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Bioassays of

Stone Container Corporation Groundwater Monitoring Wells

Panama City, Bay County, Florida

No NPDES Number

Sampled 4/13 & 14/92

June 1992

Biology Section
Division of Technical Services

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Stone Container Corporation Groundwater Monitoring Wells

Panama City, Bay County, Florida

No NPDES Number

Biology Section
Bureau of Laboratories
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Introduction

Stone Container Corporation Groundwater Quality Monitoring Wells, Panama City, Bay County, Florida, on 14 to 15 April, 1992.
tests performed

This facility is located in Panama City and produces unbleached linerboard and bleached pulp. Although the mill's effluent (18.6 mgd) is piped to Bay County Regional WWTP for final treatment, the process wastewater receives primary treatment at the mill site, beginning in an earthen clarifier.

On-site groundwater monitoring wells #24, 32, 38, and 37 were sampled on 4/13 and 4/14 by Stone Container's consultant and DER NW district staff. The well locations around the clarifier, treatment/holding pond system, and ash pile are shown in Figure 1. The samples were split for independent analysis and testing.

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, and the *Microtox Manual, A Toxicity Testing Handbook*, Microbics Corporation, 1992.

Results and Discussion

The FDER Biology Section performed six toxicity bioassays with samples of groundwater from monitoring wells located at this facility. A static acute screening toxicity bioassay was performed with a sample from well #24. The bioassay organism used for this test was the bannerfin shiner, *Notropis leedsi*. The salinity of the sample from well #24 was 1.3 ppt, as determined in the lab. This salinity precluded testing with the water flea, *Ceriodaphnia dubia*.

The initial D.O. level of the sample from well #24 was 3.6 mg/L. The sample was aerated to an acceptable level (> 4 mg/L) prior to the start of the test. All test solutions (controls and samples) were aerated continuously for the duration of the test to prevent a D.O. crash during the test. The sample was opaque and tan-colored.

The test results indicated that the sample was highly toxic. The *N. leedsi* test for the sample from well #24 was terminated in 20 hours due to 100% mortality in the test concentration, as shown in Tables 2 and 3.

A static acute screening toxicity bioassay was performed with a sample from well #38. The bioassay organism used for this test was also *N. leedsi*. The salinity of the sample from well #38 was 2.4 ppt, as determined in the lab. This salinity precluded testing with *C. dubia*. The initial D.O. level of the sample from well #38 was 1.7 mg/L. The sample was aerated to an acceptable level (> 4 mg/L) prior to the start of the test. All test solutions (controls and samples) were aerated continuously for the duration of the test to prevent a D.O. crash during the test. The sample had a dark coffee color.

The sample from well #38 had an initial pH of 9.9. Prior to the start of the test, the pH of an aliquot was adjusted with hydrochloric acid to test whether other toxicants were present. Another aliquot was mixed 1:1 with the control water to try to lower the pH. Therefore, the test concentrations for this sample were 50% and 100% (pH not adjusted) and 100% (pH was adjusted).

The test results indicated that the sample was highly toxic. The *N. leedsi* test for the sample from well #38 was terminated in 16 hours due to 100% mortality in all test concentrations, as shown in Tables 2 and 4.

The salinity of the samples from wells #32 and 37 were 10.1 ppt and 26.5 ppt, respectively, as determined in the lab. These salinities were appropriate for testing with the mysid shrimp, *Mysidopsis bahia*. Both samples were aerated for 4-6 hours in the lab, but the DO level remained below 2 mg/L (a minimum of 4 mg/L is required) which precluded testing with the mysids. The sample from well #32 had a dark gray color, while the well #37 sample had a coffee color.

An acute definitive Microtox toxicity bioassay was performed with each of the four samples of groundwater from monitoring wells #24, 32, 38, and 37. Adjustments for D.O. and pH were not required for these tests. The bioassay organism used for the four tests was the marine bacterium, *Photobacterium phosphoreum*.

The Microtox tests were performed a second time, using a lower dilution series, for the samples from wells #32, 38, and 37. The lower dilutions were necessary to acquire data without color interference. The well #24 sample did not require color correction. The test results also indicated that the samples were highly toxic. Three of the samples resulted in EC50's < 15%, as shown in Tables 5-7.

The samples were further analyzed for organics, TOX, VOC, metals, and dioxin. The analytes and amounts detected in each groundwater sample are listed in Tables 8-11.

