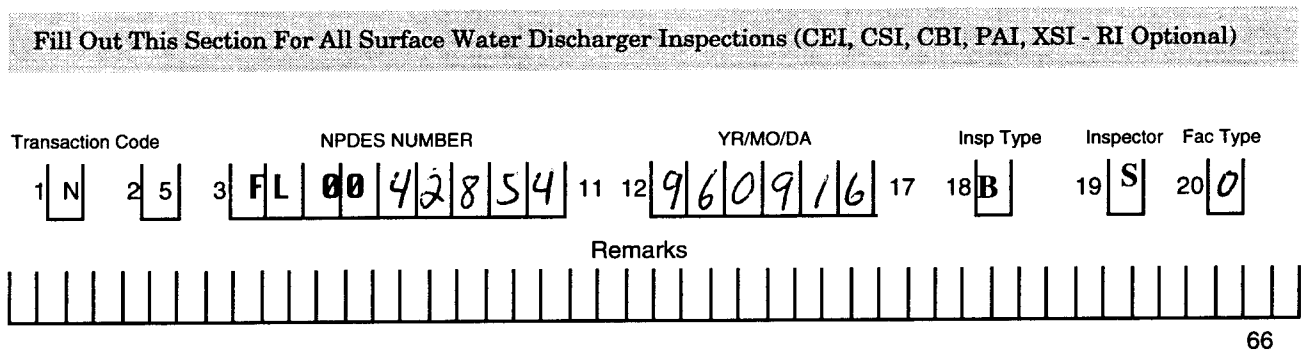
Cl2 blank: <0.03 Ammonia meter slope: -58.3

Investigators' Signatures

Marshall Fairbrother
Dennis Nicholson
Reviewer

Diluent batch # 40 Days Used: 4
Diluent batch # 41 Days Used: 3

The Bioassay of the Gulf Coast Recycling effluent sampled on September 16, 18, and 20, 1996, NPDES #FL0042854.



The Priority Pollutants Analysis for the Bioassay of the Gulf Coast Recycling effluent sampled on September 16, 18, and 20, 1996, NPDES #FL0042854.

