8-14-91
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

August 14, 1991

MEMORANDUM

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

SUBJECT: Chlorpyrifos Degradate Data Evaluation Records: Reregistration Follow-up (D163629; 191413; 394590)

FROM: Doug Urban, Acting Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)

TO: Dennis Edwards, Jr., PM 12
Insecticide/Rodenticide Branch
Registration Division (H7507C)

Five studies were submitted by Dow-Elanco in response to the Chlorpyrifos Registration Standard. These studies, with results, and their status are as follows:

3,5,6-Tricholor-2-pyridinol (99.9% pure)

Avian acute LD_{50} - bobwhite quail	LD_{50}>2000 mg/kg	Core
Avian dietary LC_{50} - mallard duck	LC_{50}5620 mg/kg	Supplemental
Bluegill sunfish	LC_{50}=12.5 mg/L	Core
Rainbow trout	LC_{50}=12.6 mg/L	Core
Daphnia magna	LC_{50}=10.4 mg/L	Core

EEB has examined the last complete Branch review (dated 1/23/90) and determined the following:

The attached studies fulfill the following data requirements:

- 71-1 - Avian LD_{50} with degradate (MRID 418290-01)
- 72-1 - Freshwater fish acute test with degradate (MRID 418290-03 and 418290-04)
- 72-2 - Freshwater invertebrate LC_{50} with degradate (MRID 418290-05)

The attached avian dietary study with the mallard (MRID 418290-02) is classified as supplemental data.

If you have any questions on the above, please feel free to contact Kathryn Valente (557-4368).

D163629
DPBARCODE (RECORD)
059101
SHAUGHNESSY NO

REVIEW NO.

EEB REVIEW

DATE IN: 04-17-91 OUT: 09-03-91

CASE # : 191413
SUBMISSION # : S394590
ID # : 3F02947

REREG CASE #:
LIST A, B, C, D

DATE OF SUBMISSION 04-01-91

DATE RECEIVED BY EFED 04-17-91

SRRD/RD REQUESTED COMPLETION DATE 09-24-91

EEB ESTIMATED COMPLETION DATE 09-24-91

SRRD/RD ACTION CODE/TYPE OF REVIEW 231 - Resubmission

MRID #(S) 418290-01, 02, 03, 04, 05

DP TYPE 001 - Submission Related Data Package

PRODUCT MANAGER, NO. D. Edwards (12)

PRODUCT NAME(S) Chlorpyrifos

TYPE PRODUCT F R I N H D Insecticide

COMPANY NAME DowElanco

SUBMISSION PURPOSE Review data on degradates

INCLUDE USE(S)

COMMON CHEMICAL NAME Chlorpyrifos

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Data Evaluation Record

1. Chemical: 3,5,6-Trichloro-2-pyridinol (Chlorpyrifos degradate)
Shaughnessy No.:206900

2. Test Material: 3,5,6-Trichloro-2-pyridinol, 99.9% pure, AGR 143197, CAS#6515-38-4, a white solid.

3. Study type: Avian Single-Dose Oral LD_{50}

Test Species: Bobwhite quail (Colinus virginianus)

4. Study ID: Capmbell, S., Hoxter, K.A., and Jaber, M. 3,5,6-Trichloro-2-pyridinol: An acute oral toxicity study with the Northern bobwhite. Wildlife International, 305 Commerce Drive, Easton, MD for the Dow Chemical Company. Study ID#103-347. MRID 418290-01.

5. Reviewed by: Kathryn Valente
Biologist
EEB/EFED
Signature: Kathryn F. Valente
Date: 8/14/91

6. Approved by: Allen Vaughan
Acting Head, Section II
EEB/EFED
Signature: Allen W. Vaughan
Date: 8.28.91

7. Conclusions: The study is scientifically sound and meets the requirements for an avian acute oral LD_{50} study. With an LD_{50} of >2000 mg/kg, the test material is considered to be practically non-toxic to Northern bobwhite. The NOEL was determined to be 125 mg/kg.

8. Recommendations: N/A

9. Background information: This study was submitted under the requirements of the registration standard for chlorpyrifos.

