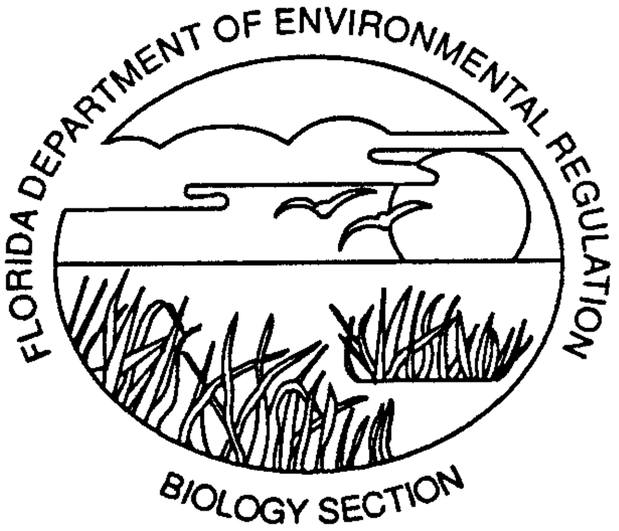


Bioassays of the City of

Gainesville Main Street Sewage Treatment Plant

Gainesville, Alachua County, Florida

NPDES #FL0027251

Sampled 1/17/89

September 6, 1989

Biology Section
Division of Administrative and Technical Services

Bioassays of the City of

Gainesville Main Street Sewage Treatment Plant

Gainesville, Alachua County, Florida

NPDES #FL0027251

Biology Section
Bureau of Laboratories
September 6, 1989

Introduction

City of Gainesville, Main Street Sewage Treatment Plant, NPDES #FL0027251, Gainesville, Alachua County, Florida, on 18 to 20 January, 1989.

The City of Gainesville, Main Street STP is located at 200 SE 16th Avenue, Gainesville, Alachua County, Florida. The facility consists of two (2) treatment plants. Treatment at plant #1, with a design capacity of 3.0 MGD, consists of comminution, grit removal, primary clarification, high-rate trickling filtration, and secondary clarification. Treatment at plant #2, with a design capacity of 4.5 MGD, consists of comminution, grit removal, activated sludge, aeration basins, and clarification. Sludge from both plants is treated by aerobic digesters, with gravity thickening. Sludge disposal is by land application. The discharge from each plant is combined, then chlorinated, dechlorinated, and discharged as a single source to Sweetwater Branch. The average discharge is 5.25 MGD. The toxicity tests discussed in this report were performed in accordance with methods described by Peltier and Weber, 1985, *Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms*, 3rd Edition and by the FDER Biology Section, 1985, *Quality Assurance Manual for Performing Acute Toxicity Tests*, 2nd Edition.

Results and Discussion

The dechlorinated sample of discharge from the City of Gainesville Main Street STP was toxic to the bioassay test organism, *Ceriodaphnia dubia*, producing an LC_{50} of 15.9%. The sample adversely affected the Microtox® assay organism, *Photobacterium phosphoreum*, producing an EC_{50} of 428%. The sample was not toxic to the bioassay test organisms, *Daphnia pulex* and *Notropis leedsi*.

Chemical analyses performed on the sample detected the metals, lead (1.7 µg/l), mercury (0.29 µ/gl), silver (0.3 µg/l) and zinc (18 µg/l), the pesticide, chlorpyrifos (0.07 µg/l), and numerous unidentified organic components which were sensitive to electron capture detection and nitrogen/phosphorus detection. Total ammonia (3.44 mg/l) and unionized ammonia (0.05 mg/l) were also detected in the sample. The cause of toxicity in this sample was not determined.

Conclusion

The sample of discharge from the City of Gainesville Main Street STP was toxic on 17 January, 1989. This facility is not in compliance with State toxicity standards unless moderating provisions (e.g., a permit variance) apply.

