

MEMO

March 5, 1985

Subject: Meeting between EAB and FMC Representatives on
FMC 57020 (Command Herbicide) Environmental Fate Data

Attendants: S. Creeger, S. Hong/EAB
J. Yowell/RD
R. Robinson, R. Cook, S. Witkonton, J. Wu, E. Cuirle,
J. Lauber/FMC

Place: Marriott 914

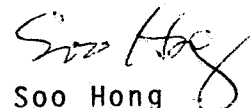
Time: 10:00 am - 12:30 pm, March 5, 1985

FMC presented responses on the comments in the 11/23/84 review.

The following agenda was discussed in the meeting:

- o Aqueous photolysis
- o Soil photolysis
- o Mobility of FMC 57020 Residue in soil
- o FMC 57020 soil mobility
- o Fish accumulation
- o Crop rotation

Their official response has been submitted to the Agency, but not yet reviewed.


Soo Hong

XT 362

FMC Corporation

2000 North 19th Avenue
P.O. Box 1000
Denver, Colorado 80202
(303) 750-1000

RM. 229

FMC

February 25, 1985

Mr. James Yowell (Team 25)
U.S. Environmental Protection Agency
Office of Pesticide Programs
Registration Division (TS-767-C)
Crystal Mall, Building 2
Room 251
1921 Jefferson Davis Highway
Arlington, VA 22202

Marriott

Rm 914

Dear Mr. Yowell:

Subject: Command Herbicide
279-GNLE, -GNLG, -GNLU

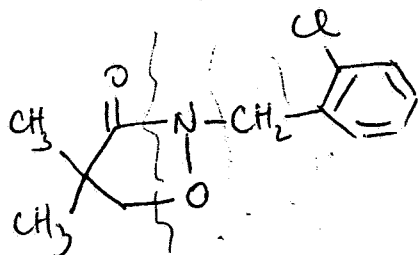
This is to confirm that a meeting between the EPA-OPP/
Exposure Assessment Branch and FMC Corporation is arranged
for Tuesday, March 5, 1985 (10:00 AM) at Crystal Mall,
Building 2. A list of attendees and the agenda are
attached. At your earliest convenience, please notify us
of the room number.

Thank you for your time and kind cooperation in making
these arrangements.

Sincerely,

Eunice M. Cuirle
Eunice M. Cuirle
Registration Specialist

cc: S. Creeger/M. Lorber/S. Hong/R. Robinson/R. Cook/S.
Witkonton/J. Wu



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MEETING BETWEEN FMC CORPORATION
AND
EPA - OPP/EXPOSURE ASSESSMENT BRANCH

DATE: March 5, 1985
TIME: 10:00 AM
LOCATION: EPA Offices, Crystal Mall, Building 2,
Room No. (to be announced)

PURPOSE:

1. To discuss FMC's 2/1/85 response (EPA Accession No. 256508) to the 11/23/84 EAB review of FMC 57020 (Command Herbicide) (EPA Accession No. 256508) and to determine whether the response has satisfactorily addressed the Agency's concerns.
2. To determine whether additional data will be required.

ATTENDEES:

Samuel Creeger, EPA - Hazard Evaluation Division/EAB,
Section I-Chief
Soobok Hong, EPA - HED/EAB
M. Lorber, EPA - HED/EAB
James Yowell, EPA - Registration Division, Team 25

Robert Robinson, FMC - Metabolism Manager
Ronald Cook, FMC - Residue Analysis Manager
Sujit Witkonton, FMC
Jinn Wu, FMC
Eunice Cuirle, FMC
John J. Lauber, FMC Manager, Product Registrations

AGENDA

1. Aqueous Photolysis
2. Soil Photolysis
3. Mobility of FMC 57020 Residue in Soil
4. FMC 57020 Soil Mobility - PESTANS Modeling
5. Dissipation of FMC 57020 Residues in Soil
6. Fish Accumulation
7. Crop Rotation - 9 Months vs. 10 Months

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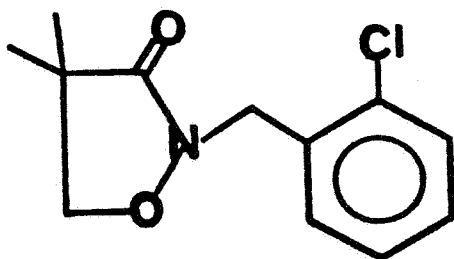
COMMAND^R HERBICIDE

CHEMICAL NAME: 2-(2-CHLOROPHENYL)METHYL-4,4-DI-METHYL-3-ISOXAZOLIDINONE

COMMON NAME: DIMETHAZONE (PROPOSED)

**PRODUCTS: COMMAND TECHNICAL
COMMAND 4 EC
COMMAND 6 EC**

CHEMICAL STRUCTURE:



2640A20005ARS

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-3/5/85

COMMAND^R HERBICIDE

CROP: SOYBEANS

PROPOSED USE:

- O 1.25 LB. AI/ACRE (MAXIMUM)**
- O PREEMERGENCE SURFACE APPLIED OR PREPLANT INCORPORATED
TREATMENT FOR THE CONTROL OF MANY ANNUAL AND
BROADLEAF WEEDS.**
- O TANK-MIX WITH:**
 - LEXONE^R**
 - LOROX^R**
 - ROUNDUP^R**
 - SENCOR^R**

REGISTRATION ACTIVITIES

RE: EXPERIMENTAL USE PERMITS

- 1/25/85 - TEMPORARY TOLERANCE ESTABLISHED FOR 0.05 PPM
ON SOYBEANS
- 279-EUP-93 - 2/8/85 -
 - 0 14,860 ACRES
 - 0 29 STATES

RE: REGISTRATION

- 8/4/84 - REGISTRATION APPLICATION/TOLERANCE PETITION
SUBMITTED
- 12/14/84 - ENVIRONMENTAL FATE REVIEW RECEIVED
- 2/1/85 - FMC RESPONSE TO ENVIRONMENTAL FATE REVIEW
SUBMITTED

ISSUES FOR DISCUSSION

- O AQUEOUS PHOTOLYSIS
- O SOIL PHOTOLYSIS
- O MOBILITY OF FMC 57020 RESIDUES IN SOIL
- O FMC 57020 SOIL MOBILITY - PESTANS MODELING
- O DISSIPATION OF FMC 57020 RESIDUES IN SOIL
- O FISH ACCUMULATION
- O CROP ROTATION - 9 MONTHS VS. 10 MONTHS

