

Bioassays of

Florida Caverns Golf Course

Marianna, Jackson County, Florida

No NPDES Number

Sampled 5/4/94

September 1994

Biology Section

Division of Administrative and Technical Services

Comprehensive Quality Assurance Plan #870346G

Bioassays of

Florida Caverns Golf Course

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No NPDES Number

Biology Section
Bureau of Laboratories
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Introduction

Florida Caverns Golf Course, Marianna, Jackson County, Florida, no NPDES #, tests performed on 4 to 6 May, 1994.

This golf course is located at 3309 Caverns Road, north of Marianna. FDEP was prompted to investigate potential pesticide accumulation in a sink hole (and nearby groundwater sites) into which stormwater runoff flows directly from the golf course. The samples were collected by staff from the Agricultural Source and Water Well Management section.

One bioassay sample was collected from each of three sites that were designated as: golf course runoff, residence well, and Pond Cave. The runoff sample was collected from a natural swale which carries sheet flow from the golf course across a dirt road and towards a sink hole. This sample was collected from the swale flow following a rainfall event. The residence well is located about one mile upgradient from the golf course. Pond Cave is a small cave containing a pool formed by the exposed aquifer and is less than 100 yards from the golf course.

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 each of three samples from this golf course, for a total of six tests. The test species used for these bioassays were the water fleas, *Ceriodaphnia dubia* and *Daphnia pulex*. No mortality occurred in any of the tests, therefore, the test results did not indicate toxicity.

Total residual chlorine of the samples were 0.1, < 0.03, and < 0.03 mg/L in the laboratory for the golf course runoff, residence well, and pond cave samples, respectively. Total residual chlorine was not measured in the field.

Total and unionized ammonia concentrations were 0.084 and 0.00 mg/L, respectively, for the golf course runoff. Total ammonia was < 0.017 mg/L in both the residence well and pond cave samples.

Further chemical analyses were performed on the samples and one pesticide and several nutrients were identified (Table 2). The pesticide does not appear to be present in concentrations known to be acutely toxic to the test species. Numerous other pesticides, as well as the metals arsenic and copper, were analyzed for but not detected.

Conclusion

The samples of stormwater runoff and groundwaters collected from and near this golf course on 3 May 1994 did not show toxicity.

Table 1. Concentration series and volumes used for the 48-hour static acute screening bioassays of stormwater and groundwater samples from Florida Caverns Golf Course, performed on 4 to 6 May, 1994.

Ceriodaphnia dubia (water flea)

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

Daphnia pulex (water flea)

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

Table 2. Results of chemical analyses of stormwater and groundwater samples from Florida Caverns Golf Course, sampled on 3 May, 1994.

Pesticides, Herbicides, and Metals

all samples analyzed for the following analytes, but none detected:

acephate
acid herbicides
benomyl, as carbendazim
carbamates
chlorinated pesticides
fenamiphos
fumigants

arsenic
copper

Pesticides & Herbicides

Oryzalin	3.7	µg/L	golf course runoff sample

Nutrients

ammonia	0.19	mg N/L	golf course runoff sample
nitrite-nitrate	0.58	mg N/L [A]	golf course runoff sample
nitrite-nitrate	0.22	mg N/L	residence well sample
nitrite-nitrate	1.8	mg N/L [Q]	pond cave sample
orthophosphate	0.70	mg P/L	golf course runoff sample
orthophosphate	0.030	mg P/L [I]	residence well sample
orthophosphate	0.027	mg P/L [I]	pond cave sample

A Value reported is the mean of two or more determinations.
Q Sample held beyond normal holding time.
I Value reported is less than the minimum quantitation limit, and greater than or equal to the minimum detection limit.

Table 3. Data recorded during the 48-hour static acute screening bioassays of a sample of runoff from the Florida Caverns Golf Course, Jackson County, Florida, No NPDES number, performed on 4 to 6 May, 1994.