Conclusion

The samples of groundwater from this facility were highly toxic to *N. leedsi* and *P. phosphoreum* on 13 and 14 April, 1991.
which were collected

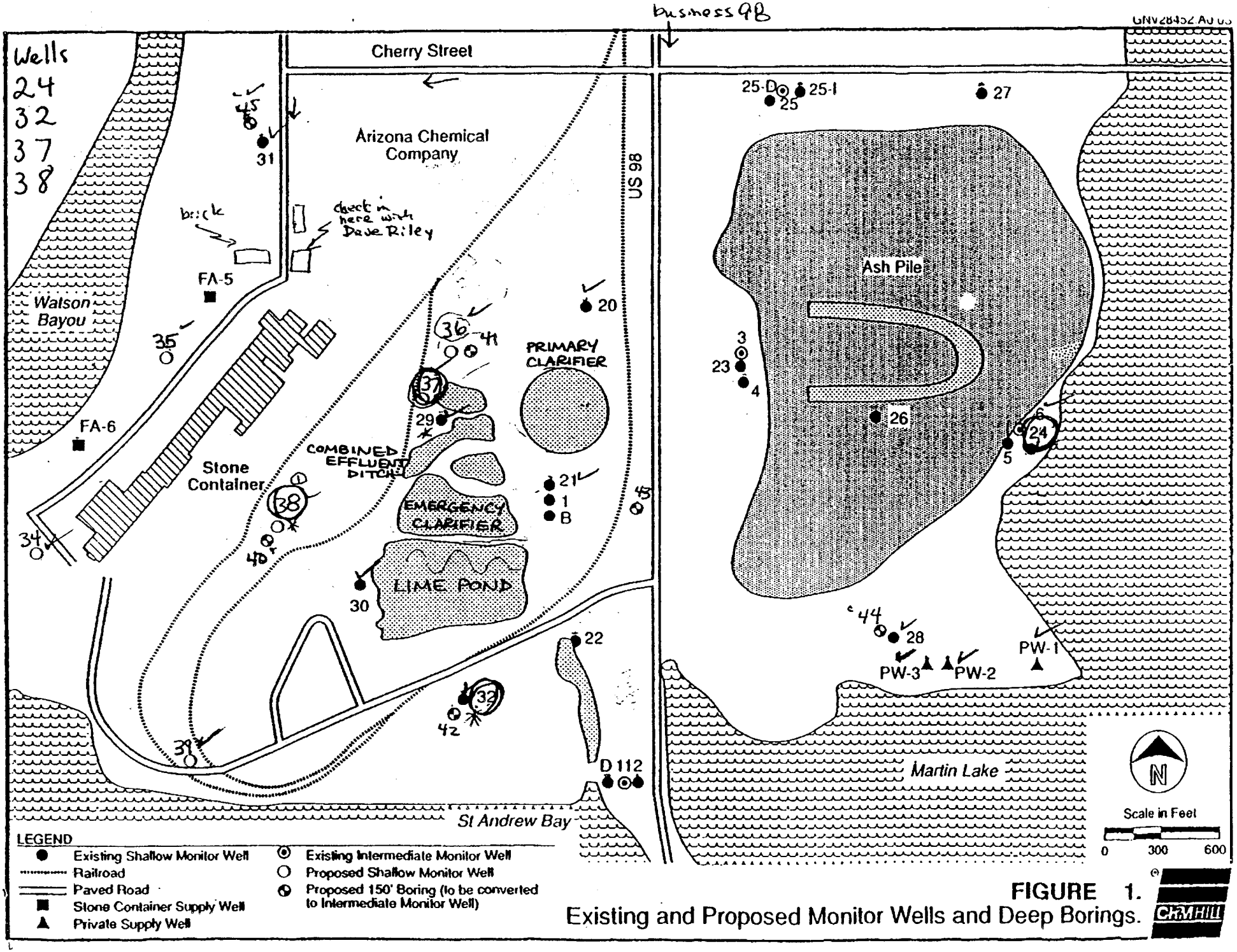


FIGURE 1.
Existing and Proposed Monitor Wells and Deep Borings.

Table 1. Concentration Series and Volumes Used for the Static Acute Screening Bioassays of Stone Container Corporation's groundwater monitoring wells #24 & #38, sampled on 13 April, 1992.

