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1242 | 1254 | 1260

REPORT TO

MONSANTO COMPANY

TOXICITY, REPRODUCTION AND RESIDUE STUDY ON AROCLOR 1242, LOT #AK-255 AROCLOR 1254, LOT #AK-38 AROCLOR 1260, LOT #AK-3 IN WHITE LEGHORN CHICKENS

JUNE 4, 1970

IBT NO. J7300

HARTOLDMON0028694

REPORT TO

MONSANTO COMPANY

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I. Introduction

At the request of Monsanto Company, a toxicity, reproduction and residue study on Aroclor 1242, Lot #AK-255, Aroclor 1254, Lot #AK-38 and Aroclor 1260, Lot #AK-3 in white Leghorn chickens was initiated. This report presents the results of the investigation conducted at Wedge's Creek Research Farm Division, Industrial BIO-TEST Laboratories, Inc.

II. Summary

White Leghorn chickens were fed Aroclor 1242, Aroclor 1254 or Aroclor 1260 at 1, 10 or 100 ppm in the diet. Effects on the chickens as well as on egg production, hatchability of the eggs and physical characteristics of the eggs were determined. These effects were as follows:

A. Body Weight

The body weights of males fed Aroclor 1242 at 10 or 100 ppm and the body weights of males and females fed Aroclor 1254 at 100 ppm were slightly lower than the weights of control chickens.

B. Food Consumption

The chickens fed Aroclor 1242 at 100 ppm or Aroclor 1254 at 100 ppm ate less than those fed the control diet.

C. Mortality and Reactions

About the same number of birds died in all groups, including controls. These animals exhibited anorexia and became progressively weaker, until death.

D. Pathology

The birds which died showed evidence of malnutrition and extensive growths on the kidneys, gonads, liver or heart. Most of the birds which were sacrificed at the end of the study did not show abnormal gross changes; however some of those fed Aroclor 1254 at 100 ppm showed changes in the heart, kidneys and ovaries.

E. Egg Production

Egg production in hens fed Aroclor 1242 at 100 ppm or Aroclor 1254 at 100 ppm was much lower than the egg production of the control group.

F. Hatchability of Eggs

There was poor hatchability of eggs from hens fed Aroclor 1242 at 10 ppm. None of the eggs hatched from hens fed Aroclor 1242 at 100 ppm or Aroclor 1254 at 100 ppm. Eggs from hens fed Aroclor 1242 at 10 or 100 ppm, that did not hatch had a large number of embryos in the 1 to 3 cm size.

G. Physical Characteristics of Eggs

There were no significant differences in specific gravity among eggs from treated or from control hens. The egg shells, however, from hens fed Aroclor 1242 at 10 or 100 ppm or fed Aroclor 1254 at 100 ppm were not as thick as the shells of eggs from hens fed the control diet.

H. Conclusions

Therefore the ingestion of Aroclor 1242 at 1 ppm, Aroclor 1254 at 10 or 100 ppm or Aroclor 1260 at 1, 10 or 100 ppm caused no apparent effects on the mature chickens or on their eggs, including hatchability and physical characteristics of the eggs. However, the

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chickens fed Aroclor 1242 at 10 or 100 ppm or Aroclor 1254 at 100 ppm did not produce as many eggs as the chickens fed the control diet. The eggs from these three groups of chickens had thin shells and did not hatch well after incubation.

Respectfully submitted,

INDUSTRIAL BIO-TEST LABORATORIES, INC.

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III. Procedure

A. Experimental Animals

The animals employed in this study were white Leghorn chickens. A total of 200 hens and 40 roosters were used.

B. Organization of Groups

The animals were divided into ten equal groups; one Control Group (C) and nine Test Groups (TI through TIX). A structural outline of the experiment is presented in Table I.

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TABLE I

TEST MATERIAL: Three Aroclors

Outline of Experiment

White Leghorn Chickens

Group	Number of Animals on Test Males	Females	Test Material	Dose Levels in Feed* (ppm)
Control (C)	4	20	None	-
Test I (TI)	4	20	Aroclor 1242, Lot #AK-255	1
Test II (TII)	4	20	Aroclor 1242, Lot #AK-255	10
Test III (TIII)	4	20	Aroclor 1242, Lot #AK-255	100
Test IV (TIV)	4	20	Aroclor 1254, Lot #AK-38	1
Test V (TV)	4	20	Aroclor 1254, Lot #AK-38	10
Test VI (TVI)	4	20	Aroclor 1254, Lot #AK-38	100
Test VII (TVII)	4	20	Aroclor 1260, Lot #AK-3	1
Test VIII (TVIII)	4	20	Aroclor 1260, Lot #AK-3	10
Test IX (IX)	4	20	Aroclor 1260, Lot #AK-3	100

* Purina Flock Chow, Ralston Purina Co., St. Louis, Missouri.

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C. Dosage and Feeding

All groups received the same base feed*. Test diets were prepared weekly. The test materials were diluted with acetone before addition to the feed to assure even distribution throughout the ration. An equal amount of acetone, without test material, was added to the control feed and the feed was then blended in the same manner as the test feeds.

All animals were allowed water and their respective control or test feed ad libitum. Dosing began when the birds were 12 weeks of age and continued until hatching results were available.

D. Observations

Observations were made daily to ascertain the presence or absence of clinical signs of toxicity indicative of test material effect. All chickens were individually weighed and the group feed consumption determined weekly.

As each group began laying, the eggs were collected daily and the egg weights recorded. When the egg weights were consistently between 50 and 60 grams, and at least 50 percent of the hens in the group were laying, egg collection for that group was started. The time required to meet these criteria was recorded for each group.

* Purina Flock Chow, Ralston Purina Co., St. Louis, Missouri.

The egg production was collected for the following studies:

1. Egg Production and Quality

Eggs were collected, weighed and candled for a number of seven-day periods. The total number and individual weights of eggs collected, the total number of uncracked and unblemished eggs and the total number of each type of defective egg were recorded.

2. Hatchability

One-half of all non-defective eggs were randomly selected for hatching. These eggs were turned twice daily during the seven-day collection period, then placed in an incubator maintained at 99° to 100° F, with a wet bulb reading of 85° F. This procedure was followed until a minimum of 100 eggs from the control group and each no-effect test group had been set for hatching. The following was recorded:

a. Number hatched

b. Number unhatched

c. Viability of chicks over a 30-day period during which feed* and water were permitted ad libitum.

d. Examination of unhatched eggs for fertility and stage of development.

e. Weight of chicks after Day 1 and Day 30.

f. Gross pathological examination of chicks at sacrifice after the 30-day observation period.

*Purina Startina, Ralston Purina Company, St. Louis, Missouri.

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3. Physical and Chemical Characteristics of Eggs

One-fourth of the non-defective eggs and all of the defective eggs were examined to determine the following:

a. Specific gravity (intact eggs only)

b. Thickness of shells at equatorial circumference (three measurements/egg).

4. Residue Studies

The remaining one-fourth of the non-defective eggs were quick-frozen and shipped to Monsanto Company for residue analysis.

After hatching results were available, one-half of the chickens in each group were sacrificed, defeathered and subjected to a gross pathological examination. Two sets of duplicate group composite samples of muscle, liver, fat and kidney were collected, one set from all of the hens and one set from all of the roosters sacrificed. One-half of the tissue samples were quick-frozen and shipped to Monsanto Company for analysis. The duplicate tissue samples and the carcasses were quick-frozen and stored until the results of the analyses were available.

The remaining chickens were fed the base diet without test material for 30 days. The eggs were collected, weighed and candled during the recovery period. A minimum of ten eggs per group per week were quick-frozen and shipped to Monsanto Company for analysis.

