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

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

DATE: 10/17/84

SUBJECT: Meeting with DuPont on DPX-T6376

FROM: Emil Regelman
Chemist

TO: Files

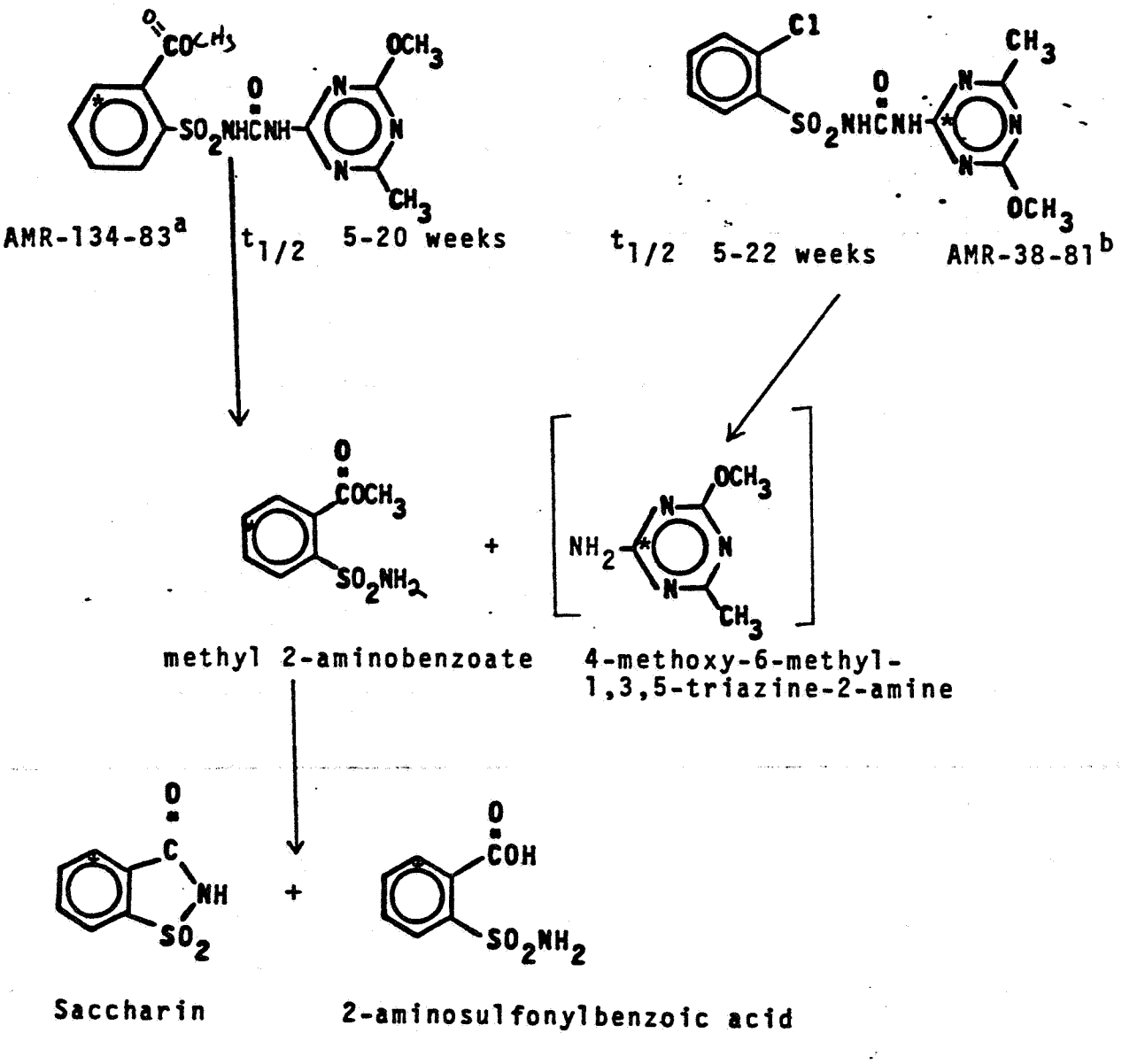
Met with Dave Schleider and Phil Schneider (DuPont) and Vickie Walters (RD) in Room 245, CM II. Issue concerned environmental fate of the triazine moiety of DPX-T6376 in soil under (aerobic) field conditions.

In the review of 7/12/84 (§3.3), EAB noted that data describing the degradation of the triazine moiety appeared to be unreliable (r^2=0.32). At the meeting, it was agreed that the data suggest persistence of that compound, once a level of about 10% of applied is reached.

It was further agreed that, in lieu of additional studies, EAB would defer to RCB and TB on the significance of the triazine moiety remaining in soil at these levels.

In addition, the 7/12/84 review (§3.2) noted that several outstanding issues had not yet been addressed by the registrant. EAB has agreed to allow DuPont to withdraw this study without prejudice, and to rely on other data to support the data requirement.

CC: S. Creeger



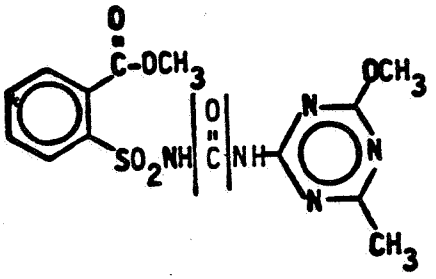
* Denotes position of the radiolabel.

a. Summary of AMR-134-83. [phenyl(U)-^{14}C]Metsulfuron methyl decomposed in anaerobic aquatic systems with half-lives ranging from 5 to 20 weeks. Saccharin, 2-aminosulfonylbenzoic acid and methyl 2-aminosulfonyl benzoate were the major degradation products.

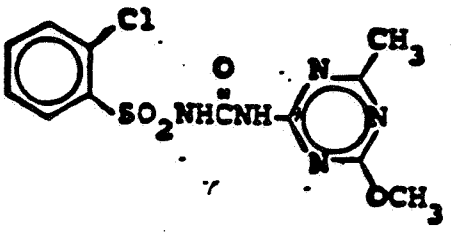
b. Summary of AMR-38-81. [Triazine(2)-^{14}C]Chlorsulfuron decomposed in anaerobic aquatic systems with half-lives ranging from 5-22 weeks. [^{14}C(2)]4-methoxy-6-methyl-1,3,5-triazine-2-amine was the major degradation product. NOTE: CHLORSULFURON CONTAINS THE SAME HYDROLYTICALLY UNSTABLE UREA BRIDGE AND THE SAME HETEROCYCLE (TRIAZINEAMINE) AS METSULFURON METHYL.