Well #24 - *Notropis leedsi* (bannerfin shiner)

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

Well #38 - *Notropis leedsi* (bannerfin shiner)

Concentration	Dilution Water	Sample	Total Volume
Control	500 mL	0 mL	500 mL
50 %	250 mL	250 mL	500 mL
100 %	0 mL	500 mL	500 mL

Table 2. LC_{50} Data for Bioassays of Stone Container Corporation's groundwater monitoring wells #24 & 38, sampled on 13 April, 1992.

Organism	Method of Data Analysis	LC_{50}
Well #24		
Notropis leedsi	not calculated	< 100% [a]
Well #38		
Notropis leedsi	not calculated	< 50% [b]
Well #38 (sample pH adjusted prior to test)		
Notropis leedsi	not calculated	< 100% [c]

[a] The LC_{50} is < 100% since all the organisms died in the lowest test concentration (100%). Test ran for 20 hours.

[b] The LC_{50} is < 50% since all the organisms died in the lowest test concentration (50%). Test ran for 16 hours.

[c] The LC_{50} is < 100% since all the organisms died in the lowest test concentration (100%). Test ran for 16 hours.

Table 3. Data recorded during the acute screening bioassays of a sample from Stone Container Corporation's groundwater monitoring well #24, Panama City, Bay County, Florida, on 14 to 15 April, 1992.

Facility:	**Stone Container groundwater well #24**		**Well #24**	Facility Type:	**paper mill**
Location:	Panama City		Contact/District:	Glen Butts / NW	
County:	Bay		Test type:	static acute screen	
Sample Collection Date:	**4/13/92**	Time: 1625	# tests:	1	Receiving Water: Martin Lake
Test Beginning Date:	4/14/92	Time: 1300	Chlorination Type:	**not chlorinated**	
Test Ending Date:	4/15/92	Time: 0900			**Page 1 of 1**

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	125	140
100% Sample:	> 1000	815

Salinity (ppt)	
Control Water:	0.0
100% Sample:	1.3

Organism: ***Notropis leedsi*** Age: 11 days
LC50: < 100% Binomial: - Moving Average: - Probit: -

	SURVIVAL			pH			Temperature			Dissolved Oxygen			Conductivity	
Concentrations	# at 0 hr	Live at 20 hr	Live at 48 hr	0 hour	20 hour	48 hour	0 hour	20 hour	48 hour	0 hour	20 hour	48 hour	0 hour	20 hour
Control	5	5	-	7.7	8.3	-	23.0	22.5	-	7.7	8.7	-	-	-
Control	5	5	-	7.7	8.3	-	-	-	-	7.7	8.7	-	237	240
100%	5	0	-	8.3	9.0	-	24.8	22.5	-	8.0 *	8.0	-	-	-
100%	5	0	-	8.3	8.9	-	-	-	-	8.0 *	8.1	-	2640	2280

test terminated at 20 hours.

* initial DO = 3.6 mg/L. Aerated sample prior to loading. Aerated jars throughout test.

Table 4. Data recorded during the acute screening bioassays of a sample from Stone Container Corporation's groundwater monitoring well #38, Panama City, Bay County, Florida, on 14 to 15 April, 1992.

Facility:	**Stone Container groundwater well #38**		**Well #38**	Facility Type:	**paper mill**
Location:	Panama City		Contact/District:	Glen Butts / NW	
County:	Bay		Test type:	static acute screen	
Sample Collection Date:	**4/13/92**	Time: 1030	# tests:	1	Receiving Water: St. Andrew Bay
Test Beginning Date:	4/14/92	Time: 1645	Chlorination Type:	**not chlorinated**	
Test Ending Date:	4/15/92	Time: 0900			**Page 1 of 1**

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	125	140
100% Sample:	450	90

Salinity (ppt)	
Control Water:	0.0
100% Sample:	2.4

Organism: ***Notropis leedsi*** Age: 11 days
LC50: < 50% Binomial: - Moving Average: - Probit: -

	SURVIVAL			pH			Temperature			Dissolved Oxygen			Conductivity	
Concentrations	# at 0 hr	Live at 16 hr	Live at 48 hr	0 hour	16 hour	48 hour	0 hour	16 hour	48 hour	0 hour	16 hour	48 hour	0 hour	16 hour
Control	5	5	-	7.7	8.3	-	23.0	22.5	-	7.3	8.7	-	-	-
Control	5	5	-	7.7	8.3	-	-	-	-	7.3	8.7	-	239	240
50%	5	0	-	9.8	9.5	-	23.8	22.0	-	5.7	8.2	-	-	-
50%	5	0	-	9.8	9.6	-	-	-	-	5.7	8.3	-	2190	2100
100%	5	0	-	9.9	9.8	-	23.7	22.0	-	2.2 **	8.3	-	-	-
100%	5	0	-	9.9	9.9	-	-	-	-	2.0 **	8.3	-	4030	3930
pH adjust,100%	5	0	-	7.6 *	9.0	-	23.9	22.5	-	2.2 **	8.4	-	-	-
pH adjust,100%	5	0	-	7.6 *	9.0	-	-	-	-	2.3 **	8.3	-	4490	4390

test terminated at 16 hours.