IV. Results

A. Parent Generation

1. Body Weight Data

The average male and female body weights during the test diet period are shown in Tables II through XI.

The average male and female body weights during the recovery diet period are shown in Table XII.

These data are summarized in Table XIIA. The body weights of males fed Aroclor 1242 at 10 or 100 ppm and the body weights of males and females fed Aroclor 1254 at 100 ppm were slightly lower than the weights of control chickens.

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TABLE II

TEST MATERIAL: Three Aroclors

Test Diet Period Body Weight Data

White Leghorn Chickens

Control Group

Sex	Mean Body Weights in Kilograms Week: 0	1	2	3	4	5	6	7	8
M	1.27	1.41	1.53	1.64	1.67	1.70	1.71	1.68	1.85
F	0.95	0.99	1.04	1.18	1.22	1.29	1.35	1.39	1.41

Sex	Mean Body Weights in Kilograms Week: 9	10	11	12	13	14	15	16	17
M	1.83	1.89	1.95	1.97	1.99	2.01	2.06	2.09	2.11
F	1.47	1.47	1.50	1.53	1.52	1.52	1.60	1.61	1.57

Sex	Mean Body Weights in Kilograms Week: 18	19	20	21	22	23	24	25	26
M	2.14	2.14	2.24	2.27	2.31	2.36	2.38	2.35	2.43
F	1.59	1.57	1.75	1.75	1.75	1.78	1.81	1.84	1.89

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TABLE III

TEST MATERIAL: Three Aroclors

Test Diet Period Body Weight Data

White Leghorn Chickens

Aroclor 1242 - 1 ppm

	Mean Body Weights in Kilograms								
Sex	Week: 0	1	2	3	4	5	6	7	8
M	1.27	1.46	1.57	1.65	1.68	1.72	1.80	1.82	1.83
F	0.95	1.00	1.07	1.18	1.25	1.30	1.39	1.45	1.47

	Mean Body Weights in Kilograms								
Sex	Week: 9	10	11	12	13	14	15	16	17
M	1.85	1.95	2.01	2.06	2.08	2.14	2.17	2.19	2.22
F	1.45	1.49	1.55	1.57	1.57	1.58	1.59	1.65	1.67

	Mean Body Weights in Kilograms								
Sex	Week: 18	19	20	21	22	23	24	25	26
M	2.20	2.23	2.50	2.53	2.59	2.61	2.60	2.61	2.68
F	1.64	1.66	1.81	1.76	1.81	1.86	1.86	1.83	1.88

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TABLE IV

TEST MATERIAL: Three Aroclors

Test Diet Period Body Weight Data

White Leghorn Chickens

Aroclor 1242 - 10 ppm

Sex	Mean Body Weights in Kilograms Week: 0	1	2	3	4	5	6	7	8
M	1.28	1.45	1.41	1.49	1.52	1.55	1.59	1.66	1.63
F	0.95	1.00	1.05	1.17	1.22	1.29	1.38	1.41	1.48

Sex	Mean Body Weights in Kilograms Week: 9	10	11	12	13	14	15	16	17
M	1.60	1.71	1.71	1.77	1.80	1.81	1.82	1.84	1.86
F	1.41	1.52	1.50	1.53	1.57	1.62	1.63	1.63	1.63

Sex	Mean Body Weights in Kilograms Week: 18	19	20	21	22	23	24	25	26
M	1.89	1.86	2.00	2.03	2.05	2.11	2.11	2.08	2.11
F	1.59	1.59	1.74	1.79	1.82	1.90	1.82	1.84	1.82

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TABLE VI

TEST MATERIAL: Three Aroclors

Test Diet Period Body Weight Data

White Leghorn Chickens

Aroclor 1254 - 1 ppm

Sex	Week:	Mean Body Weights in Kilograms 0	1	2	3	4	5	6	7	8
M		1.28	1.40	1.46	1.55	1.58	1.61	1.64	1.76	1.80
F		0.96	1.00	1.06	1.15	1.20	1.27	1.40	1.42	1.49

Sex	Week:	Mean Body Weights in Kilograms 9	10	11	12	13	14	15	16	17
M		1.83	1.86	1.91	1.99	2.01	1.96	1.98	1.99	2.00
F		1.51	1.54	1.54	1.61	1.62	1.62	1.65	1.66	1.69

Sex	Week:	Mean Body Weights in Kilograms 19	20	21	22	23	24	25
M		1.85	2.22	2.21	2.24	2.22	2.26	2.26
F		1.66	1.69	1.73	1.73	1.71	1.74	1.93

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TABLE V

TEST MATERIAL: Three Aroclors

Test Diet Period Body Weight Data

White Leghorn Chickens

Aroclor 1242 - 100 ppm

Sex	Mean Body Weights in Kilograms Week: 0	1	2	3	4	5	6	7	8
M	1.28	1.41	1.52	1.58	1.61	1.67	1.69	1.70	1.72
F	0.96	1.02	1.07	1.15	1.19	1.27	1.37	1.38	1.44

Sex	Mean Body Weights in Kilograms Week: 9	10	11	12	13	14	15	16	17
M	1.60	1.75	1.78	1.76	1.75	1.77	1.81	1.79	1.78
F	1.46	1.52	1.47	1.52	1.47	1.65	1.67	1.66	1.63

Sex	Mean Body Weights in Kilograms Week: 18	19	20	21	22
M	1.78	1.74	1.79	1.92	2.05
F	1.63	1.62	1.66	1.69	1.88

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TABLE VII

TEST MATERIAL: Three Aroclors

Test Diet Period Body Weight Data

White Leghorn Chickens

Aroclor 1254 - 10 ppm

Sex	Week:	Mean Body Weights in Kilograms 0	1	2	3	4	5	6	7	8
M		1.28	1.40	1.49	1.47	1.46	1.60	1.68	1.73	1.75
F		0.96	0.96	1.10	1.14	1.21	1.32	1.40	1.44	1.49

Sex	Week:	Mean Body Weights in Kilograms 9	10	11	12	13	14	15	16	17
M		1.73	1.72	1.80	1.88	1.93	2.00	2.03	2.01	2.03
F		1.46	1.52	1.50	1.52	1.55	1.66	1.63	1.60	1.60

Sex	Week:	Mean Body Weights in Kilograms 18	19	20	21	22	23	24	25	26
M		2.06	2.03	2.07	2.08	2.07	2.00	2.14	2.07	2.30
F		1.64	1.64	1.62	1.66	1.68	1.61	1.63	1.54	1.84

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TABLE VIII

TEST MATERIAL: Three Aroclors

Test Diet Period Body Weight Data

White Leghorn Chickens

Aroclor 1254 - 100 ppm

		Mean Body Weights in Kilograms								
Sex	Week: 0	1	2	3	4	5	6	7	8	
M	1.28	1.44	1.54	1.62	1.67	1.70	1.73	1.77	1.82	
F	0.95	0.98	1.05	1.12	1.17	1.22	1.27	1.37	1.40	

		Mean Body Weights in Kilograms								
Sex	Week: 9	10	11	12	13	14	15	16	17	
M	1.77	1.73	1.62	1.85	1.85	1.81	1.84	1.74	1.70	
F	1.42	1.46	1.49	1.54	1.52	1.51	1.50	1.41	1.47	

		Mean Body Weights in Kilograms				
Sex	Week: 18	19	20	21	22	
M	1.56	1.70	1.75	1.78	1.83	
F	1.48	1.55	1.50	1.54	1.81	