Table 1. Concentration Series and Volumes Used for These Static Bioassays.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	15.0 ml	0.0 ml	15 ml
10.0%	13.5 ml	1.5 ml	15 ml
30.0%	10.5 ml	4.5 ml	15 ml
50.0%	7.5 ml	7.5 ml	15 ml
70.0%	4.5 ml	10.5 ml	15 ml
85.0%	2.25 ml	12.75 ml	15 ml
100.0%	0.0 ml	15.0 ml	15 ml

Daphnia pulex (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	15.0 ml	0.0ml	15 ml
100.0%	0.0 ml	15.0 ml	15 ml

Notropis leedsi (bannerfin shiner)

Concentration	Dilution Water	Sample	Total Volume
Control	500 ml	0 ml	500 ml
10.0%	450 ml	50 ml	500 ml
30.0%	350 ml	150 ml	500 ml
50.0%	250 ml	250 ml	500 ml
70.0%	150 ml	350 ml	500 ml
85.0%	75 ml	425 ml	500 ml
100.0%	0 ml	500 ml	500 ml

Table 2. Data recorded during the 48-hour static definitive acute bioassay performed on a sample discharge from the City of Gainesville Main Street STP, NPDES #FL0027251, Gainesville, Alachua County, Florida, on 18 to 20 January, 1989.

Facility: **Gainesville Main Street STP** NPDES # **FL0027251** Facility Type: **Sewage Treatment**
Location: 200 SE 16th Ave., Gainesville Contact/District: J. Carver
County: Alachua Test type: static definitive
Sample Collection Date: **1/17/89** Time: 1415 # tests: 3 Receiving Water: Sweetwater Branch
Test Beginning Date: 1/18/89 Time: 1300 Chlorination Type: **dechlorinated** to Paynes Prairie
Test Ending Date: 1/20/89 Time: 1330 Method: Plant dechlorination prior to discharge **Page 1 of 2**

Organism: ***Ceriodaphnia dubia*** Life stage: neonate
LC50: 16.50% Binomial: 16.5% Moving Average: 16.5% Probit: 15.9%

Concentrations	SURVIVAL # at 0 hr	Live at 24 hr	Live at 48 hr	Dissolved Oxygen 0 hour	24 hour	48 hour	pH 0 hour	24 hour	48 hour	Temperature 0 hour	24 hour	48 hour	Conductivity 0 hour	48 hour
Control	5	5	4	9.2	-	8.6	8.3	-	8.3	19.4	-	20.0	-	-
Control	5	5	5	9.2	-	8.5	8.3	-	8.3	-	-	-	-	-
Control	5	5	4	9.2	-	8.4	8.3	-	8.3	-	-	-	-	-
Control	5	5	5	9.2	-	8.4	8.3	-	8.3	-	-	-	220	240
10%	5	4	4	8.8	-	8.3	8.3	-	8.3	19.1	-	20.1	-	-
10%	5	4	2	8.8	-	8.3	8.3	-	8.3	-	-	-	-	-
10%	5	5	5	8.9	-	8.4	8.3	-	8.3	-	-	-	-	-
10%	5	5	5	8.9	-	8.4	8.3	-	8.3	-	-	-	260	275
30%	5	5	3	8.9	-	8.3	8.1	-	8.3	19.3	-	20.0	-	-
30%	5	5	0	8.9	-	8.3	8.1	-	8.3	-	-	-	-	-
30%	5	5	1	8.9	-	8.4	8.1	-	8.3	-	-	-	-	-
30%	5	5	3	8.9	-	8.4	8.1	-	8.3	-	-	-	335	360
50%	5	4	0	8.7	-	8.3	7.9	-	8.3	19.5	-	20.0	-	-
50%	5	4	0	8.8	-	8.3	7.9	-	8.3	-	-	-	-	-
50%	5	5	0	8.8	-	8.3	7.9	-	8.3	-	-	-	-	-
50%	5	5	0	8.8	-	8.3	7.9	-	8.3	-	-	-	400	440
70%	5	5	0	8.8	-	8.3	7.8	-	8.2	19.6	-	20.0	-	-
70%	5	5	0	8.8	-	8.3	7.8	-	8.2	-	-	-	-	-
70%	5	5	0	8.8	-	8.3	7.8	-	8.2	-	-	-	-	-
70%	5	4	0	8.8	-	8.3	7.8	-	8.2	-	-	-	490	525
85%	5	3	0	9.0	-	8.2	7.6	-	8.2	19.5	-	20.0	-	-
85%	5	3	0	9.0	-	8.2	7.6	-	8.2	-	-	-	-	-
85%	5	4	0	9.0	-	8.2	7.6	-	8.2	-	-	-	-	-
85%	5	2	0	9.0	-	8.3	7.6	-	8.2	-	-	-	550	595
100%	5	0	0	9.1	-	8.2	7.5	-	8.1	19.4	-	20.0	-	-
100%	5	0	0	9.1	-	8.2	7.5	-	8.1	-	-	-	-	-
100%	5	0	0	9.1	-	8.2	7.5	-	8.1	-	-	-	-	-
100%	5	0	0	9.2	-	8.2	7.5	-	8.1	-	-	-	605	655