* pH adjusted w/ HCl prior to loading.

** initial DO = 1.7 mg/L. Aerated sample to 6.2 mg/L prior to loading. Aerated jars throughout test.

Table 5. Microtox test results, Stone Container Corporation's groundwater monitoring **well #24**, Bay County, on 13 April, 1992.

Microtox Test Culture Lot # M-603 *Photobacterium phosphoreum*

% Sample	monitoring well #24	
	5-min	15-min
0	59	46
0	74	57
0	65	51
12.38	77	53
12.38	71	50
12.38	73	52
24.75	63	43
24.75	64	43
24.75	67	46
49.5	60	40
49.5	77	54
49.5	69	48
99	55	37
99	52	35
99	52	36

Well #24

EC_{50} Nonchlorinated (15 minute, 15 °C) = **107.77 %** 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 (Microbics) Systems Operating Manual, 1982.

The EC_{50} is the sample concentration that reduces the reagent light output by 50%. The effect measured in a Microtox test, light loss, reflects change in the respiration of the test organisms.

Table 6. Microtox test results, Stone Container Corporation's groundwater monitoring **wells #32 & 38**, Bay County, on 13 April, 1992.

Microtox Test Culture Lot # M-603 *Photobacterium phosphoreum*

% Sample	monitoring well #32		monitoring well #38	
	5-min	15-min	5-min	15-min
0	26	16	41	34
0	29	17	35	31
0	32	20	35	32
0.625	22	12	42	35
0.625	24	14	43	36
0.625	25	15	44	38
1.25	23	9	39	32
1.25	20	9	34	31
1.25	23	9	44	37
2.5	18	3	20	17
2.5	16	3	18	14
2.5	18	3	21	17
5.0	11	1	9	5
5.0	10	1	8	5
5.0	10	1	9	6

Well #32

EC_{50} Nonchlorinated, Color-corrected (15 minute, 15 °C) = **1.56** % sample [95% C.I. = 1.19 - 2.04]

Well #38

EC_{50} Nonchlorinated, Color-corrected (15 minute, 15 °C) = **14.19** % sample [95% C.I. = 2.10 - 95.97]

EC_{50} (15 minute, 15 °C) is calculated using the Data Reduction Computer Program (version 6.3) developed by Microbics Corporation.

The EC_{50} is the sample concentration that reduces the reagent light output by 50%. The effect measured in a Microtox test, light loss, reflects change in the respiration of the test organisms.

Table 7. Microtox test results, Stone Container Corporation's groundwater monitoring **well #37**, Bay County, on 14 April, 1992.

Microtox Test Culture Lot # M-603 *Photobacterium phosphoreum*

% Sample	Monitoring Well #37	
	5-min	15-min
0	60	54
0	85	73
0	79	73
0.80	38	32
0.80	42	36
0.80	44	38
1.60	27	18
1.60	28	18
1.60	26	17
3.10	15	7
3.10	14	6
3.10	14	7
6.19	4	1
6.19	3	1
6.19	3	2

Well #37

EC_{50} Nonchlorinated, Color-corrected (15 minute, 15 °C) = **2.72** % sample [95% C.I. = 1.93 - 3.84]

EC_{50} (15 minute, 15 °C) is calculated using the Data Reduction Computer Program (version 6.3) developed by Microbics Corporation.

The EC_{50} is the sample concentration that reduces the reagent light output by 50%. The effect measured in a Microtox test, light loss, reflects change in the respiration of the test organisms.

Table 8. Results of chemical analyses on the sample from Stone Container Corporation's groundwater monitoring **well #24**, Bay County, on 13 April, 1992.

Base-Neutral & Acid Extractables

Tentative identification	*estimated concentration*	
aromatic compounds	10	µg/L
dioxin		none found

Total Organic Halogens

TOX	170	µg/L

Volatile Organic Compounds

none detected

Metals

Arsenic	33	µg/L	T
Iron	5630	µg/L	J
Manganese	34	µg/L	
Potassium	65	µg/L	
Sodium	384	µg/L	

J Estimated value.

