

Bioassays of

E. I. Dupont de Nemours - Trail Ridge Mine

Stark, Bradford County, Florida

NPDES #FL0000051

Sampled 4/24/95

June 1995

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan #870346G

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Biology Section
Bureau of Laboratories
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Introduction

E. I. Dupont de Nemours - Trail Ridge Mine, Stark, Bradford County, Florida, NPDES #FL0000051, tests performed on 25 to 27 April, 1995.

This heavy mineral mining facility is located off State Road 230 near Stark. It has a design flow of 20 MGD and an average flow of 8.5 MGD. Wastewater from the mining operation is acidified to flocculate colloidal material which is settled in a series of diked ponds. The wastewater is then neutralized with hydrated lime and undergoes additional settling prior to discharge to Alligator Creek (facility summary provided by Dan Hull and Rich Bowman, FDEP Jacksonville).

The toxicity tests discussed in this report were performed in accordance with methods described by Weber, 1993, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, 4th Edition, EPA/600/4-90/027F.

Results and Discussion

The FDEP Biology Section performed two 48-hour static acute screening toxicity bioassays with a sample of effluent from this facility. The test species used for these bioassays were the water flea, *Ceriodaphnia dubia*, and the bannerfin shiner, *Cyprinella leedsi*. The test results did not indicate toxicity (Table 1).

Total residual chlorine and total ammonia were not detected in the sample. Further chemical analyses were performed on the sample and several metals were identified (Table 2).

Conclusion

The sample of effluent collected from this facility on 24 April, 1995, did not show toxicity.

Table 1. Data recorded during the 48-hour acute screening bioassays of a sample of effluent from the E. I. Dupont de Nemours-Trail Ridge facility, Stark, Bradford County, Florida, NPDES# FL0000051, performed on 25 to 27 April, 1995.

Facility:	**E. I. Dupont de Nemours Trail Ridge facility**		**NPDES #**	**FL0000051**	Facility Type: **Mining**
Location:	State Road 230, Stark		Contact/District:	T. McKelvey/Northeast	
County:	Bradford		Test type:	static acute screen	
Sample Collection Date:	**4/24/95**	Time: 1115	# tests:	2	Receiving Water: Alligator Creek
Test Beginning Date:	4/25/95	Time: 1530	Chlorination Type:	**Not Chlorinated**	
Test Ending Date:	4/27/95	Time: 1530			**Page 1 of1**

Total Residual CL2	mg/L	Method
Field:	-	-
Lab:	<0.03	DR-100

Ammonia	Total (mg/L)	Unionized (mg/L)
Control Water (fish):	< 0.017	0.00
20% Dilute Mineral Water (cladocerans):	< 0.017	0.00
100% Sample:	<0.017	0.00

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	125	120
20% Dilute Mineral Water (cladocerans):	75	80
100% Sample:	15	130

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

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

	Sample/Diluent	**SURVIVAL # Alive**			pH			Temperature [A]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	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 A	0/20	5	5	5	8.1	-	8.2	23.8	-	24.2	7.8	-	8.1	170	175
Control B	0/20	5	5	5	-	-	8.2	-	-	24.0	-	-	8.1	-	180
Control C	0/20	5	5	5	-	-	8.2	-	-	23.9	-	-	8.2	-	175
Control D	0/20	5	5	5	-	-	8.2	-	-	23.7	-	-	8.2	-	175
100% A	20/0	5	5	5	7.5	-	7.6	23.5	-	23.9	7.5	-	8.3	465	550
100% B	20/0	5	5	5	-	-	7.6	-	-	23.7	-	-	8.6	-	545
100% C	20/0	5	5	5	-	-	7.6	-	-	23.6	-	-	8.3	-	530
100% D	20/0	5	5	5	-	-	7.6	-	-	23.4	-	-	8.3	-	540

[A] Temperature of the test incubator was continously recorded on a strip chart recorder. Incubator temperature range for the test period was 23.3-24.4°C.

Organism: ***Cyprinella leedsi*** Age: 11 days

	Sample/Diluent	**SURVIVAL # Alive**			pH			Temperature [B]			Dissolved Oxygen			Conductivity Uncorrected µmhos/cm	
Concentrations	Volume(mL)	0 hr	24 hr	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 A	0/500	5	5	5	7.9	8.2	8.3	23.9	23.0	24.1	7.6	8.3	7.9	245	250
Control B	0/500	5	5	5	7.9	8.2	8.3	-	-	23.9	7.6	8.3	7.9	245	260
Control C	0/500	5	5	5	7.9	8.2	8.3	-	-	23.8	7.6	8.3	8.1	245	250
Control D	0/500	5	5	5	7.9	8.2	8.3	-	-	23.8	7.6	8.4	8.2	245	255
100% A	500/0	5	5	5	7.6	7.7	7.7	24.1	23.0	23.8	7.3	8.3	8.3	490	495
100% B	500/0	5	5	5	7.6	7.6	7.7	-	-	23.6	7.3	8.2	8.2	485	495
100% C	500/0	5	5	5	7.6	7.6	7.6	-	-	23.5	7.3	8.3	8.3	490	490
100% D	500/0	5	5	5	7.6	7.5	7.6	-	-	23.5	7.4	8.3	8.3	490	495

[B] Temperature of test room was continously recorded on a strip chart recorder. Room temperature range for the test period was 23.5-24.2°C.

