8-19-87

DATA EVALUATION REPORT

1. <u>Chemical</u>: PP321

2. <u>Test Material</u>: PP321, 96.5% ai

3. <u>Study Type</u>: 96-Hour Acute Fish Toxicity Testing - Flowthrough

   <u>Species Tested</u>: <u>Cyprinodon variegatus</u>

4. <u>Study ID</u>: Hill, R.W. (1985) PP321: Determination of Acute Toxicity to Sheepshead Minnow (<u>Cyprinodon variegatus</u>), submitted by ICI Americas, Inc. Prepared by Imperial Chemical Industries, PLC, Brixham Laboratory, Brixham, Devon. EPA Accession No. 073989.

5. <u>Reviewed By</u>: Candy Brassard
   Environmental Protection Specialist
   EEB/HED
   Signature: Candy Brassard
   Date: 8-17-87

6. <u>Approved By</u>: Douglas J. Urban
   Head, Section III
   EEB/HED
   Signature: Douglas J. Urban
   Date: 8/19/87

7. <u>Conclusion</u>:

   The study is scientifically sound and with a 96-hour LC_{50} = 0.807 (0.672 and 0.967) ug/L (ppb) (measured concentration), PP321 is "very highly toxic" to the marine fish, sheepshead minnow, <u>Cyprinodon variegatus</u>. The NOEL = $\geq$ 0.29 ug/L (ppb). The study fulfills the Guideline requirements (72-3) for the acute toxicity determination for the marine fish with a representative 96.5% PP321 technical.

8. <u>Recommendation</u>:

   The company should submit the raw data in the future. See section 14 for listed discrepancies.

9. <u>Background</u>:

   This study was submitted prior to registration of PP321 for use on cotton.

10. <u>Discussion of Individual Test</u>: N/A.

11. Materials and Methods:

a. Test Animals - Sheepshead minnow, *Cyprinodon variegatus*, obtained from Sea Plantations, Inc., Salem, MA. These fish were on site for 2.5 months prior to testing, and were held at 22 ± 1 °C for 4 days prior to the test.

The fish were acclimated for an additional 3 days at 22 ± 1 °C. The fish ranged in weight from 0.32 to 0.91 g, with mean weight 0.60 g. Length ranged from 22 to 32 cm with a mean length of 27.4 mm.

b. Test System - 20-L glass test vessels were used to hold the test fish.

A 95 percent exchange of test solutions was calculated to occur within 4.5 hours (the test solutions were renewed at a rate of 200 mL/min). The dilution ratio of stock solutions to seawater diluent was approximately 1:100 in this study.

c. Dose - A total of five treatment levels (3.2, 2.4, 1.8, 1.0, and 0.56 ug/L PP321), a solvent control, and a control were used in the study. Acetone was used at a maximum level of 16 mg/L. Measured concentrations were taken daily, and were analyzed using gas liquid chromatography. The mean measured values of PP321 ranged from 51.8 to 75.0 percent of the nominal values. The mean recovery value was 108 percent of the nominal and therefore no recovery factors were used in this study. See Table 3 for Analytical Results.

d. Study Design - Twenty fish were tested per treatment level. The test volume used was a nominal 20 liters.

Dissolved oxygen (DO), pH, temperature, and salinity were measured throughout the 96-hour period. The pH was 8.0 to 8.1, the DO ranged from 6.2 to 6.8 mg/L, the temperature ranged from 21.8 to 22.3 °C, and the salinity ranged from 34.91 to 35.02 percent.

Observations of mortalities were made at 24, 48, 72, and 96 hours. Other symptoms of toxicity were recorded at the beginning and end of each working day.

e. Statistics - The mortality data were analyzed by the method of probit analysis of Finney and carried out according to the Brixham computer program certified as 150, 150-toxic, probit analysis.

A CIL Midas computer plotter was used to draw the graph of the dose response curve. See Figure 1.

The LC_{50} values and 95% confidence intervals are shown below as ug/L PP321 based on mean measured concentration.

Time	LC_{50}	95% C.I.
24 hours	1.34	(1.10-1.46)
48 hours	1.14	(0.45-1.29)
72 hours	0.85	(0.71-1.02)
96 hours	0.81	(0.67-0.97)

No mortalities were recorded in the control, solvent control, or 0.29 ug/L treatment level (mean measured concentration).