Facility:	**Florida Caverns Golf Course**		**NPDES #**	**None**	Facility Type: **Golf Course**
Location:	GC Runoff		Contact/District:	D. Tterlikkis/TT (for Twin Towers)	
County:	Jackson		Test type:	static acute screen	
Sample Collection Date:	**5/3/94**	Time: 1420	# tests:	2	Receiving Water: a sink to aquifer
Test Beginning Date:	5/4/94	Time: 1300	Chlorination Type:	not chlorinated	
Test Ending Date:	5/6/94	Time: 1300			**Page 1 of 1**

Total Residual Cl2	mg/L	Method
Field:	not measured	-
Lab:	0.1	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:	0.084	< 0.001

Alk & Hardness	Alkalinity (mg/L)	Hardness (mg/L)
Control Water (fish):	115	115
20% Dilute Mineral Water (cladocerans):	70	75
100% Sample:	20	20

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	8.1	-	8.2	23.0	-	23.4	8.3	-	8.1	155	200
Control	5	5	5	-	-	8.3	-	-	23.3	-	-	8.1	-	205
Control	5	5	5	-	-	8.3	-	-	23.2	-	-	8.0	-	190
Control	5	5	5	-	-	8.3	-	-	23.3	-	-	8.1	-	180
100%	5	5	5	6.9	-	7.6	23.0	-	23.4	8.0	-	7.9	50	70
100%	5	5	5	-	-	7.6	-	-	23.3	-	-	7.9	-	60
100%	5	5	5	-	-	7.6	-	-	23.3	-	-	7.9	-	55
100%	5	5	5	-	-	7.6	-	-	23.4	-	-	7.9	-	60

Organism: ***Daphnia pulex*** Age: < 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	7.9	-	8.5	22.8	-	23.4	8.4	-	8.1	225	260
Control	5	5	5	-	-	8.5	-	-	23.3	-	-	8.1	-	260
Control	5	5	5	-	-	8.6	-	-	23.1	-	-	8.1	-	265
Control	5	5	5	-	-	8.6	-	-	23.1	-	-	8.2	-	245
100%	5	5	5	7.0	-	7.5	22.8	-	23.3	8.1	-	7.9	60	60
100%	5	5	5	-	-	7.5	-	-	23.4	-	-	7.9	-	60
100%	5	5	5	-	-	7.4	-	-	23.3	-	-	7.9	-	55
100%	5	5	5	-	-	7.4	-	-	23.3	-	-	7.9	-	50

Table 4. Data recorded during the 48-hour static acute screening bioassays of a water sample from a cave pond beneath the Florida Caverns Golf Course, Jackson County, Florida, No NPDES number, performed on 4 to 6 May, 1994.

Facility:	**Florida Caverns Golf Course**		**NPDES #**	**None**	Facility Type: **Golf Course**
Location:	Cave Pond		Contact/District:	D. Tterlikkis/TT	
County:	Jackson		Test type:	static acute screen	
Sample Collection Date:	**5/3/94**	Time: 1530	# tests:	2	Receiving Water: Aquifer
Test Beginning Date:	5/4/94	Time: 1300	Chlorination Type:	not chlorinated	
Test Ending Date:	5/6/94	Time: 1300			**Page 1 of 1**

Total Residual Cl2	mg/L	Method
Field:	not measured	-
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):	115	115
20% Dilute Mineral Water (cladocerans):	70	75
100% Sample:	115	120

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	8.1	-	8.3	22.9	-	23.4	8.5	-	8.1	155	205
Control	5	5	5	-	-	8.3	-	-	23.2	-	-	8.1	-	200
Control	5	5	5	-	-	8.3	-	-	23.0	-	-	8.1	-	190
Control	5	5	5	-	-	8.2	-	-	23.0	-	-	8.1	-	180
100%	5	5	5	7.9	-	8.5	22.8	-	23.4	9.0	-	8.2	255	270
100%	5	5	5	-	-	8.5	-	-	23.3	-	-	8.2	-	285
100%	5	5	5	-	-	8.5	-	-	23.0	-	-	8.2	-	260
100%	5	5	5	-	-	8.5	-	-	23.0	-	-	8.2	-	285

Organism: ***Daphnia pulex*** Age: < 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	8.0	-	8.6	22.6	-	23.4	8.6	-	8.2	225	270
Control	5	5	5	-	-	8.6	-	-	23.2	-	-	8.4	-	275
Control	5	5	5	-	-	8.6	-	-	23.1	-	-	8.3	-	265
Control	5	5	5	-	-	8.6	-	-	23.1	-	-	8.4	-	240
100%	5	5	5	7.9	-	8.6	22.6	-	23.5	8.7	-	8.1	255	295
100%	5	5	5	-	-	8.5	-	-	23.4	-	-	8.0	-	300
100%	5	5	5	-	-	8.6	-	-	23.4	-	-	8.1	-	290
100%	5	5	5	-	-	8.6	-	-	23.4	-	-	8.2	-	285

Table 5. Data recorded during the 48-hour static acute screening bioassays of a well water sample from the residence well at the Florida Caverns Golf Course, Jackson County, Florida, No NPDES number, performed on 4 to 6 May, 1994.