Additional Note: An anaerobic aquatic study using [triazine(2)-^{14}C] metsulfuron methyl is in progress.

AEROBIC SOIL METABOLISM OF METSULFURON METHYL (DPX-T6376)
AMR-75-82 (Supporting Data AMR-32-81 and AMR 408-85)



Metsulfuron Methyl

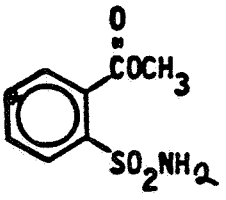


Chlorsulfuron
AMR-32-81[b]

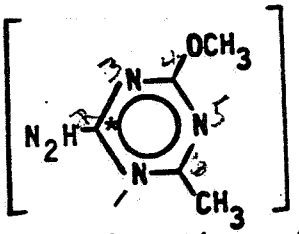
1st $t_{1/2}$
2-3 weeks

1st $t_{1/2}$
1-2 weeks

AMR-75-82[a]

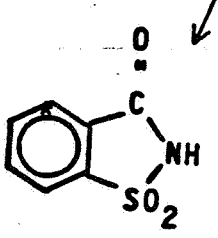


+



Methyl 2-aminosulfonyl benzoic acid

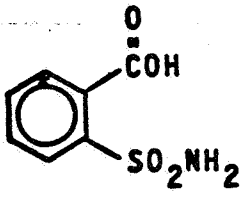
4-methoxy-6-methyl-1,3,5-triazine-2-amine



Saccharin

+

$^{14}CO_2$



2-aminosulfonyl benzoic acid

1st $t_{1/2}$ 5 months

AMR-408-85[c]
Interim Report

$^{14}CO_2$ + Bound Residue +
Polar Breakdown Products

* Denotes postion of the radiolabel.

a. Summary of AMR-75-82. [phenyl(U)-^{14}C]Metsulfuron methyl decomposed (half-life from 2 to 3 weeks) to [^{14}C]methyl 2-aminosulfonylbenzoate, [^{14}C]saccharin, [^{14}C]2-aminosulfonylbenzoic acid and $^{14}CO_2$ when applied to Keyport silt loam at a concentration of 0.1 ppm. After 24 weeks of incubation, the levels of these metabolites remaining on soil (or trapped) were respectively 4%, 13%, < 1% and 36% of the radiolabel originally applied to the soil. Less than 1% of the originally applied metsulfuron methyl remained after this time.

b. Summary of AMR-32-81. [Triazine(2)-^{14}C]Chlorsulfuron decomposed (half-life of 1 to 2 weeks) to [^{14}C]4-methoxy-6-methyl-1,3,5-triazine-2-amine(triazineamine) and $^{14}CO_2$ when applied to Keyport silt loam at a concentration of 0.1 ppm. After 6 months incubation, 41% of the applied radioactivity was recovered as triazineamine and 23% as $^{14}CO_2$. NOTE: CHLORSULFURON CONTAINS THE SAME HYDROLYTICALLY UNSTABLE UREA BRIDGE AND THE SAME HETEROCYCLE (TRIAZINEAMINE)AS METSULFURON METHYL.

c. Summary of AMR-408-85 (Interim Report). [^{14}C(2)]4-methoxy-6-methyl-1,3,5-triazine-2-amine decomposed (half-life of 5 months) to $^{14}CO_2$, polar breakdown products and bound residues when applied to Keyport silt loam at a rate of 0.12 ppm. After 6 months of incubation, the levels of these metabolites remaining on soil (or trapped) were respectively 23%, 17%, and 9%.

SOIL COLUMN LEACHING STUDIES WITH ^{14}C-DPX-T6376

AMR-82-82

The review of AMR-82-82 faulted the study on the following points:

- No acceptable data was submitted regarding the characterization of the aged residues in soil before and after leaching.

- No data was presented addressing the mobility of the triazine moiety in soil.

We feel that the data submitted by Du Pont concerning the leaching behavior of metsulfuron methyl is acceptable for the following reasons:

- When the experimental work for this study was performed, the Pesticide Assessment Guidelines regulating data requirements for environmental fate studies were not in effect. The issue date for these guidelines was October, 1982. Soil column leaching data presented in AMR-82-82 followed a procedure previously used to determine the soil leaching behavior of chlorsulfuron and sulfometuron methyl. The EPA found both these studies acceptable.

- AMR-82-82 describes the leaching behavior of [^{14}C-phenyl] metsulfuron methyl on unaged soil. However, it also describes the extent of leaching of metsulfuron methyl and degradates in aged soil. Fifty percent of the material found to elute from the aged soil column was found to be [^{14}C] saccharin, the primary metabolite of [phenyl(U)-^{14}C] metsulfuron methyl in soil. The remainder of the eluting radioactivity were the soil metabolites, methyl 2-amino sulfonyl benzoate, and parent compound.

- Soil mobility data has been obtained for the major soil metabolite expected as a result of decomposition of [^{14}C-triazine]metsulfuron methyl. This degradation product is 4-methoxy,6-methyl-1,3,5-triazine-2-amine (triazine amine). The mobility of triazine amine was determined on four soil types (AMR-399-85). In these soil thin layer chromatography experiments, triazine amine exhibited a mobility which would characterize it as "immobile" to "intermediate mobility" (R_f values 0.04 to 0.58, dependent on soil type). It is actually less mobile than metsulfuron methyl.

CONCLUSION

The data submitted originally by Du Pont (AMR-82-82) and our most recent work (AMR-399-85) satisfy the purpose of the leaching study guidelines (163-1(a)(1)) to determine "the leaching potential for pesticides and their degradates through the soil profile at terrestrial sites;".

Study 7 - Crop Rotation Study with ^{14}C-DPX-T6376 in the Greenhouse

Data Deficiency cited by EPA.

