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SUBMITTED BY:

E G & G, Bionomics
Aquatic Toxicology Laboratory
790 Main Street
Wareham, Massachusetts
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PREPARED BY:

Brenda F. Wilson

Brenda F. Wilson

Aquatic Biologist

Stephen J. Ells

Stephen J. Ells

Aquatic Toxicologist

APPROVED BY:

George A. Cary

George A. Cary

Director, Aquatic Biology

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SUMMARY OF HISTOPATHOLOGICAL EXAMINATIONS OF FATHEAD MINNOW (Pimephales promelas) EXPOSED TO 78.03 FOR 30 DAYS.

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RESEARCH REPORT

SUBMITTED TO 3M COMPANY

ST. PAUL, MINNESOTA

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E G & G, Bionomics
Aquatic Toxicology Laboratory
790 Main Street
Wareham, Massachusetts
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INTRODUCTION

An "egg and fry test" was conducted between March 31 and May 4, 1978 (Bionomics Report #BW-78-6-175, June, 1978) to assess the sub-lethal effects of 78.03 on fathead minnows (Pimephales promelas). Effects on egg hatchability and on survival and growth of fry were measured. To further investigate possible effects due to exposure to 78.03, histopathological examinations of exposed fish were also performed. The results of these examinations are reported here.

MATERIALS AND METHODS

Upon termination of the egg and fry study, five fish from each replicate of the high 78.03 concentration (100 mg/ℓ, nominal) and control were preserved in 10% buffered formalin and sent to the Environmental Pathology Laboratories, Inc. Carolina, Rhode Island.

The fish were examined for gross lesions, and sagital sections were prepared by a pathologist. Fish were placed with indentifying numbers into processing cassettes, dehydrated, cleared and infiltrated on an Auto-technicon tissue processor using the method of the Armed Forces Institute of Pathology. The fish were then placed in a vacuum oven and subsequently embedded in paraffin. All blocks were sectioned at 6 microns: one

slide was prepared from each block and stained with hematoxylin and eosin. Special staining procedures such as PAS, Trichrome and Acid Fast were used occasionally when requested by the pathologist. All blocks were sealed with paraffin and stored.

Slides were labeled, boxed and delivered with all work sheets to the pathologist for examination. Two slides were prepared from each fish. Tissues processed and examined included but were not limited to; gill, thymus, liver, spleen, heart, gonad, kidney, foregut, hindgut, olfactory mucosa (nares), brain, ear, skin, muscle, pancreas and pharyngeal mucosa.

RESULTS

A summary of the examination of each fish is reported in Table 1. Only those tissues which were missing or contained demonstrable change are listed.

The only tissue changes observed were hyperplasia of gill lamellar epithilium and fatty change of the liver. These changes were judged to be minimal and consistent with changes seen routinely in healthy fish. Autolipis of gill tissue was observed in several fish. This change was probably due to the poor penetration of the buffered formalin to the posterior dorsal portion of the gill space.

Based on these data, it is concluded that 30 days exposure to a nominal 78.01 concentration of 20 ug/ℓ did not cause any significant, demonstrable, tissue changes in 30 day old fathead minnow fry.

Table 1 -- Histopathological examination of fathead minnow (Pimephales promelas) exposed 30 days to 100 mg/ℓ nominal 78.03 and control water.

100 mg/ℓ 78.03

Fish #	Sex	Organ Condition	Missing Tissue
1	Ukn[a]	Normal	Spleen, gonad, nares, ear
2	Ukn	Normal	Spleen, gonad, thymus
3	Ukn	Normal	Heart, gonad, nares
4	Ukn	Normal	Spleen, gonad, thymus
5	F[b]	Normal	Spleen, nares
6	F	Liver-Fatty change Ic Gill-Hyperplasia (epithelium) I	Nares, thymus
7	F	Liver-Fatty change I Gill-Hyperplasia (epithelium) I	Nares, ear
8	F	Liver-Fatty change I	Spleen, ear
9	Ukn	Liver-Fatty change I	Spleen, gonad, nares, ear
10	F	Liver-Fatty change I	Spleen, nares

Table 1 (cont.)

Fish #	Sex	Organ Condition	Missing Tissue
Control			
1	Ukn	Liver-Fatty change I Gill-hyperplasia (epithelium) I	Gonad, nares, thymus
2	Ukn	Liver-Fatty change I	Spleen, gonad, nares
3	F	Gill-hyperplasia (epithelium) I	Thymus
4	F	Normal	Spleen, nares
5	M[d]	Normal	Spleen, thymus, heart
6	F	Liver-Fatty change I	Spleen, heart
7	Ukn	Liver-Fatty change I	Spleen, heart, gonad, thymus, nares
8	Ukn	Liver-Fatty change I	Spleen, gonad, nares, thymus
9	F	Liver-Fatty change I Gill hyperplasia (epithelium) I	Spleen, nares
10	Ukn	Normal	Gonad, thymus

a Female.
b Unknown.
c Lesions are minimal.
d Male

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