10. Discussion of Individual Tests: N/A

11. Materials and Methods:
a. Test animals: 70 Northern bobwhite were obtained from Fritts Quail Farm, Phillipsburg, New Jersey. The birds were 18 weeks of age and ranged in weight from 164-219 grams at test initiation. All test birds were acclimated to the caging and facilities for approximately three weeks prior to testing. The birds were maintained on a 8 hour light/16 hour dark photoperiod at 21 C+/- 2 C and average relative humidity of 39% +/-11%. The birds were fasted for at least 15 hours prior to dosing.

b. Dosing regime: The test substance was dissolved in corn oil and presented by oral gavage in the following nominal concentrations: 0.0 (control), 62.5, 125.0, 250.0, 500.0, 1000.0 and 2000.0 mg/kg body weight.

c. Study design: Ten birds, five males and five females, were assigned to each treatment level, including the controls. Observations for mortality and sublethal effects were made for 14 days post dosing. Body weights were measured at test initiation, and on days 3, 7 and 14. Average estimated feed consumption was determined for each group for days 0-3, 4-7 and 8-14.

d. Statistics: The lack of mortality in this study prevented the calculation of an LD_{50} value using the computer program of Stephan et al, which normally calculates LD_{50} values using probit analysis, moving average method or the binomial probability method. An estimation of the LD_{50} was therefore made by visual inspection of the mortality data.

12. Reported Results: Bobwhite were exposed to seven nominal concentrations of 3,5,6-trichloro-2-pyridinol: 0, 62.5, 125.0, 250.0, 500.0, 1000.0 and 2000.0 mg/kg. There was no mortality observed at any level. Temporary signs of toxicity (reduced reaction to external stimuli, lower limb weakness, wing droop, lethargy and ruffled appearance) were observed at levels >500 mg/kg from 15-60 minutes post-dose. All birds displaying these effects had recovered and were fully normal by the following morning. There was a slight reduction in body weight gain at 250 mg/kg and in females at 500 mg/kg from day 0-3. A loss in body weight was noted among males and females at 1000 and 2000 mg/kg for the same period. Reduced feed consumption was noted in females at 1000 and 2000 mg/kg from day 0-3.

13. Study Author's Conclusions/Quality Assurance Report: The LD_{50} value was >20000 mg/kg based on the lack of mortality observed at all levels. The NOEL was 125 mg/kg based on the abnormal effects seen at levels of 250 mg/kg and greater.

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

14. Reviewer's Discussion and Interpretation of the Results:
a. Test Procedure: The test design and procedure were in accordance with protocols recommended by the Guidelines.

b. Statistical Analysis: The LD_{50} could not be directly calculated due to the lack of mortality. However, the study shows that the LD_{50} is greater than 2000 mg/kg, which is in accordance with the Guidelines.

c. Discussion/Results: The study is scientifically sound and in accordance with the Guidelines. The study is classified as core. With an LD_{50} of >2000 mg/kg, 3,5,6-trichloro-2-pyridinol is considered to be practically non-toxic to northern bobwhite.

d. Adequacy of the study:
(1) Classification: Core
(2) Rationale: N/A
(3) Repairability: N/A

Data Evaluation Record

1. Chemical: 3,5,6-Trichloro-2-pyridinol (Chlorpyrifos degradate)
Shaughnessy No.:206900

2. Test Material: 3,5,6-Trichloro-2-pyridinol, 99.9% pure, AGR 143197, CAS#6515-38-4, a white solid.

3. Study type: Avian Dietary LC_{50}

Test Species: Mallard duck (Anas platyrhynchos)

4. Study ID: Long, R., Hoxter, K.A., and Jaber, M. 3,5,6-Trichloro-2-pyridinol: A dietary LC_{50} study with the mallard. Wildlife International, 305 Commerce Drive, Easton, MD for the Dow Chemical Company. Study ID #103-346. MRID 418290-02.

5. Reviewed by: Kathryn Valente
Biologist
EEB/EFED
Signature: Kathryn T. Valente
Date: 8/14/91

6. Approved by: Allen Vaughan
Acting Head, Section II
EEB/EFED
Signature: Allen W. Vaughan
Date: 9.28.91

7. Conclusions: The study is scientifically sound; however, due to the lack of a solvent control and the occurrence of sublethal effects at all levels tested, it is classified as supplemental. With an LC_{50} of >5620 ppm, the test material is considered to be practically non-toxic to the mallard.

8. Recommendations: A solvent control should be run whenever a solvent other than water is used.

9. Background information: This study was submitted under the requirements of the registration standard for chlorpyrifos.

10. Discussion of Individual Tests: N/A

11. Materials and Methods:
a. Test animals: Mallards were obtained from Whistling Wings in Hanover, Illinois. The birds were 10 days old and ranged in weight from 160-179 grams at test initiation. All test birds were acclimated to the caging and facilities for approximately 8 days prior to testing. The birds were maintained on a 16 hour light/8 hour dark photoperiod at 33 C+/- 3 C in the brooder compartment (21 C +/- 2 C average ambient temperature) and average relative humidity of 51% +/- 9%.