"Phenyl labeled uptake studies required for root crops and leafy vegetables. Triazine labeled studies required for root, small grain, and leafy vegetable crops."

Du Pont Response

Agency Guidelines state "Crops planted in the treated and aged soil should include those expected in the proposed rotational schedule and, where possible, be representative of each of the following crop groupings: root, small grain, and leafy vegetable." The crops selected for the current study, i.e. sugarbeet, rape, oats and soybeans, are the crops expected in the typical rotational schedule for the proposed use. They include a root crop (sugarbeet) and a small grain (oats), as well as two other crops. Leafy vegetables are not expected to be rotational crops under the proposed use.

The proposed use rate for metsulfuron methyl is 0.1 oz/A. The application rate in this confined crop rotation study was 0.22 oz/A, or 2.2x the proposed rate. It is reasonable to expect that crops grown on soil which had received less than one-half the treatment applied here would exhibit lower residues in their tissues than the crops examined in this study. Nevertheless crops grown on this treated soil after 120 days aging exhibited residues of total ^{14}C equal to or less than only 10 ppb in the edible portions. This is at most one-half the limit of detection for the residue method for metsulfuron methyl (20 ppb), i.e. residues of this magnitude in rotational crops could not be detected by the 'cold chemistry' method. Only in dry senescent soybean foliage at maturity, foliage which is not used for food by man or animal, were residues higher than 10 ppb found. Because this residue represented the only residue that could possibly be identified, it was examined and found to contain

<0.3 ppb of metsulfuron methyl, a proportion presumably indicative of the other much lower residue levels in other tissues, e.g. soybean seeds. No attempt was made to identify the other components of this residue because they did not occur in an edible tissue.

The requirement for a rotational crop study with the triazine-labeled compound was not anticipated when the subject study was started. As soon as the Agency's initial review was made available a study with triazine labeled T6376 was initiated but has not been completed at the present time because of the time required to age the treated soil and grow the crops. A summary of the findings to date reported by the study director is attached to these comments.

The total residue levels reported in the ongoing crop metabolism study with the triazine labeled metsulfuron methyl (treatment rate again 2x the proposed use rate) are comparable to those reported for the phenyl label, and again fall well below the limit of detection of the residue method.

Study 8 - Crop Rotation Study with 14C-Metsulfuron Methyl in the Field

Data Deficiency Cited by EPA

"Conditional on results of the confined study."

Du Pont Response

Du Pont feels that in view of the demonstrated non-accumulation of residues from metsulfuron methyl treatment in rotational crops that there is no need for a field accumulation study in rotational crops.

E. I. DU PONT DE NEMOURS & COMPANY
AGRICULTURAL PRODUCTS DEPARTMENT
EXPERIMENTAL STATION
WILMINGTON, DELAWARE 19898

November 7, 1985

TO: J. HARVEY, JR.

FROM: B. C. RHODES

A 120-day soil aging greenhouse crop rotation study with DPX-T6376 [triazine-2-^{14}C] was initiated on 4/17/85 with treatment of Sassafras sandy loam soil at the rate of 15 g a.i./HA. Garden beets, rape, oats and soybeans were planted in the aged soils on 8/19/85. Combustion analysis of whole-plant samples taken 60 days after planting yielded the following total ^{14}C residue concentrations, calculated as DPX-T6376 equivalent on a fresh weight basis:

Oats	0.015 ppm
Rape	0.007 "
Soybeans	0.012 "
Beets	not sampled

(T6376 retards the growth of beets, and the plants were still too small to sample.)

BCR:mcp

FISH ACCUMULATION
(AMR-81-82)

STATUS OF COMPLETION:

- "NO ACCEPTABLE STUDY SUBMITTED"

DUPONT RESPONSE:

- ORIGINAL REPORT WAS REVISED and REISSUED (12-18-84) TO ADDRESS CONCERNS EXPRESSED IN THE 7-12-84 EPA REVIEW.

- STUDY SHOWED NO ACCUMULATION OF RADIOACTIVITY IN BLUEGILL SUNFISH EXPOSED TO 0.01 OR 1.0 PPM [PHENYL(U)-14C] METSULFURON METHYL FOR 28 DAYS.

- CONSISTENT WITH VERY LOW OCTANOL/WATER PARTITION COEFFICIENT (AMR-68-82):

K_{oc}

0.014 AT pH 7

1.0 AT pH 5

File

METSULFURON METHYL ENVIRONMENTAL FATE STUDIES

STUDY	STARTING DATE	FINISHING DATE
HYDROLYSIS (AMR-62-82)	7-27-81	1-14-82
PHOTOLYSIS IN WATER (AMR-102-82)	11-27-81	4-21-82
PHOTOLYSIS ON SOIL (AMR-77-82)	1-11-82	3-25-82
AEROBIC SOIL METABOLISM (AMR-75-82)	9-29-81	3-29-82
ANAEROBIC AQUATIC METABOLISM (AMR-134-83)	4-7-82	5-26-83
LEACHING (AMR-82-82)	11-11-81	1-18-82
ADSORPTION (MEMORANDUM OF DATA)	-	8-13-81
FIELD DISSIPATION (AMR-117-83)		
NEWARK, DE	7-15-81	~ July 1983
STONEVILLE, MS	9-22-81	~ October 1983
FAYETTEVILLE, NC	9-22-81	~ October 1983
BRADENTON, FL	9-25-81	~ October 1983
ROTATIONAL CROPS - CONFINED (AMR-120-83)	~ November 1982	~ September 1983
ROTATIONAL CROPS - FIELD (AMR-190-84)	5-18-83	12-20-83
FISH ACCUMULATION (AMR-81-82)	11-20-81	~ July 1982 *

* Revision No. 1 issued 12/18/84 in response to EPA review.

DU PONT

Ally® HERBICIDE

DRY FLOWABLE

ACTIVE INGREDIENT:
Methyl 2-[[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]-benzoate 60%
INERT INGREDIENTS 40%
U.S. Pat. 4,383,113 EPA Est. 352-DE-1

KEEP OUT OF REACH OF CHILDREN

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS

WARNING! MAY IRRITATE EYES, NOSE, THROAT AND SKIN.

