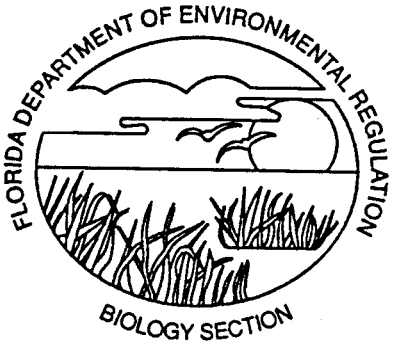


Bioassays of

Goldkist Poultry, Inc.

Live Oak, Suwannee County, Florida

NPDES #FL0001465

Sampled 5/21/91

July 10, 1991

Biology Section
Division of Administrative and Technical Services

Bioassays of

Goldkist Poultry, Inc.

Live Oak, Suwannee County, Florida

NPDES #FL0001465

Biology Section
Bureau of Laboratories
July 10, 1991

Introduction

Goldkist Poultry, Inc., Live Oak, Suwannee County, Florida, NPDES #FL0001465, on 22 to 24 May, 1991.

This poultry processing facility is located on U. S. Highway 90, eleven miles west of Live Oak. Approximately 137,000 birds per day are slaughtered and packed, totalling 650,750 pounds. By-products are processed into protein meal. Wastewater treatment for this operation includes both secondary and advanced systems, the latter primarily for nitrogenous waste removal. The final discharge of treated chlorinated effluent, averaging 0.5 MGD, is through a pipe to the bottom of the Suwannee River.

The toxicity tests discussed in this report were performed in accordance with methods described by Peltier and Weber, 1985, *Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms*, 3rd Edition, and by the FDER Biology Section, 1985, *Quality Assurance Manual for Performing Acute Toxicity Tests*, 2nd Edition.

Results and Discussion

The Biology Section performed static acute toxicity bioassays on a 24-hour composite sample of effluent from this facility. The bioassay test organisms used were the water flea, *Ceriodaphnia dubia*, and the fish, *Notropis leedsi*. The sample of chlorinated effluent was toxic to *C. dubia* and produced an $LC_{50} < 100\%$. The chlorinated sample was not toxic to *N. leedsi*. The total residual chlorine concentration in the sample was 0.45 mg/L (Hach). A portion of the sample was dechlorinated in the lab using sodium thiosulfate. The dechlorinated aliquot was not toxic to either test organism.

The total and unionized ammonia concentrations in the sample were 3.8 and 0.41 mg/L, respectively. No further chemical analyses were performed on the sample.

Conclusion

The chlorinated sample of effluent from this facility was toxic to *C. dubia* on 21 May, 1991. The toxicity was attributed to the total residual chlorine (0.45 mg/L Hach) in the sample.

Table 1. Concentration Series and Volumes Used for the Static Acute Bioassays of the Goldkist Poultry, Inc., Facility.

Ceriodaphnia dubia (water flea)

Concentration	Dilution Water	Sample	Total Volume
Control	20.0 mL	0.0 mL	20 mL
25.0%	15.0 mL	5.0 mL	20 mL
50.0%	10.0 mL	10.0 mL	20 mL
75.0%	5.0 mL	15.0 mL	20 mL
100.0%	0.0 mL	20.0 mL	20 mL

Notropis leedsi (bannerfin shiner)

Concentration	Dilution Water	Sample	Total Volume
Control	500 mL	0 mL	500 mL
25.0%	375 mL	125 mL	500 mL
50.0%	250 mL	250 mL	500 mL
75.0%	125 mL	375 mL	500 mL
100.0%	0 mL	500 mL	500 mL

Table 2. Data recorded during the static acute bioassay of a dechlorinated sample of effluent from Goldkist Poultry, Inc., Live Oak, Suwannee County, Florida, NPDES# FL0001465 on 22 to 24 May, 1991.

Facility: **Goldkist Poultry, Inc.** NPDES # **FL0001465** Facility Type: **Food Processing**
Location: US Hwy. 90, Live Oak Contact/District: S. Bulgrin / NE
County: Suwannee Test type: static definitive
Sample Collection Date: 5/21/91 Time: 1400 # tests: 2 Receiving Water: Suwannee River
Test Beginning Date: 5/22/91 Time: 1100 Chlorination Type: **dechlorinated**
Test Ending Date: 5/24/91 Time: 0930 Dechlor Method: lab, sodium thiosulfate **Page 1 of 2**

Total Residual Cl2	mg/l	Method
Field:	0.65	-
Lab:	0.45	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:	3.80	0.41

