UNDATED

DATA EVALUATION RECORD

1. **CHEMICAL:** Molinate.
Shaughnessey Number: 041402.

2. **TEST MATERIAL:** A formulation of molinate (ORDRAM 8E), S-ethyl hexahydro-1H-azepine-1-carbothioate; purity of 90.3% w/w; Lot No. N an amber liquid; reported water solubility of 880 mg/L at 20°C.

3. **STUDY TYPE:** Freshwater fish static acute toxicity test. Speci Rainbow trout (Salmo gairdneri = Oncorhynchus mykiss).

4. **CITATION:** Tapp, J.F., S.A. Sankey, J.E. Caunter, and P.A. Johns MOLINATE: Determination of acute toxicity of the formulation ORDRA rainbow trout (Salmo gairdneri). Prepared by Imperial Chemical Ind Brixham Laboratory, Freshwater Quarry, Brixham Devon UK. Brixham s number T050/A (FT18/90). Submitted by ICI Agrochemicals, Imperial Industries PLC, Fernhurst, Haslemere, Surrey UK. EPA MRID No. 4161

5. **REVIEWED BY:**

Sam R. Petrocelli, Ph.D.
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6. **APPROVED BY:**

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7. **CONCLUSIONS:** This study is scientifically sound and fulfills the g requirements for an acute toxicity test using freshwater fish. The based upon mean measured concentrations, of molinate to rainbow tro gairdneri = Oncorhynchus mykiss) was 19.5 mg/L. Therefore, molinat considered slightly toxic to rainbow trout. The NOEC (reported as determined to be 0.097 mg/L molinate formulation based on mean meas concentrations.

8. **RECOMMENDATIONS:** N/A

9. **BACKGROUND:**

10. **DISCUSSION OF INDIVIDUAL TESTS:** N/A

11. **MATERIALS AND METHODS:**

A. **Test Animals:** Rainbow trout (Oncorhyncus mykiss, previ Salmo gairdneri) used in this test were obtained from Up Farm, Upwey, Weymouth, Dorset, UK. Fish were held in glass aq 13 days at a temperature of 12 ± 1.0°C and under daylight and lighting (photoperiod and intensity not specified).

Fish were fed a diet of BP Mainstream (batch ref. FF100), iden proprietary product with no further specification. Feeding wa continued into the exposure period. Fish were not medicated. mortalities were observed prior to the test initiation. Contro measured following the test and determined to have a mean rang of 0.93 (0.68 to 1.18) grams and a length of 41 (37 to 45) mil Loading was 0.23 g/L, based on the control fish.

B. **Test System:** The exposure system consisted of rectangular gla vessels measuring 460 x 305 x 385 millimeters (length x width and containing 40 liters of test solution. These vessels were a temperature controlled (12 ± 1.0°C) room. No aeration was p during the test. A photoperiod of 16 hours light and 8 hours maintained during the test.

The dilution freshwater used was dechlorinated tap water. The passed through activated carbon, filtered to remove particulat dechlorinated with sodium thiosulphate. The dechlorinated wat total hardness of 55 mg/L as $CaCO_3$ and conductivity of 151 ?S/ water was added to the vessels and allowed to equilibrate to 1 test initiation.

C. **Dosage:** The nominal test concentrations used in this 96-hour acute toxicity test were: 56, 32, 18, 10, 5.6, 0.10, 0.056, a A dilution water control was maintained concurrently.

D. **Design:** Test solutions for the 56 through the 5.6 mg/L treat prepared by direct addition of the formulation to the te equilibrated dilution water in the test vessels. For the 0.10 mg/L treatments, a stock solution of the formulation in dilut prepared and distributed to the vessels. No solvent was adding the formulation, the test solutions were stirre Ten fish were added by random assignment to each vessel includ control.

Observations of the test were made at 24, 48, 72, and 96 hours condition of fish and the test solution oxygen concentration, temperature from each vessel were recorded daily. Water hardn conductivity were measured at the beginning of the test. Avai and total residual chlorine were also measured.