Avoid breathing dust or spray mist. Avoid contact with skin, eyes and clothing.

For medical emergencies involving this product, call toll free 1-800-441-3637.

ENVIRONMENTAL HAZARDS

Keep out of any body of water. Do not contaminate water by cleaning of equipment or disposal of wastes.

AGRICULTURAL PRODUCTS DEPT., WILM., DE
AG-850 8095 Made in U.S.A. Printed in U.S.A.

IMPORTANT

Injury to or loss of desirable trees or vegetation may result from failure to observe the following: Do not apply, drain, or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with these areas. Do not use on lawns, walks, driveways, tennis courts or similar areas. Prevent drift of spray to desirable plants. Do not contaminate any body of water, including irrigation water that may be used on other crops.

Carefully observe sprayer cleanup instructions, as spray tank residue may damage crops other than wheat or barley.

NOTICE TO BUYER: Purchase of this material does not confer any rights under patents of countries outside of the United States.

STORAGE AND DISPOSAL

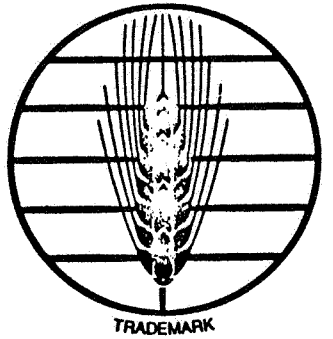
Storage—Store product in original container only, away from other pesticides, fertilizer, food or feed.

Disposal—Do not contaminate water, food, or feed by storage, disposal or cleaning of equipment. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Triple rinse (or equivalent) the container and then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or by incineration or, if allowed by state and local authorities by burning. If burned, stay out of smoke.

DU PONT

Ally®

HERBICIDE



TRADEMARK

SEE ACCOMPANYING DIRECTIONS FOR USE

DRY FLOWABLE NET WT 8 OZ

Ally® HERBICIDE DRY FLOWABLE

ACTIVE INGREDIENT:
Methyl 2-[[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]benzoate 60%
INERT INGREDIENTS 40%

U.S. Patent 4,383,113

EPA Est. 352-DE-1
EPA Reg. No. 352-XXX

KEEP OUT OF REACH OF CHILDREN
PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS

WARNING! **May irritate eyes, nose, throat and skin.**

Avoid breathing dust or spray mist. Avoid contact with skin, eyes and clothing.

For medical emergencies involving this product, call toll free 1-800-441-3637.

ENVIRONMENTAL HAZARDS

Keep out of any body of water. Do not contaminate water by cleaning of equipment or disposal of wastes.

NET WT 8 OZ

AGRICULTURAL PRODUCTS DEPARTMENT
WILMINGTON, DELAWARE

AG-852 8095

IMPORTANT

Injury to or loss of desirable trees or vegetation may result from failure to observe the following: Do not apply, drain, or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with these areas. Do not use on lawns, walks, driveways, tennis courts or similar areas. Prevent drift of spray to desirable plants. Do not contaminate any body of water, including irrigation water that may be used on other crops.

Carefully observe sprayer cleanup instructions, as spray tank residue may damage crops other than wheat or barley.

NOTICE OF WARRANTY

Du Pont warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness, or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of Du Pont. In no case shall Du Pont be liable for consequential, special or indirect damages resulting from the use or handling of this product. All such risks shall be assumed by the buyer. DU PONT MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

GENERAL INFORMATION

Du Pont "Ally" Herbicide is recommended for use in CO, southeast ID, KS, MT, NE, NM, ND (west of State Highway 1), the Oklahoma Panhandle, SD (west of State Highway 281 plus Brown County), TX, northern UT, and WY.

"Ally" is recommended for use only on land primarily dedicated to the production of wheat (including durum), barley and certain other crops. In areas having a short growing season, prolonged periods of low soil temperature, and low annual rainfall, "Ally" can remain in the soil for 34 months or more and cause severe injury to certain crops other than wheat or barley. Before using "Ally", carefully consider your crop rotation plans and options. For maximum rotational flexibility, do not treat all your wheat, barley or fallow acres with "Ally". See "Crop Rotation Guidelines" for details.

"Ally" is a 60% active ingredient herbicide formulated as a dry flowable granule to be mixed in water and applied for use as a uniform broadcast spray for selective weed control in wheat (including durum) and barley. "Ally" also is recommended for use as a reduced tillage fallow postemergence treatment preceding the planting of wheat, barley and certain other crops. "Ally" may be applied by air or with ground spray equipment. It is noncorrosive, non-

For application to wheat or barley, "Ally" should be applied early postemergence to the main flush of broadleaf weeds. Fallow applications can be made postemergence to weeds either in the spring or postharvest. For wheat, barley, and fallow applications, apply "Ally" to actively growing weeds. Herbicide combinations may be required for certain weeds as indicated under "Tank Mixtures" in the "Weed Control in Wheat and Barley" and "Weed Control in Reduced Tillage Fallow" sections.

"Ally" rapidly inhibits growth of susceptible weeds. However, typical symptoms (discoloration) of dying weeds may not be noticeable for 1 to 3 weeks after application depending on growing conditions and weed susceptibility. Warm, moist conditions following treatment enhance the activity of "Ally", while cold, dry conditions delay activity. Weeds hardened-off by cold weather or drought stress may not be fully controlled or suppressed and regrowth may occur.

Degree of control and duration of effect depend on: Weed spectrum and density; weed size and variability; growing conditions prior to, at, and following time of application; amount of precipitation; and spray coverage.

READ AND FOLLOW ALL APPROPRIATE SECTIONS OF LABEL INCLUDING PRECAUTIONS BEFORE USING THIS PRODUCT.

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

"Ally" should be used only in accordance with recommendations on this label or in separate published Du Pont recommendations available through local dealers.

Du Pont will not be responsible for losses or damages resulting from the use of this product in any manner not specifically recommended by Du Pont. User assumes all risks associated with such nonrecommended use.

WEED CONTROL IN WHEAT AND BARLEY

Unless directed otherwise on this label, for best weed control or suppression, apply postemergence when environmental conditions favor active growth of broadleaf weeds and when crop canopy will allow thorough coverage of target weeds. Always include a surfactant.