AQUEOUS PHOTOLYSIS

A. EPA CONCERN #1:

HALF-LIVES WERE NOT DERIVED IN A CONSISTENT MANNER

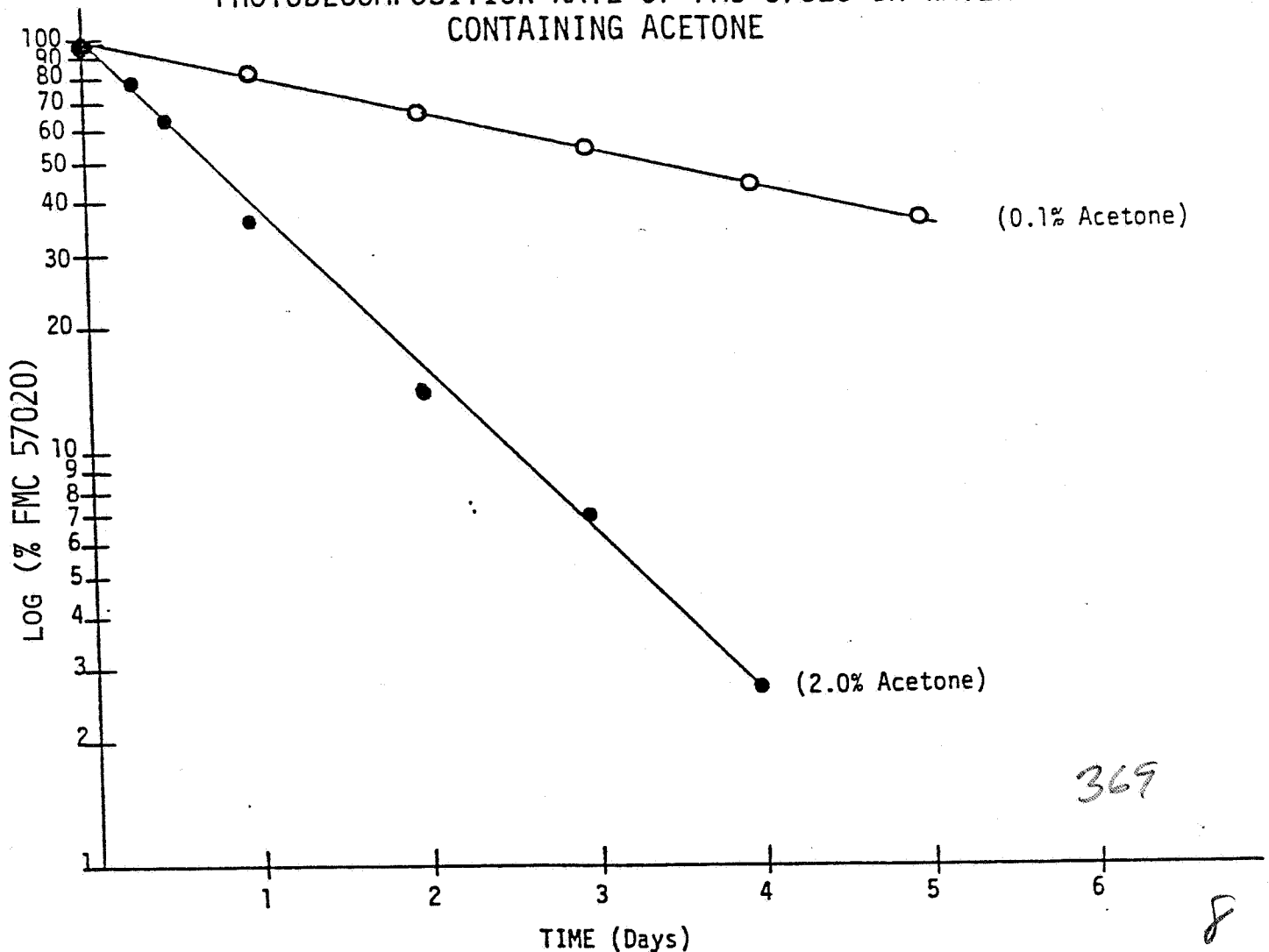
B. PETITIONER'S RESPONSE:

- ORIGINAL GRAPH CALCULATIONS WERE BASED ON

1. OBSERVED FIRST-ORDER KINETICS FOR SENSITIZED SOLUTION

FIGURE 3

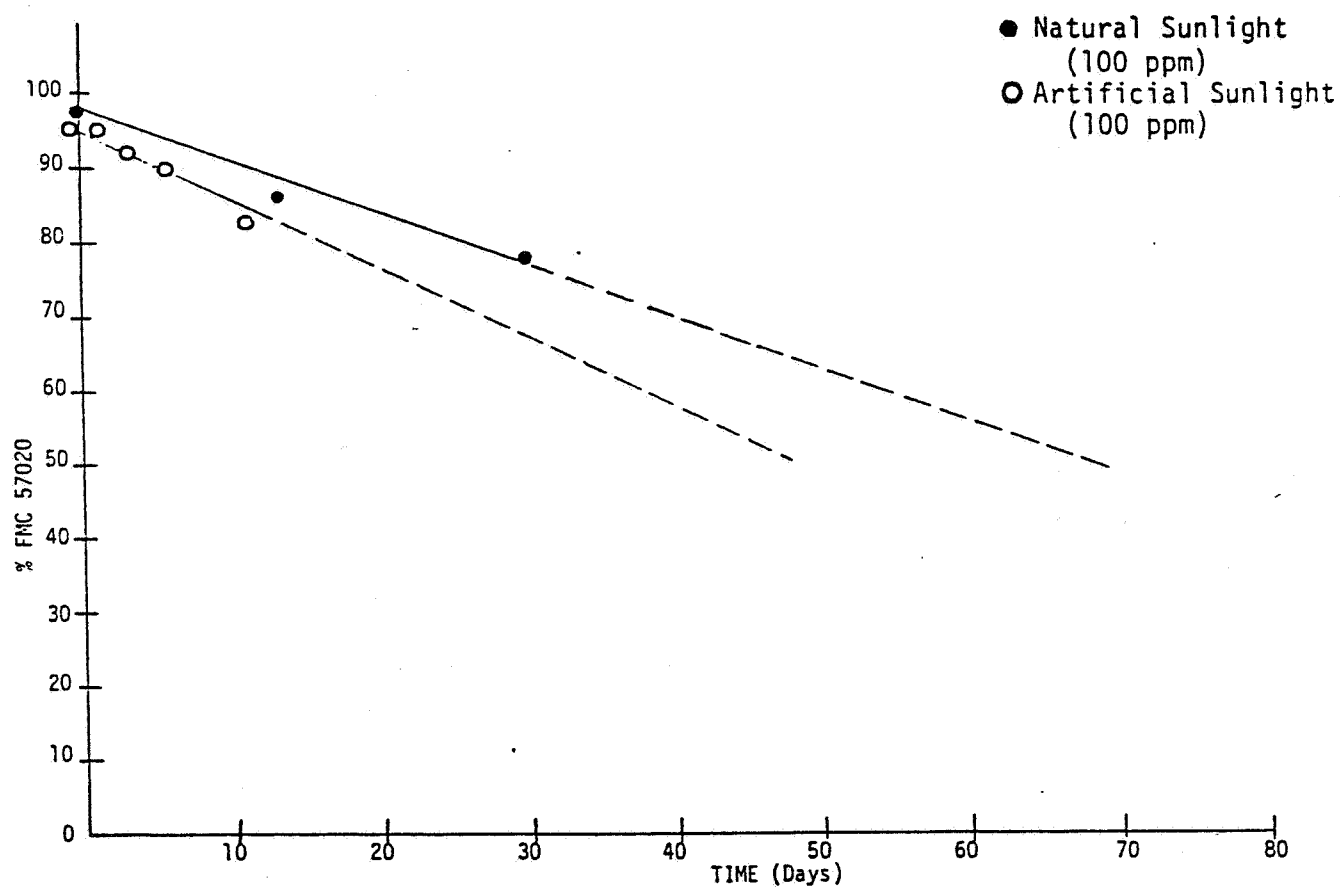
PHOTODECOMPOSITION RATE OF FMC 57020 IN WATER CONTAINING ACETONE



2. OBSERVED ZERO-ORDER KINETICS FOR
NON-SENSITIZED SOLUTION

FIGURE 2

PHOTODECOMPOSITION OF FMC 57020 IN WATER
EXPOSED TO NATURAL AND ARTIFICIAL LIGHT



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• REVISED HALF-LIFE ESTIMATES

1. ASSUMING ALL SOLUTION TEST DATA ARE FIRST-ORDER KINETICS
2. USING TI-58C PROGRAMMABLE CALCULATOR FOR SIMPLE LINEAR REGRESSION ANALYSES
3. HALF-LIVES WERE DERIVED FROM THE FOLLOWING FORMULA:

$$T_{1/2} = \frac{0.693}{K_p}$$

C. RESULTS:

SUMMARY OF PHOTOCHEMICAL HALF-LIVES OF FMC 57020 IN WATER

	RING- ¹⁴ C	METHYLENE- ¹⁴ C			
	(OUTDOOR TEST)	(INDOOR TEST)			
TEST NUMBER	-	#6	#1	#4	#5
FMC 57020 CONC. (PPM)	100	100	1	1	1
ACETONE CONC. (%)	0	0	0	2.0	0.1
EAB HALF-LIFE (DAYS)	87.1	70.2	60.6	1	3.8
FMC HALF-LIFE (DAYS)	87.1	70.3	63	0.9	3.5
SLOPE (K _p)	7.9x10 ⁻³	9.8x10 ⁻³	1.1x10 ⁻²	7.68x10 ⁻¹	1.99x10 ⁻¹
R ²	0.978	0.987	0.994	0.980	0.998