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TABLE IX

TEST MATERIAL: Three Aroclors

Test Diet Period Body Weight Data

White Leghorn Chickens

Aroclor 1260 - 1 ppm

		Mean Body Weights in Kilograms								
Sex	Week: 0	1	2	3	4	5	6	7	8	
M	1.28	1.48	1.55	1.65	1.66	1.74	1.88	1.81	1.85	
F	0.96	1.00	1.07	1.16	1.22	1.30	1.38	1.39	1.44	

		Mean Body Weights in Kilograms								
Sex	Week: 9	10	11	12	13	14	15	16	17	
M	1.86	1.91	1.92	2.02	2.06	2.11	2.10	2.10	2.18	
F	1.44	1.46	1.49	1.55	1.57	1.59	1.61	1.59	1.61	

Sex	Week: 18	19	20	21	22	23	24	25	26
M	2.20	2.19	2.24	2.23	2.24	2.13	1.79	1.76	1.84
F	1.59	1.65	1.66	1.69	1.69	1.69	1.79	1.76	1.84

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TABLE X

TEST MATERIALS: Three Aroclors

Test Diet Period Body Weight Data

White Leghorn Chickens

Aroclor 1260 - 10 ppm

	Mean Body Weights in Kilograms								
Sex	Week: 0	1	2	3	4	5	6	7	8
M	1.28	1.47	1.54	1.62	1.68	1.72	1.76	1.79	1.84
F	0.95	0.99	1.05	1.17	1.24	1.31	1.39	1.41	1.51

	Mean Body Weights in Kilograms								
Sex	Week: 9	10	11	12	13	14	15	16	17
M	1.76	1.80	1.89	1.93	1.98	2.03	2.05	2.02	2.07
F	1.47	1.48	1.55	1.59	1.61	1.63	1.63	1.62	1.65

	Mean Body Weights in Kilograms								
Sex	Week: 18	19	20	21	22	23	24	25	26
M	2.08	2.12	2.13	2.12	2.19	2.22	2.22	2.18	2.52
F	2.08	1.69	1.68	1.69	1.73	1.75	1.72	1.71	1.92

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TABLE XI

TEST MATERIAL: Three Aroclors

Test Diet Period Body Weight Data

White Leghorn Chickens

Aroclor 1260 - 100 ppm

Sex	Mean Body Weights in Kilograms Week: 0	1	2	3	4	5	6	7	8
M	1.28	1.45	1.46	1.55	1.59	1.61	1.70	1.77	1.73
F	0.95	1.00	1.03	1.14	1.21	1.27	1.35	1.43	1.46

Sex	Mean Body Weights in Kilograms Week: 9	10	11	12	13	14	15	16	17
M	1.77	1.80	1.82	1.69	1.94	1.93	1.97	1.97	1.98
F	1.48	1.51	1.53	1.55	1.56	1.57	1.58	1.61	1.64

Sex	Mean Body Weights in Kilograms Week: 18	19	20	21	22	23	24	25
M	2.00	1.90	1.97	1.92	1.99	1.99	2.00	2.05
F	1.64	1.67	1.63	1.68	1.68	1.71	1.68	1.86

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TABLE XII

TEST MATERIAL: Three Aroclors

Recovery Diet Period Body Weight Data

White Leghorn Chickens

Group	Sex	Week:	Mean Body Weights in Kilograms 26	27	28	29	Sacrifice
Control	M		2.43	2.42	2.42	2.45	2.44
	F		1.89	1.89	1.85	1.85	1.88

Group	Sex	Week:	Mean Body Weights in Kilograms 26	27	28	29	Sacrifice
Aroclor 1242 1 ppm	M		2.68	2.68	2.71	2.70	2.70
	F		1.88	1.89	1.92	1.90	1.86

Group	Sex	Week:	Mean Body Weights in Kilograms 26	27	28	29	Sacrifice
Aroclor 1242 10 ppm	M		2.11	2.16	2.14	2.13	2.13
	F		1.82	1.82	1.83	1.79	1.79

Group	Sex	Week:	Mean Body Weights in Kilograms 22	23	24	25	Sacrifice
Aroclor 1242 100 ppm	M		2.05	2.10	2.06	2.06	2.10
	F		1.88	1.85	1.94	1.91	1.91

Group	Sex	Week:	Mean Body Weights in Kilograms 25	26	27	28	Sacrifice
Aroclor 1254 1 ppm	M		2.26	2.23	2.22	2.27	2.27
	F		1.93	1.89	1.92	1.94	1.94

Group	Sex	Week:	Mean Body Weights in Kilograms 26	27	28	29	Sacrifice
Aroclor 1254 10 ppm	M		2.30	2.30	2.34	2.29	2.28
	F		1.84	1.83	1.87	1.84	1.85

Group	Sex	Week:	Mean Body Weights in Kilograms 22	23	24	25	Sacrifice
Aroclor 1254 100 ppm	M		1.83	1.76	1.83	1.97	1.96
	F		1.81	1.79	1.76	1.66	1.68

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TABLE XII continued

TEST MATERIAL: Three Aroclors

Recovery Diet Period Body Weight Data

White Leghorn Chickens

Group	Sex	Week:	Mean Body Weights in Kilograms 26	27	28	29	Sacrifice
Aroclor 1260 1 ppm	M		2.11	2.17	2.18	2.18	2.18
	F		1.84	1.92	1.94	1.92	1.82

Group	Sex	Week:	Mean Body Weights in Kilograms 26	27	28	29	Sacrifice
Aroclor 1260 10 ppm	M		2.52	2.48	2.50	2.58	2.57
	F		1.92	1.90	1.96	2.02	2.01

Group	Sex	Week:	Mean Body Weights in Kilograms 25	26	27	28	Sacrifice
Aroclor 1260 100 ppm	M		2.05	2.12	2.14	2.20	2.26
	F		1.86	1.90	1.90	1.93	1.95

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TABLE XII continued

TEST MATERIAL: Three Aroclors

Recovery Diet Period Body Weight Data

White Leghorn Chickens

Group	Sex	Week:	Mean Body Weights in Kilograms 26	27	28	29	Sacrifice
Aroclor 1260 1 ppm	M		2.11	2.17	2.18	2.18	2.18
	F		1.84	1.92	1.94	1.92	1.82

Group	Sex	Week:	Mean Body Weights in Kilograms 26	27	28	29	Sacrifice
Aroclor 1260 10 ppm	M		2.52	2.48	2.50	2.58	2.57
	F		1.92	1.90	1.96	2.02	2.01

Group	Sex	Week:	Mean Body Weights in Kilograms 25	26	27	28	Sacrifice
Aroclor 1260 100 ppm	M		2.05	2.12	2.14	2.20	2.26
	F		1.86	1.90	1.90	1.93	1.95

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TABLE XII-A

TEST MATERIAL: Three Aroclors
White Leghorn Chickens

Summary of Body Weight Data

Group and Test Material	Concentration (ppm)	Mean Body Weight Data - Kilograms 0 Day: Male	0 Day: Female	Through Dosing: Male	Through Dosing: Female	At Sacrifice: Male	At Sacrifice: Female
I Control	-	1.27	0.95	2.43	1.89	2.44	1.88
II Aroclor 1242	1	1.27	0.95	2.68	1.88	2.70	1.86
III Aroclor 1242	10	1.28	0.95	2.11	1.82	2.13	1.79
IV Aroclor 1242	100	1.28	0.96	2.05	1.88	2.10	1.91
V Aroclor 1254	1	1.28	0.96	2.26	1.93	2.27	1.94
VI Aroclor 1254	10	1.28	0.96	2.30	1.84	2.28	1.85
VII Aroclor 1254	100	1.28	0.95	1.83	1.81	1.97	1.68
VIII Aroclor 1260	1	1.28	0.96	2.11	1.84	2.18	1.82
IX Aroclor 1260	10	1.28	0.95	2.52	1.92	2.57	2.01
X Aroclor 1260	100	1.28	0.95	2.05	1.86	2.26	1.95

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2. Food Consumption

The food consumption data for the parent generation are presented in Table XIII.