Total Residual Cl2	mg/l	Method
Field:	0.1	-
Lab:	0.0	Hach
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control Water (daphnids):	0.09	0.01
100% Sample:	3.44	0.05

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	122	125
Cond. Control Water (daphnids):	130	130
100% Sample:	85	160

Salinity (ppt)	
Control Water:	0
100% Sample:	0

Table 2. Continued.

Facility: **Gainesville Main Street STP** NPDES # **FL0027251** Facility Type: **Sewage Treatment**
Location: 200 SE 16th Ave., Gainesville Contact/District: J. Carver
County: Alachua Test type: static definitive
Sample Collection Date: **1/17/89** Time: 1415 # tests: 3 Receiving Water: Sweetwater Branch to Paynes Prairie
Test Beginning Date: 1/18/89 Time: 1300 Chlorination Type: **dechlorinated**
Test Ending Date: 1/20/89 Time: 1330 Method: Plant dechlorination prior to discharge **Page 2 of 2**

Total Residual Cl2	mg/l	Method
Field:	0.1	-
Lab:	0.0	Hach
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control Water (daphnids):	0.09	0.01
100% Sample:	3.44	0.05

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	122	125
Cond. Control Water (daphnids):	130	130
100% Sample:	85	160

Salinity (ppt)	
Control Water:	0
100% Sample:	0

Organism: ***Daphnia pulex*** Life stage: neonate
LC50: - Binomial: - Moving Average: - Probit: -

	SURVIVAL			Dissolved Oxygen			pH			Temperature			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control	5	5	5	8.9	-	8.3	8.2	-	8.3	19.3	-	20.0	-	-
Control	5	5	5	8.9	-	8.3	8.3	-	8.3	-	-	-	-	-
Control	5	5	5	8.9	-	8.3	8.3	-	8.3	-	-	-	-	-
Control	5	5	5	8.9	-	8.3	8.3	-	8.3	-	-	-	220	245
100.0%	5	5	5	9.0	-	8.3	7.5	-	8.1	19.4	-	20.0	-	-
100.0%	5	5	5	9.0	-	8.2	7.5	-	8.1	-	-	-	-	-
100.0%	5	5	5	9.0	-	8.3	7.5	-	8.1	-	-	-	-	-
100.0%	5	5	5	9.0	-	8.3	7.5	-	8.1	-	-	-	600	665

Organism: ***Notropis leedsi*** Age: 14 days
LC50: - Binomial: - Moving Average: - Probit: -