Facility:	**Florida Caverns Golf Course**		**NPDES #**	**None**	Facility Type: **Golf Course**
Location:	Residence Well		Contact/District:	D. Tterlikkis/TT	
County:	Jackson		Test type:	static acute screen	
Sample Collection Date:	**5/3/94**	Time: 1055	# tests:	2	Receiving Water: Aquifer
Test Beginning Date:	5/4/94	Time: 1300	Chlorination Type:	not chlroinated	
Test Ending Date:	5/6/94	Time: 1300			**Page 1 of 1**

Total Residual Cl2	mg/L	Method
Field:	not measured	-
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):	115	115
20% Dilute Mineral Water (cladocerans):	70	75
100% Sample:	180	180

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	8.1	-	8.3	22.7	-	23.4	8.7	-	8.1	155	205
Control	5	5	5	-	-	8.3	-	-	23.5	-	-	8.1	-	200
Control	5	5	5	-	-	8.3	-	-	23.5	-	-	8.1	-	195
Control	5	5	5	-	-	8.3	-	-	23.5	-	-	8.1	-	195
100%	5	5	5	7.6	-	8.7	22.4	-	23.3	8.8	-	8.3	345	425
100%	5	5	5	-	-	8.7	-	-	23.3	-	-	8.3	-	425
100%	5	5	5	-	-	8.7	-	-	23.2	-	-	8.3	-	410
100%	5	5	5	-	-	8.7	-	-	23.2	-	-	8.3	-	430

Organism: ***Daphnia pulex*** Age: < 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	8.0	-	8.6	22.6	-	23.3	8.7	-	8.1	240	290
Control	5	5	5	-	-	8.6	-	-	23.3	-	-	8.3	-	280
Control	5	5	5	-	-	8.6	-	-	23.2	-	-	8.2	-	265
Control	5	5	5	-	-	8.6	-	-	23.2	-	-	8.2	-	260
100%	5	5	5	7.6	-	8.7	22.4	-	23.3	8.9	-	8.3	355	410
100%	5	5	5	-	-	8.7	-	-	23.3	-	-	8.3	-	400
100%	5	5	5	-	-	8.7	-	-	23.2	-	-	8.3	-	395
100%	5	5	5	-	-	8.7	-	-	23.2	-	-	8.3	-	385

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Caverns Golf Course
Location: GC Runoff
County: Jackson
Contact/District: D. Therlikkis PDRS
NPDES Permit #: FL00 ——— **Outfall #:** ———

Sample Collection: Date 05/03/94 Time 1420
Test Beginning: Date 05/04/94 Time 1300
Test Ending: Date 05/06/94 Time 1300
Organism Batch #: 160 **Diluent Batch #:** 160
Organism Age: <24 hrs.
Test Organism: Ceriodaphnia dubia

79068 94-MAY-04-18

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

Test Number: 1 of 2

Remarks:
cloudy sample

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0@7.0 9.0@9.0	23.8@23.9	8.4@24.1	975@1,000 9720@10,000 @23.8 °C
24 hr	7.0@7.0 9.0@9.0	23.5@23.6	8.4@24.0	980@1,000 9750@10,000 @24.1 °C
48 hr	7.0@7.0 9.0@9.0	24.7@24.8	8.4@24.2	980@1,000 9790@10,000 @24.4 °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
Control	A	5	5	5	8.1		8.2	23.0		23.4	8.3		8.1	155		200
Control	B	5	5	5			8.3			23.3			8.1			205
Control	C	5	5	5			8.3			23.2			8.0			190
Control	D	5	5	5			8.3			23.3			8.1			180
100%	A	5	5	5	7.6		7.6	23.0		23.4	8.0		7.9	50		70
100%	B	5	5	5	6.9		7.6			23.3			7.9			60
100%	C	5	5	5	KP		7.6			23.3			7.9			55
100%	D	5	5	5			7.6			23.4			7.9			60
					allowed meter to stabilize better KP 5/4/94											
Measured/Loaded by:		TM	MF	MF	TM		MF	TM		MF	TM		MF	TM		MF
Recorded by:		TM	TM	MF	TM		MF	KP		MF	KP		MF	KP		MF