The chickens fed Aroclor 1242 at 100 ppm or Aroclor 1254 at 100 ppm ate less than those fed the control diet.

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TABLE XIII

TEST MATERIAL: Three Aroclors

Average Food Consumption in grams/bird/day

White Leghorn Chickens

Week	Control	1242 1 ppm	1242 10 ppm	1242 100 ppm	1254 1 ppm	1254 10 ppm	1254 100 ppm	1260 1 ppm	1260 10 ppm	1260 100 ppm
					Test Period					
1	67	66	78	63	77	77	80	82	78	66
2	90	67	81	70	82	72	54	39	54	88
3	97	98	90	77	95	88	90	99	98	86
4	113	136	101	82	113	107	107	90	102	95
5	89	110	94	61	93	95	80	80	100	87
6	147	134	121	86	109	120	99	135	107	132
7	117	143	120	77	99	111	137	141	103	87
8	131	125	109	90	108	130	140	146	117	145
9	126	156	132	99	129	127	128	142	154	148
10	232	204	204	176	206	210	171	254	192	221
11	172	166	166	175	151	144	164	186	157	174
12	134	132	140	94	126	114	113	163	128	131
13	144	136	156	97	148	139	78	162	134	148
14	135	138	160	78	134	140	74	139	130	162
15	117	118	147	98	129	126	76	125	126	108
16	123	167	185	111	170	171	98	178	141	153
17	121	137	127	31	128	99	38	129	113	129
18	109	110	111	23	102	76	68	106	103	106
19	167	149	131	62	115	139	14	138	128	129
20	86	100	39	20	69	79	28	100	94	88
21	126	108	99	101	128	95	94	149	101	120
22	266	154	154	100	117	169	80	150	123	120
23	247	217	256	-	87	33	-	130	138	207
24	249	198	197	-	134	124	-	148	135	120
25	190	156	167	-	171	102	-	143	133	191
26	148	144	-	-	-	122	-	139	71	-
					Recovery Period					
22	-	-	-	146	-	-	97	-	-	-
23	-	-	-	118	-	-	106	-	-	-
24	-	-	-	126	-	-	148	-	-	-
25	-	-	140	111	126	-	97	-	-	121
26	134	135	135	93	130	111	90	92	111	145
27	205	169	155	-	127	177	-	142	187	148
28	136	104	151	-	145	168	-	154	165	143
29	257	226	154	-	160	140	-	143	159	161
30	256	161	-	-	-	153	-	143	179	-

HARTOLDMON0028720

3. Mortality and Reactions

The parent generation mortality chronology is presented in Table XIV. Autopsy of birds dying on test revealed malnutrition and extensive growths on kidneys, gonads, liver, or heart. These animals exhibited anorexia and grew progressively weaker until death.

HARTOLDMON0028721

TABLE XIV

TEST MATERIAL: Three Aroclors

Mortality Data

White Leghorn Chickens

Week	Control	1242 1 ppm	1242 10 ppm	1242 100 ppm	1254 1 ppm	1254 10 ppm	1254 100 ppm	1260 1 ppm	1260 10 ppm	1260 100 ppm
				Test Period Mortality During Week Indicated						
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
6	0	0	0	1F	0	0	0	0	0	0
7	1F	0	0	0	1M	0	1F	1F	0	0
8	1F, 1M	0	1F	1F	0	1F	0	1F	0	0
9	0	0	0	2F	1F	0	1F	0	0	0
10	0	0	0	1F, 1M	0	0	0	0	0	0
11	0	1F	1F	0	0	0	0	1F	0	0
12	0	0	2F	1F	1F	1F	2M	0	0	0
13	0	0	1F	0	0	1F	0	0	0	1M
14	0	1F	0	3F	0	0	0	0	0	0
15	1F	0	0	0	0	1F	1F	0	1F	0
16	1F	2F	1F	0	0	0	0	0	0	0
17	0	0	0	1F	0	0	2F	0	0	0
18	1F	0	0	0	0	0	0	0	0	0
19	1F	0	0	0	0	0	1F	1F	0	0
20	1F	0	0	0	1M	0	1F	0	1F	1M
21	0	0	0	1M	1F	0	0	0	0	1F
22	0	0	0	0	1F	0	1F	0	0	0
23	1M	0	0	-	0	0	-	0	1F	1F
24	1F	0	0	-	2F	1M	-	2F, 1M	1F	1F
25	0	0	0	-	0	0	-	0	0	-
26	0	0	-	-	-	0	-	0	0	-
				Recovery Period Mortality During Week Indicated						
22	-	-	-	0	-	-	0	-	-	-
23	-	-	-	0	-	-	0	-	-	-
24	-	-	-	1F	-	-	0	-	-	-
25	-	-	0	0	0	-	0	-	-	0
26	0	0	0	0	0	1F	0	0	0	0
27	0	0	0	-	0	0	-	0	0	0
28	0	0	0	-	0	0	-	0	0	0
29	0	0	0	-	0	0	-	0	0	0
30	0	0	-	-	-	0	-	0	0	-

HARTOLDMON0028722

4. Gross Pathology

The results of the gross pathological examinations at sacrifice are presented in Tables XV through XXIV.

The results of the gross pathological examinations at recovery sacrifice are presented in Tables XXV through XXXIV.

HARTOLDMON0028723

TABLE XV

TEST MATERIAL: Three Aroclors

Residue Sacrifice Gross Pathology

White Leghorn Chickens

Control Group

Animal Number and Sex	Results of Gross Pathological Examination
218-M	Normal
733-F	Malnutrition - Small, diffuse growth on liver
790-F	Malnutrition, Pericarditis, Myocarditis. Not Producing mature ova.
837-F	Normal
933-F	Normal
938-F	Normal
980-F	Normal
83-F	Normal

HARTOLDMON0028724

TABLE XVI

TEST MATERIAL: Three Aroclors

Residue Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1242 - 1 ppm

Animal Number and Sex	Results of Gross Pathological Examination
212-F	Normal
226-M	Normal
798-F	Normal
811-F	Malnutrition - Massive ovarian tumor. Many small tumors on kidneys.
894-F	3 cm. fatty encapsulated ball of pus in omentum.
949-F	Normal
981-F	Normal
423-F	Normal
758-F	Normal
816-F	Normal

HARTOLDMON0028725

TABLE XVII

TEST MATERIAL: Three Aroclors

Residue Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1242 - 10 ppm

Animal Number and Sex	Results of Gross Pathological Examination
203-M	Normal
230-M	Normal
763-F	Normal
862-F	Normal
970-F	Normal
988-F	One leathery and one hard shell egg in peritoneal cavity
994-F	Malnutrition. Ovary and oviduct filled with consolidated white material. Small pale spots on kidneys.
925-F	Normal
828-F	Normal

HARTOLDMON0028726

TABLE XVIII

TEST MATERIAL: Three Aroclors

Residue Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1242 - 100 ppm

Animal Number and Sex	Results of Gross Pathological Examination
201-M	Omental fat depleted.
770-F	Malnutrition. Not producing mature ova. Thin, semi-transparent ventricle wall.
969-F	Normal
772-F	Normal
876-F	Normal
707-F	Fat depletion. Ovum in peritoneal cavity.