	SURVIVAL			Dissolved Oxygen			pH			Temperature			Conductivity	
Concentrations	# at 0 hr	Live at 24 hr	Live at 48 hr	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	24 hour	48 hour	0 hour	48 hour
Control	5	5	5	8.4	8.3	7.7	7.7	8.1	8.1	21.0	20.2	20.0	-	-
Control	5	5	5	8.4	8.3	7.8	7.7	8.1	8.1	-	-	-	230	230
10%	5	5	5	8.6	-	7.7	7.6	8.1	8.1	21.1	19.4	19.6	-	-
10%	5	5	5	8.6	-	7.9	7.6	8.1	8.1	-	-	-	285	285
30%	5	5	5	8.8	-	7.9	7.5	8.0	8.0	21.2	19.5	19.5	-	-
30%	5	5	5	8.8	-	7.9	7.5	8.0	8.0	-	-	-	355	350
50%	5	5	5	8.9	-	7.8	7.4	7.9	8.0	20.0	19.4	19.3	-	-
50%	5	5	5	9.0	-	7.8	7.4	7.9	8.0	-	-	-	430	430
70%	5	5	5	9.0	-	7.7	7.3	7.8	8.0	19.8	19.4	19.3	-	-
70%	5	5	5	9.0	-	7.7	7.3	7.8	7.9	-	-	-	510	515
85%	5	5	5	9.1	-	7.5	7.2	7.7	7.8	19.5	19.4	19.4	-	-
85%	5	5	5	9.1	-	7.6	7.2	7.7	7.8	-	-	-	570	570
100%	5	5	5	9.0	-	7.5	7.1	7.7	7.8	19.5	19.5	19.7	-	-
100%	5	5	5	9.0	-	7.5	7.1	7.7	7.8	-	-	-	630	635

Table 3. Microtox test results, Gainesville Main Street STP, Alachua County, NPDES #FL0027251, on 18 January, 1989.

Microtox Test — Culture Lot # M-603

% Sample	Final Reclaimed Water 5-min	15-min
0	56	34
0	53	33
0	55	33
12.38	51	29
12.38	57	33
12.38	55	32
24.75	50	28
24.75	55	32
24.75	50	29
49.5	48	28
49.5	48	28
49.5	55	33
99	41	23
99	45	26
99	47	27

EC_{50} Nonchlorinated (15 minute, 15 °C) = 425.38% sample

EC_{50} (15 minute, 15 °C) is calculated using the Data Reduction Computer Program developed by Microbics Corporation for the Sharp Model EL-5100 calculator. *Microbics Systems Operating Manual, 1982.*

Table 4. LC_{50} Data for bioassay of the Gainesville Main Street Sewage Treatment Plant on 18 January, 1989.

Organism	Method of Data Analysis	48 Hour LC_{50} (95% Confidence Intervals)
Dechlorinated discharge		
Ceriodaphnia dubia	Binomial	16.48% (10.00%, 30.00%)
	Moving Average	16.48% (12.25%, 21.59%)
	Probit	15.94% (12.01%, 20.13%)[a]
Daphnia pulex		not toxic
Notropis leedsi		not toxic

a This LC_{50} is reported in the text since it is the most statistically conservative value of the data set.

Table 5. Results of chemical analyses on the sample of discharge from the Gainesville Main Street STP, Alachua County, Florida.

Organics

Acid Extractables	None detected
Base Neutral Extractables	None detected
Pesticide Extractables	Chlorpyrifos 0.07µg/l
	Numerous unidentified components sensitive to ECD and NPD

Metals

Lead	1.7 µg/l
Mercury	0.29 µg/l
Silver	0.3 µg/l
Zinc	18.0 µg/l

024

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: GAINESVILLE MAIN ST. WWTP
Address/City: 200 SE 16th AVE., GAINESVILLE
County: ALACHUA
Contact/District: JAY CARVER / NE
NPDES Permit #: _____ Outfall #: 001

Sample Collection: Date 1/17/89 Time 1415
Test Beginning: Date 1/18/89 Time 1300
Test Ending: Date 1-20/89 Time 1330
Test Organism: CERIODAPHNIA DUBIA
Life Stage/Age: NEONATE

Test Number: 1 of 3 Test Type: Screening (Definitive)
(Static) Static Renewal | Flow-through

Remarks: Unchlorinated

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7.09	8.9@21.5	1314@21.6	21.3@21.4
24 hr	7@7.09	9.2@20.2	_____	20.0@19.9
48 hr	7@7.09	9.0@21°C	1316@21.7	1317/19.7@19.6