Determine crop rotation plans according to "Crop Rotation Guidelines."

TIMING FOR POSTEMERGENCE APPLICATION:
Apply "Ally" (1/10 ounce per acre) postemergence to spring wheat (including durum), winter wheat, or barley from the 2-leaf stage, but before the boot stage. To obtain control or suppression, apply only to actively growing broadleaf weeds prior to crop canopy closing in. See "Specific Weed Problems" for additional information on certain weeds.

Weeds Controlled or Suppressed*
1/10 Ounce Per Acre**

Bittercress	Field pennycress (fanweed)	Russian thistle*
Blue mustard (purple)	Filaree	Shepherdspurse
Bur buttercup (testiculate)	Flixweed*	Smallseed falseflax
Canada thistle*	Groundsel (common)	Smartweed (green, ladysthumb, pale)
Chickweed (common)	Henbit	Sowthistle*
Common purslane	Knotweed (prostrate)	Tansymustard*
Common sunflower*	Kochia*	Treacle mustard
Conical catchfly	Lambsquarters* (common, slimleaf)	Tumble mustard (Jim Hill)
Corn cockle	Mayweed	Volunteer sunflower
Corn gromwell*	Miners lettuce	Waterpod
Cow cockle	Pigweed (redroot, smooth, tumble)	Wild buckwheat*
Dogfennel	Prickly lettuce	Wild mustard
False chamomile		
Fiddleneck (tarweed)*		

*Weeds marked with an asterisk may only be suppressed. Weed suppression is a visual reduction in weed competition (reduced population or vigor) as compared to untreated area. Degree of suppression will vary with size of weed and environmental conditions following treatment. See "Specific Weed Problems" concerning Canada thistle, common sunflower, corn gromwell, fiddleneck (tarweed), flixweed, kochia, lambsquarters, Russian thistle, sowthistle, tansymustard and wild buckwheat.

**80 acres treated per 8 ounce container.

"Ally" will not control wild oats or other grasses. If broadleaf weeds plus wild oats and/or grasses are present, apply "Ally" with a suitable registered product either as a tank mix or sequential treatment. DO NOT tank mix with Hoelon 3EC as wild oat control may be reduced.

SPECIFIC WEED PROBLEMS:
Canada Thistle and Sowthistle - Apply "Ally" plus surfactant in the spring after the majority of thistles have emerged and are small (rosette stage to 6" elongating stems) and actively growing. An application will inhibit the

Buckwheat - Apply "Ally" plus surfactant postemergence when weeds are both actively growing and no larger than 2" tall or in diameter, and crop canopy will allow thorough coverage of target weeds. Wild buckwheat should not have more than 3 true leaves (not counting the cotyledons). If weeds are not actively growing, delay treatment until environmental conditions favoring active growth are present. Thorough coverage is important.

Flixweed and Tansymustard in Winter Wheat - For best results, apply "Ally" plus surfactant when plants are actively growing, no larger than 2" tall or in diameter, and crop canopy will allow thorough coverage of target weeds. If weeds are not actively growing, delay treatment until environmental conditions favoring active growth are present. Also, if crop canopy will prevent thorough coverage, delay treatment until it is more open. Treating plants between the 2" rosette to the 4" bolt stage may result in less than adequate suppression. Thorough coverage is important.

SPRAY PREPARATION/TANK MIXTURES:
Pour the proper amount of "Ally" into the necessary volume of water in the spray tank with the agitator running. Continuous agitation is required for a uniform suspension and application. "Ally" must be added first to the spray tank followed by any other tank mix chemicals and surfactant.

Use spray preparation of "Ally" within 24 hours or product degradation may occur. If spray preparation is left standing without agitation, thoroughly agitate before re-using.

Surfactant - Use a surfactant of at least 80% active ingredient to improve wetting and/or contact activity of "Ally". Add surfactant as the last ingredient at the rate of 1 to 2 quarts per 100 gallons of spray volume. Antifoaming agents may be needed. Do not use low rates of liquid fertilizers as a substitute for a surfactant.

Liquid Fertilizer - Slurry "Ally" in water; then thoroughly mix the slurry into the liquid fertilizer. Do not add a surfactant. Run a tank mix compatibility test before mixing "Ally" in fertilizer solution. Do not use with fertilizers having a pH of 3.0 or less as rapid product degradation can occur.

Tank Mixtures - Tank mix "Ally" with a suitable registered herbicide, for example 2,4-D, if crop canopy will prevent thorough coverage of target weeds or if weeds are hardened-off by moisture stresses, or if certain problem weeds (Canada thistle, common sunflower, corn gromwell, fiddleneck (tarweed), flixweed, kochia, lambsquarters, Russian thistle, tansymustard and wild buckwheat) are larger than "Ally" label guidelines, or if weeds other than those listed for "Ally" are present or anticipated (follow manufacturer's label). "Ally" must be in suspension before adding the companion herbicide. Follow the application timing and surfactant recommendations of the companion herbicide.

If application timing of companion herbicide differs from "Ally", apply separately as recommended for each product. DO NOT tank mix with Hoelon 3EC as wild oat control may be reduced.

"Ally" plus Du Pont Glean® Herbicide - A tank mix of "Ally" plus "Glean" is recommended to extend residual weed control. Do not exceed 1/10 ounce per acre of "Ally" or 1/2 ounce per acre of "Glean" in tank mixtures. Always include a surfactant. Follow recrop/rotational guidelines and pH restrictions on "Glean" label.

WEED CONTROL IN REDUCED TILLAGE FALLOW

Reduced tillage fallow applications of "Ally" are made preceding wheat, barley and certain other crops. Determine crop rotation plans according to "Crop Rotation Guidelines."

Use of "Ally" for weed control on fallow ground is primarily as a postemergence herbicide applied either alone or in combination with Landmaster® Roundup® Roundup plus 2,4-D amine, residual volunteer cereal/grassy weed herbicides, 2,4-D, or Banvel®. Susceptible weeds should be actively growing at time of application. Always include surfactant.

TIMING OF FALLOW APPLICATIONS:
Two timing options are available for use of "Ally" to reduce tillage in cereal, dryland grain sorghum or corn, and sunflower stubble fields.