HARTOLDMON0028727

TABLE XIX

TEST MATERIAL: Three Aroclors

Residue Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1254 - 1 ppm

Animal Number and Sex	Results of Gross Pathological Examination
233-M	Normal
997-F	Normal
877-F	Normal
976-F	Normal
704-F	Normal
775-F	Normal
916-F	Normal
923-F	Malnutrition. Enlarged, fatty infiltrated spleen. Encapsulated tumors of breast muscle. Fatty infiltrated liver. Encapsulated chick embryo being absorbed.

HARTOLDMON0028728

TABLE XX

TEST MATERIAL: Three Aroclors

Residue Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1254 - 10 ppm

Animal Number and Sex	Results of Gross Pathological Examination
244-M	Normal
715-F	Malnutrition. Not producing mature ova.
735-F	Malnutrition. Not producing mature ova. Several myocardial and hepatic fatty tumors.
736-F	Normal
813-F	Normal
858-F	Normal
866-F	Normal
902-F	Not producing mature ova.
881-F	Normal

HARTOLDMON0028729

TABLE XXI

TEST MATERIAL: Three Aroclors

Residue Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1254 - 100 ppm

Animal Number and Sex	Results of Gross Pathological Examination
227-M	Malnutrition. Pericarditis, Myocarditis. Hepatic consolidation and hemorrhage.
723-F	Normal
765-F	Normal
826-F	Myocarditis. Pericarditis. Pale kidneys. Resorbing ovum in peritoneal cavity. Weak wall of left ventricle.
832-F	Malnutrition. Not producing mature ova.
848-F	Ovary contains many follicles filled with blood or resorbing.
983-F	Normal

HARTOLDMON0028730

TABLE XXII

TEST MATERIAL: Three Aroclors

Residue Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1260 - 1 ppm

Animal Number and Sex	Results of Gross Pathological Examination
222-M	Normal
829-F	Normal
785-F	Not producing mature ova.
792-F	Normal
800-F	Normal
794-F	Normal
731-F	Normal
944-F	Normal

HARTOLDMON0028731

TABLE XXIII

TEST MATERIAL: Three Aroclors

Residue Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1260 - 10 ppm

Animal Number and Sex	Results of Gross Pathological Examination
249-M	Normal
239-M	Normal
915-F	Normal
903-F	Normal
985-F	Normal
999-F	Patent right oviduct filled with 40 ml. white granular-material and covered with growths. 3 fatty encapsulated growths on liver.
922-F	Normal
789-F	Normal
932-F	Malnutrition. Enlarged liver. Ovarian and renal growths.
732-F	Normal

HARTOLDMON0028732

TABLE XXIV

TEST MATERIAL: Three Aroclors

Residue Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1260 - 100 ppm

Animal Number and Sex	Results of Gross Pathological Examination
211-M	Normal
721-F	Normal
806-F	Malnutrition
984-F	Normal
745-F	Normal
896-F	Normal
780-F	Normal
979-F	Fatty growths on spleen and heart.
853-F	Normal

HARTOLDMON0028733

TABLE XXV

TEST MATERIALS: Three Aroclors

Recovery Sacrifice Gross Pathology

White Leghorn Chickens

Control Group

Animal Number and Sex	Results of Gross Pathological Examination
224-M	Normal
987-F	Normal
717-F	Normal
838-F	Fatty growths throughout kidneys
912-F	Normal
992-F	Normal

HARTOLDMON0028734

TABLE XXVI

TEST MATERIAL: Three Aroclors

Recovery Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1242 - 1 ppm

Animal Number and Sex	Results of Gross Pathological Examination
238-M	Normal
250-M	Normal
703-F	Normal
752-F	Normal
782-F	Normal
840-F	Normal
867-F	Fibrous growths in duodenal mesentery.
709-F	Normal
897-F	Normal
963-F	Normal

HARTOLDMON0028735

TABLE XXVII

TEST MATERIAL: Three Aroclors

Recovery Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1242 - 10 ppm

Animal Number and Sex	Results of Gross Pathological Examination
235-M	Several large, pale growths on kidneys.
252-M	Normal
718-F	Normal
796-F	Normal
842-F	10 ml. fluid-filled vesicle in mesometrium. Rubbery-shelled egg in peritoneal cavity.
884-F	Normal
888-F	Normal
906-F	Malnutrition. Mottled and fibrotic liver.
934-F	Normal

HARTOLDMON0028736

TABLE XXVIII

TEST MATERIAL: Three Aroclors

Recovery Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1242 - 100 ppm

Animal Number and Sex	Results of Gross Pathological Examination
225-M	3 small, white growths on heart.
776-F	Normal
742-F	Normal
869-F	Normal
964-F	200 ml. fluid in peritoneal cavity. 25 ml. fluid in pleural cavity. Omentum fragmented and the omental fat necrotic. Ovary necrotic. Two dozen small white growths on heart.

HARTOLDMON0028737

TABLE XXIX

TEST MATERIAL: Three Aroclors

Recovery Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1254 - 1 ppm

Animal Number and Sex	Results of Gross Pathological Examination
206-M	Normal
714-F	Normal
810-F	Normal
833-F	Normal
864-F	3 ml. fluid-filled vesicle in mesometrium.
891-F	Normal
900-F	Normal
910-F	Normal

HARTOLDMON0028738

TABLE XXX

TEST MATERIAL: Three Aroclors

Recovery Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1254 - 10 ppm

Animal Number and Sex	Results of Gross Pathological Examination
217-M	Normal
245-M	Normal
778-F	Normal
801-F	Normal
786-F	Normal
702-F	Normal
847-F	Normal
720-F	Resorbing ovum in peritoneal cavity.
713-F	Normal

HARTOLDMON0028739

TABLE XXXI

TEST MATERIAL: Three Aroclors

Recovery Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1254 - 100 ppm

Animal Number and Sex	Results of Gross Pathological Examination
229-M	Malnutrition. 50 ml. pericardial fluid. Enlarged, dark liver.
998-F	Malnutrition. Several small, white cardiac growths. Enlarged pale kidneys. No detectable gall bladder. Not producing mature ova.
724-F	Normal
921-F	Normal
957-F	Normal
959-F	Normal
819-F	30 ml. yellow subcutaneous fluid. 100 ml. fluid in peritoneal cavity. 50 ml granular material and fluid in omentum. Enlarged, pale liver. Several small growths on heart. Enlarged ovary shedding immature ova. Malnutrition.

HARTOLDMON0028740

TABLE XXXII

TEST MATERIAL: Three Aroclors

Recovery Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1260 - 1 ppm

Animal Number and Sex	Results of Gross Pathological Examination
232-M	Normal
240-M	3 cm. cage bruise (breast blister)
946-F	Normal
1000-F	Normal
913-F	Normal
885-F	Normal
757-F	Normal
729-F	Normal
759-F	Resorbing egg in peritoneal cavity.

HARTOLDMON0028741

TABLE XXXIII

TEST MATERIAL: Three Aroclors

Recovery Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1260 - 10 ppm

Animal Number and Sex	Results of Gross Pathological Examination
243-M	Small cage bruise (breast blister)
215-M	3 cm. cage bruise (breast blister)
716-F	Normal
784-F	Normal
748-F	Normal
849-F	Normal
919-F	Resorbing ovum in peritoneal cavity.
879-F	Normal
839-F	Normal
701-F	Resorbing ovum in omentum.

HARTOLDMON0028742

TABLE XXXIV

TEST MATERIAL: Three Aroclors

Recovery Sacrifice Gross Pathology

White Leghorn Chickens

Aroclor 1260 - 100 ppm

Animal Number and Sex	Results of Gross Pathological Examination
236-M	Normal
737-F	Resorbing ovum in peritoneal cavity.
805-F	Resorbing ovum in peritoneal cavity.
754-F	Normal
924-F	Normal
966-F	Normal
741-F	Normal
926-F	Normal
870-F	Normal
996-F	Resorbing ovum in peritoneal cavity.

