12-1
July 7/12/90

MRID No. 41635-55 and 41635-57

410635-55 -57

DATA EVALUATION RECORD

1. **CHEMICAL:** BAS 514 H Quinclorac. Shaughnessey Number: Not available.

2. **TEST MATERIAL:** One part (by weight) BAS 514 H; Lot No. 150732; a white powder containing 96.2% active ingredient; plus twelve parts (by weight) BAS 864 01S (a viscous yellow liquid).

3. **STUDY TYPE:** Acute Toxicity Test for Freshwater Fish. Species Tested: Bluegill sunfish (Lepomis macrochirus).

4. **CITATION:** Boeri, R.L. 1989. Static Acute Toxicity of BAS 514 H Plus the Surfactant to Bluegill sunfish (Lepomis macrochirus). Submitted by BASF Corporation Chemicals Division, Agricultural Chemicals, Parsippany, New Jersey. Study performed by Enseco Incorporated, Doaks Lane at Little Harbor, Marblehead, MA. Laboratory Report No. BAS010. MRID No. 410635-55 and 410635-57.

5. **REVIEWED BY:**

Richard B. Shepard, Ph.D. **Signature:**
Aquatic Ecologist
KBN Engineering and **Date:**
Applied Sciences, Inc.

6. **APPROVED BY:**

Michael L. Whitten, M.S. **Signature:**
Wildlife Toxicologist
KBN Engineering and **Date:**
Applied Sciences, Inc.

Henry T. Craven, M.S. **Signature:** Henry T. Craven 7/12/90
Supervisor, EEB/HED
USEPA **Date:** 7-12-90

7. **CONCLUSIONS:** The test is scientifically valid and meets the requirements of an acute toxicity test using freshwater fish. The 96-hour LC50 was 31.6 mg/L BAS 514 H mean measured concentrations. This classifies BAS 514 H plus BAS 864 01 S surfactant as slightly toxic to bluegill sunfish.

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5. **REVIEWED BY**:

Richard B. Shepard, Ph.D.
Aquatic Ecologist
KBN Engineering and
Applied Sciences, Inc.

Signature: Richard B. Shepard
Date: 1 Sept. 1989

6. **APPROVED BY**:

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KBN Engineering and
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Signature: Michael L Whitten
Date: 9-1-89

Henry T. Craven, M.S.
Supervisor, EEB/HED
USEPA

Signature: Henry T. Craven
Date: 7/12/90

7. **CONCLUSIONS**: The test is scientifically valid and meets the requirements of an acute toxicity test using freshwater fish. The 96-hour LC50 was 30.3 mg/L, based on nominal concentrations. This classifies BAS 514 H plus BAS 864 01 S surfactant as slightly toxic to rainbow trout (Salmo ~~gairdneri~~).

65pgs

8. **RECOMMENDATIONS:** N/A

9. **BACKGROUND:**

10. **DISCUSSION OF INDIVIDUAL TESTS:** N/A

11. **MATERIALS AND METHODS:**

A. **Test Animals:** Bluegill sunfish (Lepomis macrochirus) were obtained from a commercial supplier in Georgia. The fish were held in a 750 L polyethylene tank containing 100% dilution water for a minimum of 14 days; temperature was not specified. The fish were fed a commercial fish flake daily except during the 48 hours prior to testing and during the testing period. There was less than 1% mortality in the test fish population during the 48-hour period prior to testing and the rest of the fish showed no visible signs of stress or disease. Size and weight of the fish used for the experiment was reported for only control fish at the conclusion of the test. These fish had a mean weight of 0.246 g (range of 0.192 to 0.360 g) and a mean total length of 28.6 mm (range 25 to 34 mm).

B. **Test System:** The test was conducted at a mean temperature of 22.2° C (range 21-23° C). The test was conducted in 19 L glass aquaria which contained 10 L of test solution. The test solution surface area was 800 cm^2. Test solutions were prepared by adding the desired of BAS 514 H (corrected for a purity of 96.2% active ingredient) to all glass aquaria containing 19 L of dilution water. Twelve times (by weight) the amount of BAS 864 01 S was weighed into a 500 ml graduated cylinder, brought up to a total volume of 500 ml with dilution water, and added to the aquaria. The graduated cylinder was again filled to 500 ml with dilution water and added to the aquaria to bring the total volume to 20 L. The surfactant control was prepared in the same manner by adding only BAS 864 01 S to the aquaria in am amount equal to the surfactant added to the highest tested concentration. Each aquarium was mixed on a magnetic stir plate for 24 hrs. The contents of each aquarium was then divided into equal 10 L volumes. A control aquarium was established and maintained under the same conditions as the test aquaria but contained neither BAS 514 H nor BAS 864 01 S.