1. Postharvest* - "Ally"; "Ally" plus 2,4-D or Banvel; and "Ally" plus residual herbicides.
2. Spring (during fallow) - "Ally"; "Ally" plus Landmaster or Roundup; "Ally" plus Roundup plus 2,4-D amine; "Ally" plus residual herbicides; and "Ally" plus 2,4-D or Banvel.

* Spray by August 1 if dryland grain sorghum is to be planted the following year.

Apply "Ally" or "Ally" combinations to emerged actively growing weeds. Thorough coverage is essential. When stubble is dense and/or weeds are stressed (drought and/or cold weather), use higher spray volumes to insure better coverage and control. For best results from postharvest applications, apply when temperatures exceed 70°F and include surfactant. See "Spray Preparation/Tank Mixtures" for additional information.

Determine crop rotation plans according to "Crop Rotation Guidelines."

Continued on back side

Weeds Controlled or Suppressed

1/10 Ounce Per Acre**

Canada thistle*	Pigweed (redroot, tumble)
Common purslane	Prickly lettuce
Common sunfloweer*	Russian thistle*
[illegible]	[illegible]*
Flixweed*	Tumble mustard (Jim Hill)
Kochia*	Wild buckwheat*
Lambsquarters (common, slimleaf)	Wild mustard
	Volunteer sunflower

*Weeds marked with an asterisk may only be suppressed. Weed suppression is a visual reduction in weed growth or vigor as compared to untreated area. Degree of suppression will vary with size of weed and environmental conditions at and following treatment.

**80 acres treated per 8 ounce container.

SPRAY PREPARATION/TANK MIXTURES:
Pour the proper amount of "Ally" into the necessary volume of water in the spray tank with the agitator running. Continuous agitation is required for a uniform suspension and application.

Use spray preparation of "Ally" within 24 hours or product degradation may occur. If spray preparation is left standing, thoroughly agitate before re-using.

Surfactant - Unless otherwise noted, use a surfactant of at least 80% active ingredient in postemergence applications to weeds. Add surfactant as the last ingredient at the rates of 2 to 3 quarts per 100 gallons of spray volume. Antifoaming agents may be needed.

"Ally" plus Landmaster or Roundup , or "Ally" plus Roundup[1] plus 2,4-D Amine - Use for control of broadleaf weeds, volunteer cereals and grassy weeds. For best results, apply either combination to actively growing broadleaf and volunteer cereals/grassy (6" tall or less) weeds. Either combination should be applied in 3 to 10 GPA with ground equipment or 3 to 5 GPA by air. Ammonium sulfate (2% by weight) may be added when using Landmaster[1]. When using Roundup[1], include a nonionic surfactant (of at least 50% active ingredient) at 2 quarts per 100 gallons of spray volume.

"Ally" plus 2,4-D or Banvel - Use for postharvest broadleaf weed control. Apply to actively growing weeds. Include a surfactant at 2 quarts per 100 gallons of spray volume.

"Ally" plus Residual Herbicides - For control of volunteer cereals and grassy weeds, tank mix "Ally" with other fallow labeled herbicides such as atrazine, Bladex[4] or Igran[5].

If broadleaf and grassy weed stages or application timings of individual products are not appropriate for tank mix application, apply each product sequentially according to respective label timing guidelines.

In tank mixtures, "Ally" must be in suspension before adding the companion herbicides or spray adjuvants.

Follow all use instructions, label rates, warnings, precautions and surfactant recommendations of companion herbicides.

EQUIPMENT - SPRAY VOLUMES

Apply using properly calibrated air or ground equipment. Select a spray volume and delivery system that will insure thorough coverage and a uniform spray pattern. Avoid overlapping, and shut off spray booms while starting, turning, slowing or stopping, or injury to the crop or following crops may result.

Spray Equipment - Refer to specific manufacturer's recommendations for additional information on GPA, pressure, speed, nozzle types and arrangements, nozzle heights above the target canopy, etc., for respective application equipment.

Ground Application - For optimum spray distribution and thorough coverage, use flat fan or low volume flood nozzles. For flat fan nozzles, do not use less than 3-gallon spray volume per acre (GPA).

For flood nozzles, use no larger than TK10 or equivalent, and not less than 30 psi. With 30-inch nozzle spacings, use not less than 10 GPA; for 60-inch nozzle spacings, use not less than 20 GPA. 100% overlapping of nozzle spray pattern is recommended.

With Raindrop[4] nozzles, do not use less than 30 GPA and insure for 100% overlap of nozzle spray patterns.

Use 50-mesh screens or larger.

Aerial Application - Use orifice discs, cores, and nozzle types and arrangements that will provide for optimum spray distribution and maximum coverage at 1 to 5 GPA. Do not apply during inversion conditions, when winds are gusty, or when other conditions will favor poor coverage and/or drift.

Agitation - Continuous agitation is required to keep "Ally" in suspension.

NOTE: Do not allow spray to drift onto adjacent crops, or onto agricultural land scheduled to be planted to crops other than wheat as injury to the crop may occur. Extreme care must be taken to prevent drift onto desirable plants or nontarget agricultural land.

CROP ROTATION GUIDELINES

Crop rotation plans are determined by the crop to be planted and a minimum rotation interval. Minimum rotation interval is the time from the last application of "Ally" to the anticipated date of planting. For maximum rotational [illegible] do not use "Ally" on all your wheat, barley or

Rate Used (ounce/acre)	Crop To Be Planted	Minimum Rotation Interval (months)
1/10	winter/spring wheat	1
1/10	durum wheat, barley, proso millet*, oats, dryland grain sorghum*	10
1/10	dryland corn, flax, safflower, sunflower	22
1/10	all other crops	34 or more**

* In the states of MT, ND, SD, and northern WY, the minimum rotation interval for proso millet and dryland sorghum is 22 months.

****IMPORTANT** - Land previously treated with "Ally" at 1/10 ounce per acre cannot be rotated to crops other than those listed until a FIELD BIOASSAY confirms that residues of "Ally" are not present. A FIELD BIOASSAY involves growing test strips of the crop(s) intended for production the following year in fields previously treated with "Ally". Crop response will indicate whether or not to rotate to the crop(s) used in the test strips. See "Field Bioassay" for instructions. Failure to follow these instructions could result in injury to subsequent crops.