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	110	116
Cond. Control Water (daphnids):	53	77
100% Sample:	187	206

Organism: ***Ceriodaphnia dubia*** Life stage: neonate
LC50: - Binomial: - Moving Average: - Probit: -

	SURVIVAL			Dissolved Oxygen			pH			Temperature			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	8.8	8.7	9.4	8.0	7.9	8.2	21.2	22.3	21.5	167	190
Control	5	5	5	-	-	-	-	-	-	-	-	-	-	-
Control	5	5	5	-	-	-	-	-	-	-	-	-	-	-
Control	5	5	5	-	-	-	-	-	-	-	-	-	-	-
25%	5	5	5	8.9	8.7	9.3	8.2	8.3	8.3	21.5	22.3	21.5	353	366
25%	5	5	5	-	-	-	-	-	-	-	-	-	-	-
25%	5	5	5	-	-	-	-	-	-	-	-	-	-	-
25%	5	5	5	-	-	-	-	-	-	-	-	-	-	-
50%	5	5	5	8.9	8.7	9.4	8.3	8.4	8.5	21.9	22.3	21.5	544	592
50%	5	5	5	-	-	-	-	-	-	-	-	-	-	-
50%	5	5	5	-	-	-	-	-	-	-	-	-	-	-
50%	5	5	4	-	-	-	-	-	-	-	-	-	-	-
75%	5	5	4	9.0	8.5	9.2	8.4	8.5	8.5	22.0	22.3	21.5	731	752
75%	5	5	5	-	-	-	-	-	-	-	-	-	-	-
75%	5	4	4	-	-	-	-	-	-	-	-	-	-	-
75%	5	5	5	-	-	-	-	-	-	-	-	-	-	-
100%	5	5	5	9.1	8.5	9.1	8.4	8.6	8.5	22.2	22.3	21.5	902	928
100%	5	5	5	-	-	-	-	-	-	-	-	-	-	-
100%	5	5	5	-	-	-	-	-	-	-	-	-	-	-
100%	5	4	4	-	-	-	-	-	-	-	-	-	-	-

"continued"

Table 2. Continued

Facility:	**Goldkist Poultry, Inc.**		NPDES #	FL0001465	Facility Type: **Food Processing**
Location:	US Hwy. 90, Live Oak		Contact/District:	S. Bulgrin / NE	
County:	Suwannee		Test type:	static definitive	
Sample Collection Date:	**5/21/91**	Time: 1400	# tests:	2	Receiving Water: **Suwannee River**
Test Beginning Date:	5/22/91	Time: 1100	Chlorination Type:	**dechlorinated**	
Test Ending Date:	5/24/91	Time: 0930	Dechlor Method:	lab, sodium thiosulfate	**Page 2 of 2**

Total Residual Cl2	mg/l	Method
Field:	0.65	-
Lab:	0.45	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:	3.80	0.41

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	110	116
Cond. Control Water (daphnids):	53	77
100% Sample:	187	206

Organism: ***Notropis leedsi*** Age: 26 days
LC50: - Binomial: - Moving Average: - Probit: -

	SURVIVAL			Dissolved Oxygen			pH			Temperature			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	8.9	8.1	a	7.7	8.1	a	21.0	21.5	a	-	-
Control	5	5	5	8.9	8.1	a	7.7	8.1	a	-	-	-	240	245
25%	5	5	5	9.0	7.7	a	8.0	8.2	a	21.3	21.3	a	-	-
25%	5	5	5	9.0	7.8	a	8.0	8.2	a	-	-	-	425	428
50%	5	5	5	9.3	7.5	a	8.2	8.3	a	22.0	21.3	a	-	-
50%	5	5	5	9.3	7.6	a	8.2	8.3	a	-	-	-	602	603
75%	5	5	5	9.6	7.6	a	8.3	8.3	a	22.7	21.2	a	-	-
75%	5	5	5	9.6	7.2	a	8.3	8.3	a	-	-	-	785	769
100%	5	5	5	9.8	7.1	a	8.3	8.4	a	23.1	21.2	a	-	-
100%	5	5	5	9.8	7.1	a	8.3	8.4	a	-	-	-	962	940

a = Samples were accidently discarded after fish were counted, but before parameters were read at 48 hours.

Table 3. Data recorded during the static acute bioassay of a chlorinated sample of effluent from Goldkist Poultry, Inc., Live Oak, Suwannee County, Florida, NPDES# FL0001465 on 22 to 24 May, 1991.

