

Bioassays of

C-E Basic, Incorporated

Port St. Joe, Gulf County, Florida

NPDES #FL0002607

Sampled 5/11/92

June 1992

Biology Section
Division of Technical Services

Bioassays of

C-E Basic, Incorporated

Port St. Joe, Gulf County, Florida

NPDES #FL0002607

Biology Section
Bureau of Laboratories
June 1992

Introduction

C-E Basic, Incorporated, Port St. Joe, Gulf County, Florida, NPDES #FL0002607, on May 12 to 14, 1992.

This facility is located on Industrial Road 382 North. The process manufactures magnesium oxide by reacting dolomite lime with sea water to precipitate magnesium hydroxide. The magnesium hydroxide is then cooked to drive off the water to yield magnesium oxide as a finished product. The facility consisting of a 300,000 gallon reactor, a 4.66 million gallon thickener tank, and three wash tanks in series (2.124 MG capacity each). The facility discharges 13.5 MGD (design capacity) into the barge basin to the Gulf County Canal, and then to St. Joseph's Bay. According to the NPDES files, the facility has a mixing zone for temperature, pH, and TSS.

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 static acute screening toxicity bioassays on a sample of effluent from this facility. The salinity of the sample was 30 ppt, therefore, the bioassay test species used for these tests was the mysid shrimp, *Mysidopsis bahia*. The control water for the tests was made to a salinity of 30 ppt using Forty Fathoms sea salts; the salinity of the sample was not altered.

Hydrochloric acid was used to lower the pH of a portion of the sample to 8.0 since the original pH of the sample (9.6) was near the upper tolerance limit of the test species. A screening test was performed on the pH-adjusted portion of the sample, as well as the unadjusted portion. The bioassay results indicated that both the original sample and the pH-adjusted portion were toxic to the mysids, producing 48-hour LC_{50}'s < 100%.

Total residual chlorine and total ammonia were not detected in the sample. Additional chemical analyses did not detect metals, organics, or pesticides in the sample. The pH-adjusted and non-adjusted samples were found to be equally toxic, although mortality was somewhat more rapid in the non-adjusted sample. No cause of toxicity was determined.

Conclusion

The sample of effluent from this facility was toxic on 11 May, 1992. No cause of toxicity was determined.

Table 1. Concentration Series and Volumes Used for the Static Acute Screening Bioassays of the C-E Basic, Inc., facility, on 12 to 14 May, 1992.

Mysidopsis bahia (mysid shrimp)

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

Table 2. Results of chemical analyses on the sample of effluent from the C-E Basic, Inc., facility, Gulf County, on 12 May, 1992.

Base Neutral and Acid Extractables

none detected

Metals

none detected

Pesticides

none detected

Table 3. Data recorded during the static acute screening bioassays of a sample of effluent from the C E Basic, Inc., facility, Port St. Joe, Gulf County, Florida, NPDES# FL0002607, on 12 to 14 May, 1992.

Facility:	C-E Basic, Inc.		NPDES #	FL0002607	Facility Type: Chemical Processing
Location:	Industrial Road 382 North, Port St. Joe		Contact/District:	G. Butts / Northwest	
County:	Gulf		Test type:	static screening	
Sample Collection Date:	5/11/92	Time: 1145	# tests:	2	Receiving Water: Gulf Coast Canal
Test Beginning Date:	5/12/92	Time: 1400	Chlorination Type:	not chlorinated	to St. Joseph's Bay
Test Ending Date:	5/14/92	Time: 1400			Page 1 of 1

Total Residual Cl2	mg/l	Method
Field:	not measured	
Lab:	0.0	Hach

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

Salinity	(ppt)	
Control Water:	30	control made with Forty Fathoms.
100% Sample:	30	original salinity of sample as received.

Organism: ***Mysidopsis Bahia*** Age: 1 Day
LC50: <100%

	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	8.2	8.2	8.0	24.5	23.1	23.0	7.2	7.1	6.8	-	-
Control	5	5	5	8.2	8.2	8.0	-	-	-	7.2	7.1	6.8	45300	45200
100%	5	1*	0	9.6	8.8	8.0	24.3	23.0	22.8	7.3	7.2	7.0	-	-
100%	5	0	0	9.6	8.8	8.0	-	-	-	7.3	7.2	7.0	43600	43400

*survivor swimming in circles, jerky movement.

Organism: ***Mysidopsis Bahia*** Age: 1 Day
LC50: <100%

pH adjusted portion of sample.

	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	8.2	8.2	8.0	24.5	23.1	23.0	7.2	7.1	6.8	-	-
Control	5	5	5	8.2	8.2	8.0	-	-	-	7.2	7.1	6.8	45300	45200
100%	5	4	0	8.0**	7.8	7.1	24.3	23.1	23.0	7.3	7.0	6.2	-	-
100%	5	1	0	8.0**	7.8	7.1	-	-	-	7.3	7.0	6.2	43500	43500

** Prior to loading the test organisms, the pH of the sample was adjusted to pH 8.0, per EPA/600/4-90/027 methods.

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: CE BASIC INC
Address/City:
County: Gulf
Contact/District: G Ruffs/NW
NPDES Permit #: FL0002607 Outfall #: 001

