1-23-92

D170443
DPBARCODE (RECORD)
068103
SHAUGHNESSY NO

REVIEW NO.

EEB REVIEW

DATE IN: 11/04/91 OUT: 1/23/92

CASE # : 829333 REREG CASE #: 2405
SUBMISSION # : S405917 LIST A, B, C, D
ID # : 068103-045639

DATE OF SUBMISSION 09/30/91

DATE RECEIVED BY EFED 10/31/91

SRRD/RD REQUESTED COMPLETION DATE 01/08/92

EEB ESTIMATED COMPLETION DATE 01/08/92

SRRD/RD **ACTION** CODE/TYPE OF REVIEW 602 PHASE 3 RESPONSE

MRID #(S) 420580-01, 420580-02

DP TYPE 001 PHASE 4 REVIEW

PRODUCT MANAGER, NO. BARBARA BRISCOE 51

PRODUCT NAME(S) METHYL ISOTHIOCYANATE

TYPE PRODUCT F R I N H D SOIL FUMIGANT

COMPANY NAME NOR-AM CHEMICAL COMPANY

SUBMISSION PURPOSE REREGISTRATION

INCLUDE USE(S)

COMMON CHEMICAL NAME METHYL ISOTHIOCYANATE

DP BARCODE: D170443 REREG CASE # 2405

CASE: 809333 DATA PACKAGE RECORD DATE: 10/30/91
SUBMISSION: S405917 BEAN SHEET Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REREGISTRATION ACTION: 602 PHASE 3 RESPONSE SUBMIS.
CHEMICALS: 068103 Methyl isothiocyanate

ID#: 068103-045639
COMPANY: 045639 NOR-AM CHEMICAL COMPANY
PRODUCT MANAGER: 51 BARBARA BRISCOE 703-308-8065 ROOM: CS1 3H3
PM TEAM REVIEWER: BETTY CROMPTON 703-308-8067 ROOM: CS1 4L5
RECEIVED DATE: 09/30/91 DUE OUT DATE: 12/29/91

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 170443 EXPEDITE: N DATE SENT: 10/30/91 DATE RET.: / /
CHEMICAL: 068103 Methyl isothiocyanate
DP TYPE: 101 Phase IV Review
ADMIN DUE DATE: 01/08/92 CSF: N LABEL: N

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	10/31/91	/ /
BRAN: EEB	11/04/91	/ /
SECT:	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

* * * DATA REVIEW INSTRUCTIONS * * *

Please review data package and provide comments. Included: Guideline 72-1 (MRID #420580-01-bluegill) and 72-1 (MRID # 420580-02-rainbow trout).

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL

2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MEMORANDUM

JAN 23 1992

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

To: Barbara Briscoe, PM 51
Generic Chemical Support Branch
Reregistration Division

From: Douglas Urban, Acting Chief Branch
Ecological Effects Branch
Environmental Fate and Effect Division
(H7507C)

Douglas D. Urban 1/23/92

Subject: Review of studies for Methyl Isothiocyanate

BACKGROUND

Nor-Am Chemical Company has submitted the following studies as part of the reregistration process of methyl isothiocyanate:

Schupner, J.K. and B.J. Stachura, 1991. The Acute Toxicity of MITC Technical to Bluegill Sunfish (Lepomis macrochirus). MRID No. 420580-01.

Schupner, J.K. and B.J. Stachura, 1991. The Acute Toxicity of MITC Technical to Rainbow Trout (Oncorhynchus mykiss). MRID No. 420580-02.

REVIEW SUMMARY

These studies were reviewed and categorized by the Ecological Effects Branch as follows:

Guide. Ref. #	Test Species	% a.i.	Test Type	Test Result	Study Status	MRID No.
72-1(a)	Lepomis macrochirus	94.9	Acute Flow Through	LC50= 142 µg/L	Core	420580 -01
72-1(c)	Oncorhynchus mykiss	94.9	Acute Flow Through	LC50= 94 µg/L	Core	420580 -02

Included is the Data Evaluation Record for the above studies. It should be noticed that the water quality analysis was done 8 months before the studies were effected. If you have any questions, please contact Concepción Rodríguez at 308-2805 of Henry Craven at 305-5320.