Table 2. Results of chemical analyses on the effluent from the E. I. Dupont de Nemours-Trail Ridge facility sampled on April 24, 1995.

Metals

Aluminum	1020	µg/L [A]
Calcium	46.3	mg/L [A]
Iron	233	µg/L [A]
Magnesium	3.25	mg/L [A]

Base, Neutral, & Acid Extractable Organic Compounds

None Detected

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

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Dupont trail ridge effluent
County: Bradford
Contact / District: Tim McKelvey / NE
NPDES Permit #: FL00~~40274~~ 00051 (initial data incorrect mf 5/31/95)
LIMS Sample #: 104809 LIMS Job #: 95-Apr-25-18 (sample log 4/28)

Sample Collection: Date 4-24-95 Time 1115
Test Beginning: Date 4-25-95 Time 1530
Test Ending: Date 4-27-95 Time 1530
Organism Batch #: 16 Diluent Batch #: Well
Organism Age: 11 days old
Test Organism: Cyprinella leedsi

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

Test Number: 1 of 2

Remarks:

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 10.0 @ 10.0	23.5 @ 23.6	8.5 @ 23.3 °C 107.6 @ 98.6 @ 24.2 °C	15.40 @ 10.73 997 @ 1004
24 hr	7.0 @ 7.0 10.0 @ 10.0	24.3 @ 24.4	8.4 @ 23.8 °C 107.6 @ 98.6 @ 24.1 °C	15.3 @ 10.73 1004 @ 1004
48 hr	7.0 @ 7.0 10.0 @ 10.0	23.8 @ 23.9	8.2 @ 25.2 °C 1008 @ 1004 @ 24.5 °C	108.3 @ 98.6 1022 @ 1028

Conc.	Chamber #	Number Live 0 hr	Number Live 24 h	Number Live 48 h	pH 0 hr	pH 24 h	pH 48 h	Temperature (°C) 0 hr	Temperature (°C) 24 h	Temperature (°C) 48 h	D.O. (mg/L) 0 hr	D.O. (mg/L) 24 h	D.O. (mg/L) 48 h	UNCORRECTED Cond. (mmhos/cm) 0 hr	UNCORRECTED Cond. (µmhos/cm) 24 h	UNCORRECTED Cond. (µmhos/cm) 48 h
CTL A	174	5	5	5	7.9	8.2	8.3	23.9	23.0	24.1	7.6	8.3	7.9	245	245	250
CTL B	502	5	5	5	7.9	8.2	8.3			23.9	7.6	8.3	7.9	245	260	260
CTL C	26	5	5	5	7.9	8.2	8.3			23.8	7.6	8.3	8.1	245	245	250
CTL D	41	5	3	~~3~~ 3	7.9	8.2	8.3			23.8	7.6	8.4	8.2	245	250	255
100%A	11	5	5	5	7.6	7.7	7.7	24.1	23.0	23.8	7.3	8.3	8.3	490	485	495
100%B	198	5	5	5	7.6	7.6	7.7			23.6	7.3	8.2	8.2	485	485	495
100%C	147	5	5	5	7.6	7.6	7.6			23.5	7.3	8.3	8.3	490	480	490
100%D	307	5	5	5	7.6	7.5	7.6			23.5	7.4	8.3	8.3	490	485	495
			*Pan Shipped 3rd # of alive. 4/27/95 MF													
Recorded by:		TR	TR	MF	TR	TR	JBS	TR	TR	JBS	TR	TR	JBS	TR	TR	JBS
Measured/Loaded by:		MF	TR	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF

Investigators' Signatures

Tobin C. Rader

Marshall Faircloth

Jennifer Sparacpane

Reviewer

form updated 10/05/94

Water Quality Parameters

	Salt Water (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):			—	—	—
Lab Total Residual Cl2 (mg/L):	<0.03	—	<0.03	DR-100	TR
Alkalinity (mg/L as $CaCO_3$):	125	—	15	Hach	TR
Hardness (mg/L as $CaCO_3$):	120	—	130	Hach	TR
Total ammonia (mg/L as N):	<0.017	—	<0.017	Orion	JN