RESULTS ARE CONSISTENT WITH THOSE
CALCULATED BY EPA

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A. EPA CONCERN #2:

RADIOACTIVITY RECOVERIES NOT REPORTED

B. PETITIONER'S RESPONSE:

- RADIOACTIVITY RECOVERIES WERE CALCULATED BASED

ON THE FOLLOWING FORMULA:

$$\text{RECOVERY} = \frac{\text{RADIOACTIVITY AT TIME T}}{\text{RADIOACTIVITY AT TIME 0}}$$

C. RESULTS:

SUMMARY OF % ¹⁴C RECOVERY FROM SOLUTION PHOTOLYSIS

Tests	Days of Exposure										
	0	1/3	1/2	1	2	3	4	5	7	14	30
OUTDOOR TESTS											
Irradiated	100	-	-	-	-	-	-	-	-	103.4	83.5
Dark Control	100	-	-	-	-	-	-	-	-	-	83.6
INDOOR TESTS											
#1 Non-sensitized	100	-	-	97.8	-	93.6	-	-	67.3	78.1	-
#4 } Sensitized	100	95.9	91.3	89.7	78.6	72.6	65.9	61.9	54.4	-	-
#5 } Non-sensitized	100	103.0	96.1	94.3	91.5	85.9	84.2	74.9	68.9	-	-
#6 Non-sensitized	100	-	-	85.4	-	82.3	-	-	71.1	75.6	-
#2 } Dark Control	100	-	-	-	-	-	-	-	-	76.6	-
#3 } Dark Control	100	-	-	-	-	-	-	-	71.1	-	-

SOIL PHOTOLYSIS

A. EPA CONCERN #1:

VOLATILE COMPOUNDS WERE NOT TRAPPED;
SO, MATERIAL BALANCE WAS POOR

B. PETITIONER'S RESPONSE:

- MATERIAL BALANCE IS ADEQUATE
- LOSS DUE TO VOLATILITY CAN BE CALCULATED
FROM ^{14}C RECOVERY DATA

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TABLE 2
RECOVERY OF FMC 57020 AND DEGRADATES FROM SOIL EXPOSED TO SUNLIGHT

Fractions	% ¹⁴ C Distribution			
	0 Day	14 Day	30 Day	30 Day Control
Methylene Chloride (I + II)				
FMC 57020	95.8	91.4	81.8	94.0
Polar Degradates	(95.6)	(85.2)	(75.1)	(91.4)
Non-Polar Degradates	(0.1)	(3.7)	(3.3)	(1.4)
	(0.1)	(2.5)	(3.4)	(1.2)
Methanol (IV)				
			5.0	4.8
FMC 57020				
Polar Degradates			(3.2)	(4.3)
Non-Polar Degradates			(1.7)	(N/A)
			(0.1)	(N/A)
Aqueous (III)	0.7	1.6	4.9	0.1
Non-Extractable (V)	3.5	7.0	8.3	1.1
Total	100.0	100.0	100.0	100.0
% Recovery of Applied ¹⁴ C	92.7	74.4	71.0	87.0

C. RESULTS:

Loss due to volatility at 14 days - 25.6%

30 days - 29.0%

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A. EPA CONCERN #2:

SOIL WAS NOT STERILIZED; MICROBIAL METABOLISM IS EXPECTED. THE RESULTS FROM THE 30 DAY CONTROL ANALYSIS INDICATE THAT DEGRADATION OF FMC 57020 OCCURRED THROUGH MECHANISMS OTHER THAN PHOTOLYSIS.

B. PETITIONER'S RESPONSE:

- THICKNESS OF SOIL PLATE - 250 MICRON
- AIR-DRIED OVERNIGHT PRIOR TO TREATMENT
- NO WATER WAS ADDED DURING THE TESTING INTERVAL - MOISTURE CONTENT INSUFFICIENT TO PROMOTE MICROBIAL ACTIVITY
- 95.7% OF ^{14}C WAS PARENT COMPOUND AT 30 DAY CONTROL SAMPLE
- SOIL METABOLISM STUDY (SAME SOIL TYPE)
 - 65% FIELD MOISTURE CAPACITY
 - 58.7% OF ^{14}C AS PARENT COMPOUND 28 DAYS AFTER INCUBATION

C. RESULTS:

NO MICROBIAL DEGRADATION WAS OBSERVED IN PHOTODEGRADATION SOIL SAMPLES

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A. EPA CONCERN #3:

THE TEMPERATURE OF SOIL WAS NOT MENTIONED

B. PETITIONER'S RESPONSE:

- SOIL TEMPERATURES (250 μ LAYERS) COULD NOT BE ACCURATELY AND PRECISELY MONITORED
- A SUMMARY OF ENVIRONMENTAL TEMPERATURES ARE PROVIDED

SOLAR ENERGY WEATHER DATA
 WEATHER SURVEY - MONTHLY REPORT
 PSE&G RESEARCH CORPORATION
 ENERGY LABORATORY

CAMDEN JUNE, 1983
 (CALENDAR DAY)

APPENDIX A
 MONTHLY SUMMARY - JUNE
 PSE&G TG040 R04

DAY	SOLAR RADIATION		DEGREE DAYS	TEMPERATURE						AVG REL HUM (%)	AVG TEMP HUM INDEX
	(BTU/Sq. Ft.)			(DEG F)			AVG DEW POINT				
	(HORIZONTAL SURFACE)			MAX DRY BULB	MIN DRY BULB	AVG DEW POINT					
	TOTAL	DIRECT									
1	1386.	715.	671.	2.	63.1	74.	54.	47.	57.	62.	
2	2237.	564.	1673.	0.	64.9	73.	54.	44.	46.	62.	
3	1633.	918.	715.	0.	67.7	78.	56.	52.	56.	65.	
4	929.	789.	140.	0.	68.0	76.	61.	59.	74.	67.	
5	2171.	752.	1419.	0.	72.1	82.	63.	56.	57.	68.	
6	1839.	851.	988.	0.	72.8	85.	61.	60.	64.	70.	
7	1902.	792.	1109.	0.	72.2	79.	67.	55.	55.	68.	
25	2318.	505.	1813.	0.	76.3	83.	69.	46.	35.	69.	
26	2322.	509.	1813.	0.	72.5	83.	60.	47.	40.	67.	
27	2208.	608.	1600.	0.	81.0	93.	68.	63.	54.	75.	
28	737.	623.	114.	0.	75.2	85.	63.	66.	73.	72.	
29	2049.	520.	1529.	0.	67.9	79.	61.	51.	56.	65.	
30	2418.	591.	2027.	0.	69.1	81.	55.	49.	48.	65.	

MONTHLY SUMMARY

TOTAL	54446.*	19437.*	35009.*	5.	72.5	94.	53.	55.	54.	68.
AVERAGE										
EXTREME										

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A. EPA CONCERN #4:

DEGRADATION RATE WAS NEITHER REPORTED NOR CAN BE ESTIMATED. MICROBIAL DEGRADATION MIGHT HAVE BEEN INVOLVED.