3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

MEMORANDUM

To: Barbara Briscoe, PM 51
Generic Chemical Support Branch
Reregistration Division

From: Douglas Urban, Acting Chief Branch
Ecological Effects Branch
Environmental Fate and Effect Division
(H7507C)

JAN 23 1992

Subject: Review of studies for Methyl Isothiocyanate

BACKGROUND

Nor-Am Chemical Company has submitted the following studies as part of the reregistration process of methyl isothiocyanate:

Schupner, J.K. and B.J. Stachura, 1991. The Acute Toxicity of MITC Technical to Bluegill Sunfish (Lepomis macrochirus). MRID No. 420580-01.

Schupner, J.K. and B.J. Stachura, 1991. The Acute Toxicity of MITC Technical to Rainbow Trout (Oncorhynchus mykiss). MRID No. 420580-02.

REVIEW SUMMARY

These studies were reviewed and categorized by the Ecological Effects Branch as follows:

Guide. Ref. #	Test Species	% a.i.	Test Type	Test Result	Study Status	MRID No.
72-1(a)	Lepomis macrochirus	94.9	Acute Flow Through	LC50= 142 µg/L	Core	420580 -01
72-1(c)	Oncorhynchus mykiss	94.9	Acute Flow Through	LC50= 94 µg/L	Core	420580 -02

Included is the Data Evaluation Record for the above studies. It should be noticed that the water quality analysis was done 8 months before the studies were effected. If you have any questions, please contact Concepción Rodríguez at 308-2805 of Henry Craven at 305-5320.

CONCURRENCES

SYMBOL	7507C	7507C	7507C					
SURNAME	C. Rodriguez	Craven						
DATE	1/17/92	1/17/92	1/23/92					

4

EPA Form 1320-1 (12-70)
U.S. GOVERNMENT PRINTING OFFICE: 1991 0—867-079

Printed on Recycled Paper

OFFICIAL FILE COPY

DATA EVALUATION RECORD

1. **CHEMICAL:** Methyl isothiocyanate.
Shaughnessey No. 068103.

2. **TEST MATERIAL:** Methyl isothiocyanate technical (isothiocyanatomethane); Batch No. 5902; 94.9% active ingredient; a yellow-orange solid.

3. **STUDY TYPE:** Freshwater Fish Acute Flow-Through Toxicity Test. Species Tested: Bluegill Sunfish (*Lepomis macrochirus*).

4. **CITATION:** Schupner, J.K. and B.J. Stachura. 1991. The Acute Toxicity of MITC Technical to Bluegill Sunfish, *Lepomis macrochirus*, in a Flow Through System. Laboratory Project ID No. 501AF. Prepared and submitted by NOR-AM Chemical Company, Pikeville, NC. EPA MRID No. 420580-01.

5. **REVIEWED BY:**

Mark A. Mossler, M.S.
Associate Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: Mark Mossler
Date: 1/6/92

6. **APPROVED BY:**

Pim Kosalwat, Ph.D.
Senior Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: P. Kosalwat
Date: 1/9/92

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

Signature: Henry T. Craven
Date: 1/17/92
Concepcion Rodrigues 1/17/92

7. **CONCLUSIONS:** This study is scientifically sound and meets the guideline requirements for a flow-through freshwater fish toxicity study. The 96-hour LC_{50} of 142 µg/l (based on mean measured concentrations) classifies MITC as highly toxic to bluegill. The NOEC was 88 µg/l.

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 Aquatic Research Organisms in Hampton, NH. The fish (approximately 4 months old) were maintained in well water in a flow-through system and were fed salmon starter *ad libitum*.

Fish were acclimated to the test temperature and dilution water for 5 days and feeding was discontinued 75 hours before test initiation. No mortality occurred during acclimation. Mean weight and length of control fish taken at test termination were 0.608 ±0.16 g and 29 ±2.0 mm. Biomass loading rate was 0.608 g/l.

B. Test System: The test was conducted using a proportional diluter. Test chambers were 12-liter glass aquaria (24.2 x 19.2 x 26.4 cm), each containing 10 l of test solution. The depth of the solution was 21.5 cm. The aquaria were covered with glass sheets to prevent evaporation and entry of foreign material.