		Number Live			DO (mg/l)			pH			Temp. (°C)			Cond. (umhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
CONTROL	1	5	5	4	9.2		8.6	8.3	8.	8.3	19.4		20.0			
"	2	5	5	5	9.2		8.5	8.3		8.3						
"	3	5	5	4	9.2		8.4	8.3		8.3						
"	4	5	5	5	9.2		8.4	8.3		8.3				220		240
10%	5	5	4	4	8.8		8.3	8.3		8.3	19.1		20.1			
"	6	5	4	2	8.8		8.3	8.3		8.3						
"	7	5	5	5	8.9		8.4	8.3		8.3						
"	8	5	5	5	8.9		8.4	8.3		8.3				260		275
30%	9	5	5	3	8.9		8.3	8.1		8.3	19.2		20.0			
"	10	5	5	0	8.9		8.3	8.1		8.3						
"	11	5	5	1	8.9		8.4	8.1		8.3						
"	12	5	5	3	8.9		8.4	8.1		8.3				335		360
50%	13	5	4	0	8.7		8.3	7.9		8.3	19.5		20.0			
"	14	5	4	0	8.8		8.3	7.9		8.3						
"	15	5	5	0	8.8		8.3	7.9		8.3						
"	16	5	5	0	8.8		8.3	7.9		8.3			20.0	400		440
70%	17	5	5	0	8.8		8.3	7.8		8.2	19.6		20.0			
"	18	5	5	0	8.8		8.3	7.8		8.2						
"	19	5	5	0	8.8		8.3	7.8		8.2						
"	20	5	4	0	8.8		8.3	7.8		8.2			20.0	490		535
85%	21	5	3	0	9.0		8.2	7.6		8.2	19.5		20.0			
"	22	5	3	0	9.0		8.2	7.6		8.2						
"	23	5	4	0	9.0		8.2	7.6		8.2						
"	24	5	2	0	9.0		8.3	7.6		8.2			20.0	550		595
100%	25	5	0	0	9.1		8.2	7.5		8.1	19.4		20.0			
"	26	5	0	0	9.1		8.2	7.5		8.1						
"	27	5	0	0	9.1		8.2	7.5		8.1						
"	28	5	0	0	9.2		8.2	7.5		8.1				605		655
	Measured by:	SHW	SHW	MF	MF		SHW	JMF		SHW	JMF		SHW	JMF		SHW
	Recorded by:	SHW	SHW	MF	SHW		MF	SHW		MF	SHW		MF	SHW		MF

Investigators' Signatures

Steven H Wolfe

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			0.1	—	JC
Lab Tot. Resid. Cl2:	—	—	0.0	Hach	MF
Alkalinity:	122	130	85	Hach	MF
Hardness:	125	130	160	Hach	MF
Total Ammonia:	0.0	0.09	3.44	auto analyzer	MF

slope = 57.0

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: GAINESVILLE MAIN ST. WWTP
Address/City: _____
County: _____
Contact/District: _____
NPDES Permit #: _____ Outfall #: _____

Sample Collection: Date 1/17/89 Time 1415
Test Beginning: Date 1/18/89 Time 1350
Test Ending: Date 1/25/89 Time 1320
Test Organism: DAPHNIA PULEX
Life Stage/Age: NEONATE

Test Number: 2 of 3 Test Type: (Screening) | Definitive
(Static) | Static Renewal | Flow-through

Remarks: UNCHLORINATED

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

		Number Live			DO (mg/l)			pH			Temp. (°C)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
CONTROL	29	5	5	5	8.9		8.3	8.2		8.3	19.3		20.0			
"	30	5	5	5	8.9		8.3	8.3		8.3						
"	31	5	5	5	8.9		8.3	8.3		8.3						
"	32	5	5	5	8.9		8.3	8.3		8.3				220		245
100%	33	5	5	5	9.0		8.3	7.5		8.1	19.4		20.0			
"	34	5	5	5	9.0		8.2	7.5		8.1						
"	35	5	5	5	9.0		8.3	7.5		8.1						
"	36	5	5	5	9.0		8.3	7.5		8.1				600		665
														SHW		
Measured by:		SHW		MF	JMF		SHW	JMF		SHW	JMF		SHW	JMF		SHW
Recorded by:		SHW		MF	SHW		MF	SHW		MF	SHW		MF	SHW		MF