Facility:	**Goldkist Poultry, Inc.**		NPDES #	FL0001465	Facility Type: **Food Processing**
Location:	US Hwy. 90, Live Oak		Contact/District:	S. Bulgrin / NE	
County:	Suwannee		Test type:	static screening	
Sample Collection Date:	5/21/91	Time: 1400	# tests:	2	Receiving Water: **Suwannee River**
Test Beginning Date:	5/22/91	Time: 1100	Chlorination Type:	**chlorinated**	
Test Ending Date:	5/24/91	Time: 0930	Dechlor Method:	-	**Page 1 of 1**

Total Residual Cl2	mg/l	Method
Field:	0.65	-
Lab:	0.45	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:	3.80	0.41

Alk & Hardness	Alkalinity (mg/l)	Hardness (mg/l)
Control Water (fish):	110	116
Cond. Control Water (daphnids):	53	77
100% Sample:	187	206

Organism: ***Ceriodaphnia dubia*** Life stage: neonate
LC50: <100%

	SURVIVAL			Dissolved Oxygen			pH			Temperature			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	8.8	8.7	9.4	8.0	7.9	8.2	21.2	22.3	21.5	167	190
Control*	5	5	5	-	-	-	-	-	-	-	-	-	-	-
Control*	5	5	5	-	-	-	-	-	-	-	-	-	-	-
Control*	5	5	5	-	-	-	-	-	-	-	-	-	-	-
100%	5	2	1	9.6	8.5	9.1	8.3	8.6	8.6	21.3	22.3	21.5	903	932
100%	5	2	0	-	-	-	-	-	-	-	-	-	-	-
100%	5	3	0	-	-	-	-	-	-	-	-	-	-	-
100%	5	3	1	-	-	-	-	-	-	-	-	-	-	-

* dechlor control used

Organism: ***Notropis leedsi*** Age: 26days
LC50: -

	SURVIVAL			Dissolved Oxygen			pH			Temperature			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	8.9	8.1	a	7.7	8.1	a	21.0	21.5	a	-	-
Control*	5	5	5	8.9	8.1	a	7.7	8.1	a	-	-	-	240	245
100%	5	5	5	10.3	7.2	a	8.3	8.4	a	23.2	21.4	a	-	-
100%	5	5	5	10.2	7.4	a	8.3	8.4	a	-	-	-	955	920

* dechlorinated control used a = Samples were accidently discarded after fish were counted, but before parameters were read at 48 hours.

Table 4. LC_{50} Data for the Bioassay of the Goldkist Poultry, Inc., Facility.

Organism	Method of Data Analysis	48 Hour LC_{50} (95% Confidence Intervals)
Chlorinated discharge		
Ceriodaphnia dubia	not calculated	<100%

a The LC_{50} is < 100% since 90% of the organisms died in the lowest test concentration (100%).

Sample Source: GOLDKIST POULTRY

Address/City:

County: SUWANNEE

Contact/District: SCOTT BULGRIN / NE

NPDES Permit #: [illegible] Outfall #:

Sample Collection: Date 5-21-91 Time 1400

Test Beginning: Date 5-22-91 Time 1100

Test Ending: Date 5-24-91 Time 0930

Test Organism: CERIODAPHNIA DUBIA

Life Stage/Age: <24 HOURS

Test Number: 1 of 2 Test Type: Screening (Definitive)

(Static) Static Renewal | Flow-through

Remarks:
CHLORINATED
24-HR COMPOSITE SAMPLE

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7, 9@9	8.3@22	1332@23.6 @1310	21.0@22
24 hr	7@7, 9@9	8.7@23	1401@24.5 @1325	25.2@22
48 hr	7@7, 9@9	8.9@21.5	1326@24.2 @1403	21.5@22