SPRAYER CLEANUP

To avoid subsequent injury to crops other than wheat or barley, immediately after spraying and prior to spraying other crops, thoroughly remove all traces of "Ally" from mixing and spray equipment as follows:

1. Drain tank, then flush tank, boom and hoses with clean water for a minimum of 10 minutes.
2. Fill the tank with clean water then add ½ gallon chlorine bleach (containing 5¼% sodium hypochlorite) per 100 gallons of water. Flush solution through boom and hoses, then allow to sit for 15 minutes with agitation; then drain.
3. Repeat Step 2.
4. Nozzles and screens should be removed and cleaned separately. To remove traces of chlorine bleach, rinse the tank thoroughly with clean water and flush through hoses and boom.

NOTE: To reduce the amount of water required in the above procedure, see separate Du Pont bulletin, "Reduced Volume Cleanout Procedure for Large Sprayers."

CAUTION: Do not use chlorine bleach with ammonia. All traces of liquid fertilizer containing ammonia, ammonium nitrate or ammonium sulphate must be rinsed with water from the mixing and application equipment before adding chlorine bleach solution. Failure to do so will release a gas with a musty chlorine odor which can cause eye, nose, throat and lung irritation. Do not clean equipment in an enclosed area.

PRECAUTIONS

Do not apply more than 1/10 ounce per acre per year.

Do not use on highly calcareous soils (soil pH of greater than 8.0).

Do not apply to irrigated land where tail water will be used to irrigate other crop land.

Do not apply to frozen ground where surface runoff may occur. Do not apply when snow covers the ground.

Because varieties of wheat and barley differ in their tolerance to herbicides, limit first use of "Ally" to a small area of each variety prior to adoption as a field practice.

Do not apply "Ally" to wheat or barley that is stressed by severe weather conditions, drought, low fertility, water saturated soil, disease or insect damage as crop injury may result. Severe winter stress, drought, disease or insect damage following application also may result in crop injury.

Under certain conditions such as heavy rainfall, prolonged cool weather, or frost conditions (wide fluctuations in day/night temperatures) just prior to or soon after application, temporary discoloration and/or crop injury may occur. Tank mixtures of "Ally" and methyl or ethyl parathion also may cause temporary discoloration. When tank mixing with organophosphate insecticides that don't have a surfactant in the formulation, only add surfactant at a rate of 1 quart per 100 gallons of spray volume.

To prevent cold weather-related crop injury, avoid making applications during winter months when weather conditions are unpredictable and can be severe.

Do not apply to wheat or barley undersown with legumes or grasses as injury to the forage may result.

Do not graze or feed treated forage or straw to livestock for 28 days from date of application.

The "Ally" volumetric measuring cylinder is to be used only as a guide, since the degree of accuracy varies by plus or minus 7%. For more precise measurement, use

FIELD BIOASSAY

"Ally" is a useful tool for weed control in wheat or barley and in reduced tillage fallow; however, under some conditions small amounts of "Ally" can remain in the soil and injure crops other than those listed on the "Ally" label under "Crop Rotation Guidelines" for 34 months or more after application; therefore, before you use "Ally", you should carefully consider your crop rotation plans during the three (or more) year period following treatment.

A bioassay involves growing test strips of the crop or crops you plan to grow the following year in fields previously treated with "Ally". Crop response will indicate whether or not to rotate to the crop(s) grown in the test strips.

"Ally" breaks down more rapidly in soils that have high microbial populations. Factors that favor microbial activity include having annual rainfall of 10" or more and having long growing seasons with warm soil temperatures. Factors that reduce microbial activity, hence slow the disappearance of "Ally" in soils, are low rainfall and prolonged periods of soil temperatures less than 40°F.

Microbial activity, soil temperature, and to a large degree soil moisture, can vary greatly from year-to-year, and from area-to-area. Consequently, it is not always possible to accurately predict when areas treated with "Ally" can be rotated to crops other than those listed on the label.

A biological assay of your "Ally" treated field is the only sure way of determining when crops other than those listed on the label can be grown and is conducted as follows:

1. The accuracy and reliability of any field bioassay is largely dependent on the location and number of strips planted. Be sure to select areas of the field previously treated with "Ally" that are representative of the various field conditions. Be sure to consider factors such as field size, soil texture, drainage, turnaround areas, eroded knolls or alkaline spots when selecting the sites that are most representative of the soil conditions in the field.

   Even in small fields, more than one test strip is required to accurately determine whether it is safe to rotate to a noncereal crop. On large fields, several test strips will be needed in order to obtain reliable results based on the field variables mentioned above.
2. Plant the test strips perpendicular to the direction in which the field was sprayed. Each strip should be long enough to cross the width of several spray swaths. A large test strip area is more reliable than a small one. Suggested size is ¼ to ½ acre per site.
3. Use standard tillage and seeding equipment to plant the bioassay crop(s).
4. Prepare a seed bed and plant the crops and varieties you want the option of growing the following year. It is important to use the same planting time, conditions, techniques and cultural practices you normally use to plant and grow the bioassay crop(s). If possible, plant into an adjacent area not treated with "Ally" to use as a comparison.
5. Do not overspray the test strips with herbicides that may damage the bioassay crop(s).
6. If the crop(s) in the test strips grow to maturity with a normal harvest, the assay is positive and you may now rotate to the new crop. However, if crop(s) in the test strips die, are stunted, or fail to yield a normal harvest, the assay is negative and you should not rotate to the new crop(s). Run the assay until positive results are obtained before rotating to the new crop(s).
7. If the bioassay indicates that "Ally" residues are still present, do not rotate to crop(s) other than those listed on the label until bioassay results indicate that the assay crops are growing normally.