The laboratory environment was maintained on a 16-hour daylight photoperiod (115 foot candles) with a dawn/dusk simulation period. The test aquaria were maintained at 22 ±1°C in a water bath. The test system was calibrated prior to test initiation. The test was initiated after the system had been in operation for one day.

A 5.04 mg/ml diluter stock solution was prepared in acetone. The diluter delivered 550 ml of test solution, solvent control, or control water to each aquarium at an average rate of 144 times per day over the course of the study which resulted in the equivalent of 8.6 volume additions per chamber per day. Soft blended water (a mixture of well water and deionized water) was used as the dilution water (Appendix II, attached).

C. Dosage: Ninety-six-hour flow-through test. Based on a range-finding test, five nominal concentrations (64.8, 108, 180, 300, and 500 µg/l) of methyl isothiocyanate (MITC), a dilution water control and a solvent control (0.1 ml acetone/l) were used.

D. Design: Ten bluegill were randomly distributed to each aquarium (two replicate aquaria per concentration or control). Test chambers were randomly positioned in the water bath.

Observations of mortality and sublethal responses were made every 24 hours. The temperature, dissolved oxygen (D.O.), pH, and specific conductance were measured in all test chambers at 0, 48, and 96 hours. Temperature was also monitored continuously in the water bath.

MITC concentrations were measured by gas chromatography from samples taken at test initiation and termination from the controls and test concentrations.

E. **Statistics:** The median lethal concentration (LC_{50}) and associated 95% confidence interval (C.I.) for each 24-hour interval were calculated using a computer program that employs the binomial, moving average, and probit methods. The slope of the dose-response was calculated by least squares linear regression of the percent mortality vs. the log of the dose.

12. **REPORTED RESULTS:** The mean measured concentrations of MITC were 48, 88, 157, 250, and 398 µg/l. These values represent 81 ±5% of nominal concentrations (Table 3, attached).

The responses of bluegill are given in Table 1 (attached). The 96-hour LC_{50} based on mean measured concentrations was 142 µg/l (95% C.I. = 88-250 µg/l). The slope of the dose-response curve was given as 2.2 (calculated by least squares regression). The no-observed-effect concentration (NOEC) was 88 µg/l.

All dissolved oxygen readings were ≥83% of saturation. The pH values ranged from 6.3 to 7.1. The temperature was 22.1-22.9°C throughout the test. Conductivity ranged from 40 to 50 µmhos/cm.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** The authors presented no conclusions other than those stated.

Quality Assurance and Good Laboratory Practice Regulation Statements were included in the report, indicating that the study was conducted in accordance with FIFRA Good Laboratory Practice Standards set forth in 40 CFR Part 160.

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

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

Fish were acclimated for a shorter period (5 days) than recommended (2 weeks).

It was not stated if the diluter system was checked twice daily.

Loading was higher (0.608 g/L) than recommended (0.5 g/L.

B. **Statistical Analysis:** The reviewer used EPA's Toxanal program to calculate the LC_{50} value and obtained the same results (see attached printout). The NOEC was determined to be 88 µg/l based on the lack of mortality and sublethal effects.

C. **Discussion/Results:** The food analysis indicated some detectable mercury, heptachlor epoxide, and delta-BHC. However, these amounts were low and probably did not influence the results.

This study is scientifically sound and meets the guideline requirements for a flow-through freshwater fish toxicity study. The 96-hour LC_{50} of 142 µg/l (based on mean measured concentrations) classifies MITC as highly toxic to bluegill. The NOEC was 88 µg/l.

D. **Adequacy of the Study:**

(1) **Classification:** Core.

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

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

15. **COMPLETION OF ONE-LINER FOR STUDY:** Yes, 12-9-91.

8

Fish were acclimated for a shorter period (5 days) than recommended (2 weeks).

It was not stated if the diluter system was checked twice daily.

Loading was higher (0.608 g/L) than recommended (0.5 g/L.

B. **Statistical Analysis:** The reviewer used EPA's Toxanal program to calculate the LC_{50} value and obtained the same results (see attached printout). The NOEC was determined to be 88 µg/l based on the lack of mortality and sublethal effects.

C. **Discussion/Results:** The food analysis indicated some detectable mercury, heptachlor epoxide, and delta-BHC. However, these amounts were low and probably did not influence the results.