Investigators' Signatures

Tina Mikuldi
Kim Pearce
Marshall Faircloth

Reviewer

form updated 7/8/93

Water Quality Parameters

	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not measured		
Lab Total Residual Cl2:	<0.03	<0.03	0.1	DR/100	KP
Alkalinity:	115	70	20	Hach	TM/KP
Hardness:	115	75	20	Hach	TM/KP
Total Ammonia:	<0.017	<0.017	0.084	Orion	TM/MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Caverns Golf Course
Location: GC Runoff
County: Jackson
Contact/District: D. Tferlikis PORS
NPDES Permit #: FL00 ——— Outfall #: ———

Sample Collection: Date 05/03/94 Time 1420
Test Beginning: Date 05/04/94 Time 1300
Test Ending: Date 05/06/94 Time 1300
Organism Batch #: 2 Diluent Batch #: well
Organism Age: <24 hrs
Test Organism: Daphnia pulex

79068 94-MAY-04-18

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

Test Number: 2 of 2

Remarks:
cloudy sample

Instrument Calibrations:

	pH	Temperature °C	D.O. mg/L	Conductivity µmhos/cm
meter #	7851	90H018262	90H018262	G9005749
0 hr	7.0@7.0 9.0@9.0	23.8@23.9	8.4@24.1	975@1,000 9720@10,000@23.8 °C
24 hr	7.0@7.0 9.0@9.0	23.5@23.6	8.4@24.0	980@1,000 9750@10,000@24.1 °C
48 hr	7.0@7.0 9.0@9.0	24.7@24.8	8.4@24.2	980@1,000 9790@10,000@24.4 °C

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) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	A	5	5	5	7.9		8.5	22.8		23.4	8.4		8.1	225		260
Control	B	5	5	5			8.5			23.3			8.1			260
Control	C	5	5	5			8.6			23.1			8.1			265
Control	D	5	5	5			8.6			23.1			8.2			245
100%	A	5	5	5	7.0		7.5	22.8		23.3	8.1		7.9	60		60
100%	B	5	5	5			7.5			23.4			7.9			60
100%	C	5	5	5			7.4			23.3			7.9			55
100%	D	5	5	5			7.4			23.3			7.9			50
Measured/Loaded by:		MF	MF	MF	TM		MF	TM		MF	TM		MF	TM		MF
Recorded by:		TM	TM	MF	KP		MF	KP		MF	KP		MF	KP		MF

Investigators' Signatures

Tina Mikulski
Kim Pearce
Marshall Faircloth

Reviewer

form updated 7/8/93

Water Quality Parameters	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not	measured	
Lab Total Residual Cl2:	<0.03	<0.03	0.1	DR100	KP
Alkalinity:	115	70	20	Hach	TM/KP
Hardness:	115	75	20	Hach	TM/KP
Total Ammonia:	<0.017	<0.017	0.084	Orion	TM/MF

Ammonia Meter #98136 Ammonia Meter Slope: −58.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Caverns Golf Course
Location: Pond Cave
County: Jackson
Contact/District: D. Therlikkis PDRS
NPDES Permit #: FL00 — Outfall #: 79069

Sample Collection: Date 05/03/94 Time 1530
Test Beginning: Date 05/04/94 Time 1300
Test Ending: Date 05/06/94 Time 1300
Organism Batch #: 16 Diluent Batch #: 16
Organism Age: <24 hrs.
Test Organism: Ceriodaphnia dubia

94-MAY-04-18

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 9.0 @ 9.0	23.8 @ 23.9	8.4 @ 24.1	975 @ 1,000 9720 @ 10,000 @ 23.8 °C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.5 @ 23.6	8.4 @ 24.0	980 @ 1,000 9750 @ 10,000 @ 24.1 °C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.7 @ 24.8	8.4 @ 24.2	980 @ 1,000 9790 @ 10,000 @ 24.4 °C