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b. Dosing regime: The test substance was dissolved in corn oil and acetone and mixed into the basal diet (Wildlife International's Game Bird Ration) with a Hobart mixer. The concentration of corn oil in the test and control diets was 2%. One hundred mL of acetone was used in the preparation of each of the test diets. There was no acetone added to the control diet. Nominal dietary test concentrations of 3,5,6-trichloro-2-pyridinol used were 562, 1000, 1780, 3160 and 5620 ppm a.i.. Birds were maintained on the test diets for 5 days, followed by a 3 day post-exposure observation period during which the birds were maintained on the untreated basal diet.

c. Study design: Ten birds were assigned to each treatment level, including three control groups. The birds could not be differentiated by sex due to age. Observations for mortality and sublethal effects were made daily throughout the exposure and post-exposure periods. Individual body weights by group were measured at test initiation, on day 5 and at the end of the test, day 8. Average estimated feed consumption was determined for each group for days 0-5, and 6-8.

d. Statistics: The lack of mortality in this study prevented the calculation of an LC_{50} value using the computer program of Stephan et al, which normally calculates LC_{50} values using probit analysis, moving average method or the binomial probability method. An estimation of the LC_{50} was therefore made by visual inspection of the mortality data.

12. Reported Results: Mallards were exposed to five nominal concentrations of 3,5,6-trichloro-2-pyridinol: 562, 1000, 1780, 3160 and 5620 ppm. There was a single mortality (10%) at 1000 ppm and 2 mortalities (20%) at 3160 ppm. Two birds at 3160 ppm demonstrated signs of toxicity: lethargy, reduced reaction to external stimuli, loss of coordination , lower limb weakness and a ruffled posture in 1 bird on day 2, and lethargy, depression, reduced reaction to external stimuli, prostration, loss of righting reflex, lower limb rigidity and convulsions in another bird on day 3. There was one bird in this group found dead on day 3, and the second bird to exhibit signs of toxicity was found dead on day 4. The bird which died at 1000 ppm did not exhibit any abnormal behavior prior to death. There was no mortality or abnormal behavior observed in any other group. Body weight gain was reduced at all concentrations of the test material. Based on these observations, the LC_{50} was determined to be >5620 ppm, and the NOEL was determined to by <562 ppm.

13. Study Author's Conclusions/Quality Assurance Report: The LC_{50} value was >5620 ppm. The NOEL was <562 ppm, based on the reduction in body weight gain seen at all levels tested.

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

14. Reviewer's Discussion and Interpretation of the Results:
a. Test Procedure: The test design and procedure were generally in accordance with protocols recommended by the Guidelines. However, there was no acetone added to the control diet, whereas 100 mL of acetone was added to each test diet. The Guidelines require that a solvent control be included whenever a solvent other than water is used in the preparation of the test diet.

b. Statistical Analysis: The LC_{50} could not be directly calculated due to the lack of mortality. However, the study shows that the LC_{50} is greater than 5000 ppm, which is in accordance with the Guidelines.

c. Discussion/Results: The study is scientifically sound; however, due to the occurrence of mortalities at 1000 and 3160 ppm, the exhibition of abnormal behavior at 3160 ppm and the reduction in body weight gain at all levels, there is some concern about the possibility of hazard from 3,5,6-trichloro-2-pyridinol. Also, the lack of a solvent control raises the possibility that the adverse effects seen in this study may have been caused by the solvent or an interaction of the solvent with the test chemical. The study is therefore classified as supplemental. Additional data are needed before the study can be classified as core.

d. Adequacy of the study:
(1) Classification: Supplemental.

(2) Rationale: No solvent control was included in the study, which is not in accordance with the Guidelines. Also, there were sublethal effects (reduced body weight gain) observed at all concentrations tested.
(3) Repairability: None.