T Value reported is less than the practical quantitation limit.

Table 9. Results of chemical analyses on the sample from Stone Container Corporation's groundwater monitoring **well #32**, Bay County, on 13 April, 1992.

Base-Neutral & Acid Extractables

Diethylphthalate	< 5.0	µg/L
m,p-Cresols	2.6	µg/L T

Tentative identification	*estimated concentration*	
sulfur compounds	220	µg/L
aliphatics	130	µg/L
PAH's	100	µg/L
aromatic acids	60	µg/L
aliphatic acids	54	µg/L
aromatics	49	µg/L
alkyl sub phenols	18	µg/L
dioxin		none found

Total Organic Halogens

TOX	40	µg/L

Volatile Organic Compounds

Methylene chloride	36	µg/L

Elevated detection limits due to sample matrix interference.

Metals

Arsenic	164	µg/L
Chromium	307	µg/L
Iron	1810	µg/L J
Manganese	10	µg/L T
Potassium	205	µg/L
Sodium	4300	µg/L

J Estimated value.
T Value reported is less than the practical quantitation limit.

Table 10. Results of chemical analyses on the sample from Stone Container Corporation's groundwater monitoring **well #38**, Bay County, on 13 April, 1992.

Base-Neutral & Acid Extractables

Acenaphthene	M	µg/L
Fluorene	M	µg/L
Naphthalene	M	µg/L
2,4-dimethylphenol	M	µg/L
Phenol	M	µg/L

M: unable to quantitate analytes found. Sample was diluted during cleanup and lab was unable to determine the correct dilution factor. There was not enough sample for a re-extraction.

Total Organic Halogens

TOX	48	µg/L

Volatile Organic Compounds

Benzene	1.2	µg/L T
Ethylbenzene	< 1.0	µg/L
Alkyl benzene	20.0	µg/L J
Aliphatic compound	11.0	µg/L J

Metals

Arsenic	34	µg/L T
Chromium	22	µg/L T
Iron	12,900	µg/L J
Manganese	239	µg/L
Potassium	77	µg/L
Sodium	971	µg/L

J Estimated value.

T Value reported is less than the practical quantitation limit.

Table 11. Results of chemical analyses on the sample from Stone Container Corporation's groundwater monitoring **well #37**, Bay County, on 14 April, 1992.

Base-Neutral & Acid Extractables

Diethylphthalate	< 5.0	µg/L
m,p-Cresols	2.4	µg/L T

Tentative identification	*estimated concentration*	
aliphatics	760	µg/L
aromatics	420	µg/L
PAH's	340	µg/L
alkyl sub phenols	150	µg/L
sulfur compounds	130	µg/L
dioxin		none found

Total Organic Halogens

TOX	100	µg/L

Volatile Organic Compounds

Methylene chloride	260	µg/L
Aliphatic compound	4700	µg/L

Elevated detection limits due to sample matrix interference.

Metals

Arsenic	962	µg/L
Chromium	3,390	µg/L
Iron	68,300	µg/L
Manganese	1,220	µg/L
Potassium	378	µg/L
Sodium	11,100	µg/L

T Value reported is less than the practical quantitation limit.

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: WELL 24 STONE CONTAINER
Address/City:
County: BAY
Contact/District: GLEN BUTTS / NW
NPDES Permit #: FL00 N/A **Outfall #:** GROUNDWATER

Sample Collection: Date 4-13-92 Time 1625
Test Beginning: Date 4-14-92 Time 1300
Test Ending: Date 4-15-92 Time 0900
Test Organism: N. LEEDSI
Life Stage/Age: 11 DAYS

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

92-APR-14-06 #5 32506 ~~06~~ entered 4/16

Remarks:
INITIAL D.O. WAS 3.6 mg/L
AERATED SAMPLE TO 8.8 mg/L PRIOR TO LOADING
DID NOT BOTHER TO TEST UNAERATED SAMPLE SINCE D.O. WAS < 40% SATURATION
SALINITY = 1.5ppt
Test terminated in 20 hours
all jars aerated for duration of test

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr	7@7, 10@10	8.5@24	23%@23.5	1361 @ 23.6
24 hr	7@7, 10@10	8.5@24	23%@23.9	1360 @ 23.7
48 hr				

