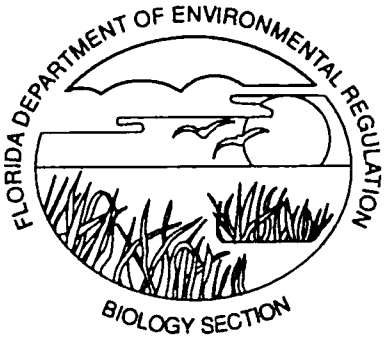


Bioassays of

Nitram, Incorporated

Tampa, Hillsborough County, Florida

NPDES #FL0001643

Sampled 6/19/89

October 19, 1989

Biology Section
Division of Administrative and Technical Services

Bioassays of

Nitram, Incorporated

Tampa, Hillsborough County, Florida

NPDES #FL0001643

Biology Section
Bureau of Laboratories
October 19, 1989

Introduction

Nitram, Incorporated, Tampa, Hillsborough County, Florida, NPDES #FL0001643, on 20 to 22 June, 1989.

This facility is located at 5321 Hartford Street. It discharges an average of 0.45 MGD reclaimed water from outfall #001 through a ditch to Delaney Creek, which flows into Hillsborough Bay. Operation began in 1963, producing up to 1200 tons/day of ammonium nitrate fertilizer. The company operates two ammonium prilling plants and two nitric acid plants in the manufacturing process. The daily plant operation requires 1.10 MGD intake water. Domestic wastewater and process wastewater are treated separately. Sanitary wastewater (0.002 MGD) is routed through a package sewage treatment plant and then to complete retention in an evaporation pond. Process water is temporarily retained on site in a holding pond. Treatment includes a diversion system for the retention of contaminants and an ammonium/ammonium nitrate recovery system prior to discharge to Delaney Creek.

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, 1989, *Quality Assurance Manual for Performing Acute Toxicity Tests*, 2nd Edition.

Results and Discussion

The sample of discharge from the Nitram, Inc. facility was not toxic to the bioassay test organisms, the water fleas, *Ceriodaphnia dubia* and *Daphnia pulex*, and the fish, *Notropis leedsi*. The sample was stimulatory to the Microtox® assay test organism, *Photobacterium phosphoreum*. Deaths were noted in each concentrations of the *C. dubia* tests, including the control. These deaths did not appear to be related to test concentration, therefore the test sample was considered to be not toxic. The total ammonia concentration in the sample was 0.39 mg/l. Unionized ammonia was not present. No further chemical analyses were performed.

Conclusion

The sample of discharge from the Nitram, Inc. facility was not toxic on 19 June, 1989.

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 bioassay of a sample of discharge from Nitram, Inc., Tampa, Hillsborough County, Florida, NPDES #FL0001643, on 20 to 22 June, 1989.

Facility:	Nitram, Incorporated	NPDES #	FL0001643	Facility Type:	Chemical Processor
Location:	5321 Hartford Street, Tampa	Contact/District:	D. Demmi / SW		
County:	Hillsborough	Test type:	static definitive		
Sample Collection Date:	6/19/89 Time: 1057	# tests:	3	Receiving Water:	Delany Creek
Test Beginning Date:	6/20/89 Time: 1115	Chlorination Type:	nonchlorinated		to Hillsborough Bay
Test Ending Date:	6/22/89 Time: 1100				Page 1 of 2

Total Residual Cl2	mg/l	Method
Field:	-	-
Lab:	-	-
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control Water (daphnids):	0.05	0.00
100% Sample:	0.39	0.00

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	121	116
Cond. Control Water (daphnids):	125	115
100% Sample:	128	634

