DATA EVALUATION RECORD

1. Chemical: Lindane

2. Test Material: Lindane 40% Flowable

3. Study/Action Type: Invertebrate Acute Toxicity Test
Daphnia magna

4. Study Identification: Acute Toxicity of Lindane 40% WP Flowable to *Daphnia magna*. By Analytical Bio-Chemistry Laboratories, Inc., July 7, 1986. Submitted by Rhone-Poulenc, Inc. for CIEL. EPA Accession No. 263949.

5. Reviewed by: Ann Stavola
Aquatic Biologist
EEB/HED
Signature: Ann Stavola
Date: 9 Dec 86

6. Approved by: Doug Urban
Supervisory Biologist
EEB/HED
Signature: Douglas J. Urban
Date: 12/31/86

7. Conclusions:

The study is scientifically sound and meets EPA Guidelines requirements for acute toxicity testing with freshwater invertebrates. With an LC_{50} value of 6.5 (5.0-9.2) mg/L, Lindane 40% Flowable is moderately toxic to freshwater invertebrates.

8. Recommendations: N/A.

9. Background:

This study was submitted in response to the data requirements of the Lindane Registration Standard.

10. Materials and Methods:

a. Test Animals: First instar Daphnia magna less than 24 hours old. Cultures maintained on a diet of algae and yeast at 20 °C on a 16-hour day.

b. Dosage: Lindane 40% Flowable. ABC Lab aged wellwater (hard quality) was used to prepare all working stock solutions. Concentrations were measured by GLC.

c. Study Design: The test was conducted in 250 mL glass beakers containing 200 mL of test solution. There were three beakers per concentration, and each beaker contained 10 Daphnia. The test was conducted at 20 °C with a 16L:8D photoperiod.

d. Statistics: The LC_{50} values were calculated with a computerized version of Stephan's program.

11. Reported Results:

Nominal Conc. (ug/L)	Measured Conc. (ug/L) as formulation	Measured Conc. (ug/L) as lindane	% Mortality 24 hr	% Mortality 48 hr
10,000	9200	3700	23.3	100
5000	5000	2000	6.7	6.7
2500	2500	1000	0	0
1300	1200	480	0	0
650	650	260	0	0
330	280	110	0	0
Control	--	--	0	0

Time	LC_{50} and 95% CI (mg/L) as formulation	LC_{50} and 95% CI (mg/L) as lindane
24 hr	> 9.2	> 3.7
48 hr	6.5(5.0-9.2)	2.6(2.0-3.7)

D.O. levels were 8.3 mg/L in the controls and 8.8 mg/L in the test beakers at 0 hour and 8.8 mg/L in the controls and 8.5 mg/L in the test beakers at 48 hours; pH values were 8.1 at 0 hour and 8.2 at 48 hours. The beakers containing the nominal concentrations of 5 and 10 mg/L were cloudy throughout the study period.

12. Study Author's Conclusions/QA Measures

The 48-hour LC_{50} value of Lindane 40% Flowable to Daphnia magna was 6.5 (5.0-9.2) mg/L as measured formulation.

QA Statement "In accordance with ABC Laboratories intent that all studies conducted at our facilities are designed and function in conformance with good laboratory practice regulations and the protocols for individual laboratory studies, an inspection of the final report for Lindane 40% Flowable was conducted and found to be in acceptable form by a member of our Quality Assurance Unit. A procedure audit was conducted on May 21, 1986. A final inspection of all data and records on June 23, 1986 indicated that the report submitted to you is an accurate reflection of the study as it was conducted by ABC Laboratories."

13. Reviewer's Evaluation:

a. Test Procedures: The protocol is acceptable since it follows Methods for Acute Toxicity Tests with Fish, Macroinvertebrates, and Amphibians, EPA-660/3-75-009. The test material was a formulated product as required in the Registration Standard. The beakers containing the nominal concentrations of 5 and 10 mg/L were cloudy throughout the study period. However, this is not considered significant since the concentrations were measured.

b. Statistics: The data were analyzed with EEB's Toxanal program, which is based on Stephan's program. The 48-hour LC_{50} and 95% CI values were 6.45 (5.0-9.2) mg/L as measured formulation and 2.59 (2.0-3.7) mg/L as lindane. The reported values are valid.

c. Discussion/Results: With a 48-hr LC_{50} value of 6.5 (5.0-9.2) mg/L Lindane 40% Flowable is moderately toxic to aquatic invertebrates.

d. Conclusions:

1. Category: Core.

2. Rationale: Testing with a formulated product was required in the Standard.

STAVOLA LINDANE 40 FLOWABLE DAPHNIA MAGNA 11-26-86

****

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
9200	30	30	100	9.313226E-08
5000	30	2	6.666666	4.339964E-05
2500	30	0	0	9.313226E-08
1200	30	0	0	9.313226E-08
650	30	0	0	9.313226E-08
280	30	0	0	9.313226E-08

THE BINOMIAL TEST SHOWS THAT 5000 AND 9200 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 6450.76

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.

****

STAVOLA LINDANE 40 FLOWABLE DAPHNIA MAGNA 11-26-86

****

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
3700	30	30	100	9.313226E-08
2000	30	2	6.666666	4.339964E-05
1000	30	0	0	9.313226E-08
480	30	0	0	9.313226E-08
260	30	0	0	9.313226E-08
110	30	0	0	9.313226E-08

THE BINOMIAL TEST SHOWS THAT 2000 AND 3700 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 2586.154

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.

****