B. PETITIONER'S RESPONSE:

- DEGRADATION RATE CAN BE ESTIMATED USING A SIMILAR PROCEDURE AS THAT IN SOLUTION PHOTOLYSIS

C. RESULTS:

- FMC 57020 SOIL PHOTOLYSIS HALF-LIFE SUMMARY

HALF-LIFE (DAYS)	96.7
SLOPE (K _P) ^{1/}	7.2x10 ⁻³
R ² ^{2/}	0.982

^{1/}PHOTOCHEMICAL RATE CONSTANT (DAYS⁻¹)

^{2/}LINEAR CORRELATION COEFFICIENT

- AS INDICATED IN SOIL STERILITY SECTION - NO MICROBIAL DEGRADATION WAS INVOLVED

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A. EPA CONCERN #5:

IDENTIFICATION OF DEGRADATION PRODUCTS WAS NOT DONE

B. PETITIONER'S RESPONSE:

- NO EXTRACTABLE ¹⁴C RESIDUES OTHER THAN PARENT COMPOUND EXCEEDED 4.9%
- SOIL BOUND RESIDUES ≤8.3%
- NO PRODUCT IDENTIFICATION WAS DEEMED NECESSARY IN ACCORDANCE WITH PROCEDURES AND RECOMMENDATIONS DESCRIBED IN SECTION 161-3 OF THE EPA PESTICIDE ASSESSMENT GUIDELINES

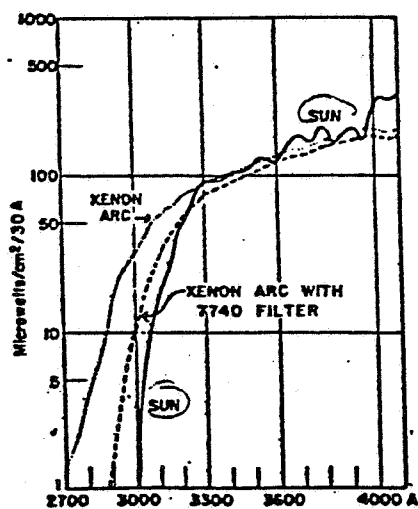
A. EPA CONCERN #6:

THE MYLAR FILM MAY HAVE EXCLUDED THOSE WAVELENGTHS THAT COULD CAUSE PHOTODEGRADATION

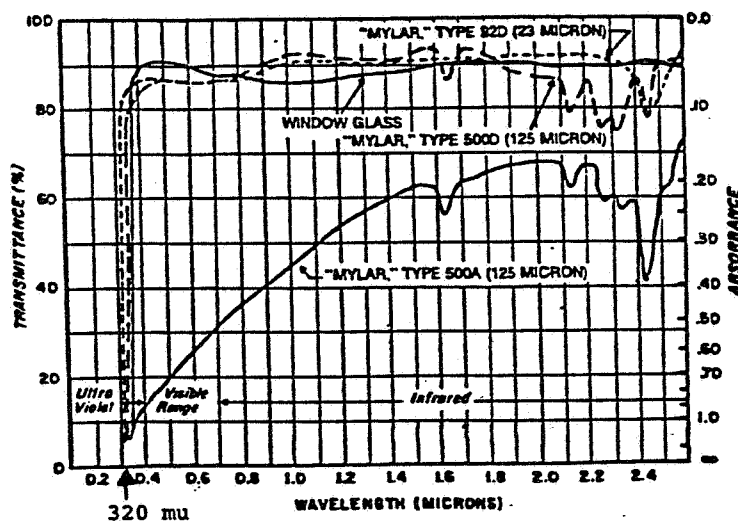
B. PETITIONER'S RESPONSE:

- FMC 57020 SHOWS NO SIGNIFICANT ABSORPTION IN THE REGION OF 290-400 NM
- TYPE 92D (23 U) MYLAR FILM HAS AN ABSORPTION CUT-OFF AT 320 NM
- NATURAL SUNLIGHT HAS HIGHER SPECTRAL ENERGY DISTRIBUTION IN THE RANGE OF 300-400 NM

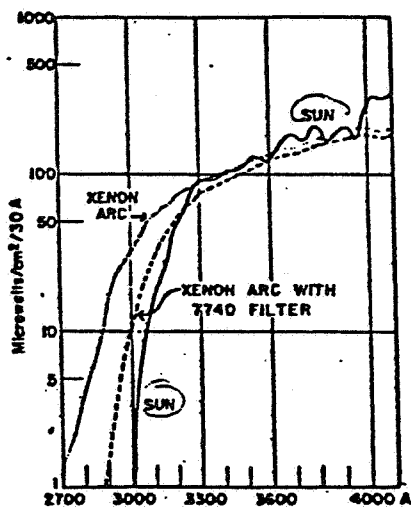
UV SPECTRAL ENERGY OF NATURAL SUNLIGHT



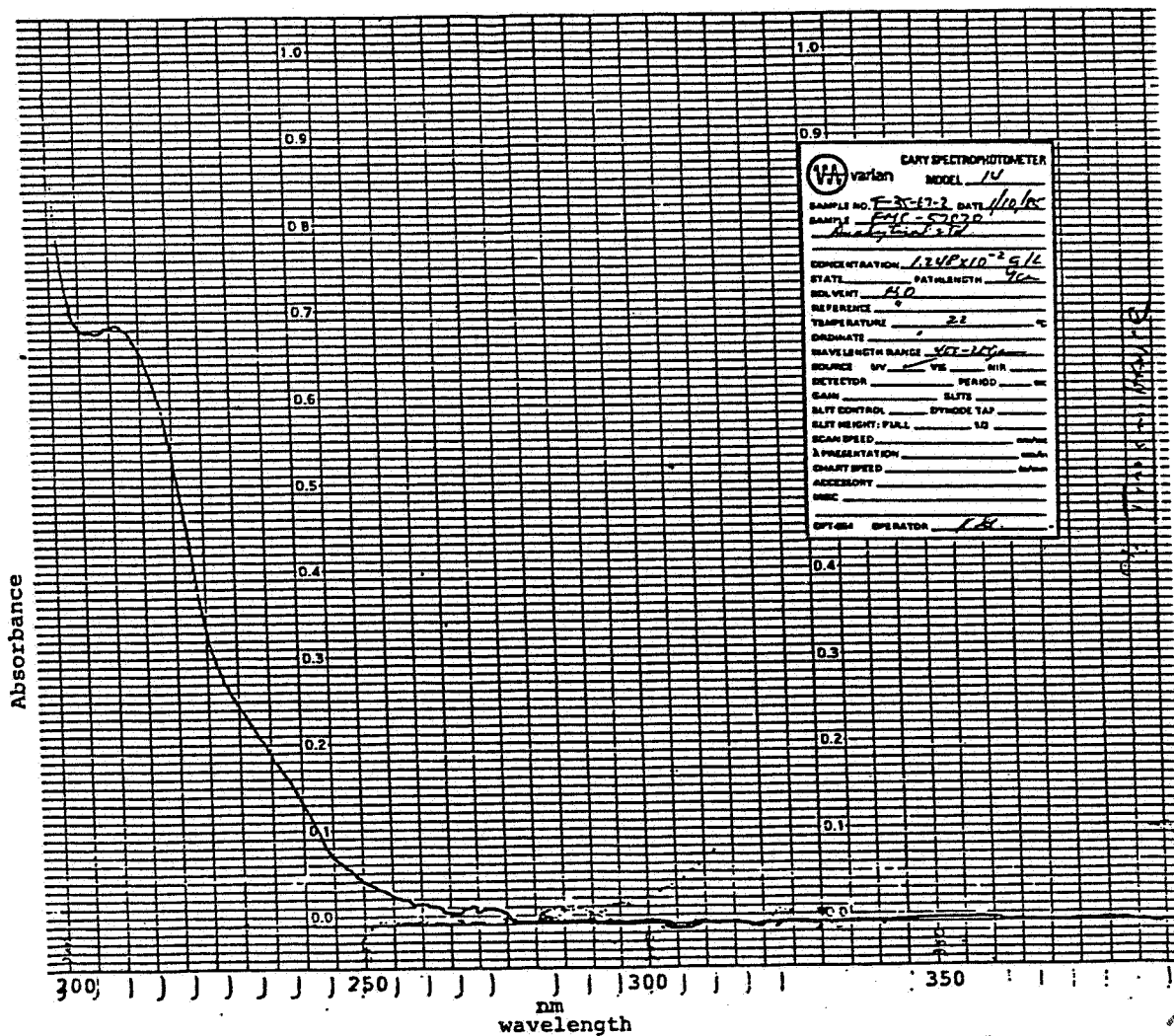
ABSORPTION SPECTRUM FOR MYLAR FILM (LOW RANGE)



