DATA EVALUATION RECORD

1. Chemical: Glyphosate, S# 103601

2. Test Material: 87.3% ai glyphosate

3. Study Type: Twenty-four hour Pimephales promelas LC_{50}

4. Study ID: EG&G, Bionomics (1975) Chronic Toxicity of Glyphosate to the Fathead Minnow (Pimephales promelas, Rafinesque). (Unpublished study received December 27, 1978, under 524-308; submitted by Monsanto Co., Washington, DC; CDL:097759-B)

5. Reviewed by: Dennis J. McLane, Wildlife Biologist, EEB/HED — Signature: Dennis J McLane — Date: 9-9-85

6. Approved by: Raymond W. Matheny, Supervisory Biologist, EEB/HED — Signature: Raymond W. Matheny — Date: 9-9-85

7. Conclusion:

This study can be used for hazard assessment purposes. However, it does not meet the guideline requirements. Using the toxicity categories of Brooks et al. (1973) the acute LC_{50} of > 87 mg/L would place 87.3 percent - glyphosate into the category of slightly toxic.

8. Recommendation:

N/A

9. Background:

This study was received by RD on December 27, 1978, and reviewed by D. McLane of EEB on August 8, 1979. The present evaluation was initiated as part of the Registration Standard process.

10. Discussion of Individual Tests:

N/A

11. Materials and Methods:

a. Test animals: were Pimephales promelas from EEG, Bionomics stock; mean weight is 1.5 g; length and age were not given. Test system The author made the following statement: "A standard 96-hour static bioassay was conducted with 1.5 g fathead minnows at 19 °C using 10 fish in each 15 liter jar." Also, well water at 19 °C was used.

b. Dose: Static bioassay using nominal concentrations; no solvent used.

c. Design: Ten fish per level; 7 dose levels plus control (0, 68, 75, 81, 87, 100, 120, and 140 mg/L).

d. Statistics: (excerpted from citation)

A 24-hour LC_{50} (95 percent confidence interval) was estimated from a linear regression equation calculated from the conversion of glyphosate concentrations and corresponding percent mortalities into logarithms and probits, respectively.

12. Reported Results: (excerpted from citation)

Based on a static bioassay with 1.5 g fathead minnows, the estimated 24-hour LC_{50} (95% confidence interval) is 84.9 (72.7 to 99.3) mg/L. An LC_{50} could not be calculated from observed responses after 96 hours exposure. One hundred percent mortality was observed for fish exposed to nominal concentrations $\geq$ 87 mg/L glyphosate while no mortality was observed among fish exposed to $\leq$ 81 mg/L (Table 2).

Table 2. Percent Mortality Observed For Fathead Minnows (Pimephales promelas) After 24 and 96 Hours Exposure to Various Nominal Concentrations of Glyphosate and Measured pH for Each Concentration at 0 Hour.

Glyphosate (mg/L)	pH	% mortality 24 hour	% mortality 96 hour
140	3.7	100	100
120	3.9	100	100
100	4.0	100	100
87	4.5	80	100
81	5.5	0	0
75	5.6	0	0
68	5.7	0	0
Control	7.0	0	0

13. Study Author's Conclusions/QA Measures:

No mention was made of the quality assurance measures other than the references to acceptable protocols.

14. Reviewer's Discussion and Interpretation of the Study:

a. Test Procedures: The following items did not meet the guideline criteria.

1. Pretest fasting period was not reported.

2. Size of the test vessel and volume of test solution per vessel.

3. Composition of test vessel.

4. Dissolved oxygen (D.O.) content at the beginning and end of the study.

5. Low pH values 5.7 to 3.7.

6. Toxic symptoms were not reported.

7. 96 hour LC_{50} was not determined.

8. No raw mortality data.

9. The use of aeration was not addressed.

b. Statistical Analysis: The 24-hour LC_{50} value was confirmed by the EEB computer program (See attached printout).

c. Discussion/Results: This study appears to be adequate for hazard assessment if one keeps in mind the lack of reported information and the purpose of the study. Also, the 96-hour LC_{50} was not provided. However, the study does document the slightly toxic nature of glyphosate.

d. Adequacy of Study:

1. Classification: Supplemental.

2. Rationale: The study did not report all the items necessary for validation but more importantly it did not produce a 96-hour LC_{50}.

3. Repairability: No, a 96-hour duration would not be possible at this point.

15. Completion of One-Liner for Study:

Completed July 19, 1985.

16. CBI Appendix:

N/A

103601

OD 208171
MCOGLY06

Data Evaluation Record

1. Chemical: Glyphosate

2. Formulation: 93.5% Technical*

3. Citation:

Anonymous, unpublished, Chronic toxicity of glyphosate to the fathead minnow (Pimephales promelas, Rafinesque), Acute Bioassay, EG&G, Bionomics Aquatic Toxicology Laboratory (1975), Submitted by Monsanto Company, St. Louis, Missouri, for Registration No. 524-308, petition numbers 9F2163 and 9H5204, accession number 097759.

4. Reviewed by

Name	Dennis J. McLane	Signature	Dennis J. McLane
Title	Biologist	Date:	8-8-79
Organization	EEB/HED		

5. Test Type

Fish Acute LC_{50}

6. The test did comply with the recommended USEPA protocol (1975). At the 87 mg/l level at 96 hours, 100 percent mortality was observed; below that level no mortality occurred. Although a partial mortality did occur at the 87 mg/l level at 24 hours, two or more partial mortality levels are required by the probit method. The binomial method, on the other hand, estimated a value of 85.0651 (81-100 mg/l). This is very similar to the reported results, 84.9 (72.9-99.3) mg/l. Therefore, the 24 hour test is accepted for use as 96 hour - fish LC_{50} and "core" data.

7. Methods and Materials

A standard 96-hour static bioassay was conducted with 1.5g fathead minnows at 19°C using 10 fish in each 15 liter jar. A 24 hour LC_{50} (95%) percent confidence interval) was estimated from a linear regression equation calculated from the conversion of glyphosate concentrations and corresponding percent mortalities into logarithms and probits, respectively.

No detailed description of the dilution water was available.

8. Reported Results

Based on a static bioassay with 1.5 g fathead minnows, the estimated 24 hour LC_{50} (95% confidence interval) is 84.9 (72.7-99.5) mg/l.

9. Discussion

The original study was designed to determine a 96-hour LC_{50}, however, 100% mortality occurred at concentrations 87 mg/l glyphosate while no mortality was observed among fish exposed to the next lower level, 81 mg/l or any of the levels below it. The author explains that at the 87 mg/l level, the pH was 4.5 which is dangerously low for the fathead minnow. The pH at the 81 mg/l level was 5.5.

* As per a telephone conversation on May 21, 1979 with Dr. Earl Spurrier of Monsanto Chemical Co.

ICLANEE GLYPHOSATE FATHEAD MINNOWS

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
100	10	10	100	.0976563
87	10	8	80	5.46875
81	10	0	0	.0976563

THE BINOMIAL TEST SHOWS THAT 81 AND 100 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 85.065

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE
PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE
NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.