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	8	5	5		7.7	8.3		23.0	22.5		7.7	8.7				
control	13	5	5		7.7	8.3					7.7	8.7		237	240	
100%	29	5	0		8.3	9.0		24.8	22.5		8.0	8.0				
100%	63	5	0		8.3	8.9					8.0	8.1		2640	2280	
Measured/Loaded by:		MF	KP		MF	KP		MF	KP		MF	KP		MF	KP	
Recorded by:		KP	KP		KP	AJ		KP	AJ		KP	AJ		KP	AJ	

Investigators' Signatures
Kim Pearce
Marbel Faircloth
Alison Jordan

Reviewer

RECORDED ALK + HARD ON WRONG LINE KP 5/29/92

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:	1.25		0900	Hach	AJ
Alkalinity:	140		815	Hach	AJ
Hardness:					
Total Ammonia:					

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

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: ~~WELL~~ 32 KP 4/15 ~~38~~ - STONE CONTAINER
Address/City: WELL 38 KP 4/15
County: BAY
Contact/District: GLEN BUTTS / NW
NPDES Permit #: FL00 n/a Outfall #: GROUNDWATER

Sample Collection: Date 1-13-92 Time 1030
Test Beginning: Date 4/14/92 Time 1645
Test Ending: Date ~~1-15-92~~ Time 0900
Test Organism: N. LEEDSI
Life Stage/Age: 11 DAYS

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

92-APR-14-06 *S 32511 ~~11~~
entered 4/16

Remarks:
Test terminated in 16 hrs
all jars aerated for
duration of test

Instrument Calibrations:

	pH	DO	Temp	Cond
0 hr				
24 hr				
48 hr				

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	3	5	5		7.7	8.3		23.0	22.5		7.3	8.7				
Control	68	5	5		7.7	8.3					7.3	8.7		239	240	
50%	57	5	0		9.8	9.5		23.9	22.0		5.7	8.2				
50%	4	5	0		9.8	9.6					5.7	8.3		2190	2100	
100%	75	5	0		9.9	9.8		23.7	22.0		2.2	8.3				
100%	14	5	0		9.8	9.9					2.0	8.3		4030	3930	
100%	32	5	0		7.6	9.0		23.9	22.5		2.2	8.4				
100%	67	5	0		7.6	9.0					2.3	8.3		4490	4390	
Measured/Loaded by:		MF	KP		MF	KP		MF	KP		MF	KP		MF	KP	
Recorded by:		MF	AJ		MF	AJ		FM	AJ		FM	AJ		FM	AJ	

OH only

Investigators' Signatures
Marshall Faircloth
Sharon Jordan
Kim Pearce
Reviewer

Water-quality Parameters

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:					
Lab Tot. Resid. Cl2:	125		450	Hach	AJ
Alkalinity:	140		90	Hach	AJ
Hardness:					
Total Ammonia:					

RECORDED ALK + HARD ON WRONG LINES KP 5/29/92

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

MICROTOX™ Data Reduction Sheet

SOURCE: WELL-24 STONE CONTAINER COLLECTED 4/13/92 16:25

GRAPH CALC EC _____ (_____ MIN, _____ °C) = _____ %SAMPLE mg/L

SAMPLE DATA: #32505 entered 4/24

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.): LEACHATE, GROUNDWATER

DATE ASSAYED: 4-14-92 TIME: 1330

VISUAL COLOR: LIGHT TAN/YELLOW CORRECTION REQUIRED: (YES) NO at ~~47.5~~ KP 99%

VISUAL TURBIDITY: YES SEPARATION REQUIRED: YES NO

INITIAL pH: 8.3 pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS (DRY NaCl) OTHER INIT COLOR READING = IT = ~~76 at T5~~ KP RE-DO ~~BT = 70 at T10~~ KP

PRIMARY DILUTION OF SAMPLE: Seawater $B_0 = 95$ $I_T = 76$ $B_T = 59$

OPERATOR: JMF REAGENT VIAL LOT NO. M-

REMARKS:

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	Γ5	Γ15	NOTES time = 0
A1	0	59	46			94
B1		74	57			114
C1		65	51			103
A2	12.38	77	53	-.10	-0.01	106
B2		71	50			103
C2		73	52			106
A3	24.75	63	43	0.02	0.17	92
B3		64	43			94
C3		67	46			99
A4	49.5	60	49	-0.04	0.08	87
B4		77	54			108
C4		69	48			102
A5	99	55	37	0.25	0.43	83
B5		52	35			78
C5		52	36			74
EC_{50} (MIN, °C)						

107.77

REVIEWED BY:

DATE: 6/3/92

MICROTOX™ Data Reduction Sheet

SOURCE: WELL 32 Stone Container / collected 4/13/92 12:00

GRAPH CALC EC _____ (_____ MIN, _____ ° C) = _____ %SAMPLE mg/L

SAMPLE DATA: #32509

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.):

DATE ASSAYED: 4-15-92 TIME: 1430 5%

VISUAL COLOR: COFFEE BROWN 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: JMF REAGENT VIAL LOT NO. M-

REMARKS:

B_0 - 94
I_{TO} = 82
B_T = 89

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	Γ5	Γ15	NOTES time Ø
A1	0	26	16			29
B1		29	17			31
C1		32	20			35
A2	0.63	22	12	0.23	0.29	28
B2		24	14			30
C2		25	15			34
A3	1.25	23	9	0.32	0.96	28
B3		20	9			25
C3		23	9			27
A4	2.5	18	3	0.67	4.89	22
B4		16	3			21
C4		18	3			22
A5	5.0	11	1	1.81	16.67	15
B5		10	1			15
C5		10	1			16
EC_{50} (MIN, ° C)						

1.66

REVIEWED BY:
DATE: 6/3/92

MICROTOX™ Data Reduction Sheet

SOURCE: WELL-32 STONE CONTAINER COLLECTED 4-13-92 ~~1625~~ 12:00 LP

GRAPH CALC EC _____ (_____ MIN, _____ ° C) = _____ %SAMPLE mg/L

SAMPLE DATA: #32509

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.): LEACHATE, GROUNDWATER

DATE ASSAYED: 4-14-92 TIME: 1430

VISUAL COLOR: COFFEE BROWN CORRECTION REQUIRED: (YES) at 12.38% NO

VISUAL TURBIDITY: NO SEPARATION REQUIRED: YES NO

INITIAL pH: 8.1 pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS (DRY NaCl) OTHER ~~B=0~~ B_0 = 95, IT = 53, BT = 59

PRIMARY DILUTION OF SAMPLE: Seawater

OPERATOR: JMF REAGENT VIAL LOT NO. M-

REMARKS:

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	Γ5	Γ15	NOTES time 0
A1	0	58	41	/	/	93
B1		52	~~41~~ 37			83
C1		45	30			71
A2	12.38	04	01	9.33	53.00	20 2.80
B2		06	0			23
C2		05	01			22
A3	24.75	01	0	50.67	0	6 11.35
B3		01	0			6
C3		01	0			8
A4	49.5	0	0	0		1 122.50
B4		0	0			1
C4		0	0			0
A5	99	/				/
B5						
C5						
EC_{50} (MIN, ° C)				4.95		

REVIEWED BY:

DATE: 6/3/92

MICROTOX™ Data Reduction Sheet

SOURCE: well 38 - Stone Container / collected 4/13/92 10:30

GRAPH
CALC EC_____ (_____ MIN, _____° C) = _____ %SAMPLE mg/L

SAMPLE DATA: #32513 entered 4/24

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.):

DATE ASSAYED: 4-15-92 TIME: 1430

VISUAL COLOR: CHARCOAL GRAY/BROWN CORRECTION REQUIRED: (YES) NO 5% not needed but done anyhow

VISUAL TURBIDITY: SEPARATION REQUIRED: YES NO

INITIAL pH: pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS DRY NaCl OTHER Seawater

PRIMARY DILUTION OF SAMPLE:

OPERATOR: JMF REAGENT VIAL LOT NO. M- B_0 9'4 I_{15} 86 B_t 89

REMARKS:

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	I5	I15	NOTES time 0
A1	0	41	34			39
B1		35	31			34
C1		35	32			34
A2	0.63	42	35	-0.14	-0.11	38
B2		43	36			36
C2		44	38			40
A3	1.25	39	32	-0.05	-0.03	36
B3		34	31			33
C3		44	37			42
A4	2.5	20	17	0.88	1.02	26
B4		18	14			23
C4		21	17			25
A5	5.0	9	5	3.27	5.01	13
B5		8	5			11
C5		9	6			12
EC_{50} (MIN, ° C)						

