DATA EVALUATION RECORD

1. **CHEMICAL:** Molinate
   Shaughnessey No. 041402

2. **TEST MATERIAL:** Molinate technical; S-ethyl hexahydro-1H-azepine-1-carbothioate; Test substance No. T256; 99% w ingredient; a straw-colored liquid.

3. **STUDY TYPE:** Growth and Reproduction of Aquatic Plants -- Tier 2
   Tested: *Lemna gibba* G3.


5. **REVIEWED BY:**
   Mark A. Mossler, M.S. 
   Associate Scientist II 
   KBN Engineering and 
   Applied Sciences, Inc. 
   Signature: 
   Date:

6. **APPROVED BY:**
   Louis M. Rifici, M.S. 
   Associate Scientist II 
   KBN Engineering and 
   Applied Sciences, Inc. 
   Signature: 
   Date:
   Henry T. Craven, M.S. 
   Supervisor, EEB/HED 
   USEPA 
   Signature: 
   Date:

7. **CONCLUSIONS:** This study is scientifically sound and meets the guid requirements for a Tier 2 non-target plant growth and reproducti 14-day EC25 and EC50 frond number values of molinate for *L. gibba* w and 3.30 mg ai/l, respectively. The NOEC was determined to be 0.84

8. **RECOMMENDATIONS:** N/A

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

11. **MATERIALS AND METHODS:**

A. **Test Species:** The plants used in the test, *Lemna gibba* G3, came from the University of Waterloo, Canada. Plants were maintained in Hoagland's medium (Hillman, 1961) under 5270 lux illumination at a temperature of 25 ±1°C. Warm-white fluorescent tubes and a controlled photoperiod were used. Plants that were growing actively were inoculated for the test.

B. **Test System:** Test vessels used were glass 400 ml cylindrical flasks with loose-fitting lids. The test medium was the same as that used in culturing, with a pH of 4.8.

The test vessels were kept in an incubator with environmental conditions like those employed in culturing.

C. **Dosage:** Nominal rates of 0.25, 0.5, 1, 2, 4, 8, 16, 32 mg ai/control and a blank (no algal inoculum) were used for the defluoranthene test.

D. **Test Design:** A 64 mg ai/l stock solution was prepared by dilution of the test material to sterile culture medium. Aliquots of the stock solution were added to sterile culture medium to obtain the nominal concentrations. The controls and test solutions were clear and colorless. One-hundred and sixty mililitre test solutions were placed in each of three replicate 400 ml treatment vials. The control dishes were replicated three times, and the test solutions were prepared on days 7 and 11 of the test. The vessels were renewed. The dishes were randomized by rows within the incubator and were re-randomized after 7 days.

Five plants with three fronds each were randomly placed in each dish. Frond counts were performed on test days 3, 5, 7, 10, 14, and 17 (visibly projected beyond the edge of the paraffin counted). Toxicity symptoms were recorded. At the end of the test period, the plants from each dish were rinsed with distilled water to a constant weight.

Samples were taken from the freshly-prepared solutions and the test solutions at test initiation (freshly prepared only), each termination (old solutions only). These solutions were analysed for test material by gas chromatography (GC).

The pH of the freshly-prepared test solutions were measured on days 7, 11, and 17. The temperature of the incubator was measured daily with a thermograph and hourly by a datalogger. The light intensity...
measured once during the study.

E. **Statistics:** For each nominal concentration, the mean of the m concentration was calculated. The mean measured concentration then used as the basis for the data analysis. Frond number an weight per replicate were examined as a function of time. Mov angle and Dunnett's analysis (p<0.05) were conducted on both parameters at day 14.

12. **REPORTED RESULTS:** Plant frond number for the control and the expos concentrations throughout the test are given in Table 2 (attache weights per replicate are given in Table 4 (attached).

Measured concentrations were 80% to 100% of nominal. The means measured concentrations were 0.20, 0.42, 0.84, 1.7, 3.6, 7.5, 15, a

Increasing concentrations of molinate had increasingly inhibitory e growth and reproduction of *Lemma gibba*.

By day 14, the effect of the test material on the frond number, control, ranged between 11% and 93% inhibition. The EC₅₀ was 3.3 m confidence limits of 2.7 and 3.9 mg ai/l.

By day 4, the effect of the test material on dry weight, relativ ranged between 0% and 74% inhibition. The EC₅₀ was 7.7 mg ai/l confidence limits of 6.1 and 9.6 mg ai/l.

Results from Dunnett's analysis indicated that the frond numbers on five highest concentrations were significantly less than the contr rate of 0.20 mg ai/l was also significantly different from the con next two highest rates were not significantly different, the NOEC to be 0.84 mg ai/l.
The results from the dry weight data indicate that by day 14, the rates of molinate significantly reduced the growth of *Lemna gibba* was reported as 1.7 mg ai/l.

From day 10 onwards, at and above a nominal concentration of 4 mg were smaller and had a shrivelled appearance compared to the control was increasingly apparent with increasing concentration.

The pH in the control and the exposure concentrations ranged from throughout the experiment. The temperature ranged from 24.6 to 25.

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

Good laboratory practice and Quality Assurance Unit statements were the report indicating compliance with EPA Good Laboratory Practic under the Federal Insecticide, Fungicide, and Rodenticide Act.

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

   A. **Test Procedure:** The test procedure and the report were genera accordance with the SEP and Subdivision J guidelines, except following deviations:

   The conductivity of the test solutions was not measured.

   The light intensity was 5.27 klux. The recommended intensity

   No subtoxic (EC25) values were reported.

   B. **Statistical Analysis:** The reviewer used a computer program for statistical analysis (attached) of the 14 day frond number data Dunnett's tests were used to determine the EC and NOEC v respectively. The results from Dunnett's analysis were in agreement the authors'. The reviewer obtained EC values that were slightly lower than the authors'. Since the authors' EC50 value of 3.3 mg/kg conservative, and will better protect non-target plants, it wi the correct EC value.

C. **Discussion/Results:** Although the dosages were not adjusted for purity of the test material, the
reviewer reported rates in terms of mg ai/l because of the pur material (99%).

This study is scientifically sound and meets the guideline re a Tier 2 non-target aquatic plant study. Growth of Lemna increasingly inhibited by increasing amounts of molinate.

D. Adequacy of the Study:

(1) Classification: Core.

(2) Rationale: N/A

(3) Repairability: N/A