UV SPECTRAL ENERGY OF NATURAL SUNLIGHT



FMC 57020 UV SPECTRUM IN WATER



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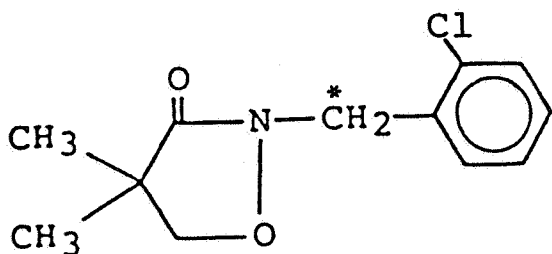
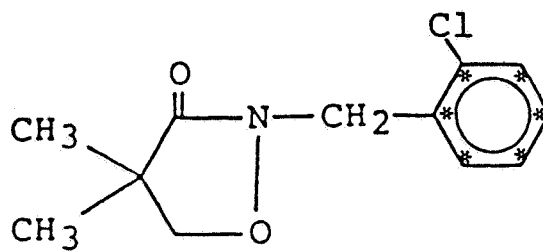
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- LEVELS OF MOLECULAR EXCITATION, NECESSARY IN PHOTOCHEMICAL DECOMPOSITION OF ORGANIC CHEMICALS, CAN BE CORRELATED WITH DEGREE OF UV ABSORPTION
- THEREFORE, PHOTODECOMPOSITION WOULD BE NEGLIGIBLE IN THE SUNLIGHT UV REGION (300-400 NM) OF INTEREST

FISH ACCUMULATION

A. EPA COMMENTS

- METHYLENE-¹⁴C FMC 57020 USED IN THE STUDY.
AROMATIC PORTION OF COMPOUND MAY NOT BE
ADEQUATELY MONITORED. WOULD RESULTS BE
MORE OR LESS THE SAME USING RING-¹⁴C FMC 57020?

METHYLENE-¹⁴C FMC 57020RING-¹⁴C FMC 57020*DENOTES ¹⁴C-LABEL

- STUDIES NOT ACCEPTABLE BUT MAY BE ACCEPTABLE
DEPENDING ON ADEQUATE EXPLANATION OF LABELING
POSITION

B. PETITIONER'S RESPONSE:

USE OF METHYLENE- ^{14}C FMC 57020 ADEQUATE FOR
STUDY OF AROMATIC MOIETY IN FISH BASED ON OBSERVED
METABOLIC STABILITY OF THE PRODUCT IN RAT.

STABILITY ASSESSMENT

MATERIAL BALANCE

PRODUCT IDENTIFICATION

- MATERIAL BALANCE (RAT)
 - QUANTITATIVE RECOVERY OF ^{14}C IN
URINE AND FECES (98-100%)
 - NO SIGNIFICANT $^{14}\text{CO}_2$ EVOLUTION (<0.01%)
 - DATA DEMONSTRATE METHYLENE- ^{14}C
FMC 57020 TO BE STABLE

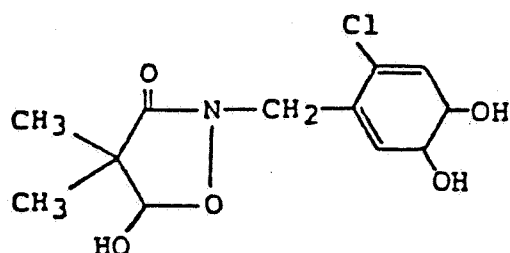
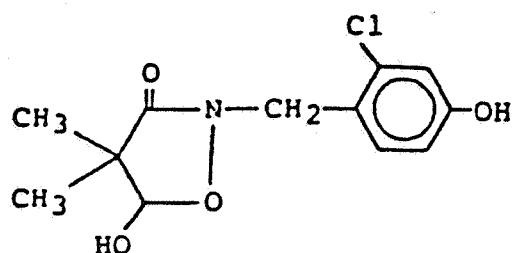
• PRODUCT IDENTIFICATION (RAT)

- METABOLISM OF FMC 57020 PROCEEDS
PRIMARILY BY OXIDATION, HYDROXYLATION
OF INTACT PARENT CHEMICAL AND
OPENING OF THE HETEROCYCLIC RING.
- METABOLITES CONTAIN INTACT
O-CHLOROBENZYL GROUP.
- METABOLITES ARE ADEQUATELY MONITORED
BY USE OF EITHER METHYLENE-¹⁴C OR
RING-¹⁴C FMC 57020.

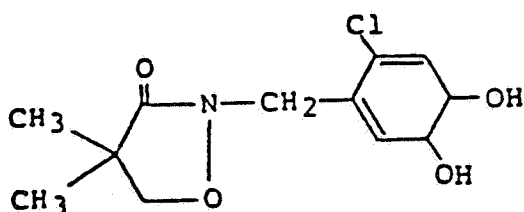
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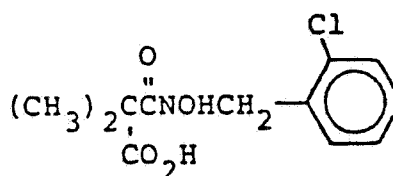
FMC 57020
MAJOR RAT METABOLITES



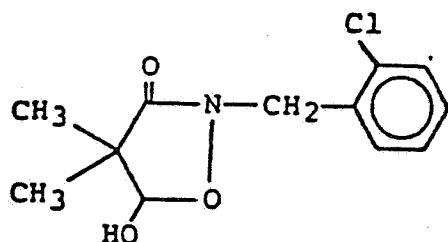
FMC 83918
(4',5'-dihydroxy-
FMC 57020)



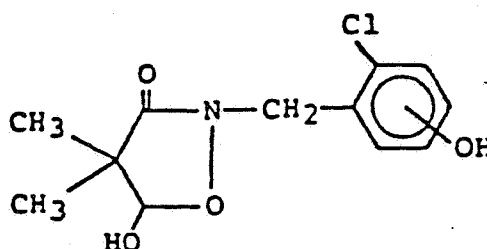
FMC 87010
(4',5'-dihydrodiol-
5-hydroxy-FMC 57020)



FMC 87009
(4',5'-dihydrodiol-
FMC 57020)



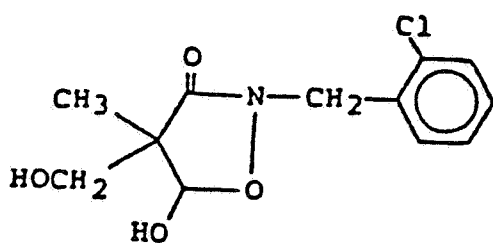
FMC 87008
(N-hydroxy-carboxylic
acid)



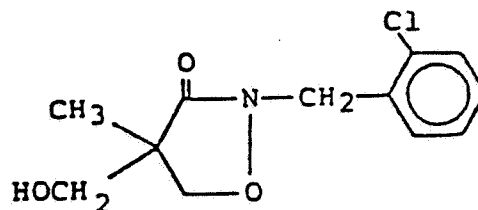
FMC 60217
(5-hydroxy
FMC 57020)

FMC 87011
(dihydroxy-
FMC 57020)

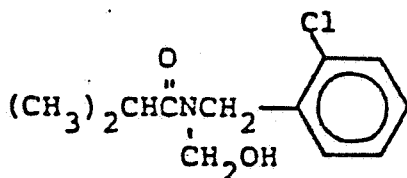
FMC 57020
OTHER RAT METABOLITES



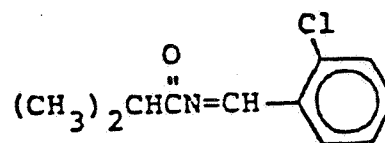
FMC 87012
(4-Hydroxymethyl-
5-hydroxy FMC 57020)



