2/27/90

C.

DATA EVALUATION RECORD

1.) CHEMICAL: XRM-5019 (sulfonylurea herbicide)

2.) TEST MATERIAL: XRD-498, 99.6% active ingredient. The formulated product XRM-5019 contains 74.9% active ingredient.
EPA No. 464-EUP-RNG; PM-23.

3.) STUDY TYPE: Acute toxicity to the freshwater aquatic invertebrate Daphnia magna Straus.

4.) CITATION: Dill, D. C., D. E. Milazzo, and K. M. Lehr. 1988. XRD-498 Herbicide: Evaluation Of The Toxicity To Daphnia magna Straus. Dow Chemical Corp. Laboratory, Midland, Mi.
MRID 412632-24.

5.) REVIEWED BY:
Richard C. Petrie
Agronomist
EEB/EFED
Signature: Richard C. Petrie
Date: 2/16/90

6.) APPROVED BY:
Ann Stavola
Head, Section 3
EEB/EFED
Signature: Ann Stavola
Date: 2/27/90

7.) CONCLUSIONS:
This study is scientifically sound and is acceptable for use in hazard assessments (CORE). Solubility above 270 ppm was not achieved for the test material. The 48 hour LC50 level of 250 mg/L was determined for Daphnia magna. XRD-498 is categorized as "practically non-toxic" to Daphnia magna. The NOEL was 174 mg/L.

8.) RECOMMENDATIONS:
N/A

9.) BACKGROUND:
No background information was found in EEB files.

10.) DISCUSSION OF INDIVIDUAL TESTS:

11.) MATERIALS AND METHODS:

A. TEST ANIMALS

Daphnia magna neonates were obtained from lab-reared cultures. Rearing conditions were fluorescent light 2500 lux, photoperiod 16 hours light/ 8 hours dark, temperature 20 degrees C, and fed Selenastrum capricornutum algae 3 times weekly. Neonates were screened before testing to ensure that they were less than 24 hours old.

B. DOSAGE

Zero and 48 hour concentrations were measured with HPLC.

	DOSAGES
Nominal:	999,600,363,219,132 mg/L
Measured 0hr:	269,270,251,176,109 mg/L
Measured 48hr:	252,217,253,173,109 mg/L
Stability 48h/0h:	.94,.80,1.0,.98,1.1
Ave. Conc. 0-48h/2:	260,243,252,174,107 mg/L

Measured concentrations remained stable for the 48 hour period. Maximum water solubility was approximately 270 ppm.

C. STUDY DESIGN

Glass beakers (250ml) were used for this static test. No solvents were used. Test water was autoclaved, adjusted for hardness, cooled and aerated before use. Test temperature ranged from 19.5 to 21 degrees C; pH ranged from 5.9 to 8.3; DO saturation from 0 to 48 hrs. was >96% of saturation. The DO, pH, and water temperature were recorded daily. There were 10 daphnids per vessel, 3 replicates. Daphnids were not fed during the 48 hour test period. Photo-period was 16 hrs. light/ 8 hrs. dark. Test vessels were not aerated during the test.

D. STATISTICAL ANALYSIS

The probit method of analysis was used (95% CI).

12.) REPORTED RESULTS:

The measured concentrations at day 0 ranged from 104 to 269 mg/L with a pH range of 5.9 to 8.3. The test substance was stable with final measured concentrations 95% of first day measured concentrations. The LC50 was determined to be greater than the maximum water solubility value of 270 mg/L. XRD-498 is classified as "practically non-toxic" to Daphnia magna.

TEST CONC.	pH	% DEAD 24hr.	48hr.	NO. Dead
999 (260)*	5.9	13	63	(19)
600 (243)	5.9	03	60	(18)
363 (252)	6.1	0	30	(09)
219 (174)	7.1	0	0	(00)
132 (107)	8.0	0	0	(00)
water cont.	8.1	0	0	(00)

* Measured Concentration (Average).

There was much undissolved test substance at the 3 highest test levels. All fish looked normal at all times during the exposure.

13.) STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:
Due to the low mortality, statistical analysis was not possible. By observation, the XRD-498 technical LC50 for Daphnia magna is 270 mg/L. This level is categorized as "practically non-toxic" to Daphnia magna. The highest attained solubility level appeared to be 270 ppm.

14.) REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:

A. Test Procedure:
This study was performed under conditions of compliance with EPA GLP standards.

B. Statistical Analysis:
The Toxanol program was used to approximate an LC50. Using the average measured concentrations during the test period, the LC50 is approximately 250 mg/L and is classified as "practically non-toxic" to Daphnia magna.

C. Discussion/Results:
This study is judged scientifically sound and acceptable for use in a hazard assessment.

D. Adequacy Of The Study:
(1) Classification: Core
(2) Rationale: N/A
(3) Repairability: N/A

R. Petrie xrd-498 acute Daphnia magna 48hr.

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CONC. Measured	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
260	30	19	63.33333	10.02442
255 243	30	18	60.00001	18.07973
252	30	9	30	2.138698
174	30	0	0	9.313227E-08
107	30	0	0	9.313227E-08

THE BINOMIAL TEST SHOWS THAT 252 AND +INFINITY 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 254.0095 Measured

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
2	.5802261	254.718	249.4329	257.9649

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

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R. Petrie xrd-498 acute Daphnia magna 48hour

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CONC. NOMINAL	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
999	30	19	63.33333	10.02442
600	30	18	60.00001	18.07973
363	30	9	30	2.138698
219	30	0	0	9.313227E-08
132	30	0	0	9.313227E-08

THE BINOMIAL TEST SHOWS THAT 363 AND +INFINITY 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 508.6058 Nominal

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
3	9.247709E-02	590.2436	496.5185	736.0665

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
5	.6461643	2.621589	4.889083E-02

SINCE THE PROBABILITY IS LESS THAN 0.05, RESULTS CALCULATED
USING THE PROBIT METHOD PROBABLY SHOULD NOT BE USED.

SLOPE = 3.352948
95 PERCENT CONFIDENCE LIMITS = .657703 AND 6.048193

LC50 = 629.3746
95 PERCENT CONFIDENCE LIMITS = 377.9346 AND 2385.698

LC10 = 263.1105
95 PERCENT CONFIDENCE LIMITS = 15.38955 AND 423.5087
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R. Petrie xrd-498 acute Daphnia magna 48 Hour
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CONC. Measured	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
260	30	19	63.33333	10.02442
255 243	30	18	60.00001	18.07973
252	30	9	30	2.138698
174	30	0	0	9.313227E-08
107	30	0	0	9.313227E-08

THE BINOMIAL TEST SHOWS THAT 252 AND +INFINITY 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 254.0095

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
2	.5802261	254.718	249.4329	257.9649

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

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R. Petrie xrd-498 acute Daphnia magna 24 hour
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CONC. Measured	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
260	30	4	13.33333	2.973807E-03
255 243	30	1	3.333334	2.8871E-06
252	30	0	0	9.313227E-08
174	30	0	0	9.313227E-08
107	30	0	0	9.313227E-08

THE BINOMIAL TEST SHOWS THAT 260 AND +INFINITY 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.