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	A	5	5	5	8.1		8.3	22.9		23.4	8.5		8.1	155		205
Control	B	5	5	5			8.3			23.2			8.1			200
Control	C	5	5	5			8.3			23.0			8.1			190
Control	D	5	5	5			8.2			23.0			8.1			180
100%	A	5	5	5	7.9		8.5	22.8		23.4	9.0		8.2	255		270
100%	B	5	5	5			8.5			*~~23.7~~			8.2			285
100%	C	5	5	5			8.5			* 23.1			8.2			260
100%	D	5	5	5			8.5			* 23.1			8.2			285
									100% B	23.3						
									100% C	23.0						
									100% D	23.0						
									* Right temperature wrong Vial mf 5/6/94 1300							
Measured/Loaded by:		TM	MF	MF	TM		MF	TM		MF	TM		MF	TM		MF
Recorded by:		TM	TM	MF	KP		MF	KP		MF	KP		MF	KP		MF

Investigators' Signatures

Tina Mikulski
Kim Pearce
Marshall Faircloth

Reviewer

form updated 7/8/93

Water Quality Parameters	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not	measured	
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR100	KP
Alkalinity:	115	70	115	Hach	TM/KP
Hardness:	115	75	120	Hach	TM/KP
Total Ammonia:	<0.07	<0.017	<0.017	Orion	MF/TM

Ammonia Meter #98136 Ammonia Meter Slope: -58.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Caverns Golf Course
Location: Pond Cave
County: Jackson
Contact/District: D. Herlihkis PDRS
NPDES Permit #: FL00 ——— Outfall #: ———

Sample Collection: Date 05/03/94 Time 1530
Test Beginning: Date 05/04/94 Time 1300
Test Ending: Date 05/06/94 Time 1300
Organism Batch #: 2 Diluent Batch #: well
Organism Age: <24 hrs.
Test Organism: Daphnia pulex

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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 9.0@9.0	23.8@23.9	8.4@24.1	975@1,000 9720@10,000@23.8°C
24 hr	7.0@7.0 9.0@9.0	23.5@23.6	8.4@24.0	980@1,000 9750@10,000@24.1°C
48 hr	7.0@7.0 9.0@9.0	24.7@24.8	8.4@24.2	980@1,000 9790@10,000@24.4°C

Conc.	Chamber #	Number Live 0 hr	24 h	48 h	pH 0 hr	24 h	48 h	Temperature (°C) 0 hr	24 h	48 h	D.O. (mg/L) 0 hr	24 h	48 h	UNCORRECTED Cond. (mmhos/cm) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	A	5	5	5	8.0		8.6	22.6		23.4	8.6		8.2	225		270
Control	B	5	5	5			8.6			23.2			8.4			275
Control	C	5	5	5			8.6			23.1			8.3			265
Control	D	5	5	5			8.6			23.1			8.4			240
100%	A	5	5	5	7.9		8.6	22.6		23.5	8.7		8.1	255		295
100%	B	5	5	5			8.5			23.4			8.0			300
100%	C	5	5	5			8.6			23.4			8.1			290
100%	D	5	5	5			8.6			23.4			8.2			285
Measured/Loaded by:		MF	MF	MF	TM		MF	TM			TM		MF	TM		MF
Recorded by:		TM	TM	MF	KP		MF	KP			KP		MF	KP		MF

Investigators' Signatures

Tina Mikulski
Kim Pearce
Marshall Faircloth

Reviewer

form updated 7/8/93

Water Quality Parameters	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not measured		
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR100	KP
Alkalinity:	115	70	115	Hach	TM/KP
Hardness:	115	75	120	Hach	TM/KP
Total Ammonia:	<0.017	<0.017	<0.017	Orion	TM/MF

Ammonia Meter #98136 Ammonia Meter Slope: -58.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Caverns Golf Course
Location: Residence WELL
County: Jackson.
Contact/District: D. Herlikkis PD25
NPDES Permit #: FL00 — Outfall #: —

Sample Collection: Date 05/03/94 Time 1055
Test Beginning: Date 05/04/94 Time 1300
Test Ending: Date 05/06/94 Time 1300
Organism Batch #: 116 Diluent Batch #: 116
Organism Age: <24 hrs.
Test Organism: Ceriodaphnia dubia