FMC 87006
(4-Hydroxymethyl
FMC 57020)

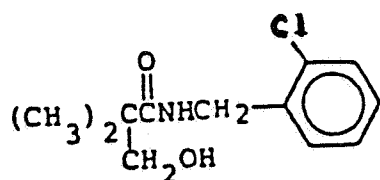


FMC 87013
(N-Hydroxymethyl-
benzyl-isobutyramide)

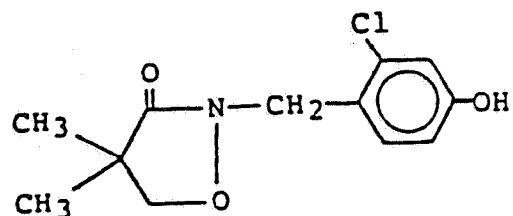


FMC 87014
(Benzylidinamide)

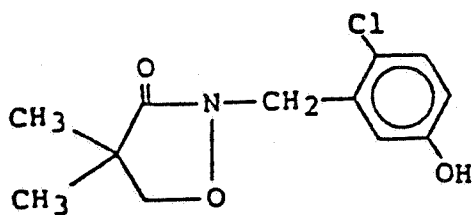
FMC 57020
OTHER RAT METABOLITES
(CONT'D)



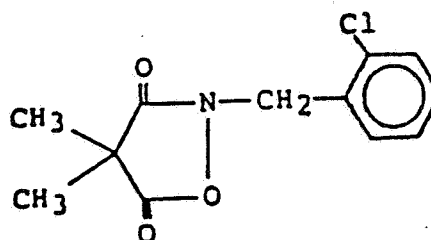
FMC 65317
(Seco- FMC 3517)



FMC 62667
(4'-hydroxy FMC 57020)



FMC 77039
(5'-hydroxy
FMC 57020)



FMC 55626
(5-keto FMC 57020)

FMC REPORT NO. P-0896

DISSIPATION OF FMC 57020 RESIDUES

IN SOIL

EPA COMMENTS:

EXPLAIN MATHEMATICAL EQUATION OF
LOG TIME VS. CONCENTRATION

EPA CONCLUSION:

1. REPLOT/RECALCULATE HALF-LIVES
2. 6-12 INCH DEPTH SHOULD BE CONSIDERED
3. SAMPLING SHOULD HAVE BEEN DONE AT DEPTHS
DEEPER THAN 12 INCHES

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FMC's RESPONSE:

1. ADD 0-6 INCHES AND 6-12 INCHES SOIL RESIDUES
2. REPLOT DATA BASED ON "BEST FIT" PRINCIPLE

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"RATE LAW"

$$-dc/dt = kc^n$$

FIRST ORDER

(N = 1)

$$\text{LNC} = \text{LNC}_0 - \text{KT}$$

$$\text{HALF-LIFE} = \frac{\text{LN } 2}{K}$$

SECOND ORDER

(N = 2)

$$\frac{1}{C} = \frac{1}{C_0} + \text{KT}$$

$$\text{HALF-LIFE} = \frac{1}{C_0 K}$$

FMC 57020 SOIL HALF LIVES (DAYS)^{1/}

Soil Type and Location		Preemergence Application	Preplant Incorporated Application
Silt loam (Champaign, IL)	$T_{1/2}$	75	73
	r^2	0.800	0.972
Sandy loam (Penns Grove, NJ)	$T_{1/2}$	34	49
	r^2	0.982	0.985
Sandy clay loam (Raleigh, NC)	$T_{1/2}$	61	53
	r^2	0.968	0.863
Silt loam (Marion, AR)	$T_{1/2}$	26	47
	r^2	0.973	0.951

^{1/}Derived from second order model plotting, except sand loam soil (NJ) which were derived from 1.5 order model plotting

(20)	(35)
(16)	(19)
(24)	(23)
(21)	(36)

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1.5 ORDER

$$\frac{1}{\sqrt{C}} = \frac{1}{\sqrt{C_0}} + 0.5 kt$$

plot $\frac{1}{\sqrt{C}}$ vs. t

$$\text{Half-life} = \left(\frac{\sqrt{2}-1}{\sqrt{C_0}} \right) / 0.5 k$$

2ND ORDER MODEL MARION (PKE)

$$t_{1/2} = 25.9$$

THE REGRESSION EQUATION IS

$$Y = 1.3176713013175$$

$$+ .050935220731267 X$$

COEFF. STD.DEV T-RATIO

0.05094 0.00315 16.19334

S= 1.5402654540875 WITH 7 DF

R-SQUARE= .973

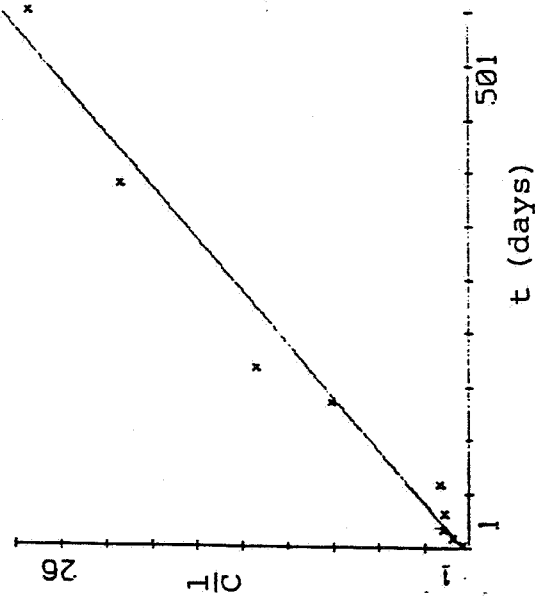


FIGURE 13

2ND ORDER MODEL MARION (PPI)

$$t_{1/2} = 46.8$$

THE REGRESSION EQUATION IS

$$Y = 1.3132989948223$$

$$+ .028080816228865 X$$

COEFF. STD.DEV T-RATIO

0.02808 0.00240 11.71699

S= 1.1735664961426 WITH 7 DF

R-SQUARE= .951

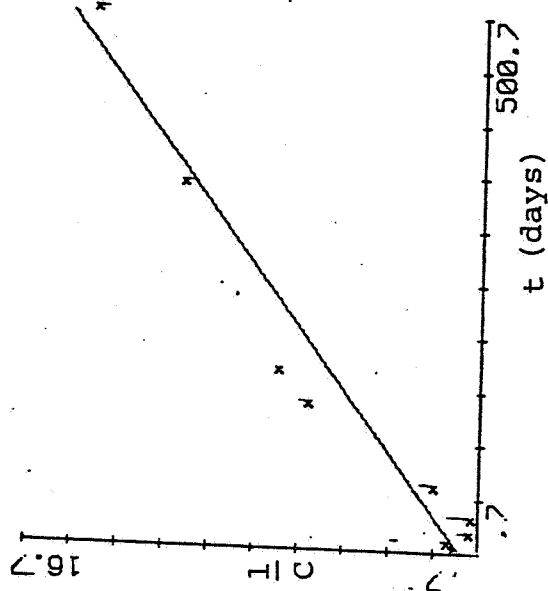


FIGURE 14

QUESTION: SINCE THERE WERE INDICATIONS THAT FMC 57020 IS LEACHING, SAMPLING SHOULD HAVE BEEN DONE AT DEPTHS DEEPER THAN 12 INCHES.