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

Organism: *Ceriodaphnia dubia* 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	3	3	8.6	-	8.7	8.1	-	8.0	18.9	-	21.0	-	-
Control	5	5	5	8.6	-	8.7	8.1	-	8.0	-	-	-	-	-
Control	5	5	5	8.6	-	8.7	8.1	-	8.0	-	-	-	-	-
Control	5	5	5	8.6	-	8.7	8.1	-	8.0	-	-	-	215	240
10%	5	3	3	8.6	-	8.5	8.0	-	7.9	18.7	-	21.0	-	-
10%	5	5	5	8.6	-	8.5	8.0	-	7.9	-	-	-	-	-
10%	5	5	5	8.6	-	8.5	8.0	-	7.9	-	-	-	-	-
10%	5	3	3	8.7	-	8.5	8.0	-	7.9	-	-	-	705	755
30%	5	4	4	8.7	-	8.7	7.9	-	8.0	18.8	-	21.0	-	-
30%	5	5	5	8.7	-	8.7	7.9	-	8.0	-	-	-	-	-
30%	5	5	5	8.7	-	8.7	7.9	-	8.0	-	-	-	-	-
30%	5	5	5	8.7	-	8.7	7.9	-	8.0	-	-	-	1385	1500
50%	5	5	5	8.7	-	8.7	7.8	-	7.9	18.8	-	21.0	-	-
50%	5	6	6	8.7	-	8.7	7.8	-	7.9	-	-	-	-	-
50%	5	3	3	8.7	-	8.8	7.8	-	7.9	-	-	-	-	-
50%	5	5	5	8.7	-	8.8	7.8	-	8.0	-	-	-	2190	2310
70%	5	5	5	8.7	-	8.8	7.7	-	8.0	19.0	-	20.9	-	-
70%	5	5	5	8.7	-	8.9	7.7	-	8.0	-	-	-	-	-
70%	5	5	5	8.7	-	8.8	7.7	-	8.0	-	-	-	-	-
70%	5	5	4	8.7	-	8.8	7.7	-	8.0	-	-	-	2930	3200
85%	5	5	5	8.6	-	8.9	7.6	-	8.0	19.2	-	20.9	-	-
85%	5	5	5	8.6	-	8.9	7.6	-	7.9	-	-	-	-	-
85%	5	4	3	8.6	-	8.9	7.6	-	7.9	-	-	-	-	-
85%	5	5	5	8.6	-	8.9	7.6	-	7.9	-	-	-	3460	3750
100%	5	5	4	8.6	-	8.9	7.4	-	7.9	19.2	-	21.0	-	-
100%	5	4	4	8.6	-	8.9	7.4	-	7.9	-	-	-	-	-
100%	5	5	5	8.6	-	8.9	7.4	-	7.9	-	-	-	-	-
100%	5	5	5	8.6	-	8.9	7.4	-	7.9	-	-	-	4010	4410

Table 2. Continued.

Facility:	Nitram, Incorporated		NPDES #	FL0001643	Facility Type: Chemical Processor
Location:	5321 Hartford Street, Tampa		Contact/District:	D. Demmi / SW	
County:	Hillsborough		Test type:	static definitive	
Sample Collection Date:	6/19/89	Time: 1057	# tests:	3	Receiving Water: Delany Creek
Test Beginning Date:	6/20/89	Time: 1115	Chlorination Type:	nonchlorinated	to Hillsborough Bay
Test Ending Date:	6/22/89	Time: 1100			Page 2 of 2

Total Residual Cl2	mg/l	Method
Field:	-	-
Lab:	-	-
Lab:	-	-

Ammonia	Total (mg/l)	Unionized (mg/l)
Control Water (fish):	0.00	0.00
Cond. Control Water (daphnids):	0.05	0.00
100% Sample:	0.39	0.00

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	121	116
Cond. Control Water (daphnids):	125	115
100% Sample:	128	634

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	8.6	-	9.0	7.9	-	8.0	19.1	-	20.9	-	-
Control	5	5	5	8.6	-	9.0	7.9	-	8.0	-	-	-	-	-
Control	5	5	5	8.6	-	9.0	7.9	-	8.0	-	-	-	-	-
Control	5	5	5	8.6	-	9.0	7.9	-	8.0	-	-	-	225	240
100.0%	5	5	5	8.6	-	9.1	7.4	-	7.9	19.5	-	20.9	-	-
100.0%	5	5	5	8.6	-	9.1	7.4	-	7.9	-	-	-	-	-
100.0%	5	5	5	8.6	-	9.1	7.4	-	7.9	-	-	-	-	-
100.0%	5	5	4	8.6	-	9.1	7.4	-	7.9	-	-	-	3990	4310

Organism: *Notropis leedsi* Age: 17 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	8.3	8.0	8.6	7.6	7.8	7.8	21.1	19.8	20.1	-	-
Control	5	5	5	8.3	8.0	8.6	7.6	7.8	7.8	-	-	-	225	225
10%	5	5	5	8.3	8.0	8.5	7.6	7.7	7.7	21.2	19.6	19.7	-	-
10%	5	5	5	8.3	7.9	8.5	7.6	7.8	7.7	-	-	-	700	670
30%	5	5	5	8.2	7.8	8.4	7.5	7.7	7.7	21.3	19.6	19.5	-	-
30%	5	5	5	8.2	7.8	8.4	7.5	7.7	7.7	-	-	-	1550	1490
50%	5	5	5	8.2	7.8	8.5	7.4	7.7	7.6	21.5	19.5	19.5	-	-
50%	5	5	5	8.2	7.8	8.5	7.4	7.7	7.6	-	-	-	2390	2310
70%	5	5	5	8.2	7.8	8.5	7.3	7.6	7.6	21.5	19.5	19.5	-	-
70%	5	5	5	8.2	7.8	8.4	7.3	7.6	7.6	-	-	-	3200	3110
85%	5	5	5	8.2	7.8	8.5	7.2	7.6	7.6	21.6	19.4	19.4	-	-
85%	5	5	5	8.2	7.8	8.5	7.2	7.6	7.6	-	-	-	3770	3640
100%	5	5	5	8.1	7.7	8.5	7.2	7.6	7.6	21.4	19.4	19.4	-	-
100%	5	5	5	8.2	7.7	8.6	7.2	7.6	7.6	-	-	-	4370	4250

Table 3. Microtox test results, Nitram, Inc., Hillsborough County, NPDES #FL0001643, on 20 June, 1989.

