EEB REVIEW

DATE: IN 10/21/85 OUT FEB 14 1985

FILE OR REG. NO. 618-OL

PETITION OR EXP. PERMIT NO.

DATE OF SUBMISSION 10/03/85

DATE RECEIVED BY HED 10/11/85

RD REQUESTED COMPLETION DATE 01/29/86

EEB ESTIMATED COMPLETION DATE 01/22/86

RD ACTION CODE/TYPE OF REVIEW 126

TYPE PRODUCT(S): I, D, H, F, N, R, S Fire Ant Insecticide

DATA ACCESSION NO(S).

PRODUCT MANAGER NO. G. LaRocca (15)

PRODUCT NAME(S) Affirm Technical

COMPANY NAME Merck, Sharp, and Dohme Research Laboratories

SUBMISSION PURPOSE Submission of further data to support registration.

SHAUGHNESSY NO. CHEMICAL & FORMULATION % A.I.
ECOLOGICAL EFFECTS BRANCH
REVIEW

Affirm Technical

100 Submission Purpose

The registrant, Merck, Sharp, and Dohme Research Laboratories, has submitted two estuarine studies which were requested in a June 29, 1984 review by D. Rieder.

101 Data Assessment

Two studies were received and validated.

1. 96-Hour LC50 with Mysid shrimp (Mysidopsis bahia)
   Results: LC50 = 0.21 ppb.
   Category: Core

2. 96-Hour LC50 with Fathead minnow (Cyprinodon variegatus)
   Results: LC50 = 15 ppb.
   Category: Core

102 Conclusions

The studies submitted fulfill the Guideline requirements for an estuarine fish and shrimp LC50. The acute mollusc study requirement has been fulfilled. These studies were submitted to fulfill the requirements for a fire ant and bait use previously reviewed October 29, 1985. All data requirements have been fulfilled for this use. However, other uses may require additional testing.
Daniel Rieder  2/11/86
Wildlife Biologist, Section 2
Ecological Effects Branch
Hazard Evaluation Division

Norman Cook  2/13/86
Norm Cook
Section Head, Section 2
Ecological Effects Branch
Hazard Evaluation Division

Michael Slimak  2/13/86
Michael Slimak, Chief
Ecological Effects Branch
Hazard Evaluation Division
Data Evaluation Record

1. Chemical: Affirm Technical
   Sha.No: 122804

2. Test Material: MK-936 91% a.i.

3. Study Type: Fish 96-hr LC50
   Species Tested: Sheepshead Minnow

4. Study I.D.: Author: Ward, G. Scott
   Title: Acute Toxicity of MK-936 to the Sheepshead Minnow (Cyprinodon variegatus)
   Laboratory: Environmental Science and Engineering, Inc.
   Study No: 85-347-0100-2130
   Study Date: October 1985
   Study submitted to EPA by: Merck Sharp and Dohme Research Laboratories
   Acc. No: 259623

5. Reviewed By:
   Daniel D. Rieder
   Wildlife Biologist
   EEB/HED
   Signature: [Signature]
   Date: 12/96

6. Approved By:
   Norm J. Cook
   Supervisory Biologist
   EEB/HED
   Signature: [Signature]
   Date: 2/13/86

7. Conclusions: This study is scientifically sound.
   96-hour LC50 = 15 ppb
   95% Confidence Limits = 11-20 ppb.
   This study will fulfill the guideline requirement for an estuarine fish acute
   96-hour LC50

8. Recommendations: N/A
9. Background: This study was provided to support registration.

10. Individual Studies: N/A

11. Methods and Materials:

A. Test Material: MK-936
   Percent active ingredient: 91%

B. Test Organisms: Sheephead Minnow (Cyprinodon variegatus)
   Source: S/P Inc.
   Length: $X = 12 \pm 1$ mm S.L.
   Acclimation: 17 days, 0 hrs without food
   Organisms per container: 10

   No. level: 10
   Weight: $X = 41 \pm 13$ mg wet wt.
   Loading: 0.046 g/l

C. Test Containers: Glass
   Size: 10 liter with 9 liter test solution
   Replicates: 1
   Aerated: No

D. Test Conditions: Static, renewal after 48 hrs.

   Photoperiod: 14 hrs/day
   Temperature: 19-21 °C
   Solvent: acetone
   Test solution: Natural Seawater
   Controls: Solvent and untreated