Investigators' Signatures

Steven H Wolfe

Mark U Finkbeiner

Reviewer

Water-quality Parameters

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

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: GAINESVILLE MAIN ST. WWTP
Address/City: _____
County: _____
Contact/District: _____
NPDES Permit #: _____ Outfall #: _____

Sample Collection: Date 1/17/89 Time 1415
Test Beginning: Date 1/18/89 Time 1330
Test Ending: Date 1/20/89 Time 1350
Test Organism: NOTROPIS LEEDSI
Life Stage/Age: 14 DAYS

Test Number: 3 of 3 Test Type: Screening (Definitive)
(Static) | Static Renewal | Flow-through

Remarks: UNCHLOR
* meter malfunction

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr				
24 hr				
48 hr				

		Number Live			DO (mg/l)			pH			Temp. (°C)			Cond. (umhos/cm)		
Conc.	Chamber #	0	24	48	0	24 *	48	0	24	48	0	24	48	0	24	48
CONTROL	38	5	5	5	8.4	8.3	7.7	7.7	8.1	8.1	21.0	20.2	20.2			
"	70	5	5	5	8.4	8.3	7.8	7.7	8.1	8.1				230		230
10%	228	5	5	5	8.6		7.7	7.6	8.1	8.1	21.1	19.4	19.6			
"	18	5	5	5	8.6		7.9	7.6	8.1	8.1				285		285
30%	71	5	5	5	8.8		7.9	7.5	8.0	8.0	21.2	19.5	19.5			
"	37	5	5	5	8.8		7.9	7.5	8.0	8.0				355		350
50%	21	5	5	5	8.9		7.8	7.4	7.9	8.0	20.0	19.4	19.3			
"	40	5	5	5	9.0		7.8	7.4	7.9	8.0				430		430
70%	4	5	5	5	9.0		7.7	7.3	7.9	8.0	19.8	19.4	19.3			
"	3	5	5	5	9.0		7.7	7.3	7.8	7.9				510		515
85%	18	5	5	5	9.1		7.5	7.2	7.7	7.8	19.5	19.4	19.4			
"	66	5	5	5	9.1		7.6	7.2	7.7	7.8				570		570
100%	44	5	5	5	9.0		7.5	7.1	7.7	7.8	19.5	19.5	19.7			
"	27	5	5	5	9.0		7.5	7.1	7.7	7.8				630		635
Measured by:		MF	SHW	MF	JMF	SHW	SHW	JMF	JHW	SHW	JMF	SHW	SHW	JMF		SHW
Recorded by:		MF	SHW	MF	SHW	SHW	MF	SHW	JHW	MF	SHW	SHW	MF	SHW		MF

Investigators' Signatures

Steven H Wolfe

Mark Smith

Reviewer

Water-quality Parameters

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

MICROTOX™ Data Reduction Sheet

SOURCE: Mainstream STP Effluent

GRAPH CALC EC 50 (15 MIN, 15 °C) = 3615.6 %SAMPLE

SAMPLE DATA:

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.): effluent Cl_2

DATE ASSAYED: 1-18-89 TIME: 9:45

VISUAL COLOR: none CORRECTION REQUIRED: YES (NO)

VISUAL TURBIDITY: none SEPARATION REQUIRED: YES (NO)

INITIAL pH: pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS (DRY NaCl) OTHER

PRIMARY DILUTION OF SAMPLE:

OPERATOR: Leslie Williams REAGENT VIAL LOT NO. 603

REMARKS: no pres'd.

MICROTOX™ 5/15 TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	T5	T15	NOTES
A1	0	51	34	X	X	
B1		53	33			
C1		55	33			
A2	12.38	51	29			
B2		57	33	.006	.064	
C2		55	32			
A3	24.75	50	28			
B3		55	32	.058	.124	
C3		50	29			
A4	49.5	48	28			
B4		48	28	.086	.124	
C4		55	33			
A5	99	41	23			
B5		45	26	.233	.316	
C5		47	27			
EC_{50} (MIN, °C)				178.6	3615.6	

REVIEWED BY:

DATE: 9/16/89