5 min 2.68 15 min 3.48

REVIEWED BY:
DATE: 6/3/92

MICROTOX™ Data Reduction Sheet

SOURCE: WELL-38 STONE CONTAINER COLLECTED 4-13-92: 10:30

GRAPH CALC EC_____ (_____ MIN, _____ ° C) = _____. %SAMPLE mg/L

SAMPLE DATA: #32513 entered 4-24

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.): LEACHATE, GROUNDWATER

DATE ASSAYED: 4-14-92 TIME: 1430

VISUAL COLOR: CHARCOAL GRAY/BROWN CORRECTION REQUIRED: (YES) NO at 12.38%

VISUAL TURBIDITY: SOME SEPARATION REQUIRED: YES NO

INITIAL pH: 10.2 pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS (DRY NaCl) OTHER $B_o = 95$, $I_T = 64$, $B_T = 59$

PRIMARY DILUTION OF SAMPLE: Seawater

OPERATOR: JMF REAGENT VIAL LOT NO. M-

REMARKS:

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	Γ5	Γ15	NOTES time 0	
A1	0	38	31			48	
B1		38	31			48	
C1		38	32			49	
A2	12.38	05	03	6.60	9.44	11	3.39
B2		05	03			11	
C2		05	03			11	
A3	24.75	0	0	27.50	46.00	3	8.06
B3		03	02			8	
C3		01	0			5	
A4	49.5	0	0	0		2	19.71
B4		0	0			3	
C4		0	0			2	
A5	99	0	/			1	47.33
B5		0				1	
C5		0				1	
EC_{50} (MIN, ° C)							

4.62

REVIEWED BY:

DATE: 6/3/92

MICROTOX™ Data Reduction Sheet

SOURCE: WELL 37 - Stone container collected 4/14/92

GRAPH
CALC EC_____ (_____ MIN, _____ °C) = _____ %SAMPLE mg/L

SAMPLE DATA: #32627

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.): LEACHATE, GROUNDWATER

DATE ASSAYED: 4-15-92 TIME: 1400

VISUAL COLOR: STRONG COFFEE COLOR CORRECTION REQUIRED: (YES) NO

VISUAL TURBIDITY: SEPARATION REQUIRED: YES NO

INITIAL pH: 9.5 pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS DRY NaCl OTHER Seawater

PRIMARY DILUTION OF SAMPLE: Seawater

OPERATOR: J.M.F REAGENT VIAL LOT NO. M- 3,10

REMARKS:

B_o = 94
I_{Fes} = 80
B.T = 89

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	Γ5	Γ15	NOTES 0 time
A1	0	60	54			50
B1		85	73			66
C1		79	73			72
A2	0.80	38	32	0.81	0.89	34
B2		42	36			40
C2		44	38			41
A3	1.60	27	18	1.77	2.77	26
B3		28	18			26
C3		26	17			24
A4	3.10	15	07	4.21	9.00	14
B4		14	06			14
C4		14	07			14
A5	6.19	04	01	21.40	49.00	08
B5		03	01			06
C5		03	02			07
EC_{50} (MIN, °C)					~~0.91~~ 0.91	

REVIEWED BY:
DATE: 6/3/92

MICROTOX™ Data Reduction Sheet

SOURCE: Well-37 Stone Container Collected 4/14/92

GRAPH CALC EC _____ (_____ MIN, _____ °C) = _____ %SAMPLE mg/L

SAMPLE DATA: #32627

SAMPLE TYPE (EFFLUENT, LEACHATE, ETC.): LEACHATE, GROUNDWATER

DATE ASSAYED: 4-15-92 TIME: 1330

VISUAL COLOR: Coffee (strong) CORRECTION REQUIRED: YES NO (b. 19% see next page)

VISUAL TURBIDITY: SEPARATION REQUIRED: YES NO

INITIAL pH: 9.5 pH ADJUSTED TO: WITH:

OSMOTICALLY ADJUSTED WITH: MOAS DRY NaCl OTHER Seawater

PRIMARY DILUTION OF SAMPLE: Seawater

OPERATOR: Faircloth REAGENT VIAL LOT NO. M- N.L.N.

REMARKS:

MICROTOX™ TEST

SAMPLE CUVETTE	% SAMPLE	READINGS 5 MIN	READINGS 15 MIN	I5	I15	NOTES Time Ø
A1	0	94	81	/	/	96
B1		98	89			100
C1		96	86			102
A2	6.19	02	0	47.0		06
B2		02	0			05
C2		02	0			06
A3	12.38	0	/	0		0
B3		0				0
C3		0				0
A4	24.75	0				0
B4		/				0
C4						0
A5	49.5	/				0
B5						0
C5						0
EC_{50} (MIN, °C)						

REVIEWED BY:

DATE: 6/3/92