The dilution water was dechlorinated tapwater with the hardness adjusted to 40-48 mg/L as $CaCO_3$. The dilution water had a pH of 7.5 and total organic carbon of 1.2 mg/L; total suspended solids, residual chlorine, organochlorine pesticides, organophosphorus pesticides, and polychlorinated biphenyls were reported as "not detected above reporting limit".

All test solution temperatures were maintained at 22 ± 1°C. Test solutions were aerated beginning at 48 hr to maintain minimal dissolved oxygen levels. A photoperiod of 16 hours of light and 8 hours of darkness was provided each day.

C. Dosage: 96-hour acute static test.

D. Design: The definitive test consisted of two controls (one dilution water, the other containing 600 mg/L BAS 864 01 S surfactant) and five nominal concentrations of 10, 15, 20, 30,and 50 mg/L were tested. Ten fish selected impartially from the holding tank were placed in each test aquarium 24 hours after the test solutions had been prepared. The resulting test organism loading was approximately 0.246 g of biomass per liter of test solution. Fish were not fed during the test.

The screening test used bluegill sunfish (Lepomis macrochirus) with nominal concentrations of BAS 514 H of 5, 10, 50, and 100 mg/L. After 96 hours of exposure, there was 100% survival at 5 mg/L, 90% survival at 10 mg/L, and 0% survival at both 50 and 100 mg/L.

All aquaria were observed at 0, 24, 48, 72, and 96 hours of exposure for mortality and abnormal effects. Dissolved oxygen, pH, conductivity, and temperature were measured in all aquaria at each 24-hour interval.

E. Statistics: ANOVA and Dunnett's procedure were used to compare survival from control and treatment concentrations. Probit analysis was used to calculate the LC50.

12. REPORTED RESULTS: Mortality data are summarized in Table 2 (attached). There was no mortality in the water control and 5% mortality in the surfactant control. All test vessels were initially clear, with no visible precipitate or turbidity. Control test vessels remained clear throughout the 96-hour exposure

4

period. After 24 hours of exposure, all other test vessels were cloudy, and they remained cloudy until the end of the testing period. After the aeration was begun, a slight foam was visible on all test vessels except for the controls, and the foam remained visible until the end of the test. Analyses of samples showed that the concentration of test material was stable throughout the test (Table III, attached). Mean measured concentrations were 89-93% nominal values.

The 24-, 48-, 72-, and 96-hour LC_{50} values are presented in the copy of Table 3 (attached). The 96-hour LC_{50} for BAS 514 H plus BAS 864 01 S surfactant on bluegill sunfish (Lepomis macrochirus) was calculated to be 33.3 mg/L with 95% confidence limits of 28.2-41.7 mg/L. This level contains 399.6 mg/L of the surfactant BAS 864 01 S. The no observed effect concentration (NOEC) calculated using nominal concentrations of active ingredient is 20 mg/L of BAS 514 H (which would contain 240 mg/L of the surfactant). After 48 hours of exposure, several fish in the test vessels containing 50 mg/L of BAS 514 H exhibited lethargy and erratic swimming. This effect continued until mortality occurred or the termination of the test. No other sublethal effects were observed.

The dissolved oxygen concentrations, pH, conductivity, and temperature as measured during the test are shown in Table A.1 (attached). The dissolved oxygen concentration remained at or above 3.8 mg/L at all times as each aquarium was aerated beginning at 24 hours. The pH ranged from 6.9 to 7.9. Conductivity ranged from 202 umhos/cm to 299 umhos/cm. The temperature ranged from 21°C to 23°C during the exposure period.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:**

The author presented no conclusions in the report.

Quality Assurance and Good Laboratory Practice Regulation Statements were included in the report.

14. **REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS**

A. **Test Procedure:** The test procedures were in accordance with recommended protocols with the following exceptions:

the test material may have been suspended and not dissolved in the test solution which may decrease the actual availability and thus the toxicity of the test chemical.

In the Analysis of Water from Tier 1 Aquatic Toxicology Studies Report, it is indicated that the analysis of water samples from the acute toxicity study was conducted March 6, 1989. Since the acute toxicity study was not conducted until March 7-11, 1989, the water samples could not have been taken from test vessels from the acute study. However, this discrepancy was correct through correspondence with BASF (see attached letter of January 26, 1990).