HARTOLDMON0028743

5. Egg Production

The weekly test period egg production is presented in Tables XXXV through XLIV.

The weekly recovery period egg production is presented in Tables XLV through LIV.

Egg production in groups fed Aroclor 1242 at 100 ppm or Aroclor 1254 at 100 ppm was much lower than the production of the control groups. After being on test for 12 or 13 weeks, a maximum of 40 to 43% of the hens in these two groups laid eggs. In the other groups about 90 to 100% of the hens laid eggs.

HARTOLDMON0028744

TABLE XXXV

TEST MATERIAL: Three Aroclors

Test Period Egg Production

White Leghorn Chickens

Control Group

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
5	2	2	42.9	1.4
6	4	3	39.4	2.9
7	27	27	42.4	19.3
8	41	41	42.7	30.6
9	72	72	44.3	56.3
10	79	76	44.4	62.7
11	90	90	47.3	71.4
12	92	91	48.1	73.0
13	90	90	49.4	71.4
14	91	91	49.9	72.2
15	96	96	52.5	76.2
16	91	91	52.5	76.5
17	91	91	54.8	81.3
18	82	82	54.5	74.5
19	75	75	55.3	71.4
21*	22	22	56.6	73.3
22	28	28	57.1	66.7
23	28	28	57.7	66.7
24	24	24	58.3	57.1
25	22	22	60.4	59.5
26	24	24	56.8	80.0

* Five days.

HARTOLDMON0028745

TABLE XXXVI

TEST MATERIAL: Three Aroclors

Test Period Egg Production

White Leghorn Chickens

Aroclor 1242 - 1 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
4	5	3	42.0	3.4
5	9	9	34.3	6.1
6	15	15	40.1	10.2
7	35	35	42.2	23.8
8	69	69	43.3	46.9
9	108	104	46.0	73.5
10	108	107	47.2	73.5
11	97	94	47.9	66.4
12	99	96	50.0	70.7
13	97	96	49.8	69.3
14	101	100	50.7	73.7
15	102	100	51.8	76.7
16	94	94	52.5	71.8
17	94	93	52.9	78.3
18	100	100	53.4	84.0
19	89	89	53.8	74.8
21*	30	30	55.0	75.0
22	32	32	57.4	57.1
23	40	40	54.9	71.4
24	37	37	56.6	66.1
25	42	42	59.2	75.0
26	38	38	57.6	67.9

* Five days.

HARTOLDMON0028746

TABLE XXXVII

TEST MATERIAL: Three Aroclors

Test Period Egg Production

White Leghorn Chickens

Aroclor 1242 - 10 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
5	1	1	33.8	0.7
6	10	10	34.9	7.1
7	33	32	42.3	23.6
8	62	62	43.1	44.3
9	77	76	45.0	57.9
10	89	89	47.0	66.9
11	98	97	48.7	74.7
12	87	86	50.8	69.0
13	95	94	49.4	79.2
14	87	83	50.8	77.0
15	85	84	51.6	75.9
16	74	74	52.2	67.3
17	73	73	53.1	70.9
18	71	71	53.2	72.4
19	73	73	55.2	74.5
20	68	68	54.8	69.4
21*	25	25	56.4	71.4
22	39	39	56.0	79.6
23	34	34	58.2	69.4
24	38	38	59.2	77.6
25**	17	17	59.9	84.0

* Five days.
** Three days.

HARTOLDMON0028747

TABLE XXXVIII

TEST MATERIAL: Three Aroclors

Test Period Egg Production

White Leghorn Chickens

Aroclor 1242 - 100 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
5	3	3	37.2	2.1
6	0	0	-	0
7	5	5	34.5	3.7
8	7	7	42.7	5.3
9	15	15	41.0	12.1
10	33	33	46.6	28.7
11	34	34	48.3	31.8
12	32	32	46.8	31.7
13	40	40	47.5	40.8
14	36	36	49.5	37.5
15	23	22	49.9	29.5
16	23	23	48.3	29.9
17	27	27	49.9	35.1
18	18	18	51.2	25.0
19	14	14	52.2	20.0
20	11	11	52.8	15.7
21*	9	9	51.6	18.0
22**	10	10	53.0	16.6

* Five days.
** Six days.

HARTOLDMON0028748

TABLE XXXIX

TEST MATERIAL: Three Aroclors

Test Period Egg Production

White Leghorn Chickens

Aroclor 1254 - 1 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
6	7	7	38.4	5.0
7	32	32	40.1	22.9
8	68	68	42.6	48.6
9	81	81	44.9	57.9
10	98	97	46.3	73.7
11	91	91	48.2	68.4
12	100	99	48.9	75.2
13	92	92	51.5	72.4
14	105	103	50.2	83.3
15	108	107	51.7	85.7
16	99	99	52.0	78.6
17	105	105	53.5	83.3
18	102	102	56.1	81.0
19	99	99	52.3	78.6
21*	68	68	54.3	75.6
22	80	80	56.1	67.8
23	64	64	56.4	57.1
24	73	73	58.4	67.0
25**	21	21	59.9	47.7

* Five days.
** Three days.

HARTOLDMON0028749

TABLE XLI

TEST MATERIAL: Three Aroclors

Test Period Egg Production

White Leghorn Chickens

Aroclor 1254 - 100 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
6	2	2	32.3	1.4
7	11	11	36.4	7.9
8	28	28	40.0	21.1
9	43	42	44.7	33.6
10	54	53	45.1	42.9
11	44	43	45.5	34.9
12	44	43	46.0	34.9
13	39	39	46.2	31.0
14	36	36	47.9	28.6
15	27	27	47.9	21.4
16	28	28	45.9	23.1
17	15	15	47.5	12.6
18	15	15	48.0	14.0
19	7	6	49.8	6.9
20	15	15	50.7	15.3
21*	10	10	50.8	15.4
22**	6	6	51.0	7.7

* Five days.
** Six days.

HARTOLDMON0028750

TABLE XLII

TEST MATERIAL: Three Aroclors

Test Period Egg Production

White Leghorn Chickens

Aroclor 1260 - 1 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
5	1	1	33.6	0.7
6	23	23	34.5	16.4
7	34	34	40.4	24.5
8	64	64	43.4	48.1
9	76	75	45.7	60.3
10	83	83	46.6	65.9
11	89	89	48.3	70.6
12	90	90	50.4	75.0
13	82	81	51.3	68.9
14	86	85	50.9	72.3
15	84	84	52.1	70.6
16	72	72	52.8	60.5
17	81	79	53.1	68.1
18	68	68	55.4	57.1
19	75	75	48.6	64.1
20	73	73	55.9	65.2
21*	59	59	50.4	73.8
22	59	59	57.8	52.7
23	68	68	56.8	60.7
24	60	60	58.6	57.7
25	70	70	59.2	71.4
26**	50	50	59.2	59.5

* Five days.
** Six days.

HARTOLDMON0028751

TABLE XLIII

TEST MATERIAL: Three Aroclors

Test Period Egg Production

White Leghorn Chickens

Aroclor 1260 - 10 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
5	8	8	41.6	5.7
6	18	17	39.3	12.9
7	36	36	37.8	25.7
8	51	51	43.3	36.4
9	85	85	44.6	60.7
10	110	110	45.3	78.6
11	97	97	46.6	71.9
12	99	99	48.1	74.4
13	99	98	48.7	74.4
14	106	105	50.3	75.7
15	101	101	50.3	73.2
16	84	84	51.2	63.2
17	94	92	51.5	70.7
18	100	100	52.1	75.1
19	98	98	52.1	73.7
21*	67	67	50.6	74.4
22	83	83	53.4	65.9
23	83	83	54.1	66.9
24	76	76	56.3	63.9
25	73	73	56.6	64.6
26	78	78	56.4	69.6

* Five days.