The well water analysis included in this report is dated as October 1, 1990, while this study was done during June, 1991. There is an 8 months period between the study and the water analysis. Water quality analysis should be done every six months.

This study is scientifically sound but does not meets the guideline requirements for a flow-through freshwater fish toxicity study. The 96-hour LC_{50} of 142 µg/l (based on mean measured concentrations) classifies MITC as highly toxic to bluegill. The NOEC was 88 µg/l.

D. **Adequacy of the Study:**

(1) **Classification:** Core

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

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

15. **COMPLETION OF ONE-LINER FOR STUDY:** Yes, 12-9-91.

9

Fish were acclimated for a shorter period (5 days) than recommended (2 weeks).

It was not stated if the diluter system was checked twice daily.

B. **Statistical Analysis:** The reviewer used EPA's Toxanal program to calculate the LC_{50} value and obtained the same results (see attached printout). The NOEC was determined to be 88 µg/l based on the lack of mortality and sublethal effects.

C. **Discussion/Results:** The food analysis indicated some detectable mercury, heptachlor epoxide, and delta-BHC. However, these amounts were low and probably did not influence the results.

This study is scientifically sound and meets the guideline requirements for a flow-through freshwater fish toxicity study. The 96-hour LC_{50} of 142 µg/l (based on mean measured concentrations) classifies MITC as highly toxic to bluegill. The NOEC was 88 µg/l.

D. **Adequacy of the Study:**

(1) **Classification:** Core.

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

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

15. **COMPLETION OF ONE-LINER FOR STUDY:** Yes, 12-9-91.

METHYL ISOTHIOCYANATE

Page_____ is not included in this copy.

Pages 11 through 14 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.

X FIFRA registration data.

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

____ The document is not responsive to the request.

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.

MOSSLER MITC LEPOMIS MACROCHIRUS 12-9-91

****

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
398	20	20	100	9.536742E-05
250	20	20	100	9.536742E-05
157	20	13	65	13.1588
88	20	0	0	9.536742E-05
48	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT 88 AND 250 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 141.7256

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.

****

Data derived from Tables 1+3 (attached)

Shaughnessey # 068103 Chemical Name Methyl isothiocyanate Chemical Class _____ Page 1 of 1

Study/Species/Lab/ MRID #	Chemical % a.i.	Results	Reviewer/ Date	Validation Status
48-Hour EC_{50}	_____	EC_{50} = ~~---~~ pp (95% C.L.) Control Mortality (%) = Solvent Control Mortality (%) = Species: Slope = # Animals/Level = Temperature = Lab: 48-Hour Dose Level pp /(% Effect) ( ), ( ), ( ), ( ), ( ) MRID # Comments:	_____	_____

96-Hour LC_{50}	94.9%	LC_{50} = 142 ~~pp~~ µg/l * (95% C.L. 88-250) binomial/prob. Control Mortality (%) = 0%
		 Solvent Control Mortality (%) = 0%
		 Species: *Ceponis macrochirus*
		 Slope = 2.25 determined from least squares regression # Animals/Level = 20
		 Temperature = 22±1°C
		 Lab: NOR-AM
		 96-Hour Dose Level µg/l * /(% Mortality)
		 48 (0), 88 (0), 157 (65), 250 (100), 398 (100)
		 MRID # 420580-01
		 Comments: * Based on mean measured concentrations
		 NOEC = 88 µg/l *
			H. Mossler 12/9/91	Core

(5)

DATA EVALUATION RECORD

1. **CHEMICAL:** Methyl isothiocyanate.
Shaughnessey No. 068103.

2. **TEST MATERIAL:** Methyl isothiocyanate technical (isothiocyanatomethane); Batch No. 5902; 94.9% active ingredient; a yellow-orange solid.

3. **STUDY TYPE:** Freshwater Fish Acute Flow-Through Toxicity Test. Species Tested: Rainbow Trout (*Oncorhynchus mykiss*).

4. **CITATION:** Schupner, J.K. and B.J. Stachura. 1991. The Acute Toxicity of MITC Technical to Rainbow Trout, *Oncorhynchus mykiss*, in a Flow Through System. Laboratory Project ID No. 502AF. Prepared and submitted by NOR-AM Chemical Company, Pikeville, NC. EPA MRID No. 420580-02.