The SEP states that individual fish should weigh between 0.5 and 5 g. Some fish used in this study weighed as low as 0.192 g. The weights prior to testing were not reported.

A loading factor of approximately 0.246 g/L was reported.

The SEP states that the fish should be added to the test chambers within 30 minutes after the test material has been added. In this test, the solutions were mixed for 24-hours prior to introduction of the fish.

The active ingredient was added to the water in the test aquaria before adding the surfactant. Obviously, this is not the way the materials will be introduced into the environment during licensed use. The author provided no rationale for this method nor an evaluation of whether or not it would have made a difference to the results of the test.

B. **Statistical Analysis:** The 96 hour LC50 calculated (attached) by the reviewer using the probit method was 31.6 mg/L, similar to the value reported by the author (33.3 mg/L).

C. **Discussion/Results:** The 96-hour LC50 was 31.6 mg/L, based on measured concentrations. This classifies BAS 514 H plus BAS 864 01 S surfactant as slightly toxic to rainbow trout (Salmo gairdneri).

The measured concentrations of test material show that aeration, cloudiness of solutions, and 24 hour mixing prior to adding fish did not seriously reduce the actual concentration of the material.

The measured concentrations of test material show that aeration, cloudiness of solutions, and 24 hour mixing prior to adding fish did not seriously reduce the actual concentration of the material.

The test is scientifically valid and meets the requirements of an acute toxicity test using freshwater fish.

D. **Adequacy of the Study:**

(1) **Classification:** Core.

(2) **Rationale:** N/A.

(3) **Repairability:** N/A.

15. **COMPLETION OF ONE-LINER:** Yes; 8-28-89.

7

Page____ is not included in this copy.

Pages 8 through 10 are not included.

The material not included contains the following type of information:

____ Identity of product inert ingredients.

____ Identity of product impurities.

____ Description of the product manufacturing process.

____ Description of quality control procedures.

____ Identity of the source of product ingredients.

____ Sales or other commercial/financial information.

____ A draft product label.

____ The product confidential statement of formula.

____ Information about a pending registration action.

√ FIFRA registration data.

____ The document is a duplicate of page(s) _____.

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The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

Shaughnessey No. NOT AVAILABLE Chemical Name ________ Chemical Class ______ Page ______ of ______

Study/Species/Lab/Accession	Chemical % a.i.	Results	Reviewer/Date	Valid St

14-Day Single Dose Oral LD_{50}

Species ______
Lab
Acc.

LD50 = mg/kg (95% C.L.) Contr. Mort.(%) =
Slope = # Animals/Level = Age(Days) = Sex =
14-Day Dose Level mg/kg/(% Mortality)
( ), ( ), ( ), ( ), ( )
Comments:

14-Day Single Dose Oral LD_{50}

Species ______
Lab
Acc.

LD50 = mg/kg. (95% C.L.). Contr. Mort.(%) =
Slope = # Animals/Level = Age(Days) = Sex =
14-Day Dose Level mg/kg/(% Mortality)
( ), ( ), ( ), ( ), ( )
Comments:

8-Day Dietary LC_{50}

Species
Lab ______
Acc.

LC50 = ppm (95% C.L.) Contr. Mort.(%) =
Slope = # Animals/Level = Age(Days) = Sex =
8-Day Dose Level ppm/(%Mortality)
( ), ( ), ( ), ( ), ( )
Comments:

8-Day Dietary LC_{50}

Species
Lab ______
Acc.

LC50 = ppm (95% C.L.) Contr. Mort.(%) =
Slope = # Animals/Level = Age(Days) = Sex =
8-Day Dose Level ppm/(%Mortality)
( ), ( ), ( ), ( ), ( )
Comments:

48-Hour LC_{50}

Species
Lab ______
Acc.

LC50 = pp__ (95% C.L.) Contr. Mort.(%) = 0
Sol. Contr. Mort.(%) = 5
Slope = # Animals/Level = Temperature =
48-Hour Dose Level pp /(%Mortality)
( ), ( ), ( ), ( ), ( )
Comments:

96-Hour LC_{50}

Species *Lepomis machrochirus*
96.2%
Lab *Envesco Inc*
Acc. 410635-55
410635-57

LC50 = 30.3 mg/L (95% C.L. 25.6–37.9) Con. Mor.(%) = 0
Sol. Con. Mor.(%) = 5
Slope = 4.4 # Animals/Level = 10 Temp. = 21-23°C
96-Hour Dose Level mg/L* /(%Mortality)
10 (0), 15 (10), 20 (10), 30 (50), 50 (75)
Comments: *NOMINAL CONCENTRATIONS*

R.S. 8-28-89 CORE

96-Hour LC_{50}

Species
Lab ______
Acc.

