

Bioassays of

Mobil Mining
Fort Meade Mine & Nichols Mine

Polk County, Florida

NPDES #FL0000302 & FL0000311

Sampled 8/17/92

October 1992

Biology Section
Division of Technical Services

Bioassays of

Mobil Mining
Fort Meade Mine & Nichols Mine

Polk County, Florida

NPDES #FL0000302 & FL0000311

Biology Section
Bureau of Laboratories
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Introduction

Mobil Mining - Fort Meade Mine, NPDES #FL0000302, and Mobil Mining - Nichols Mine, NPDES #FL0000311, Polk County, Florida, tests performed on 18 to 20 August, 1992.

The Fort Meade phosphate mining and beneficiation operation is located on US 17, six miles east of Bowling Green. The Nichols mining operation is located at Anderson Road and Highway 640 in Nichols. At both operations, waste clay slurry generated in the phosphate rock washing process is pumped to clay settling areas. After settling, the clarified liquid is pumped back into the plant for reuse. Excess water in the settling areas due to rainfall is discharged through permitted outfalls.

Of the eight permitted outfalls at the Fort Meade mine, outfall 001, discharging into the Peace River, was sampled. Of the five permitted outfalls at the Nichols mine, 001, discharging into Guy Branch, a tributary of the north prong of the Alafia River, was sampled.

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1991, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition, EPA/600/4-90/027.

Results and Discussion

The FDER Biology Section performed two 48-hour static acute screening toxicity bioassays on samples of effluent from outfall 001 at each mine. The bioassay organisms used for these tests were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Notropis leedsi*. The test results did not indicate toxicity.

Total residual chlorine was measured at < 0.02 mg/L for each sample. Total ammonia was not detected in the sample.

Conclusion

The samples of effluent collected on 17 August, 1992, from these outfalls did not show toxicity.

Table 1. Concentration series and volumes used for the 48-hour static acute screening bioassays of the Mobil Mining operation effluents, sampled from the Ft. Meade and Nichols mines, performed on 18 to 20 August, 1992.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	20 mL	0 mL	20 mL
100 %	0 mL	20 mL	20 mL

Notropis leedsi (bannerfin shiner)

Concentration	Dilution Water	Sample	Total Volume
Control	500 mL	0 mL	500 mL
100 %	0 mL	500 mL	500 mL

Table 2. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Mobil Mining Ft. Meade Mine, Ft. Meade, Polk County, Florida, NPDES# FL0000302, performed on 18 to 20 August, 1992.

Facility:	**Mobil Mining - Ft. Meade Mine**		NPDES #	FL0000302	Facility Type: **Phosphate Mining**
Location:	Ft. Meade		Contact/District:	Kathy Hicks / SW	
County:	Polk		Test type:	static acute screen	
Sample Collection Date:	8/17/92	Time: 1500	# tests:	2	Receiving Water: Peace River
Test Beginning Date:	8/18/92	Time: 1130	Chlorination Type:	**unchlorinated**	
Test Ending Date:	8/20/92	Time: 1145			**Page 1 of 1**

Organism: ***Ceriodaphnia dubia*** Life stage: < 24 hours old

	SURVIVAL			pH			Temperature			Dissolved Oxygen			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	8.5	-	8.2	23.7	-	23.8	8.1	-	8.0	172	167
Control	5	5	5	-	-	8.3	-	-	-	-	-	8.0	-	-
Control	5	4	4	-	-	8.3	-	-	-	-	-	8.0	-	-
Control	5	5	5	-	-	8.3	-	-	-	-	-	8.0	-	-
100%	5	5	5	7.8	-	8.5	24.2	-	23.7	7.2	-	7.8	311	318
100%	5	4	4	-	-	8.5	-	-	-	-	-	7.9	-	-
100%	5	5	5	-	-	8.5	-	-	-	-	-	7.9	-	-
100%	5	5	5	-	-	8.5	-	-	-	-	-	8.0	-	-

Organism: ***Notropis leedsi*** Age: 10 days

	SURVIVAL			pH			Temperature			Dissolved Oxygen			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	24 hour
Control	5	5	5	7.9	8.4	8.4	25.0	23.7	23.3	7.7	8.3	8.1	-	-
Control	5	5	5	7.9	8.4	8.4	-	-	-	7.7	8.3	8.1	244	242
100%	5	5	5	7.7	8.2	8.3	24.1	23.7	23.3	6.9	8.1	8.0	-	-
100%	5	5	5	7.7	8.2	8.3	-	-	-	6.9	8.1	8.0	323	321

Total Residual Cl2	mg/l	Method
Field:	not measured	
Lab:	< 0.02	Hach

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

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	135	123
Cond. Control Water (daphnids):	71	78
100% Sample:	109	134

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

Table 3. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the Mobil Mining Nichols Mine, Nichols, Polk County, Florida, NPDES# FL0000311, performed on 18 to 20 August, 1992.