5. **REVIEWED BY:**

Mark A. Mossler, M.S.
Associate Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: Mark A. Mossler
Date: 1/8/92

6. **APPROVED BY:**

Pim Kosalwat, Ph.D.
Senior Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: P. Kosalwat
Date: 1/9/92

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

Signature: Henry T. Craven 1/17/92
Date: Concepcion Rodriguez 1/17/92

7. **CONCLUSIONS:** This study is scientifically sound and meets the guideline requirements for a flow-through freshwater fish toxicity study. The 96-hour LC_{50} of 94 µg/l (based on mean measured concentrations) classifies MITC as very highly toxic to rainbow trout. The NOEC was 40 µg/l.

8. **RECOMMENDATIONS:** N/A.

9. **BACKGROUND:**

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

11. MATERIALS AND METHODS:

A. Test Animals: Rainbow trout (*Oncorhynchus mykiss*) were obtained from Aquatic Research Organisms in Hampton, NH. The fish (approximately 3 months old) were maintained in well water in a flow-through system and were fed salmon starter *ad libitum*.

Fish were acclimated to the test temperature and dilution water and feeding was discontinued 52 hours before test initiation. No mortality occurred during acclimation. Mean weight and length of control fish taken at test termination were 0.64 ±0.20 g and 34 ±3.2 mm. Biomass loading rate was 0.64 g/l.

B. Test System: The test was conducted using a proportional diluter. Test chambers were 12-liter glass aquaria (24.2 x 19.2 x 26.4 cm), each containing 10 l of test solution. The depth of the solution was 21.5 cm. The aquaria were covered with glass sheets to prevent evaporation and entry of foreign material.

The laboratory environment was maintained on a 16-hour daylight photoperiod (150 foot candles) with a dawn/dusk simulation period. The test aquaria were maintained at 12 ±1°C in a water bath. The test system was calibrated prior to test initiation. The test was initiated after the system had been in operation for one day.

A 5.04 mg/ml diluter stock solution was prepared in acetone. The diluter delivered 550 ml of test solution, solvent control, or control water to each aquarium at an average rate of 144 times per day over the course of the study which resulted in the equivalent of 8.6 volume additions per chamber per day. Soft blended water (a mixture of well and deionized water) was used as the dilution water (Appendix II, attached).

C. Dosage: Ninety-six-hour flow-through test. Based on a range-finding test, five nominal concentrations (32, 54, 90, 150, and 250 µg/l) of methyl isothiocyanate (MITC), a dilution water control and a solvent control (0.1 ml acetone/l) were used.

D. Design: Ten trout were randomly distributed to each aquarium (two replicate aquaria per concentration or control). Test chambers were randomly positioned in the water bath.

Observations of mortality and sublethal responses were made every 24 hours. The temperature, dissolved oxygen (D.O.), pH, and specific conductance were measured in all test chambers at 0, 48, and 96 hours. Temperature was also monitored continuously in the water bath.

MITC concentrations were measured by gas chromatography from samples taken at test initiation and termination from the controls and test concentrations.

E. **Statistics:** The median lethal concentration (LC_{50}) and associated 95% confidence interval (C.I.) for each 24-hour interval were calculated using a computer program that employs the binomial, moving average, and probit methods. The slope of the dose-response was calculated by least squares linear regression of the percent mortality vs. the log of the dose.

12. **REPORTED RESULTS:** The mean measured concentrations of MITC were 26, 40, 78, 131, and 210 µg/l. These values represent 83 ±5% of nominal concentrations (Table 3, attached).

The responses of trout are given in Table 1 (attached). The 96-hour LC_{50} based on mean measured concentrations was 94 µg/l (95% C.I. = 78-131 µg/l). The slope of the dose-response curve was given as 1.9 (calculated by least squares regression). The no-observed-effect concentration (NOEC) was 40 µg/l.

All dissolved oxygen readings were ≥75% of saturation. The pH values ranged from 6.2 to 6.5. The temperature was 11.3-13.2°C throughout the test. Conductivity was 80 µmhos/cm throughout the test.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** The authors presented no conclusions other than those stated.