Data Evaluation Record

1. Chemical: 3,5,6-Trichloro-2-pyridinol (Chlorpyrifos degradate) Shaughnessy No.:206900

2. Test Material: 3,5,6-Trichloro-2-pyridinol, 99.9% pure, AGR 143197, CAS#6515-38-4, a light tan solid.

3. Study type: Freshwater Fish 96-hour Acute Toxicity

Test Species: Bluegill sunfish (Lepomis macrochirus)

4. Study ID: Gorzinski, S.J., Mayes, M.A., Ormand, J.R., Weinberg, J.T. and Richardson, C.H. 3,5,6-Trichloro-2-pyridinol: Acute 96-hour toxicity to the Bluegill, Lepomis macrochirus Rafinesque. Performed by the Environmental Toxicology and Chemistry Research Laboratory, Health and Environmental Sciences, The Dow Chemical Company, Midland, MI. Study ID #ES-DR-0037-0423-7. MRID 418290-03.

5. Reviewed by: Kathryn Valente, Biologist, EEB/EFED — Signature: Kathryn F. Valente, Date: 8/21/91

6. Approved by: Allen Vaughan, Acting Head, Section II, EEB/EFED — Signature: Allen W. Vaughan, Date: 8.28.91

7. Conclusions: The study is scientifically sound and meets the requirements for a freshwater fish acute toxicity study. With an LC_{50} of 12.5 mg/L, the test material is considered to be slightly toxic to freshwater fish. The NOEC was determined to be 4.4 mg/L.

8. Recommendations: N/A

9. Background information: This study was submitted under the requirements of the registration standard for chlorpyrifos.

10. Discussion of Individual Tests: N/A

11. Materials and Methods:
a. Test animals: Bluegill were obtained from Osage Catfisheries in Osage Beach, MO. All bluegill were held on a 16-h light/8-h dark photoperiod and observed for at least 14 days prior to testing. The test fish were held without food for 48 hours before testing. The control fish had a mean length of 32.2 mm and a mean weight of 0.694 g, and were believed to be representative of the entire test lot. The biomass loading rate was 0.347 g/L.

b. Test system: Tests were conducted in 12L glass beakers. Each beaker was placed in a water trough with a controlled temperature of 22 +/- 1 C. The temperature of one beaker was measured continuously throughout the test. The water in the beakers had a mean temperature of 20 +/- 2C, pH 7.4-8.1 and DO of 71-86% saturation. The nominal exposure levels of 3,5,6-trichloro-2-pyridinol were: control, acetone control, 1.5, 2.6, 4.3, 7.2, 12 and 20 mg/L. The mean measured concentrations of 3,5,6-trichloro-2-pyridinol, determined from analytical samples taken at 0 and 96 hours, were: 1.7, 2.7, 4.4, 7.4, 13.4 and 18.8 mg/L.

c. Study design: A preliminary range-finding was conducted. The results from this range-finding study indicated that the 96-hr LC_{50} was between 10 and 15 mg/l. For the definitive test, ten bluegill were assigned to each treatment level. Observations for mortality and sublethal effects were made daily throughout the exposure period. Analytical water samples were taken at 0 and 96 hours. Temperature was measured continuously in one of the test beakers. Additional temperature, pH and DO measurements were taken every 24-hr during the test period.

d. Statistics: Data were analyzed for daily LC_{50} and 95% confidence interval values using a computer program, which has three methods available: probit analysis, moving average angle analysis and binomial probability.

12. Reported Results: Despite the biomass loading rate being within Guideline recommendations, gentle aeration (<100 bubbles/min) had to be started at 24 hours due to the oxygen demand by the bluegill. There was 100% mortality at the 18.8 mg/L concentration, 40% mortality at the 13.4 mg/L concentration and 10% mortality at the 7.4 mg/L concentration. No adverse effects were observed in any of the surviving bluegill. Based on these results, the 96-h LC_{50} was 12.5 mg/L and the NOEC was 4.4 mg/L.

13. Study Author's Conclusions/Quality Assurance Report: The LC_{50} value was 12.5 mg/l (95% confidence interval of 9.8 to 15.2) The NOEL was 4.4 mg/L. Based on these values, 3,5,6-trichloro-2-pyridinol is classified as slightly toxic to bluegill.
Quality Assurance and Good Laboratory Practice statements were included in the report.