HARTOLDMON0028752

TABLE XLIV

TEST MATERIAL: Three Aroclors

Test Period Egg Production

White Leghorn Chickens

Aroclor 1260 - 100 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
6	3	3	39.1	2.1
7	20	20	38.1	14.3
8	51	51	41.6	36.4
9	82	81	45.9	58.6
10	98	97	47.0	70.0
11	108	104	47.9	77.1
12	109	107	49.5	77.9
13	111	111	49.8	79.3
14	111	110	50.8	79.3
15	113	113	50.9	80.7
16	100	100	50.6	71.4
17	118	117	55.0	84.3
18	105	105	54.0	75.0
19	106	106	53.0	75.7
21*	69	69	54.0	70.4
22	93	93	53.9	69.9
23	73	73	55.3	55.7
24	76	76	56.1	60.3
25**	20	20	57.3	37.0

* Five days.
** Three days.

HARTOLDMON0028753

TABLE XLV

TEST MATERIAL: Three Aroclors

Recovery Period Egg Production

White Leghorn Chickens

Control Group

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
26*	3	3	57.5	60.0
27	28	28	59.9	80.0
28	28	28	60.0	80.0
29	23	23	59.8	65.7
30	25	25	60.2	71.4
31*	3	3	58.9	60.0

* One day.

HARTOLDMON0028754

TABLE XLVI

TEST MATERIAL: Three Aroclors

Recovery Period Egg Production

White Leghorn Chickens

Aroclor 1242 - 1 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
27	42	42	57.6	75.0
28	48	48	59.5	85.7
29	46	46	59.2	82.1
30	47	47	59.0	83.9
31*	10	10	59.1	62.5

* Two days.

HARTOLDMON0028755

TABLE XLVII

TEST MATERIAL: Three Aroclors

Recovery Period Egg Production

White Leghorn Chickens

Aroclor 1242 - 10 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
26	33	33	58.3	67.3
27	22	22	58.1	44.9
28	30	30	58.6	61.2
29	31	31	57.6	63.3
30*	3	3	59.2	42.9

* One day.

HARTOLDMON0028756

TABLE XLVIII

TEST MATERIAL: Three Aroclors

Recovery Period Egg Production

White Leghorn Chickens

Aroclor 1242 - 100 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
22*	0	0	0	0
23	9	9	60.9	25.7
24	7	7	61.8	21.2
25	10	10	59.5	35.7
26	7	7	55.8	25.0
27*	0	0	-	0

* One day.

HARTOLDMON0028757

TABLE XLIX

TEST MATERIAL: Three Aroclors

Recovery Period Egg Production

White Leghorn Chickens

Aroclor 1254 - 1 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
26	41	41	58.4	83.7
27	40	40	59.2	81.6
28	37	37	58.6	75.5
29	38	38	54.7	77.6
30*	4	4	58.3	57.1

* One day.

HARTOLDMON0028758

TABLE L

TEST MATERIAL: Three Aroclors

Recovery Period Egg Production

White Leghorn Chickens

Aroclor 1254 - 10 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
26*	3	3	54.3	37.5
27	39	39	57.8	76.5
28	41	41	58.2	83.7
29	42	42	58.6	85.7
30	39	39	58.7	79.6
31*	3	3	56.7	42.9

* One day.

HARTOLDMON0028759

TABLE LI

TEST MATERIAL: Three Aroclors

Recovery Period Egg Production

White Leghorn Chickens

Aroclor 1254 - 100 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
22*	4	4	47.0	66.7
23	14	14	50.1	33.3
24	18	18	52.9	42.9
25	14	14	54.0	33.3
26	9	9	52.0	21.4
27**	6	6	54.2	50.0

* One day.
** Two days.

HARTOLDMON0028760

TABLE LII

TEST MATERIAL: Three Aroclors

Recovery Period Egg Production

White Leghorn Chickens

Aroclor 1260 - 1 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
26*	5	5	62.5	71.4
27	37	37	60.7	75.5
28	36	36	61.0	73.5
29	33	33	60.7	67.3
30	35	35	61.9	71.4
31*	5	5	61.1	71.4

* One day.

HARTOLDMON0028761

TABLE LIII

TEST MATERIAL: Three Aroclors

Recovery Period Egg Production

White Leghorn Chickens

Aroclor 1260 - 10 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
27	48	48	55.6	85.7
28	44	44	56.5	78.6
29	43	43	57.5	76.8
30	45	45	57.5	80.4
31*	13	13	57.5	81.3

* Two days.

HARTOLDMON0028762

TABLE LIV

TEST MATERIAL: Three Aroclors

Recovery Period Egg Production

White Leghorn Chickens

Aroclor 1260 - 100 ppm

Test Week	Number of Eggs Laid	Number of Eggs Weighed	Average Egg Weight (grams)	Percent Production
26	44	44	57.0	69.8
27	52	52	58.2	82.5
28	46	46	57.3	73.0
29	45	45	57.4	71.4
30*	7	7	58.6	77.7

* One day.

HARTOLDMON0028763

B. Eggs

1. Egg Production and Quality

The test period weekly egg production is presented in Tables XXXV through XLIV.

The recovery period weekly egg production is presented in Tables XLV through LIV.

The candling results for a number of seven-day periods are presented in Table LV, with the total number of eggs for each defect tested according to the following code:

Br = Broken in nest
Mbr = Broken during handling
Cr = Cracked shell
Dy = Double yolk present
Ny = No yolk present
Ck = Check shell
Sf = Soft or misshapen shell
Sp = Blood or meat spot in egg
Nas = Air bubble defective or absent

Where multiple defects occurred, the egg is tabulated under the defect highest in the list above.

HARTOLDMON0028764

TABLE LV

TEST MATERIAL: Three Aroclors

Egg Candling Results Summary

White Leghorn Chickens

Group	Number of Eggs For Each Type of Defect									Total Defective Eggs	Total Eggs	Percent Defective Eggs
	Br	Mbr	Cr	Dy	Ny	Ck	Sf	Sp	Nas			
Control	0	0	16	6	0	68	0	1	9	100	435	23
1242 1 ppm	3	0	32	6	0	79	0	4	1	125	478	26
1242 10 ppm	1	0	20	4	0	89	0	0	1	115	444	26
1242 100 ppm	0	0	1	4	1	15	0	0	0	21	111	19
1254 1 ppm	1	0	16	4	0	110	0	3	0	134	516	26
1254 10 ppm	2	1	23	6	1	98	0	0	0	131	521	25
1254 100 ppm	1	0	7	0	0	27	1	0	0	36	100	36
1260 1 ppm	1	1	34	1	0	12	0	2	2	53	443	12
1260 10 ppm	3	1	35	5	0	78	0	0	0	122	477	26
1260 100 ppm	2	0	56	10	0	116	0	0	0	184	545	34

HARTOLDMON0028765

2. Hatchability

The hatch data are presented in Table LVI.*

Examination of the unhatched eggs revealed the data presented in Table LVII.**

Data from the gross pathological examination of chicks at sacrifice after the 30-day observation period are presented in Tables LVIII through LXV.

* There was poor hatchability of eggs from hens fed Aroclor 1242 at 10 or 100 ppm or fed Aroclor 1254 at 100 ppm.