E. Statistics: Stephan, 1982, Moving average

12. Reported Results:

   96-hour LC50 = 15 ppm
   95% C.L. = 11-20 ppb

<table>
<thead>
<tr>
<th>CONCENTRATION PPB Nominal</th>
<th>24Hrs</th>
<th>48Hrs</th>
<th>72Hrs</th>
<th>96Hrs</th>
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<tbody>
<tr>
<td>Control</td>
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</table>

13. Study Authors Conclusions:

   LC50 (ppb) 24Hrs 48Hrs 72Hrs 96Hrs
   18 16 15 15
14. **Reviewers Discussion and Interpretation of the Study:**

A. **Test Procedures:** The test procedure was acceptable.

B. **Statistical Analysis:** The statistical analysis results are consistent with the raw mortality data.

C. **Discussion/Results:** This test shows that MK-936 is very highly toxicity to estuarine fish.

D. **Adequacy of the Study:** This study fulfills the guideline requirement for an estuarine fish LC50

15. **Completion of One Liner for Study:** One-liner completed

16. **CBI Appendix:** N/A
Data Evaluation Record

1. **Chemical:** Affirm
   **Sha.No:** 122804

2. **Test Material:** MK-936 technical, 91% a.i.

3. **Study Type:** Shrimp 96-hr LC50
   **Species Tested:** Mysid Shrimp (*Mysidopsis bahia*)

4. **Study I.D.:**
   **Author:** Forbis, Alan D., and David Burgess
   **Title:** Acute Toxicity of MK-936 Technical to Mysid Shrimp (*Mysidopsis bahia*)
   **Laboratory:** Analytical Bio—chemistry Laboratories, Inc.
   **Study No:** 33624
   **Study Date:** September, 1985
   **Study submitted to EPA by:** Merck Sharp and Dohme Research Laboratories
   **Acc. No:** 259623

5. **Reviewed By:**
   **Daniel D. Rieder**
   **Wildlife Biologist**
   **EEB/HED**
   **Signature:** 
   **Date:** 1/31/86

6. **Approved By:**
   **Norm J. Cook**
   **Supervisory Biologist**
   **EEB/HED**
   **Signature:** 
   **Date:** 2/13/86

7. **Conclusions:** This study is scientifically sound.
   96-hour LC50 = 0.21 ppb
   95% Confidence Limits = 0.10–0.32 ppb.
   This study will fulfill the guideline requirement for a shrimp acute 96-hour LC50

8. **Recommendations:** N/A
9. **Background:** This study was provided to support registration.

10. **Individual Studies:** N/A

11. **Methods and Materials:**

   A. **Test Material:** MK-936  
   Technical Affirm  
   Percent active ingredient: 91%

   B. **Test Organisms:** Mysis Shrimp (*Mysislops bahia*)

   Source: Env. Sci. and Eng., Inc., Gainesville, FL.  
   No. level: 10  
   Organisms per container: 10

   C. **Test Containers:** Glass

   Size: 400 ml

   D. **Test Conditions:** Static, 96-hrs shrimp were fed c.a. 2 ml brine shrimp per day during test.

   Temperature: 22 °C  
   Controls: Untreated and solvent  
   Solvent: acetone  
   Test solution: Prepared by adding  
   Way test was begun: synthetic seawater salts to aged  
   shrimp added within 30 minutes after test material

   E. **Statistics:** Stephans program

12. **Reported Results:**

   96-hour LC$_{50}$ = 0.21 ppm  
   95% C.L. = 0.1-0.32 ppb

<table>
<thead>
<tr>
<th>CONCENTRATION PPB</th>
<th>MORTALITY</th>
<th>CONDITIONS</th>
<th>SALINITY</th>
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<tbody>
<tr>
<td>Nominal</td>
<td>24Hrs</td>
<td>48Hrs</td>
<td>72Hrs</td>
</tr>
<tr>
<td>Control</td>
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</table>

13. **Study Authors Conclusions:**

   LC$_{50}$ (ppb) = 0.81  
   NOEL = 0.1 ppb
14. **Reviewers Discussion and Interpretation of the Study:**

A. **Test Procedures:** The test procedure was adequate.

B. **Statistical Analysis:** The statistical analysis results match the data.

C. **Discussion/Results:** This test shows that MK-936 is very highly toxic to shrimp.

D. **Adequacy of the Study:** This study fulfills the guideline requirements for an estuarine aquatic invertebrate LC50

15. **Completion of One Liner for Study:** One-liner completed

16. **CBI Appendix:** N/A