Facility:	Mobil Mining - Nichols Mine			NPDES #	FL0000311	Facility Type:	Phosphate Mining
Location:	Nichols			Contact/District:	Kathy Hicks / SW		
County:	Polk			Test type:	static acute screen		
Sample Collection Date:	8/17/92	Time:	1500	# tests:	2	Receiving Water:	Guy Branch, then to
Test Beginning Date:	8/18/92	Time:	1130	Chlorination Type:	unchlorinated		north prong of Alafia River
Test Ending Date:	8/20/92	Time:	1145			Page 1 of 1	

Total Residual Cl2	mg/l	Method
Field:	not measured	
Lab:	< 0.02	Hach

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

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	135	123
Cond. Control Water (daphnids):	71	78
100% Sample:	68	189

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

Organism: ***Ceriodaphnia dubia*** Life stage: < 24 hours old

	SURVIVAL			pH			Temperature			Dissolved Oxygen			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	8.5	-	8.3	23.6	-	23.8	8.1	-	8.0	162	153
Control	5	5	5	-	-	8.3	-	-	-	-	-	8.0	-	-
Control	5	5	5	-	-	8.3	-	-	-	-	-	8.0	-	-
Control	5	5	5	-	-	8.3	-	-	-	-	-	8.0	-	-
100%	5	5	5	7.9	-	8.3	24.1	-	23.9	7.9	-	8.0	463	475
100%	5	5	5	-	-	8.3	-	-	-	-	-	8.0	-	-
100%	5	4	4	-	-	8.3	-	-	-	-	-	8.0	-	-
100%	5	5	5	-	-	8.3	-	-	-	-	-	8.0	-	-

Organism: ***Notropis leedsi*** Age: 10 days

	SURVIVAL			pH			Temperature			Dissolved Oxygen			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	24 hour
Control	5	5	5	8.0	8.4	8.5	24.0	23.7	23.3	7.8	8.4	8.1	-	-
Control	5	5	5	8.0	8.4	8.5	-	-	-	7.8	8.4	8.1	244	245
100%	5	5	5	7.9	8.1	8.1	24.7	23.7	23.3	7.7	8.2	8.0	-	-
100%	5	5	5	7.9	8.1	8.1	-	-	-	7.7	8.2	8.0	494	488

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Mobil Mining, Ft Meade
Address/City:
County: POLK
Contact/District: K Hicks / Southwest
NPDES Permit #: FL00 Outfall #:

Sample Collection: Date 8/17/92 Time 1500
Test Beginning: Date 8/18/92 Time 1130
Test Ending: Date 8/20/92 Time 1145
Test Organism: Ceriodaphnia dubia
Life Stage/Age: <24 hours

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

Remarks: 92 AUG 18 12 3958 1
Sample log 8/4/92 MF FLD ID 003

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7.0, 10.0	8.5 @ 24°C	23.7 @ 23.6	990 / 9870
24 hr	7.0, 10.0	8.5 @ 24°C	23.7 @ 23.7	991 / 9810 @ 23°C
48 hr	7.0, 10.0	8.5 @ 24°C	23.7 @ 23.7	988 / 9850 @ 24.0°C

		Number Live			pH			Temp. (°C)			DO (mg/L)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control	A	5	5	5	8.5		8.2	23.7		23.8	8.1		8.0	172	/	167
Control	B	5	5	5			8.3						8.0			
Control	C	5	4	4			8.3						8.0			
Control	D	5	5	5			8.3						8.0			
100%	A	5	5	5	7.8		8.5	24.2		23.7	7.2		7.8	311		318
100%	B	5	4	4			8.5						7.9			
100%	C	5	5	5			8.5						7.9			
100%	D	5	5	5			8.5						8.0			
Measured/Loaded by:		MF	MF	MF	MF		MF	MF		MF	MF		MF	MF		MF
Recorded by:		MF	MF	MF	MF		MF	LM		MF	LM		MF	LM		MF

Investigators' Signatures
Marshall Faircloth
Liz Miller

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:	0.0	0.0	<0.02	Hach	MF
Alkalinity:	~~135~~ ~~23~~ MF	71	109	Hach	LM
Hardness:	~~123~~ ~~35~~ MF	78	134	Hach	LM
Total Ammonia:	0.0	0.0	0.0	Orion	MF