Ammonia Meter #98136 Ammonia Meter Slope: -58.6 Ammonia Blank: -0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Dupont trail ridge effluent
County: Bradford
Contact / District: Tim McKelvey / NE
NPDES Permit #: FL00~~40274~~ 00851 Facility Treatment ME splits
LIMS Sample #: 104809 LIMS Job #: 95-Apr-25-18

Sample Collection: Date 4-24-95 Time 1115
Test Beginning: Date 4-25-95 Time 1530
Test Ending: Date 4-27-95 Time 1530
Organism Batch #: 23 Diluent Batch #: 17
Organism Age: < 24 hrs
Test Organism: Ceriodaphnia dubia

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

Test Number: 2 of 2

Remarks:

Instrument Calibrations:	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0 @ 7.0 10.0 @ 10.0	23.5 @ 23.6	8.5 @ 23.3 °C	15.40 @ 10.73 107.6 @ 98.6 @ 24.2 °C
24 hr	7.0 @ 7.0 10.0 @ 10.0	24.3 @ 24.4	8.4 @ 23.8 °C	15.3 @ K 13 (9973 1004) 107.6 @ 98.6 @ 24.1 °C (K 1004)
48 hr	7.0 @ 7.0 10.0 @ 10.0	23.8 @ 23.9	8.2 @ 25.2 °C	108.3 @ 98.6 100.8 @ 100.4 @ 24.5 °C

		Number Live			pH			Temperature (°C)			D.O. (mg/L)			UNCORRECTED Cond. (mmhos/cm) (Cond. (µmhos/cm))		
Conc.	Chamber #	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h	0 hr	24 h	48 h
CTL	A	5	5	5	8.1		8.2	23.8		24.2	7.8		8.1	170		175
Control	B	5	5	5			8.2			24.0			8.1			180
Control	C	5	5	5			8.2			23.9			8.2			195
Control	D	5	5	5			8.2			23.7			8.2			175
100%	A	5	5	5	7.5		7.6	23.5		23.9	7.5		8.3	465		550
100%	B	5	5	5			7.6			23.7			8.3			545
100%	C	5	5	5			7.6			23.6			8.3			530
100%	D	5	5	5			7.5			23.4			8.3			540
Recorded by:		MF	TR	MF	MF		JAS	MF		JAS	MF		JAS	MF		JAS
Measured/Loaded by:		MF	MF	MF	MF		MF	MF		MF	MF		MF	MF		MF

Investigators' Signatures

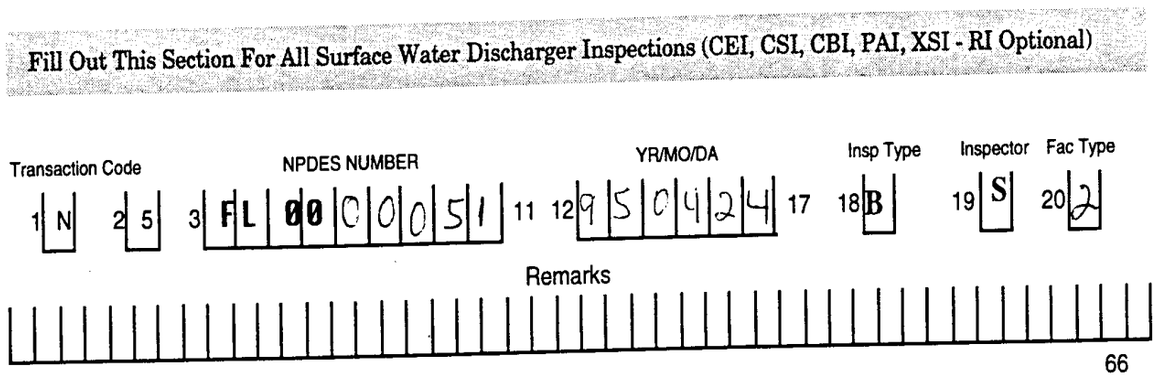
Reviewer

Water Quality Parameters	Salt Water: Well Water / 20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2 (mg/L):		—	—	—
Lab Total Residual Cl2 (mg/L):	<0.03	<0.03	DR-100	TR
Alkalinity (mg/L as $CaCO_3$):	75	15	Hach	TR
Hardness (mg/L as $CaCO_3$):	80	130	Hach	TR
Total ammonia (mg/L as N):	<0.017	<0.017	Orion	MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.6 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

form updated 10/05/94

The Bioassay of the E. I. Dupont de Nemours-Trail Ridge facility effluent sampled on April 24, 1995, NPDES # FL0000051.



The Priority Pollutants Analysis for the Bioassay of E. I. Dupont de Nemours-Trail Ridge facility effluent sampled on April 24, 1995, NPDES # FL0000051.