LC50 = pp__ (95% C.L.) Con. Mort.(%) =
Sol. Con. Mort.(%) =
Slope = # Animals/Level = Temp. =
96-Hour Dose Level pp /(%Mortality)
( ), ( ), ( ), ( ), ( )
Comments:

11

Page_____ is not included in this copy.

Pages 12 through 16 are not included.

The material not included contains the following type of information:

____ Identity of product inert ingredients.

____ Identity of product impurities.

____ Description of the product manufacturing process.

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____ Sales or other commercial/financial information.

____ A draft product label.

____ The product confidential statement of formula.

____ Information about a pending registration action.

✓ FIFRA registration data.

____ The document is a duplicate of page(s) _____.

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Shaughnessey No. NOT AVAILABLE Chemical Name _____ Chemical Class _____ Page _____ of _____

Study/Species/Lab/ Accession	Chemical % a.i.	Results	Reviewer/ Date	Val St
14-Day Single Dose Oral LD_{50}		LD50 = mg/kg (95% C.L.) Contr. Mort.(%)=		
Species _____		Slope= # Animals/Level= Age(Days)= Sex =		
Lab		14-Day Dose Level mg/kg/(% Mortality) ( ), ( ), ( ), ( ), ( )		
Acc.		Comments:		
14-Day Single Dose Oral LD_{50}		LD50 = mg/kg. (95% C.L.). Contr. Mort.(%)=		
Species _____		Slope= # Animals/Level= Age(Days)= Sex =		
Lab		14-Day Dose Level mg/kg/(% Mortality) ( ), ( ), ( ), ( ), ( )		
Acc.		Comments:		
8-Day Dietary LC_{50}		LC50 = ppm (95% C.L.) Contr. Mort.(%)=		
Species		Slope= # Animals/Level= Age(Days)= Sex =		
Lab _____		8-Day Dose Level ppm/(%Mortality) ( ), ( ), ( ), ( ), ( )		
Acc.		Comments:		
8-Day Dietary LC_{50}		LC50 = ppm (95% C.L.) Contr. Mort.(%)=		
Species		Slope= # Animals/Level= Age(Days)= Sex =		
Lab _____		8-Day Dose Level ppm/(%Mortality) ( ), ( ), ( ), ( ), ( )		
Acc.		Comments:		
48-Hour LC_{50}		LC50 = pp__ (95% C.L.) Contr. Mort.(%)= 0		
Species		Sol. Contr. Mort.(%)= 5		
Slope= # Animals/Level=				
Lab _____		Temperature = 48-Hour Dose Level pp /(%Mortality) ( ), ( ), ( ), ( ), ( )		
Acc.		Comments:		
96-Hour LC_{50}		LC50 = 30.3 mg/L (ppm) (95% C.L. 25.6-37.9) Con. Mor.(%)= 0		
Species *Lepomis machrochirus*		Sol. Con. Mor.(%)= 5	R.S.	
Slope= 4.4 # Animals/Level= 10			8-28-89	
Lab Esresco Inc 96.2%		Temp.= 21-23°C 96-Hour Dose Level * mg/L pp /(%Mortality)	CORE	
Acc. 410635-55 410635-57		10 (0), 15 (10), 20 (10), 30 (50), 50 (75)		
		Comments: NOMINAL CONCENTRATIONS		
96-Hour LC_{50}		LC50 = pp__ (95% C.L.) Con. Mort.(%)=		
Species		Sol. Con. Mort.(%)=		
Slope= # Animals/Level=				
Lab _____		Temp.= 96-Hour Dose Level pp /(%Mortality) ( ), ( ), ( ), ( ), ( )		
Acc.		Comments:		

****

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
47.1	20	15	75	2.069473
28.9	20	10	50	58.80984
19	20	2	10	2.012253E-02
14	20	2	10	2.012253E-02
9.189999		20	0	0

9.536742E-05

THE BINOMIAL TEST SHOWS THAT 19 AND 47.1 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 28.89999

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
2	.2006847	31.27874	26.00962	38.80165

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
3	.1315447	1	.612968

SLOPE = 4.366176
95 PERCENT CONFIDENCE LIMITS = 2.782604 AND 5.949748

LC50 = 31.61434
95 PERCENT CONFIDENCE LIMITS = 26.74933 AND 39.63215

LC10 = 16.18123
95 PERCENT CONFIDENCE LIMITS = 11.52601 AND 19.67072

****