ANSWER:

1. SOIL DISSIPATION PROTOCOL REQUIRED ONLY 12-INCH DEPTH.
2. NO LEACHING OF FMC 57020 IN LOAM SAND SOIL (WORST CASE CONDITIONS) WERE DETERMINED BY MOBILITY STUDY.
"PROTOCOL APPROVED BY EPA"

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PESTANS

- GOAL

ASSESS APPLICABILITY OF THE CODE
FIELD DATA VALIDATED

DEVELOP "WORST CASE" PREDICTION
NON-RETENTIVE SOIL
OVERESTIMATED RECHARGE

EVALUATE LEACHING POTENTIAL
SOIL TYPE COMPARISONS

- OUTDATED PESTANS MODEL USED

- VERSION 2.5 USED
VERSION 3.1 CURRENT

DIFFERENCE: SATURATED HYDRAULIC CONDUCTIVITY

- COMPARISON

COMMAND

SAND @ 30 DAYS BY PESTANS

Centi- meters	Total Concentration in ppm	
	FMC Version 2.5	EPA Version 3.1
0	0.004	0.0007
6	0.211	0.180
12	0.239	0.240
18	0.006	0.002

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purpo

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• SAND CHARACTERIZATION PARAMETERS FAVOR REGISTRANT

SOIL PARAMETERS OBTAINED FROM THE LITERATURE
ENFIELD

CURVE COEFFICIENT ADJUSTMENT

4.05 TO 0.02

NO SIGNIFICANT CHANGE

COMMAND

CURVE COEFFICIENT COMPARISON @ 365 DAYS

Centi- meters	Total Concentration in ppb	
	Curve Coefficient @ 4.05	Curve Coefficient @ 0.02
0	0.267	0.012
10	0.723	0.504
20	0.717	0.717
30	0.261	0.033
40	0.035	*
50	0.002	*

*Less than 0.001 ppb

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- PRZM SHOULD BE USED IN PLACE OF PESTANS

EXISTING PESTANS VALIDATED UNDER "WORST CASE"

IF NOT AN AID IN ASSESSING POTENTIAL MOBILITY

- WITHDRAWN

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FMC REPORT NO. P-0916

MOBILITY OF FMC 57020

IN

SOIL

EPA COMMENTS:

A. HALF-LIFE CALCULATION:

1. WHY NOT USE FIRST ORDER DECAY LAW OF

$$\text{LNC} = -\text{KT} + \text{LNCo}$$

AND PLOT LNC VS. T

2. EXPLAIN:

PLOTTING OF

C VS. LOG T

50/

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FMC's RESPONSES:

A. HALF-LIFE CALCULATION:

1. FIRST ORDER PLOTTING OF LNC VS. T

THE REGRESSION EQUATION IS

$Y = -1.2537299388508$

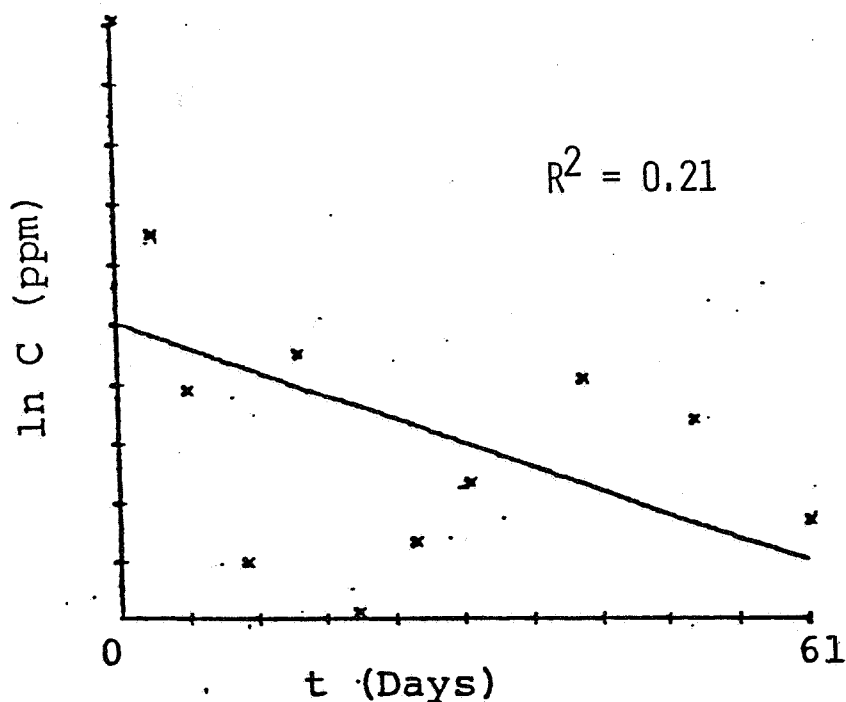
$+ .013038695409118 X$

COEFF.	STD. DEV	T-RATIO
--------	----------	---------

-0.01304	0.00873	-1.50131
----------	---------	----------

$S = .55392544295265$ WITH 9 DF

R-SQUARE = .21312739149951



DATA DOES NOT FIT FIRST ORDER

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2. SECOND ORDER PLOTTING OF

$$\frac{1}{C} \text{ vs. } t$$

THE REGRESSION EQUATION IS

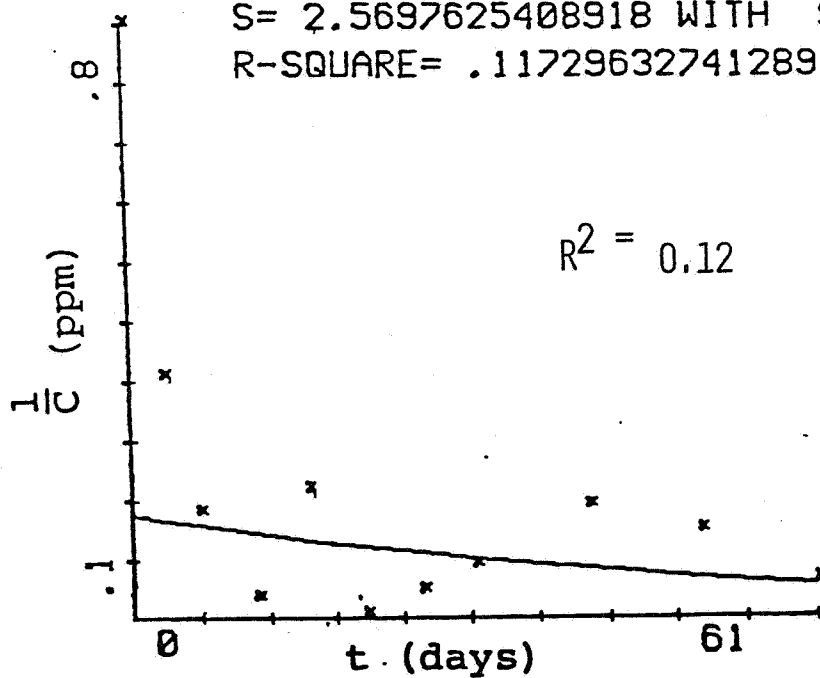
$$Y = 4.4874673865808$$

$$+ .044311672269247 X$$

COEFF.	STD.DEV	T-RATIO
0.04431	0.04052	1.09359

S = 2.5697625408918 WITH 9 DF

R-SQUARE = .11729632741289



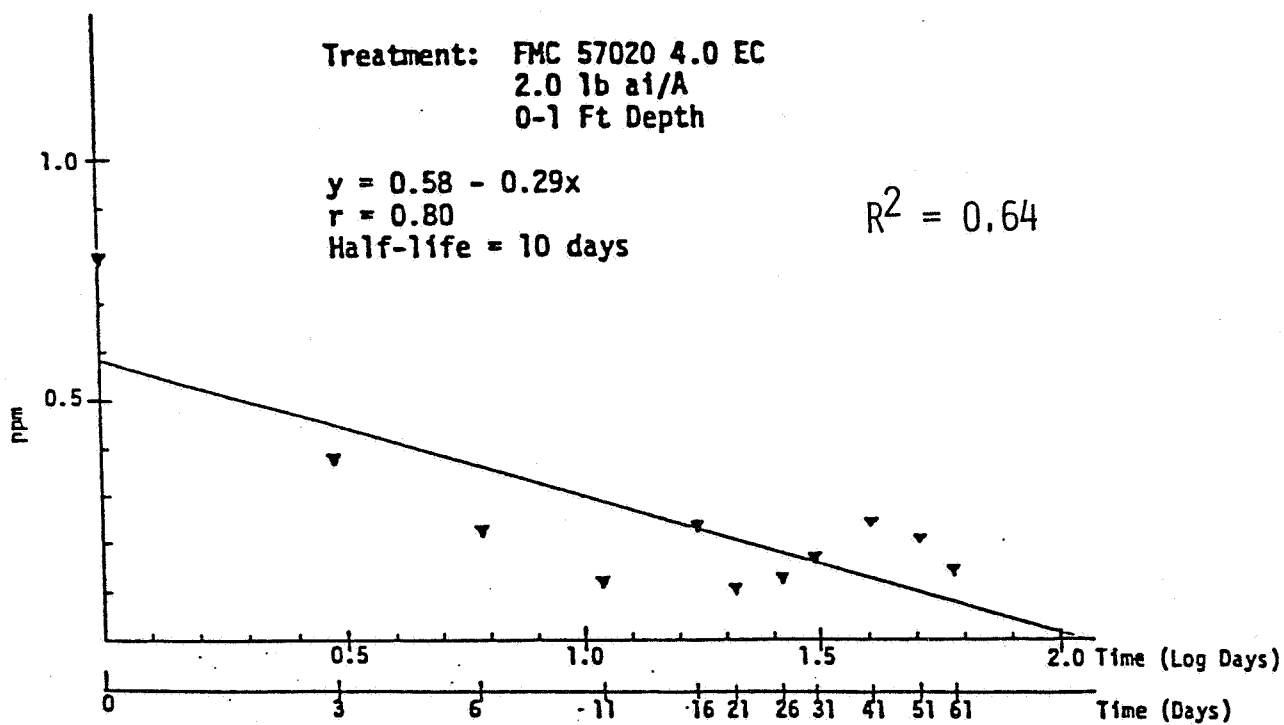
DATA DOES NOT FIT SECOND ORDER

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EMPIRICAL

PLOT C VS. LOG T



$$Y = A + B X$$

$Y = \text{PPM}$

$A = \text{Y-INTERCEPT}$

$B = \text{SLOPE OF LINE}$

$X = \text{LOG DAYS}$

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B. EPA QUESTIONS ON METHODOLOGY:

1. Do FMC 57020 AND FMC 65317 FORM RESPECTIVE SALTS WITH HCL?
2. IF THEY DO NOT FORM THE SALTS, ARE THEY SOLUBLE ENOUGH TO BE EXTRACTED EFFICIENTLY IN WATER?
3. IF THEY FORM SALTS, ISN'T IT NECESSARY TO BASIFY THE ACID EXTRACTS BEFORE PARTITIONING IN AN ORGANIC SOLVENT?
4. WHAT WAS THE NaHCO_3 WASH FOR?
5. IT WAS REPORTED THAT THE METHOD SENSITIVITY FOR FMC 57020 AND FMC 65317 IN SOIL WAS VALIDATED TO 0.10 PPM AND THAT THE DETECTION LIMIT WAS 0.02 PPM FOR BOTH COMPOUNDS. HOWEVER, IN TABLE 2 (TABLE 4 IN REPORT) NONE OF THE RESIDUE LEVELS WERE BETWEEN 0.02 PPM AND 0.1 PPM.

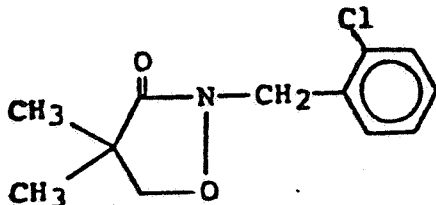
CONCLUSION:

THE LEACHING POTENTIAL OF FMC 57020 RESIDUES CANNOT BE DETERMINED FROM THIS STUDY UNTIL THE REGISTRANT PROVIDES ADEQUATE EXPLANATIONS REGARDING THE FIVE QUESTIONS ABOVE.

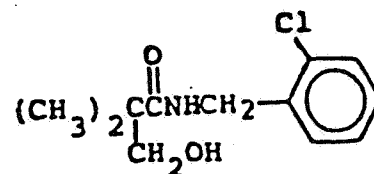
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1. QUESTION: Do FMC 57020 AND FMC 65317 FORM RESPECTIVE SALTS WITH HCL?

ANSWER: No, FMC 57020 AND FMC 65317 DO NOT FORM RESPECTIVE SALTS WITH HCL.



FMC 57020



FMC 65317

2. QUESTION: IF THEY DO NOT FORM THE SALTS, ARE THEY SOLUBLE ENOUGH TO BE EXTRACTED EFFICIENTLY IN WATER?

ANSWER: YES

3. QUESTION: IF THEY FORM SALTS, ISN'T IT NECESSARY TO BASIFY THE ACID EXTRACTS BEFORE PARTITIONING IN ORGANIC SOLVENT?

ANSWER: THEY DO NOT FORM SALTS, THEREFORE, IT IS UNNECESSARY TO BASIFY THE ACID EXTRACTS.

4. QUESTION: WHAT WAS THE NaHCO_3 WASH FOR?

ANSWER:

- REMOVE ACID IN HEXANE
- HELP CLEANUP

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5. QUESTION: IT WAS REPORTED THAT THE METHOD SENSITIVITY FOR FMC 57020 AND FMC 65317 IN SOIL WAS VALIDATED TO 0.10 PPM AND THAT THE DETECTION LIMIT WAS 0.02 PPM FOR BOTH COMPOUND. HOWEVER, IN TABLE 2 (TABLE 4 IN FMC REPORT No. P-0916) NONE OF THE RESIDUE LEVELS WERE BETWEEN 0.02 PPM AND 0.1 PPM.

ANSWER: NONE OF THE ACTUAL DETECTED RESIDUE LEVELS WERE BETWEEN 0.02 PPM AND 0.1 PPM; THEREFORE, NO VALUES BETWEEN 0.02 AND 0.10 PPM WERE REPORTED.

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TABLE 4

SUMMARY OF AVERAGE RESIDUES^{1/}

Days Lapsed	Sampling Depth (Ft)	Average Residue (ppm)	
		FMC 57020	FMC 65317
0	0-1	0.80	ND
	1-2	ND	ND
	2-3	ND	ND
	3-4	ND	ND
3	0-1	0.38	ND
	1-2	ND	ND
	2-3	ND	ND
	3-4	ND	ND
6	0-1	0.22	ND
	1-2	ND	ND
	2-3	ND	ND
	3-4	ND	ND
11	0-1	0.12	ND
	1-2	ND	ND
	2-3	ND	ND
	3-4	ND	ND
16	0-1	0.25	ND
	1-2	ND	ND
	2-3	ND	ND
	3-4	ND	ND
21	0-1	0.10	ND
	1-2	ND	ND
	2-3	ND	ND
	3-4	ND	ND
26	0-1	0.13	ND
	1-2	ND	ND
	2-3	ND	ND
	3-4	ND	ND
31	0-1	0.16	ND
	1-2	ND	ND
	2-3	ND	ND
	3-4	ND	ND
41	0-1	0.23	ND
	1-2	ND	ND
	2-3	ND	ND
	3-4	ND	ND
51	0-1	0.20	ND
	1-2	ND	ND
	2-3	ND	ND
	3-4	ND	ND
61	0-1	0.14	ND
	1-2	ND	ND
	2-3	ND	ND
	3-4	ND	ND

^{1/}All average residue values were compiled from Table 5

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CROP ROTATION

PROPOSED USE RATE: 1.25 LB. AI/ACRE (MAXIMUM)

MAXIMUM USE RATE STUDIED: 2 LB. AI/ACRE

CURRENT CROP ROTATION: 10 MONTHS

PROPOSED CROP ROTATION: 9 MONTHS