DECHLORINATED / CHLORINATED

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
CONTROL	A	5	5	5	8.8	8.7	9.4	8.0	7.9	8.2	21.2	22.3	21.5	167	191	190
CONTROL	B	5	5	5												
CONTROL	C	5	5	5												
CONTROL	D	5	5	5	8.9	8.7	9.3	8.2	8.3	8.3	21.5	22.3	21.5	353	363	366
DeCl 25%	A	5	5	5												
25%	B	5	5	5												
25%	C	5	5	5												
25%	D	5	5	5	8.9	8.7	9.4	8.3	8.4	8.5	21.9	22.3	21.5	544	577	592
50%	A	5	5	5												
50%	B	5	5	5												
50%	C	5	5	4												
50%	D	5	5	4	9.0	8.5	9.2	8.4	8.5	8.5	22.0	22.3	21.5	731	734	752
75%	A	5	5	5												
75%	B	5	5	5												
75%	C	5	4	4												
75%	D	5	5	5	9.1	8.5	9.1	8.4	8.6	8.5	22.2	22.3	21.5	902	916	928
100%	A	5	5	5												
100%	B	5	5	5												
100%	C	5	5	5												
100%	D	5	4	4	9.6	8.5	9.1	8.3	8.6	8.6	21.3	22.3	21.5	903	921	932
100% Cl	A	5	2	1												
100% Cl	B	5	2	0												
100% Cl	C	5	3	0												
100% Cl	D	5	2	1												
Measured/Loaded by:		MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP
Recorded by:		KP	KP	KP	KP	KP	KP	KP	KP	KP	KP	KP	KP	KP	KP	KP

Investigators' Signatures

[signature]

[signature]

Water-quality Parameters

Cl2 field HACH 2.0 HACH [illegible]

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:	[illegible]		0.65		SCOTT B
Lab Tot. Resid Cl2:	[illegible]		0.45	HACH	MF
Alkalinity:	112	52	187	HACH	KP
Hardness:	116		200	[illegible]	KP
Total Ammonia:	0.2	[illegible]		[illegible]	MF

[illegible] linear slope

DER Biology Section — Acute Bioassay Bench Sheet

Sample Source: GOLDKIST POULTRY
Address/City:
County: SUWANNEE
Contact/District: SCOTT BULGER-IN / NE
NPDES Permit #: _____ Outfall #: _____

Sample Collection: Date 5-21-91 Time 1400
Test Beginning: Date 5-22-91 Time 1100
Test Ending: Date 5-24-91 Time 0930
Test Organism: MYSIDOPSIS BAHIA (EE-DS1)
Life Stage/Age: 26 DAYS

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

Instrument Calibrations:

	pH	DO	Cond	Temp
0 hr	7@7, 9@9	8.8@22	1382@22.6 @1370	21.0@23.4
24 hr	7@7, 9@9	8.7@23	1400 @1365	25@23.4
48 hr	7@7, 9@9	8.9@21.5	1386 @1403	21.5@24.2

Remarks: CHLORINATED 24-HR COMPOSITE SAMPLE KP

a = SAMPLES WERE ACCIDENTLY DISCARDED AFTER COUNTING FISH BUT BEFORE READING

THE PARAMETERS @ 48

CHLORINATED

Conc.	Chamber #	Number Live 0	24	48	DO (mg/l) 0	24	48	pH 0	24	48	Temp. (°C) 0	24	48	Cond. (µmhos/cm) 0	24	48
CONTROL	86	5	5	5	8.9	8.1	a	7.7	8.1	a	21.0	21.5	a			
CONTROL	92	5	5	5	8.9	8.1	a	7.7	8.1	a				240	245	a
DeCl 25%	3	5	5	5	9.0	7.7	a	8.0	8.2	a	21.3	21.3	a			
25%	25	5	5	5	9.0	7.8	a	8.0	8.2	a				425	430	a
50%	48	5	5	5	9.3	7.5	a	8.2	8.3	a	22.0	21.3	a			
50%	14	5	5	5	9.3	7.6	a	8.2	8.3	a				602	603	a
75%	62	5	5	5	9.6	7.6	a	8.3	8.3	a	22.7	21.2	a			
75%	53	5	5	5	9.6	7.2	a	8.3	8.3	a				785	769	a
100%	4	5	5	5	9.8	7.1	a	8.3	8.4	a	23.1	21.2	a			
100%	39	5	5	5	9.8	7.1	a	8.3	8.4	a				962	940	a
100% 4Cl	142	5	5	5	10.3	7.2	a	8.3	8.4	a	23.2	21.0	a			
100%	190	5	5	5	10.2	7.4	a	8.3	8.4	a				955	920	a
Measured/Loaded by:		MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP	MF	MF	KP
Recorded by:		KP	KP	KP	KP	KP	KP	KP	KP	KP	KP	KP	KP	KP	KP	KP

Investigators' Signatures

Water-quality Parameters (Cl2 BLANK 0.0 HACH - MF)

	Well Water	Cond. Water	Sample	Method	Measured by
Field Tot. Resid. Cl2:			0.45		SCOTT B.
Lab Tot. Resid. Cl2:			0.45	HACH	MF
Alkalinity:	110	53	187	HACH	KP
Hardness:	116	77	206	HACH	KP
Total Ammonia:	0.0	0.0	3.5	HACH	MF