DATA EVALUATION

1. <u>CHEMICAL</u>: Cypermethrin

2. <u>FORMULATION</u>: 91.69 % active ingredient (Technical grade)

3. <u>CITATION</u>: Jaber, M.J. (1981) The acute toxicity of cypermethrin to crayfish (<u>Orconectes sp.</u>) Unpublished report from Union Carbide Environmental Services Laboratory, submitted 12/28/81 by ICI Americas, Wilmington, Delaware.

   EPA Accession No. 070562

4. <u>REVIEWED BY</u>: Thomas B. Johnston
   Biologist, EEB/HED

5. <u>REVIEW DATE</u>: April 12, 1982

6. <u>TEST TYPE</u>: 96-hr flow-through toxicity test

7. <u>REPORTED RESULTS</u>: The reported 24, 48, 72, and 96-hr LC_{50}s of cypermethrin for crayfish are 0.30, 0.07, 0.068, and 0.068 ppb, respectively.

8. <u>REVIEWER'S CONCLUSIONS</u>: This study is scientifically sound, and fulfills USEPA guideline requirements for an acute toxicity test using an aquatic invertebrate. With an acute flow-through 48-hr LC_{50} of 0.068 ppb, cypermethrin is very highly toxic to crayfish.

MATERIALS/METHODS

Methods used generally followed USEPA guidelines. Tests were run at 20°C, under flow-through conditions.

STATISTICAL ANALYSES

Data were analyzed according to the methods of Stephan (USEPA Duluth laboratory analysis program).

RESULTS

The Percentage Mortality of Crayfish to Cypermethrin for 96 Hours Under Flow-Through Conditions (Ten crayfish per concentration.)

Mean Measured Concentration (ug/l; ppb)	% Mortality			
	24-Hr.	48-Hr.	72-Hr.	96-Hr.
Control	0	0	0	0
Solvent Control	0	0	0	0
0.017	0	0	0	0
0.023	0	0	0	0
0.044	0	0	10	10
0.11	20	90	90	90
0.21	30	100	100	100

$LC_{50}s$	24hr	48hr	72hr	96hr
$LC_{50}s$	>0.21 ppb	0.070	0.068	0.068
95% Confidence	Upper	0.044	0.053	0.053
Limit	Lower	0.11	0.090	0.090

CONCLUSIONS:

Validation Category: Core

Category Rationale: N/A

Category Repairability: N/A

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JOHNSTON CYPERMETHRIN 48HR FLOW-THROUGH LC50 CRAYFISH
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CONC	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB (PERCENT)
.21	10	10	100	0976563
.11	10	9	90	1.07422
.044	10	0	0	0976563
023	10	0	0	.0976563
.017	10	0	0	.0976563

THE BINOMIAL TEST SHOWS THAT .044 AND .11 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 .0766283

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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JOHNSTON CYPERMETHRIN 72 AND 96HR LC50S - CRAYFISH
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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB (PERCENT)
.21	10	10	100	.0976563
.11	10	9	90	1.07422
.044	10	1	10	1.07422
.023	10	0	0	0976563
.017	10	0	0	0976563

THE BINOMIAL TEST SHOWS THAT .044 AND .11 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 .0695701

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	.0760797	.0681007	0527256	.0924471

NO CONVERGENCE IN 25 ITERATIONS. THE PROBIT METHOD
PROBABLY CANNOT BE USED WITH THIS SET OF DATA.

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