% Sample	Final Reclaimed Water nonchlorinated	
	5-min	15-min
0	86	17
0	90	18
0	79	16
12.38	>100	21
12.38	>100	22
12.38	97	20
24.75	>100	22
24.75	>100	23
24.75	>100	23
49.5	>100	23
49.5	>100	24
49.5	>100	23
99	>100	30
99	>100	32
99	>100	30

EC_{50} Nonchlorinated (15 minute, 15 °C) = Stimulatory

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, Microbics Corporation, Carlsbad, California.)

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DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: NITRAM
Address/City: 5321 HARTFORD ST., TAMPA
County: Hillsborough
Contact/District: DAVE DEMMI / SW
NPDES Permit #: FL0001643 Outfall #:

Sample Collection: Date 6-19-89 Time 1057
Test Beginning: Date 6-20-89 Time 1115
Test Ending: Date 6-22-89 Time 1100
Test Organism: Ceriodaphnia dubia
Life Stage/Age: neonate

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

Remarks:

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7.0; 9.09	7.4@22°C	1310@21.9° 1323	21.9@21.9
24 hr	7.0, 9.09	9.1@21°C		19.5@19
48 hr	7.0, 9.09	9.0@21°C	1321@2.5	19.4@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	3	3	8.6		8.7	8.1	8	8.0	18.9		21.0			
"	2	5	5	5	8.6		8.7	8.1		8.0						
"	3	5	5	5	8.6		8.7	8.1		8.0						
"	4	5	5	5	8.6		8.7	8.1		8.0				215		24.
10%	5	5	3	3	8.6		8.5	8.0		7.9	18.7		21.0			
"	6	5	5	5	8.6		8.5	8.0		7.9						
"	7	5	5	5	8.6		8.5	8.0		7.9						
"	8	5	3	3	8.7		8.5	8.0		7.9				205		25
30%	9	5	4	4	8.7		8.7	7.9	SHW (low	8.0	18.8		21.0			
"	10	5	5	5	8.7		8.7	7.9	8.0)	8.0						
"	11	5	5	5	8.7		8.7	7.9		8.0						
"	12	5	5	5	8.7		8.7	7.9		8.0				1385		15
50%	13	5	5	5	8.7		8.7	7.8		7.9	18.8		21.0	1385		
"	14	6	6	6	8.7		8.7	7.8		7.9						
"	15	5	3	3	8.7		8.8	7.8		7.9						
"	16	5	5	5	8.7		8.8	7.8		8.0				2190		23
70%	17	5	5	5	8.7		8.8	7.7		8.0	19.0		20.9			
"	18	5	5	5	8.7		8.9	7.7		8.0						
"	19	5	5	5	8.7		8.8	7.7		8.0						
"	20	5	5	4	8.7		8.8	7.7		8.0				2630		3
85%	21	5	5	5	8.6		8.9	7.6		7.9	19.2		20.9			
"	22	5	5	5	8.6		8.9	7.6		7.9						
"	23	5	4	3	8.6		8.9	7.6		7.9						
"	24	5	5	5	8.6		8.9	7.6		7.9				3460		3
100%	25	5	5	4	8.6		8.9	7.4		7.9	19.2		21.0			
"	26	5	4	4	8.6		8.9	7.4		7.9						
"	27	5	5	5	8.6		8.9	7.4		7.9						
"	28	5	5	5	8.6		8.9	7.4		7.9				4010		5
Measured by:		SHW	MF	MF	SHW		MF	SHW	MF	MF	SHW		MF	SHW		
Recorded by:		MF	MF	MF	MF		SW	MF	MF	SHW	MF		SW	MF		

Investigators' Signatures:
Steven H Wolfe
Marshall Faircloth

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					MF
Lab Tot. Resid. Cl2:					MF
Alkalinity:	121	125	128	H-4	SHW
Hardness:	~~120~~ 116	115	634	H-4	SHW
Total Ammonia:	0.0	0.05	0.39	probe	SHW

slope = -58.1

DER Biology Section — Acute-bioassay Bench Sheet

Sample Source: NITRAM
Address/City:
County:
Contact/District:
NPDES Permit #: Outfall #:

Sample Collection: Date 6-19-87 Time 1057
Test Beginning: Date 6-20-87 Time 1115
Test Ending: Date 6-22-87 Time 1100
Test Organism: DAPHNIA PULEX
Life Stage/Age: neonate

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

Remarks:

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	8.6		9.0	7.9		8.0	19.1		20.9			
"	30	5	5	5	8.6		9.0	7.9		8.0						
"	31	5	5	5	8.6		9.0	7.9		8.0						
"	32	5	5	5	8.6		9.0	7.9		8.0				225		230
100%	33	5	5	5	8.6		9.1	7.4		7.9	19.5		20.9			
"	34	5	5	5	8.6		9.1	7.4		7.9						
"	35	5	5	5	8.6		9.1	7.4		7.9						
"	36	5	5	4	8.6		9.1	7.4		7.9				3990		4310
Measured by:		MF	MF	MF	SHW		MF	SHW		MF	SHW		MF	SHW		NA
Recorded by:		MF	MF	MF	MF		SW	MF		SW	MF		SW	MF		SW

Investigators' Signatures

Steven H Wolf

Marshall Faircloth

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: NITRAM
Address/City:
County:
Contact/District:
NPDES Permit #: Outfall #:

Sample Collection: Date 6-19-89 Time 1057
Test Beginning: Date 6-20 89 Time 1130
Test Ending: Date 6-22-89 Time 1130
Test Organism: Metrops laeds
Life Stage/Age: Neo

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

Remarks:

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	2	5	5	5	8.3	8.0	8.6	7.6	7.8	7.8	21.1	19.8	20.1	~~2254~~		
"	12	5	5	5	8.3	8.0	8.6	7.6	7.8	7.8				225		225
10%	62	5	5	5	8.3	8.0	8.5	7.6	7.7	7.7	21.2	19.6	19.7			
"	17	5	5	5	8.3	7.9	8.5	7.6	7.8	7.7				700		670
30%	9	5	5	5	8.2	7.8	8.4	7.5	7.7	7.7	21.3	19.6	19.5			
"	130	5	5	5	8.2	7.8	8.4	7.5	7.7	7.7				1550		1490
50%	234	5	5	5	8.2	7.8	8.5	7.4	7.7	7.6	21.5	19.5	19.5			
"	10	5	5	5	8.2	7.8	8.5	7.4	7.7	7.6				2390		2310
70%	174	5	5	5	8.2	7.8	8.5	7.3	7.6	7.6	21.5	19.5	19.5			
"	271	5	5	5	8.2	7.8	8.4	7.3	7.6	7.6				3200		3110
85%	66	5	5	5	8.2	7.8	8.5	7.2	7.6	7.6	21.6	19.4	19.4			
"	113	5	5	5	8.2	7.8	8.5	7.2	7.6	7.6				3770		3690
100%	56	5	5	5	8.1	7.7	8.5	7.2	7.6	7.6	21.4	19.4	19.4			
"	14	5	5	5	8.2	7.7	8.6	7.2	7.6	7.6				4340		4250
Measured by:		MF	MF	MF	SHW	MF	MF	SHW	MF	MF	SHW	MF	MF	SHW		
Recorded by:		MF	MF	MF	MF	MF	SW	MF	MF	SW	MF	MF	SW	MF		

Investigators' Signatures

Steven T. Wolfe
Mark Fairchild

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: Nitram Chemical Co.

GRAPH CALC EC 50 (15 MIN, 15 °C) = Stim @ 47% SAMPLE mg/L

SAMPLE DATA:

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.):

DATE ASSAYED: 6/30/89 TIME: 1300 Hrs

VISUAL COLOR: CORRECTION REQUIRED: YES (NO)

VISUAL TURBIDITY: SEPARATION REQUIRED: YES (NO)

INITIAL pH: pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS DRY NaCl OTHER

PRIMARY DILUTION OF SAMPLE:

OPERATOR: M. Forsloth REAGENT VIAL LOT NO. M- None

REMARKS:

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	Γ5	Γ15	NOTES
A1	0	86	17	X	X	Normal Sensitivity and
B1		90	18			
C1		72	16			
A2	12.5%	130	21	-.114	-.19	Again from 5 min
B2		140	22			to 15 min Reading
C2		97	20			
A3	24.9	100	22	-.15		
B3		100	23			
C3		100	23			
A4	49.90	> 100	23	-.15		
B4		> 100	24			
C4		> 100	23			
A5	99	> 100	30	-.15	-.45	
B5		> 100	32			
C5		> 100	30			
EC_{50} (MIN, °C)						Stimulatory

REVIEWED BY:

DATE: 10/3/89