Chemical analysis was performed by a gas chromatography metho test solution samples collected at 0, 48, and 96 hours of expo water samples were analyzed to establish analytical recoveries

E. **Statistics:** Based on the mortalities observed, the LC_{50} and i confidence interval for each time period were calculated using average angle method (Stephan, 1977) on a Brixham computer pro and the dose response curve was plotted. The no observed effe (NOEL) was reported as the mean measured concentration at or b which there were no sublethal symptoms of toxicity observed.

12. **REPORTED RESULTS:** The mean measured concentrations of molinate formulation in test solutions were: 56, 31, 17, 9.8, 5.4, 0.097, 0 mg/L. Mean measured concentrations ranged from 94 to 100 percent o No molinate was detected in the dilution water control detection li mg/L). All test solutions were clear and colorless. The highest t slight froth on the surface. The nominal and mean measured concent the corresponding percent mortality at each observation period are Table 2 (attached).
Within 24 hours, there was 100 percent fish mortality at the highes concentration (56 mg/L), 20 percent mortality at the second highest and none at any other concentration. At 96 hours, there was 100 pe mortality at 56 and 31 mg/L and 30 percent at 17 mg/L. No other mo observed. Based on these data, the 24-, 48-, 72-, and 96-hour LC50 confidence limits) were calculated to be: 36 (30 to 44), 30 (24 to 29), and 19 (15 to 25) mg/L, respectively. There were no fish mort control.

Among the sublethal effects reported were: slow, irregular, and la respiration, quiescence, sounding, cessation of swimming, loss of b discoloration, surfacing, weakness and erratic swimming. One or mo effects was observed in all treatments with surviving fish down to treatment. Effects were not observed at lower concentrations (Ta attached). The NOEL was 0.097 mgL mean measured concentration.

Water quality parameters measured during the 96-hour test were: di oxygen, 7.6 to 10.4 mg/L; pH, 7.1 to 7.8; temperature, 11.6 to 12.8

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:**
No conclusions were presented by the authors.

Good Laboratory Practice Compliance, Quality Assurance, and Laborat Authentication Statements were included with this report, indicatin was conducted as stated and is in compliance with the UK, OECD, and requirements.

14. REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:

A. Test Procedure: The test procedures were in compliance with recommended by EPA guidelines, but the following deviations noted:

o The SEP states that the test must be conducted with the tec grade of the active ingredient. It is not stated if this has done. Furthermore, if a formulation is used, then there shoul consisting of exposure of the fish to the carrier and inert in was not done apparently.

o The study photoperiod was appropriate but no mention was ma use of a transitional period between light and dark.

o There was no indication of the method used to assign fish t vessels except to say that it was random. The relevant statem 8 of the report contains an apparent typographical error: "Th randomly assigned to the test results. " Apparently the word should be "vessels". The period of time between the addition material and the fish to the vessels is not stated.

o Dechlorinated water was used as dilution water in this test is acceptable since there was no control mortality and the che analysis of the water showed no residual chlorine.

B. Statistical Analysis: The reviewer used EPA's Toxanal compu program to calculate the LC_{50} from these data. Based on the m measured concentrations, the Binomial Test provided a 96-hour 19.5 mg/L with 95% confidence limits of 9.8 and 31 mg/L which essentially the same as that reported by the authors as 19 (15 to 25) mg/L.

C. Discussion/Results: This study is scientifically sound and fu guideline requirements for a static acute toxicity test using Based on mean measured concentrations and the fact that there than two concentrations at which the percent dead is between 0 the program selected the Binomial Test which provides an appro 96-hour LC_{50} of 19.5 mg/L with 95% confidence limits of 9.8 an

Therefore, this molinate formulation is slightly toxic to rain Oncorhynchus mykiss). The NOEC was 0.097 mg/L based on the me measured concentration.

D. Adequacy of the Study:

(1) Classification: Core.

(2) Rationale: N/A.

(3) Repairability: N/A.

15. COMPLETION OF ONE-LINER: Yes, June 10, 1991.