12. Reported Results:

The 96-hour LC_{50} was 0.81 (0.67-0.97) ug/L PP321 for sheepshead minnow. See Table 1 for mortalities.

Table 2 lists the times and concentrations at which other symptoms of toxicity were noted (such as quiescence, loss of balance, weak, hyperexcitability, and rapid respiration). The lowest level at which symptoms of toxicity occurred was at 1.0 ug/L (nominal concentration) or 0.55 ug/L (measured concentration).

13. Study Authors' Conclusions/QA Measures:

The acute toxicity LC_{50} is 0.81 ug/L PP321 for sheepshead minnow.

The level at which no mortality occurred was 0.29 ug/L; therefore, the NOEL is $\leq$ 0.29 ug/L. Adverse effects and mortality were reported at the next highest level; therefore, the LOEL is $\geq$ 0.55 ug/L (mean measured concentrations).

14. Reviewer's Discussion and Interpretation of Study:

a. There were a few discrepancies that were noted in the study, which are as follows:

- The raw data were not submitted.

- The solvent, acetone, was used at 16 mg/L which is a much higher level than what is recommended--0.5 mg/L. However, this did not appear to affect the organisms, since no mortality was reported with the solvent control.

- The chemical characteristics for the dilution water were not reported.

- It was not clear in the study if replicates were used at each treatment level. If so, then the study author should have reported from which tanks the measured concentrations were taken. Since it is not required to have replicate tanks for this study (Reider, D. 1985), EEB determined this discrepancy did not detract from the study.

- Study author did not indicate if the fish were randomly assigned to test vessels.

b. Statistics - EEB conducted the Stephans LC_{50} program (see Attachment A) and determined the following LC_{50} (95% confidence limit):

LC_{50} = 0.807 ug/L (0.672 and 0.967) ug/L measured concentration. The NOEL $\leq$ 0.29 ug/L (ppb).

c. Discussion and Results - N/A.

d. Adequacy of Study

1) Classification - CORE for 96.5% ai.

2) Rationale - The minor discrepancies would not have affected the study.

3) Repairability - N/A.

15. Completion of One-Liner for Study: August 13, 1987.

Page ______ is not included in this copy.

Pages __5__ through __7__ are not included in this copy.

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THIS LINE IS COMPRESSED AT 17 CHARACTERS PER INCH.
IS THIS ACCEPTABLE?
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P

     Candy Brassard   PP321   sheepshead minow   08-12-87
     **********************************************************************
     CONC.      NUMBER          NUMBER           PERCENT          BINOMIAL
                EXPOSED         DEAD             DEAD             PROB.(PERCENT)
      2.37       20              20               100              9.536742E-05
      1.72       20              20               100              9.536742E-05
      1.35       20              19               95               2.002716E-03
      .55        20              2                10               2.012253E-02
      .29        20              0                0                9.536742E-05

     THE BINOMIAL TEST SHOWS THAT .55 AND 1.35 CAN BE
     USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
     CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
     ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.


     AN APPROXIMATE LC50 FOR THIS SET OF DATA IS .8283363


     RESULTS CALCULATED USING THE MOVING AVERAGE METHOD
     SPAN         G             LC50            95 PERCENT CONFIDENCE LIMITS
      3          3.975655E-02                    .7611868       .6590283       .8722295


     RESULTS CALCULATED USING THE PROBIT METHOD
    ITERATIONS        G            H     GOODNESS OF FIT PROBABILITY
        5          .1266594        1             .9840344

     SLOPE    =                 7.79845
     95 PERCENT CONFIDENCE LIMITS = 5.023041    AND    10.57386

     LC50 =      .807202
     95 PERCENT CONFIDENCE LIMITS =   .6725948 AND   .9672975

     LC10 =      .554791
     95 PERCENT CONFIDENCE LIMITS =   .4135207 AND   .6666131
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Amendment to DER
96-Hour Acute Fish Toxicity
Sheepshead Minnow

According to the SEP, Acute Toxicity Test for Freshwater Fish, 1985, the concentration of solvent should not exceed 0.1 mL/L under flow-through conditions. The study author stated the level of solvent was $\leq$ 0.02 mL/L, which is within the limits.

The dilution water characteristics were reported--see Attachment A.

The study author reported that replicate tanks were not included in the study design, and indeed the fish were randomly assigned to the exposure vessels.