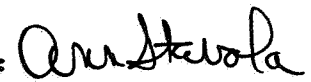## DATA EVALUATION RECORD

1. **Chemical**: Lindane

2. **Test Material**: Lindane 20% EC

3. **Study/Action Type**: Fish Static Acute Toxicity Test
   (Salmo gairdneri)

4. **Study Identification**: Acute Toxicity of Lindane 20% EC
   to Rainbow Trout (Salmo gairdneri).
   Analytical Bio-Chemistry Labs, Inc.,
   July 7, 1986. Submitted by
   Rhone-Poulenc, Inc. for CIEL. EPA
   Accession No. 263948.

5. **Reviewed by**: Ann Stavola   Signature: _(signature)_
   Aquatic Biologist
   EEB/HED   Date: 9 Dec 86

6. **Approved by**: Doug Urban   Signature: _(signature)_
   Supervisory Biologist
   EEB/HED   Date: 12/31/86

7. **Conclusion**:

   The study is scientifically sound and meets EPA Guidelines
requirements for acute toxicity testing with a coldwater fish.
With an LC_{50} value of 120 (80-150) ug/L Lindane 20% EC is
highly toxic to coldwater fish.

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:** Rainbow trout (Salmo gairdneri) obtained from Mt. Lassen Trout Farm, Red Bluff, California.

Mean weight = 0.68 ± 0.23 g.
Mean standard length = 37 ± 3.8 mm.

b. **Dosage:** Lindane 20% EC. The dilution water was soft reconstituted water. Concentrations were measured by GLC.

c. **Study Design:** The test was conducted in 5-gallon glass vessels containing 15 liters of test solutions. There were two vessels per test concentration, and 10 fish per vessel. The biological loading was 0.45 g fish/liter. The study was conducted at 12 °C with a 16-hour day.

d. **Statistics:** The data were analyzed by a computerized version of Stephan's program.

11. **Report Results:**

Nominal Conc. (ug/L)	Measured Conc. (ug/L)		% Mortality			
	as formulation	as lindane	24 hr	48 hr	72 hr	96 hr
320	280	56	95	100	100	100
180	150	30	20	65	75	85
100	80	16	0	0	0	0
56	47	9.4	0	0	0	0
32	27	5.4	0	0	0	0
Control	–	–	0	0	0	0

Time	LC_{50} and 95% CI (ug/L)	
	as formulation	as lindane
24 hr	190(160–220)	37(32–43)
48 hr	130(80–280)	27(16–56)
72 hr	127(90–150)	25(16–30)
96 hr	120(80–150)	24(16–30)

D.O. levels were 9.4 mg/L at 0 hour and 7.7 to 8.3 mg/L at 96-hour and pH values were 7.4 at 0 hour and 6.8 at 96 hours. Toxicity symptoms includes surfacing, loss of equilibrium, excitability and fish on the bottom.

12. **Author's Conclusion/QA Measures**

The 96-hour LC_{50} values of Lindane 20% EC to rainbow trout was 120 (80–150) ug/L as measured formulation and 24 (16–30) ug/L as lindane.

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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 labora-
tory studies, an inspection of the final report for Lindane
20% EC was conducted and found to be in an acceptable form by
a member of our Quality Assurance Unit... A procedure audit
for rainbow trout was conducted on June 16, 1986. No deviations
were noted. A final inspection of all data and records on
July 3, 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,
Macroinevertebrates, and Amphibians EPA-660/3-75-009. The
test material was a formulated product as required in the
Standard.

b. Statistics: The data were analyzed by EEB's Toxanal
program. The 96-hour LC_{50} value was 120.3 (80-150) ug/L
as measured formulation and 24 (16-30) ug/L as lindane.

c. Discussion/Results: With an LC_{50} value of 120 (80-150)
ug/L, Lindane 20% EC is highly toxic to coldwater fish.

d. Conclusion

1. Category: Core.

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

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STAVOLA   FISH ACUTE TOXICITY Lindane 20EC
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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
280	20	20	100	9.53674E-05
150	20	17	85	.128841
80	20	0	0	9.53674E-05
47	20	0	0	9.53674E-05
27	20	0	0	9.53674E-05

THE BINOMIAL TEST SHOWS THAT 80 AND 150 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 120.277

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   FISH ACUTE TOXICITY   *Lindane 20 EC*
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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
56	20	20	100	9.53674E-05
30	20	17	85	.128841
16	20	0	0	9.53674E-05
9.4	20	0	0	9.53674E-05
5.4	20	0	0	9.53674E-05

THE BINOMIAL TEST SHOWS THAT 16 AND 30 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 24.0554

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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