Sample Collection: Date 5/11/92 Time 1145
Test Beginning: Date 5/12/92 Time 1400
Test Ending: Date 5/14/92 Time 1400
Test Organism: Mysidopsis bahia
Life Stage/Age: 1 day

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

Lims 92-MAY-12-12 33818
entered 5/14/92 14:22

Remarks:

Forty fathom Sea Salts used to adjust salinity of control to ~ 30 o/oo
* 1 survivor at 24hrs, erratic swimming, jerky, circles

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7.7/10.10	8.5@24°C	23.0@23.0	1355@23.5@1368
24 hr	7@7.10@10	8.7@23	23@23.1	1357@23.0
48 hr	7.7/10@10	8.5@24°	24.0@24.0	1310@24°

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	70	5	5	5	8.2	8.2	8.0	24.5	23.1	23.0	7.2	7.1	6.8	4		
Control	326	5	5	5	8.1	8.2	8.0				7.2	7.1	6.8	45300	44700	45200
100%	14	5	1*	0	9.6	8.8	8.0	24.3	23.0	22.8	7.3	7.2	7.0			
100%	142	5	0	0	9.6	8.8	8.0				7.3	7.2	7.0	43600	43100	43400
Measured/Loaded by:		MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:		MF	MF	MF	DK	KP	MF	DK	KP	DK	DK	KP	DK	DK	KP	DK

Investigators' Signatures

Marshall Faircloth
Kim Pearce
David Kelly
Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	[illegible]		not measured		
Lab Tot. Resid. Cl2:			0.0	Hach	MF
Alkalinity:					
Hardness:					
Total Ammonia:		0	0	Hach	MF

Ammonia Meter Slope: _____
Ammonia Blank: 0
Salinity Sample: 30 ppt

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: CG BASIC
Address/City:
County: Gulf
Contact/District: G Butt / NW
NPDES Permit #: FL0002607 Outfall #: 001

Sample Collection: Date 5/11/92 Time 1145
Test Beginning: Date 5/14/92 Time 1400
Test Ending: Date 5/14/92 Time 1400
Test Organism: Mysidopsis bahia
Life Stage/Age: 1 day

Lims 92-MAY-12-12 33818

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

Remarks:
pH adjusted sample to 8.0 standard units. MF 5/13/92 and abbreviations incorrectly

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7, 7.10@10	8.5@24°C	23@23	1355@23.5@1268
24 hr	7@7, 10@10	8.7@23	23@23.1	1357@23.0
48 hr	7, 7; 10, 10	8.5@24°	24@24.0	1370@24°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	70	5	5	5	8.2	8.2	8.0	24.5	23.1	23.0	7.2	7.1	6.8			
Control	326	5	5	5	8.2	8.2	8.0				7.2	7.1	6.8	45500	44700	45200
100%	38	5	4	0	8.0	7.8	7.1	24.3	23.1	23.0	7.3	7.0	6.2			
100%	30	5	1	0	8.0	7.8	7.1				7.3	7.0	6.2	43500	43100	43500
Measured/Loaded by:		MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF	MF
Recorded by:		MF	MF	MF	DK	KP	MF	DK	KP	DK	DK	KP	DK	DK	KP	DK

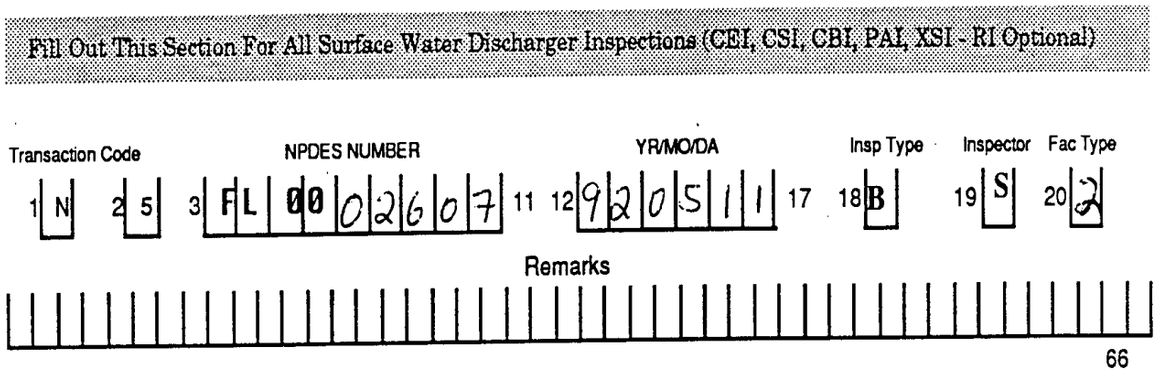
Investigators' Signatures
Marshall Faircloth
Kim Pearce
David Hall
Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	Blind		not measured		
Lab Tot. Resid. Cl2:			0.0	Hach	MF
Alkalinity:					
Hardness:					
Total Ammonia:			0	Hach	MF

Ammonia Meter Slope: _____ Ammonia Blank: 0 Salinity Sample: 30 ppt

The Bioassay of the C-E Basic, Inc., NPDES# FL0002607, effluent sampled on May 11, 1992.



The Priority Pollutants Analysis for the Bioassay of the C-E Basic, Inc., NPDES# FL0025780, effluent sampled on May 11, 1992.