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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, 9.0@9.0	23.8@23.9	8.4@24.1	975@1,000, 9720@10,000 @23.8°C
24 hr	7.0@7.0, 9.0@9.0	23.5@23.6	8.4@24.0	980@1,000, 9750@10,000 @24.1°C
48 hr	7.0@7.0, 9.0@9.0	24.7@24.8	8.4@24.2	980@1,000, 9790@10,000 @24.4°C

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) Cond. (µmhos/cm) 0 hr	24 h	48 h
Control	A	5	5	5	8.1		8.3	22.7		23.4	8.7		8.1	155		205
Control	B	5	5	5			8.3			23.5			8.1			200
Control	C	5	5	5			8.3			23.5			8.1			195
Control	D	5	5	5			8.3			23.5			8.1			195
100%	A	5	5	5	7.6		8.7	22.4		23.3	8.8		8.3	345		425
100%	B	5	5	5			8.7			23.3			8.3			425
100%	C	5	5	5			8.7			23.2			8.3			410
100%	D	5	5	5			8.7			23.2			8.3			430
Measured/Loaded by:		TM	MF	MF	TM		MF	TM		MF	TM		MF	TM		MF
Recorded by:		TM	TM	MF	KP		MF	KP		MF	KP		MF	KP		MF

Investigators' Signatures

Tina Mikulski
Kim Pearce
Marshall Faircloth

Reviewer

form updated 7/8/93

	Salt Water/ Well Water	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not measured		
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR100	KP
Alkalinity:	115	70	180	Hach	TM/KP
Hardness:	115	75	180	Hach	TM/KP
Total Ammonia:	<0.017	<0.017	<0.017	Orion	MF/TM

Ammonia Meter #98136 Ammonia Meter Slope: -58.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt

FDEP Biology Section — Acute Bioassay Bench Sheet

Sample Source: Florida Caverns Golf Course
Location: Residence WELL
County: JACKSON
Contact/District: D. TTERLIKKIS PDRS
NPDES Permit #: FL00 ——— Outfall #: ———

Sample Collection: Date 05/03/94 Time 10:55
Test Beginning: Date 05/04/94 Time 1300
Test Ending: Date 05/06/94 Time 1300
Organism Batch #: 2 Diluent Batch #: well
Organism Age: <24 hrs.
Test Organism: Daphnia pulex

79067 94-MAY-04-18

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 9.0 @ 9.0	23.8 @ 23.9	8.4 @ 24.1	975 @ 1,000 9720 @ 10,000 @ 23.8°C
24 hr	7.0 @ 7.0 9.0 @ 9.0	23.5 @ 23.6	8.4 @ 24.0	980 @ 1,000 9750 @ 10,000 @ 24.1°C
48 hr	7.0 @ 7.0 9.0 @ 9.0	24.7 @ 24.8	8.4 @ 24.2	980 @ 1,000 9790 @ 10,000 @ 24.4°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
Control	A	5	5	5	8.0		8.6	22.6		23.3	8.7		8.1	240		290
Control	B	5	5	5			8.6			23.3			8.3			280
Control	C	5	5	5			8.6			23.2			8.2			265
Control	D	5	5	5			8.6			23.2			8.2			260
100%	A	5	5	5	7.6		8.7	22.4		23.3	8.9		8.3	355		410
100%	B	5	5	5			8.7			23.3			8.3			400
100%	C	5	5	5			8.7			23.2			83			395
100%	D	5	5	5			8.7			23.2			8.3			385
Measured/Loaded by:		MF	MF	MF	TM		MF	TM		MF	TM		MF	TM		MF
Recorded by:		TM	TM	MF	KP		MF	KP		MF	KP		MF	KP		MF

Investigators' Signatures

Tina Mikulski
Kim Pearce
Marshall Faircloth

Reviewer

form updated 7/8/93

Water Quality Parameters	Salt Water/ (Well Water)	20% Min Water	Sample	Method	Measured by
Field Total Residual Cl2:			not measured		
Lab Total Residual Cl2:	<0.03	<0.03	<0.03	DR100	KP
Alkalinity:	115	70	180	Hach	TM/KP
Hardness:	115	75	180	Hach	TM/KP
Total Ammonia:	<0.017	<0.017	<0.017	Orion	MF/TM

Ammonia Meter #98136 Ammonia Meter Slope: -58.9 Ammonia Blank: <0.017 Control Salinity: 0 ppt Sample Salinity: 0 ppt