Quality Assurance and Good Laboratory Practice Regulation Statements were included in the report, indicating that the study was conducted in accordance with FIFRA Good Laboratory Practice Standards set forth in 40 CFR Part 160.

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

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

The temperature in the water bath deviated by more than 1°C over the course of the study.

Fish were acclimated for a shorter period (52 hours) than recommended (2 weeks).

It was not stated if the diluter system was checked twice daily.

B. **Statistical Analysis:** The reviewer used EPA's Toxanal program to calculate the LC_{50} value and obtained the same results (see attached printout). The NOEC was determined to be 40 µg/l based on the lack of mortality and sublethal effects.

C. **Discussion/Results:** The food analysis indicated some detectable mercury, heptachlor epoxide, and delta-BHC. However, these amounts were low and probably did not influence the results.

The well water analysis included in this report is dated as October 1, 1990, while this study was done during June, 1991. There is an 8 months period between the study and the water analysis. Water quality analysis should be done every six months.

This study is scientifically sound and meets the guideline requirements for a flow-through freshwater fish toxicity study. The 96-hour LC_{50} of 94 µg/l (based on mean measured concentrations) classifies MITC as very highly toxic to rainbow trout. The NOEC was 40 µg/l.

D. **Adequacy of the Study:**

(1) **Classification:** Core

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

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

15. **COMPLETION OF ONE-LINER FOR STUDY:** Yes, 12-10-91.

The temperature in the water bath deviated by more than 1°C over the course of the study.

Fish were acclimated for a shorter period (52 hours) than recommended (2 weeks).

It was not stated if the diluter system was checked twice daily.

B. **Statistical Analysis:** The reviewer used EPA's Toxanal program to calculate the LC_{50} value and obtained the same results (see attached printout). The NOEC was determined to be 40 µg/l based on the lack of mortality and sublethal effects.

C. **Discussion/Results:** The food analysis indicated some detectable mercury, heptachlor epoxide, and delta-BHC. However, these amounts were low and probably did not influence the results.

This study is scientifically sound and meets the guideline requirements for a flow-through freshwater fish toxicity study. The 96-hour LC_{50} of 94 µg/l (based on mean measured concentrations) classifies MITC as very highly toxic to rainbow trout. The NOEC was 40 µg/l.

D. **Adequacy of the Study:**

(1) **Classification:** Core.

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

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

15. **COMPLETION OF ONE-LINER FOR STUDY:** Yes, 12-10-91.

METHYL ISOTHIOCYANATE

Page_____ is not included in this copy.

Pages 22 through 25 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.

X FIFRA registration data.

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

____ The document is not responsive to the request.

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.

MOSSLER MITC ONCORHYNCHUS MYKISS 12-10-91

****

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
210	20	20	100	9.536742E-05
131	20	20	100	9.536742E-05
78	20	3	15	.1288414
40	20	0	0	9.536742E-05
26	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT 78 AND 131 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 93.58413

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.

****

Raw data derived (Tables 1 & 3) - attached

Shaughnessey # 068103 Chemical Name Methyl isothiocyanate Chemical Class _____ Page 1 of 1

Study/Species/Lab/ MRID #	Chemical % a.i.	Results	Reviewer/ Date	Validation Status
48-Hour EC_{50}	_____	EC_{50} = pp (95% C.L.) Control Mortality (%) = Solvent Control Mortality (%) =		
Species:		Slope = # Animals/Level = Temperature =		
Lab:		48-Hour Dose Level pp /(% Effect) ( ), ( ), ( ), ( ), ( )		
MRID #		Comments:		
96-Hour LC_{50}	94.9 %	LC_{50} = 94 mg/l* (95% C.L. 78-131) - binomial/prob. Control Mortality (%) = 0% Solvent Control Mortality (%) = 0%		
Species: Oncorhynchus mykiss		Slope = 1.9 *determined by least squares regression # Animals/Level = 20 Temperature = 12±1°C		
Lab: NOR-AM		96-Hour Dose Level mg/l* /(% Mortality) 26 (0), 40 (0), 78 (15), 131 (100), 210 (100)	M. Mossler 12/10/91	Core
MRID # 420580-02		Comments: NOEC = 40 mg/l* *Based on measured concentrations.		