DATA EVALUATION RECORD

1. Chemical: Lindane

2. Test Material: Lindane 25% WP

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

4. Study Identification: Acute Toxicity of Lindane (25% WP) to *Daphnia magna* by Analytical Bio-Chemistry Laboratories, Inc., July 6, 1986. Submitted by Rhone-Poulenc, Inc. for CIEL. EPA Accession No. 263949.

5. Reviewed by: Ann Stavola
Aquatic Biologist
EEB/HEB
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 6.3 (4.8-8.4) mg/L, Lindane 25% WP 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.

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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 25% WP. 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 and their 95% CI were calculated with a computerized program 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
20,000	20,000	5000	17	100
10,000	8400	2100	10	100
5000	4800	1200	0	0
2500	2100	520	3.3	3.3
1300	880	220	0	0
Control	--	--	0	0

Time	LC_{50} and 95% CI (mg/L) as formulation	as lindane
24 hr	> 20	> 5
48 hr	6.3(4.8-8.4)	1.6(1.2-2.1)

D.O. levels were 9.0 mg/L at 0 hour and 8.8 mg/L at 48 hours. pH values were 8.0 at 0 hour and 8.2 at 48 hours. There was a slight precipitate in all beakers at 24 hours and 48 hours but no explanation was given regarding the formation of the precipitate.

12. Study Author's Conclusions/QA Measures

The 4 hour LC_{50} value of Lindane 25% WP to Daphnia magna was 6.3 (4.8-8.4) 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 25% WP 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 25, 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 Standard. The presence of precipitates in the beakers 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 6.3 (4.8-8.4) mg/L as measured formulation and 1.6 (1.2-2.1) mg/L as lindane. The reported values are valid.

c. Discussion/Results: With a 48-hour LC_{50} value of 6.3 (4.8-8.4) mg/L Lindane 25% WP is moderately toxic to freshwater invertebrates.

d. Conclusions:

1. Category: Core.

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

STAVOLA LINDANE 25WP DAPHNIA MAGNA 11-26-86

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
5000	30	30	100	9.313226E-08
2100	30	30	100	9.313226E-08
1200	30	0	0	9.313226E-08
520	30	1	3.333333	2.8871E-06
220	30	0	0	9.313226E-08

THE BINOMIAL TEST SHOWS THAT 1200 AND 2100 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 1587.451

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.

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STAVOLA LINDANE 25WP DAPHNIA MAGMA 11-26-86

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
20000	30	30	100	9.313226E-08
8400	30	30	100	9.313226E-08
4800	30	0	0	9.313226E-08
2100	30	1	3.333333	2.8871E-06
880	30	0	0	9.313226E-08

THE BINOMIAL TEST SHOWS THAT 4800 AND 8400 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 6349.806

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.

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