14. Reviewer's Discussion and Interpretation of the Results:
a. Test Procedure: The test design and procedure were in accordance with protocols recommended by the Guidelines. The only deviation noted was the lack of a transitional dawn/dusk period in the 16-h light/8-h dark photoperiod.

b. Statistical Analysis: The LC_{50} was calculated using EPA's Toxanal computer program. The probit method was used to analyze the data. The LC_{50} was determined to be 12.49 mg/L with a 95% confidence interval of 9.8 to 15.2, which is in agreement with the reported results. The slope of the dose-response curve was determined to be 7.29.

c. Discussion/Results: The study is scientifically sound and in accordance with the Guidelines.

d. Adequacy of the study:
(1) Classification: Core.
(2) Rationale: N/A
(3) Repairability: N/A

Valente chlorpyrifos bluegill acute

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
18.8	10	10	100	9.765625E-02
13.4	10	4	40	37.69531
7.4	10	1	10	1.074219
4.4	10	0	0	9.765625E-02
2.7	10	0	0	9.765625E-02
1.7	10	0	0	9.765625E-02

THE BINOMIAL TEST SHOWS THAT 7.4 AND 18.8 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 13.98787

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS	
4	8.950839E-02	11.10501	8.964817	14.81369

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
10	.3105554	1	.5384115

SLOPE = 7.294889

95 PERCENT CONFIDENCE LIMITS = 3.229631 AND 11.36015

LC50 = 12.49322

95 PERCENT CONFIDENCE LIMITS = 9.799139 AND 15.21457

LC10 = 8.367193

95 PERCENT CONFIDENCE LIMITS = 4.466243 AND 10.43463

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Data Evaluation Record

1. Chemical: 3,5,6-Trichloro-2-pyridinol (Chlorpyrifos degradate)
Shaughnessy No.:206900

2. Test Material: 3,5,6-Trichloro-2-pyridinol, 99.9% pure, AGR 143197, CAS#6515-38-4, a light tan solid.

3. Study type: Freshwater Fish 96-hour Acute Toxicity
Test Species: Rainbow Trout (Oncorhynchus mykiss)

4. Study ID: Gorzinski, S.J., Mayes, M.A., Ormand, J.R., Weinberg, J.T., and Richardson, C.A. 3,5,6-Trichloro-2-pyridinol: Acute 96-hour toxicity to the Rainbow trout, Oncorhynchus mykiss Walbaum. Performed by the Environmental Toxicology and Chemistry Research Laboratory, Health and Environmental Sciences, The Dow Chemical Company, Midland, MI. Study Id #ES-DR-0037-0423-8. MRID 418290-04.

5. Reviewed by: Kathryn Valente
Biologist
EEB/EFED
Signature: Kathryn L. Valente
Date: 8/14/91

6. Approved by: Allen Vaughan
Acting Head, Section II
EEB/EFED
Signature: Allen W. Vaughan
Date: 8.28.91

7. Conclusions: The study is scientifically sound and meets the requirements for a freshwater fish acute toxicity study. With an LC_{50} of 12.6 mg/L, the test material is considered to be slightly toxic to freshwater fish. The NOEC was determined to be 7.6 mg/L.

8. Recommendations: N/A

9. Background information: This study was submitted under the requirements of the registration standard for chlorpyrifos.

10. Discussion of Individual Tests: N/A

11. Materials and Methods:
a. Test animals: Rainbow trout were obtained from Mt. Lassen Trout Farms in Red Bluff, CA. All fish were held on a 16-h light/8-h dark photoperiod and observed for at least 14 days prior to testing. The test fish were held without food for 48 hours before testing. The control fish had a mean length of 38.4 mm and a mean weight of 0.813 g, and were believed to be representative of the entire test lot. The biomass loading rate was 0.407 g/L.

b. Test system: Tests were conducted in 12L glass beakers.

Each beaker was placed in a water trough with a controlled temperature of 12.5 +/- 0.5 C. The temperature of one beaker was measured continuously throughout the test. The water in the beakers ranged in temperature from 12.5-12.8 C, pH 7.4-7.9 and DO of 60% saturation during hours 0-48 and 40% saturation during hours 72-96. The nominal exposure levels of 3,5,6-trichloro-2-pyridinol were: control, acetone control, 1.5, 2.6, 4.3, 7.2, 12 and 20 mg/L. The mean measured concentrations, determined from analytical water samples collected at 0 and 96 hours, were: 1.7, 2.8, 4.6, 7.6, 12.6 and 20.8 mg/L.

c. Study design: A preliminary range-finding was conducted. The results from this range-finding study indicated that the 96-hr LC_{50} was between 3.0 and 15 mg/l. For the definitive test, ten fish were assigned to each treatment level. Observations for mortality and sublethal effects were made daily throughout the exposure period. Analytical water samples were taken at 0 and 96 hours. Temperature was measured continuously in one of the test beakers. Additional temperature, pH and DO measurements were taken every 24-hr during the test period.

d. Statistics: Data were analyzed for daily LC_{50} and 95% confidence interval values using a computer program, which has three methods available: probit analysis, moving average angle analysis and binomial probability.