** In eggs from hens fed Aroclor 1242 at 10 or 100 ppm, there were a large number of embryos in the one to three cm size.

HARTOLDMON0028766

TABLE LVI

TEST MATERIAL: Three Aroclors

Hatch Data

White Leghorn Chickens

Group	Number of Eggs Set	Number of Chicks Hatched	Hatching Percent	Average Weight After Day 1 (grams)	Agerage Weight After Day 30 (grams)
Control	161	105	65.2	39.1	248
1242 1 ppm	110	73	66.4	36.7	281
1242 10 ppm	161	28	17.4	34.6	232
1242 100 ppm	44	0	0	-	-
1254 1 ppm	105	68	64.8	34.2	251
1254 10 ppm	120	78	65.0	32.6	260
1254 100 ppm	38	0	0	-	-
1260 1 ppm	127	88	69.3	39.0*	295*
1260 10 ppm	135	94	69.6	34.2**	282**
1260 100 ppm	120	74	61.7	35.9	264

* Does not include seven chicks which crossed into 1242 10 ppm at hatching.
** Includes seven chicks which crossed from 1242 1 ppm at hatching.

HARTOLDMON0028767

TABLE LVII

TEST MATERIAL: Three Aroclors

Examination of Unhatched Eggs

White Leghorn Chickens

Group	Total Unhatched	Broken Shell	Not Fertile	Number of Eggs Per Group: Embryo Decomposed	Embryo < 1 cm	Embryo 1-3 cm	Chick 1/2 Term	Chick 3/4 Term	Chick Full Term	Chick Partially Out of Shell
Control	56	0	3	1	17	6	1	8	9	2
1242 1 ppm	37	1	7	2	7	2	3	3	12	0
1242 10 ppm	133	0	8	1	9	73	11	4	22	5
1242 100 ppm	43	1	10	0	11	20	1	0	0	0
1254 1 ppm	37	0	10	0	6	8	1	1	9	2
1254 10 ppm	42	0	13	1	3	4	1	6	13	1
1254 100 ppm	38	1	13	0	14	9	0	0	1	0
1260 1 ppm	39	1	3	0	5	12	0	1	14	3
1260 10 ppm	41	0	3	0	7	9	2	8	10	2
1260 100 ppm	46	0	10	1	9	2	7	0	13	4

HARTOLDMON0028768

TABLE LVIII

TEST MATERIAL: Three Aroclors

Control Gross Pathology 30-Day Chicks

White Leghorn Chickens

Number of Animals	Results of Gross Pathological Examination
93	Normal
2	Possible fatty myocardiac growth
1	Deformed feet
1	Deformed leg
1	2.5 cm round hepatic growth with greensheen

HARTOLDMON0028769

TABLE LIX

TEST MATERIALS: Three Aroclors

1242 1 ppm Gross Pathology 30-Day Chicks

White Leghorn Chickens

Number of Animals	Results of Gross Pathological Examination
70	Normal

HARTOLDMON0028770

TABLE LX

TEST MATERIALS: Three Aroclors

1242 10 ppm Gross Pathology 30-Day Chicks

White Leghorn Chickens

Number of Animals	Results of Gross Pathological Examination
20	Normal

HARTOLDMON0028771

TABLE LXI

TEST MATERIALS: Three Aroclors

1254 1 ppm Gross Pathology 30-Day Chicks

White Leghorn Chickens

Number of Animals	Results of Gross Pathological Examination
56	Normal
1	Down on side.
1	Both feet curled inward
1	Only wings feathered

HARTOLDMON0028772

TABLE LXII

TEST MATERIALS: Three Aroclors

1254 10 ppm Gross Pathology 30-Day Chicks

White Leghorn Chickens

Number of Animals	Results of Gross Patholgical Examination
56	Normal
2	Deformed feet
1	Unable to extend right leg
1	Dark left testicle
1	Possible fatty tumors on spleen

HARTOLDMON0028773

TABLE LXIII

TEST MATERIALS: Three Aroclors

1260 1 ppm Gross Pathology 30-Day Chicks

White Leghorn Chickens

Number of Animals	Results of Gross Pathological Examination
74	Normal
1	Possible kidney tumors

HARTOLDMON0028774

TABLE LXIV

TEST MATERIALS: Three Aroclors

1260 10 ppm Gross Pathology 30-Day Chicks

White Leghorn Chickens

Number of Animals	Results of Gross Pathological Examination
90	Normal
1	Feet curled in
1	Slight discoloration of left testicle

HARTOLDMON0028775

TABLE LXV

TEST MATERIALS: Three Aroclors

1260 100 ppm Gross Pathology 30-Day Chicks

White Leghorn Chickens

Number of Animals	Results of Gross Pathological Examination
60	Normal
2	Feet curled under
1	Not eating. Still has chick down.

HARTOLDMON0028776

3. Physical Characteristics of Eggs

Data on the specific gravity of intact eggs are summarized in Table LXVI.*

Data on the average egg shell thickness (without membrane) at the equatorial circumference are presented in Table LXVII. Three measurements were determined for each egg.**

* There were no significant differences in specific gravity among eggs from treated or from control hens.

** The egg shells from hens fed Aroclor 1242 at 10 or 100 ppm or fed Aroclor 1254 at 100 ppm were not as thick as the shells of eggs from hens fed the control diet.

HARTOLDMON0028777

TABLE LXVI

TEST MATERIALS: Three Aroclors

Egg Specific Gravity

White Leghorn Chickens

Group	Normal Eggs Number	Normal Eggs Average Specific Gravity	Defective Eggs Number	Defective Eggs Average Specific Gravity	Total Eggs Number	Total Eggs Average Specific Gravity
Control	81	1.070	83	1.079	167	1.074
1242 1 ppm	88	1.074	99	1.072	187	1.073
1242 10 ppm	89	1.070	94	1.069	183	1.070
1242 100 ppm	160	1.064	19	1.065	35	1.065
1254 1 ppm	95	1.071	117	1.068	212	1.070
1254 10 ppm	109	1.070	112	1.070	221	1.070
1254 100 ppm	12	1.065	29	1.064	41	1.064
1260 1 ppm	85	1.070	115	1.070	200	1.070
1260 10 ppm	93	1.070	80	1.069	173	1.070
1260 100 ppm	96	1.070	135	1.068	231	1.068

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TABLE LXVII

TEST MATERIALS: Three Aroclors

Egg Shell Thickness

White Leghorn Chickens

Group	Normal Eggs Number	Normal Eggs Average Thickness (1/1000 in.)	Defective Eggs Number	Defective Eggs Average Thickness (1/1000 in.)	Total Eggs Number	Total Eggs Average Thickness (1/1000 in.)
Control	72	14.58	71	14.15	143	14.37
1242 1 ppm	75	14.37	89	14.04	164	14.19
1242 10 ppm	78	13.85	82	13.48	160	13.66
1242 100 ppm	14	12.07	15	11.62	29	11.84
1254 1 ppm	73	14.32	110	14.03	183	14.15
1254 10 ppm	120	12.79	127	14.40	247	13.62
1254 100 ppm	12	10.25	35	11.10	47	10.88
1260 1 ppm	86	14.56	148	14.17	234	14.28
1260 10 ppm	91	14.75	116	14.93	207	14.85
1260 100 ppm	98	13.99	179	14.11	277	14.07

HARTOLDMON0028779

4. Residue Studies

One fourth of all nondefective eggs during the test period were frozen and shipped to Monsanto for residue analysis. During the recovery period a minimum of ten eggs per group per week were quick frozen and shipped to Monsanto for analyses.

HARTOLDMON0028780