(8-31-92)

MRID No. 416100-06

DATA EVALUATION RECORD

1. **CHEMICAL:** Monosodium acid methanearsonate (MSMA).
   Shaughnessey number: 013803

2. **TEST MATERIAL:** Monosodium acid methanearsonate (MSMA); a brown liquid; 51% active ingredient.

3. **STUDY TYPE:** Acute Toxicity Test For Freshwater Fish.
   Species tested: Rainbow Trout (Oncorhynchus mykiss).

4. **CITATION:** Graves, W.C. and G.T. Peters. 1990. MSMA: A 96-Hour Flow-Through Acute Toxicity Test with the Rainbow Trout (Oncorhynchus mykiss). Laboratory Project Number 296A-101A. Prepared by Wildlife International Ltd., Easton, Maryland. Submitted by Luxemborg Industries (PAMOL), Ltd., Tel Aviv, Israel. EPA MRID No. 416100-06.

5. **REVIEWED BY:**

   Richard C. Petrie
   Agronomist
   EEB/EFED/OPP

   Signature: Richard C. Petrie
   Date: 8/06/92

6. **APPROVED BY:**

   Daniel Rieder
   Head, Section 3
   EEB/EFED/OPP

   Signature: Daniel Rieder
   Date: 8.31-92

7. **CONCLUSIONS:** This study is scientifically sound and fulfills the guideline requirements for a 96-hour acute toxicity study for a coldwater fish species. The 96-hour LC_{50} based upon nominal concentrations of MSMA to rainbow trout (Oncorhynchus mykiss) is >51 mg ai/L (>100 mg/L formulated test material) which places this compound in a "practically non-toxic" category. The no-observed-effect concentration (NOEC) was determined to be 100 mg/L.

8. **RECOMMENDATIONS:** N/A.

9. **BACKGROUND:**

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

11. **MATERIALS AND METHODS:**

A. **Test Animals:** Rainbow trout (Oncorhynchus mykiss) used in this test were obtained from Troutlodge, Inc., McMillin, Washington, as eyed eggs and held approximately 4 months prior to test initiation. The fish were held at a temperature ranging from 11.1 to 13.6°C which did not deviate more than 3 degrees in any 72 hour period. Alkalinity ranged from 170 to 195 mg/L as $CaCO_3$, and hardness from 132 to 144 mg/L as $CaCO_3$. The pH ranged from 7.6 to 8.5.

Rainbow trout were fed salmon starter and salmon mash (Zeigler Brothers, P.O. Box 95, Gardners, PA) during holding, but were fed nothing during the 48-hour acclimation period prior to the test beginning. Rainbow trout used for this study had a mean weight of 3.4 grams (g) with a range of 2.4 to 4.8 g. Length ranged from 46 to 70 mm with a mean of 60 mm. Loading biomass of the dilution water control was reported to be 0.4 g/L/24 hours during the definitive test.

B. **Test System:** The test was conducted in a continuous flow, proportional diluter which provided at least 5 volume additions of test solution every 24 hours. Test chambers were Teflon-lined, 25-L polyethylene aquaria filled to a depth of 17 mm with 15 L of test solution. Temperature was maintained at 12 ± 1°C by a water bath. Photoperiod was 16 hours of light and 8 hours of darkness with a 30 minute transition period. Light intensity was approximately 22 footcandles. Dilution water was well water filtered to 0.2 µm prior to introduction into the test system. Dilution water chemistry is provided in Table 1 (attached).

C. **Dosage:** Ninety-six-hour flow-through test. Five nominal concentrations of the test substance were tested: 13, 22, 36, 60, and 100 mg/L. The stock solution was not adjusted to correct for the purity or strength of the test substance.

D. **Design:** Five concentrations and a control were selected for the study. Treatments were duplicated. Ten rainbow trout were randomly distributed, in a group of two, to each replicate providing 20 fish per treatment. All organisms were observed once every 24 hours for mortality and abnormal behavior. DO concentration and pH were measured in one (alternate) replicate daily in each treatment. Temperature was measured in all replicates in all treatments at the beginning and end of the test. Also, a continuous measurement of temperature was made in one replicate of the control throughout the study. Fish were not fed during the study. It was mentioned that samples were collected for chemical analysis during the test but no mention was made as to frequency, method of analysis or results.

E. **Statistics:** No statistical analysis was performed due to lack of mortality in any treatment.

12. **REPORTED RESULTS:** The results of the test are presented in Table 3 (attached).

The measurements of the concentrations of MSMA are reportedly underway, no results were given in this report.

The reported 24-, 48-, 72- and 96-hour LC_{50}'s, based upon nominal concentrations as whole test material were all greater than 100 mg/L. The NOEC of MSMA was also reported to be 100 mg/L.

During the course of the study, DO concentrations ranged from 7.6 mg/L to 10.0 mg/L. The pH ranged from 7.5 to 8.0. Temperature ranged from 10.3 to 12.3°C.

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

A GLP compliance statement was included in the report and the study was audited by Wildlife international Ltd.'s Quality Assurance Unit. A statement of quality assurance was included in the report, indicating that the study was conducted in accordance with Good Laboratory Practice Standards as set forth in Title 40 of the Code of Federal Regulations, Part 160.

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

A. **Test Procedure:** Test procedures were generally in accordance with protocols recommended by the Guidelines, but deviated from the SEP as follows:

- It was not stated in the report whether a range-finding test was conducted.
- The type of length (e.g. standard or total) of fish used in the study was not specified.

B. **Statistical Analysis:** No statistical analysis was performed because no mortality or signs of toxicity were observed at nominal concentrations up to 100 mg MSMA/L.

C. **Discussion/Results:** The study results are scientifically valid. The LC50 values were determined to be greater than 100 mg/L. The no-observed-effect concentration (NOEC) was 100 mg/L as whole test material.

D. **Adequacy of the Study:**

(1) **Classification:** Core.

(2) **Rationale:** N/A.

(3) **Repairability:** N/A.

15. **COMPLETION OF ONE-LINER:** Yes, March 18, 1991.