12. Reported Results: There was 100% mortality at the 20.8 mg/L concentration, and 50% mortality at the 12.6 mg/L concentration. No adverse effects were observed in any of the surviving fish. Based on these results, the 96-h LC_{50} was 12.6 mg/L and the NOEC was 7.6 mg/L.

13. Study Author's Conclusions/Quality Assurance Report: The LC_{50} value was 12.6 mg/l (95% confidence interval of 7.6 to 20.8) The NOEL was 7.6 mg/L. Based on these values, 3,5,6-trichloro-2-pyridinol is classified as slightly toxic to rainbow trout.
Quality Assurance and Good Laboratory Practice statements were included in the report.

14. Reviewer's Discussion and Interpretation of the Results:
a. Test Procedure: The test design and procedure were in accordance with protocols recommended by the Guidelines. The only deviation noted was the lack of a transitional dawn/dusk period in the 16-h light/8-h dark photoperiod.

b. Statistical Analysis: The LC_{50} was calculated using EPA's Toxanal computer program. The binomial method was used to analyze the data. The LC_{50} was determined to be 12.6 mg/L with

a 95% confidence interval of 7.6 to 20.8, which is in agreement with the reported results. The slope of the dose-response curve could not be calculated due to less than two concentrations showing between 0 and 100% mortality.

c. Discussion/Results: The study is scientifically sound and in accordance with the Guidelines.

d. Adequacy of the study:
(1) Classification: Core.
(2) Rationale: N/A
(3) Repairability: N/A

Valente chlorpyrifosdeg daphnia acute

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
44.6	30	30	100	9.313227E-08
28.9	30	30	100	9.313227E-08
17.9	30	30	100	9.313227E-08
9.899999		30	13	43.33333
29.23324				
4.9	30	0	0	9.313227E-08
3.1	30	0	0	9.313227E-08
2.1	30	0	0	9.313227E-08
1.2	30	0	0	9.313227E-08

THE BINOMIAL TEST SHOWS THAT 4.9 AND 17.9 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 10.41232

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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Data Evaluation Record

1. Chemical: 3,5,6-Trichloro-2-pyridinol (Chlorpyrifos degradate)
   Shaughnessy No.:206900

2. Test Material: 3,5,6-Trichloro-2-pyridinol, 99.9% pure, AGR 143197, CAS#6515-38-4, a light tan solid.

3. Study type: Freshwater Invertebrate 48-hour Acute Toxicity
   Test Species: Daphnia magna

4. Study ID: Gorzinski, S.J., Milazzo, D.P., Ormand, J.R., and Servinski, M.F. 3,5,6-Trichloro-2- pyridinol: Acute 48-hour toxicity to the water flea, Daphnia magna Straus. Performed by the Environmental Toxicology and Chemistry Research Laboratory, Health and Environmental Sciences, The Dow Chemical Company, Midland, MI. Study Id #ES-DR-0037-0423-5. MRID 418290-05.

5. Reviewed by: Kathryn Valente
   Biologist
   EEB/EFED
   Signature: Kathryn L. Valente
   Date: 8/14/91

6. Approved by: Allen Vaughan
   Acting Head, Section II
   EEB/EFED
   Signature: Allen W. Vaughan
   Date: 8-28-91

7. Conclusions: The study is scientifically sound and meets the requirements for a freshwater invertebrate acute toxicity study. With an LC_{50} of 10.4 mg/L, the test material is considered to be slightly toxic to freshwater invertebrates. The NOEC was determined to be 4.9 mg/L.

8. Recommendations: N/A

9. Background information: This study was submitted under the requirements of the registration standard for chlorpyrifos.

10. Discussion of Individual Tests: N/A

11. Materials and Methods:
    a. Test animals: Neonate daphnids (<24 hours old) from a laboratory-reared culture were used. The daphnids were held on a 16-h light/8-h dark photoperiod. Daphnids were not fed during the test.
    b. Test system: Tests were conducted in 250 mL glass beakers containing 200 mL of test solution. Each beaker was placed in an incubator with a controlled temperature of 20 +/- 1 C. The water in the beakers ranged in temperature from 19.4-20.9 C, pH 7.2-8.1 and DO of 97% saturation. The nominal exposure levels of 3,5,6-trichloro-2-pyridinol were: control, acetone control, 1.4, 2.33, 3.89, 6.48, 10.8, 18.0, 30.0 and 50.0 mg/L. The mean measured concentrations, determined from