STORAGE AND DISPOSAL

Storage: Store product in original container only, away from other pesticides, fertilizer, food or feed.
Disposal: Do not contaminate water, food or feed by storage, disposal, or cleaning of equipment. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Triple rinse (or equivalent) the container and then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

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HYDROLYSIS (DUPONT DOCUMENT NUMBER AMR-62-82) AND
SOLUBILITY (DUPONT DOCUMENT NUMBER AMR-86-82)

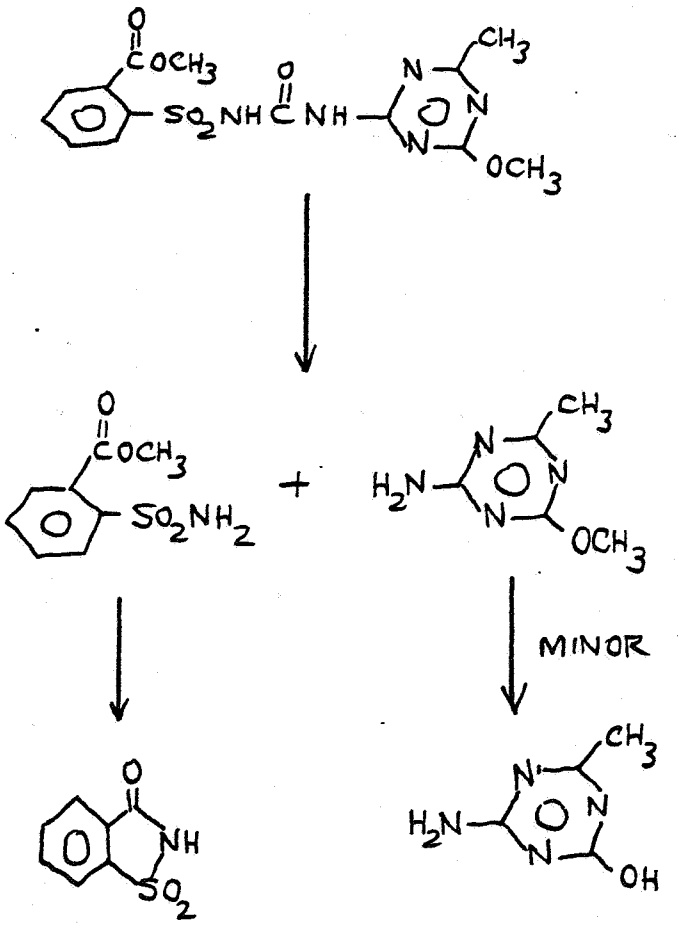
STATUS OF HYDROLYSIS STUDY:

- "HYDROLYSIS DATA REQUIREMENT HAS BEEN SATISFIED"

RESULTS OF STUDIES:

HYDROLYSIS HALF-LIFE AT 25 C	SOLUBILITY AT 25 C
21 DAYS AT pH 5	270 PPM AT pH 4.6
> 30 DAYS AT pH 7	1750 PPM AT pH 5.4
> 30 DAYS AT pH 9	9500 PPM AT pH 6.1

HYDROLYSIS MECHANISM (pH 5):



AQUEOUS PHOTOLYSIS OF 14C-METSULFURON METHYL
(DUPONT DOCUMENT NUMBER AMR-102-82)

EPA CONCERNS:

- NEED INFORMATION ON THE PHOTOLYSIS (RATE DETERMINATION AND PHOTOPRODUCT IDENTIFICATION) OF METSULFURON METHYL IN BUFFERED DISTILLED OR DEIONIZED WATER MAINTAINED UNDER STERILE CONDITIONS.

- NEED DATA ON THE FATE OF THE TRIAZINE MOIETY.

DUPONT RESPONSE

A NEW STUDY UTILIZING [TRIAZINE-2-14C] METSULFURON METHYL WAS COMPLETED.

EXPERIMENTAL:

- STUDIED IN STERILIZED AQUEOUS SOLUTIONS BUFFERED AT pH 5, 7 AND 9.

- TEMPERATURE MAINTAINED AT 25 C.

- EXPOSED TO NATURAL SUNLIGHT FROM 8-13-85 to 9-17-85.

RESULTS:

- NO PHOTODEGRADATION OCCURRED (I.E. DEGRADATION RATES SAME IN EXPOSED AND DARK CONTROLS AT ALL 3 pHs):

  t 1/2 ~ 17 DAYS AT pH 5
  ~ 2% HYDROLYSIS AT pH 7 AFTER 35 DAYS
  ~ 10% HYDROLYSIS AT pH 9 AFTER 35 DAYS

- PRODUCT DISTRIBUTION THE SAME IN THE EXPOSED AND DARK CONTROLS.

PHOTODEGRADATION OF 14C-METSULFURON METHYL ON SOIL
(DUPONT DOCUMENT NUMBER AMR-77-82)

EPA CONCERNS:

- NEED INFORMATION ON THE PHOTODEGRADATION OF METSULFURON METHYL ON SOIL MAINTAINED AT A CONSTANT TEMPERATURE BETWEEN 25 AND 30 C.

- NEED DATA ON THE PHOTODEGRADATION OF THE TRIAZINE MOIETY ON SOIL.

DUPONT RESPONSE:

A NEW STUDY UTILIZING [TRIAZINE-2-14C] METSULFURON METHYL WAS CONDUCTED.

EXPERIMENTAL:

- APPLIED TO KEYPORT SILT LOAM (pH = 4.3) ON THIN-LAYER SOIL PLATES.

- IRRADIATED SAMPLES EXPOSED TO NATURAL SUNLIGHT FROM JUNE 26 - JULY 26, 1985. CONTROLS MAINTAINED IN DARKNESS.

- SOIL SURFACE TEMPERATURE MAINTAINED AT 27-28 C FOR IRRADIATED SAMPLES VS. 25 C FOR DARK CONTROLS.

RESULTS:

- METSULFURON METHYL FIRST HALF-LIFE WAS THE SAME (I.E. 4-6 DAYS) IN BOTH THE IRRADIATED AND DARK CONTROL SAMPLES.

- ONE MINOR "PHOTOLYSIS" PRODUCT DETECTED IN THE EXPOSED SAMPLES BUT NEVER EXCEEDED 5% OF THE TOTAL RADIOACTIVITY. OTHERWISE, PRODUCT DISTRIBUTIONS WERE THE SAME IN THE EXPOSED AND CONTROL SAMPLES.