Ammonia Meter Slope: -57.5
Ammonia Blank: 0.0
Salinity Sample: 0 ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Mobil Mining, Fort Meade
Address/City:
County: Polk
Contact/District: K. Hicks / SW
NPDES Permit #: FL00 00302 Outfall #:

Sample Collection: Date 8/11/92 Time 1500
Test Beginning: Date 8/18/92 Time 1130
Test Ending: Date 8/20/92 Time 1145
Test Organism: Mysidopsis bahia
Life Stage/Age: 10 days

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

Remarks: Q2 AAC 18 12 39581
Sample(s) 8/14/92 of FLID 003

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7.7, 10, 10	8.5 @ 24°C	23.7 @ 23.6	990 9870
24 hr	7.7, 10, 10	8.5 @ 24°C	23.7 @ 23.7	991 9870 @ 23.9
48 hr	7.7, 10, 10	8.5 @ 24°C	23.7 @ 23.7	988 9880 @ 24.0°C

		Number Live			pH			Temp. (°C)			DO (mg/L)			Cond. (µmhos/cm)		
Conc.	Chamber #	0	24	48	0	24	48	0	24	48	0	24	48	0	24	48
Control	38	5	5	5	7.9	8.4	8.4	25.0	23.7	23.3	7.7	8.3	8.1			
Control	76	5	5	5	7.9	8.4	8.4				7.7	8.3	8.1	244	243	242
100%	47	5	5	5	7.7	8.2	8.3	24.1	23.7	23.3	6.9	8.1	8.0			
100%	61	5	5	5	7.7	8.2	8.3				6.9	8.1	8.0	323	321	321
Measured/Loaded by:		MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:		MF	MF	MF	MF	MF	MF	LM	MF	MF	LM	MF	MF	LM	MF	MF

Investigators' Signatures
Marshall Faircloth
Liz Miller

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:	0.0	0.0	<0.02	Hach	MF
Alkalinity:	135	71	109	Hach	LM
Hardness:	123	78	134	Hach	LM
Total Ammonia:	0.0	0.0	0.0	Orion	MF

Ammonia Meter Slope: -57.5 Ammonia Salinity

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Mobil Mining Nichols Mine
Address/City:
County: POLK
Contact/District: K. Hicks / SW
NPDES Permit #: FL0000311 Outfall #:

Sample Collection: Date 8/17/92 Time 10:45
Test Beginning: Date 8/18/92 Time 1130
Test Ending: Date 8/20/92 Time 1145
Test Organism: Ceriodaphnia dubia
Life Stage/Age: < 24 hrs

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

92AAG 1812 39580
FLDID 001 Sample log 8/21/92 MF

Remarks:

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7.0, 10.10	8.5 @ 24°C	23.7 @ 23.6	980 / 5870
24 hr	7.0, 10.10	8.5 @ 24°C	23.7 @ 23.7	991 / 5870 @ 23.9
48 hr	7.0, 10.10	8.5 @ 24°C	23.7 @ 23.7	988 / 5850 @ 24°C

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	DO (mg/L) 0	24	48	Cond. (µmhos/cm) 0	24	48
Control	A	5	5	5	8.5		8.3	23.6		23.8	8.1		8.0	162		153
Control	B	5	5	5			8.3						8.0			
Control	C	5	5	5			8.3						8.0			
Control	D	5	5	5			8.3						8.0			
100%	A	5	5	5	7.9		8.3	24.1		23.9	7.9		8.0	463		475
100%	B	5	5	5			8.3						8.0			
100%	C	5	4	4			8.3						8.0			
100%	D	5	5	5			8.3						8.0			
Measured/Loaded by:		MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:		MF	MF	MF	MF	MF	MF	LM	MF	MF	LM	MF	MF	LM	MF	MF

Investigators' Signatures
Marshall Faircloth
Liz Millers

Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:	0.0	0.0	< 0.02	Hach	MF
Alkalinity:	135	71	68	Hach	LM
Hardness:	123	78	189	Hach	LM
Total Ammonia:	0.0	0.0	0.0	Orion	MF

Ammonia Meter Slope: -57.5
Ammonia Blank: 0.0
Salinity Sample: 0 ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: Mobil Mining Nichols Mine
Address/City:
County: POLK
Contact/District: K Hicks / SCW
NPDES Permit #: FL0000311 Outfall #:

Sample Collection: Date 8/17/92 Time 10:45
Test Beginning: Date 8/18/92 Time 1130
Test Ending: Date 8/20/92 Time 1145
Test Organism: Mothyis leodae
Life Stage/Age: 10 days

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

Remarks:

92 AUG 18 12 39580
FLD ID 001
Sample log 8/21/92 MF

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7.8, 7.0, 10.0	8.5 @ 24°C	23.7 @ 23.6	990 @ 1K, 9870 @ 10K
24 hr	7.7, 10.0, 10	8.5 @ 24°C	23.7 @ 23.7	991, 9930 @ 23.1
48 hr	7.7, 10.0, 10	8.5 @ 24°C	23.7 @ 23.7	988, 9880 @ 24.0°C

Conc.	Chamber #	Number Live 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	DO (mg/L) 0	24	48	Cond. (µmhos/cm) 0	24	48
Control	13	5	5	5	8.0	8.4	8.5	24.0	23.7	23.3	7.8	8.4	8.1			
Control	87	5	5	5	8.0	8.4	8.5				7.8	8.4	8.1	244	245	245
100%	21	5	5	5	7.9	8.1	8.1	24.7	23.7	23.3	7.7	8.2	8.0			
100%	75	5	5	5	7.9	8.1	8.1				7.7	8.2	8.0	494	488	488
Measured/Loaded by:		MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:		MF	MF	MF	MF	MF	MF	LM	MF	MF	LM	MF	MF	LM	MF	MF

Investigators' Signatures
Marshall Faircloth
Liz Miller

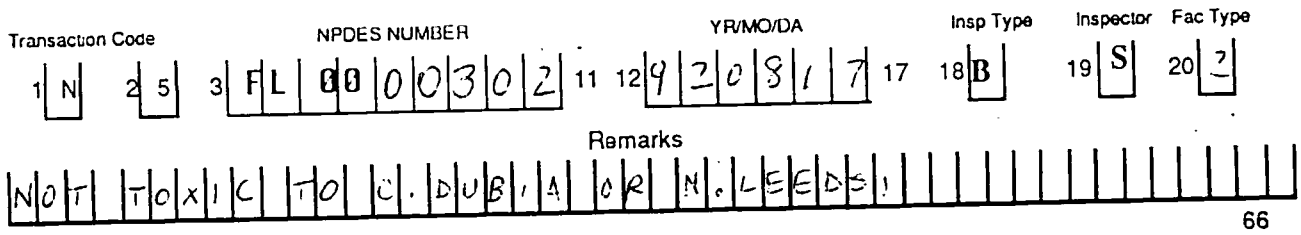
Reviewer

Water-quality Parameters

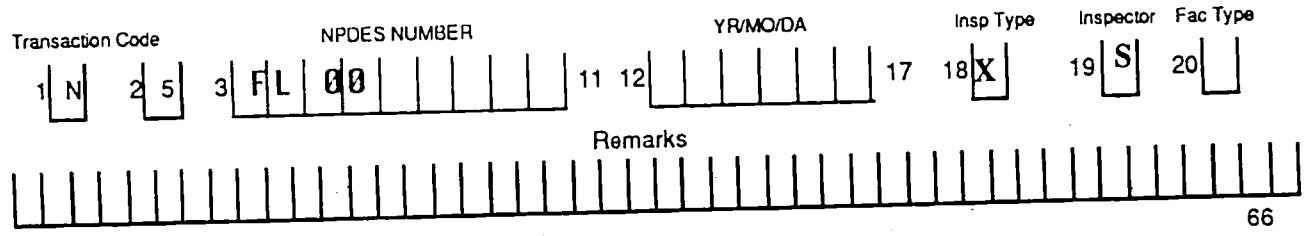
	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:	0.0	0.0	<0.02	Hach	MF
Alkalinity:	135	71	68	Hach	LM
Hardness:	123	78	189	Hach	LM
Total Ammonia:	0.0	0.0	0.0	Orion	MF

Ammonia Ammonia Salinity

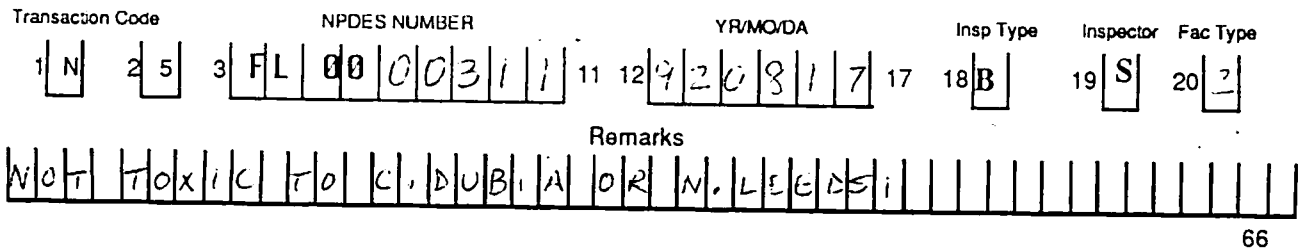
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