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

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OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Subject: Trichlorfon Product Chemistry and Residue
Chemistry Registration Standard Update.

From: Richard D. Schmitt, Ph.D., Chief
Dietary Exposure Branch
Health Effects Division (H7509C)

A handwritten signature in cursive script that reads "Richard D. Schmitt".

To: Lois Rossi, Chief
Reregistration Branch
Special Review and Reregistration Division (H7508C)

and

Reto Engler, Ph.D., Chief
Science Analysis and Coordination Branch
Health Effects Division (H7509C)

Attached are updates to the Product and Residue Chemistry Chapters of the Trichlorfon Registration Standard prepared by Dynamac Corporation under supervision of the Dietary Exposure Branch, HED. They have undergone secondary review in the Dietary Exposure Branch and have been revised to reflect the Branch policies. The Guidance Document was published in June, 1984.

Attached are updated generic and product specific data requirement tables for the technical grade of the active ingredient and manufacturing-use products of Trichlorfon. Also, an updated Residue Chemistry data requirements table has been attached.

If you need additional input please advise.

Attachment 1: Trichlorfon Product Chemistry Registration Standard Update

Attachment 2: Trichlorfon Residue Chemistry Registration Standard Update

cc (with attachments 1, and 2): E. Haeberer, Trichlorfon Registration Standard File, Trichlorfon Subject File, C. Furlow (PIB/FOD), J. Burrell (PIB/FOD), W. Boodee (HED), Dynamac

cc (without attachments): RF, Circ.(8), M. Hawkins (HED), P. Fenner-Crisp (HED)

Final Report

TRICHLORFON
Task 4: Product Chemistry
Registration Standard Update

April 4, 1990

Contract No. 68-D8-0080

Submitted to:
Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
The Dynamac Building
11140 Rockville Pike
Rockville, MD 20852

TRICHLORFON

REGISTRATION STANDARD UPDATE

PRODUCT CHEMISTRY

Task - 4

The 2/22/89 Index Update identifies four technical (T) and four formulation intermediate (FI) products of trichlorfon; these are listed below in Table 1.

Table 1. Trichlorfon manufacturing-use products.

Product	EPA Reg. No.	Registrant
98% T	2749-181	Aceto Chemical Company
97% T	44215-129	Kaw Valley, Incorporated
80% FI	44215-128	(transferred from EPA Reg. No. 40831-108) Kaw Valley, Incorporated
98% T	3125-9	Mobay Corporation
98% T	11556-30	Mobay Corporation
82% FI	11556-55	Mobay Corporation
80% FI	3125-371	Mobay Corporation
18% FI	3125-343	Mobay Corporation

The Trichlorfon Guidance Document dated 6/84 identified outstanding data gaps for all product chemistry topics. In response, Mobay Corp. (1983; MRID 00147436) submitted data for a 98% T (EPA Reg. No. 3125-9), which have been reviewed by the Agency (M. Kovacs; DEB No. 1259 dated 9/5/85 and M. Firestone; DEB No. 382 dated 2/3/86). Also, in response to the Guidance Document, Mobay submitted product chemistry data (1985; MRIDs 00148973 and 00152133) for the 98% T (EPA Reg. No. 3125-9), and Kaw Valley Inc. submitted product chemistry data (1986, 1987; MRIDs 00162307 and 40731804) for the 97% T (EPA Reg. No. 44215-129). These data are reviewed below for their adequacy in fulfilling the outstanding data requirements.

No data were submitted for the following manufacturing-use products (MUP): (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181), (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30), and (iii) Mobay 82% FI (EPA Reg. No. 11556-55). All product chemistry data requirements remain outstanding for these products.

The Mobay 80% FI and 18% FI (EPA Reg. Nos. 3125-371 and 3125-343, respectively), and Kaw Valley 80% FI (EPA Reg. No. 44215-128) were registered subsequent to the issuance of the Guidance

Document dated 6/84; data requirements pertaining to these products are not addressed in this update.

Corresponding to each of the Topical Discussions listed below are the Guideline Reference Numbers from "Pesticide Assessment Guidelines - Subdivision D - Product Chemistry", referred to in Title 40 of the Code of Federal Regulations (40 CFR), Part 158, "Data Requirements for Registration", Subpart C, "Product Chemistry Data Requirements". These regulations and guidelines explain the minimum data that the Agency needs to adequately assess the product chemistry of trichlorfon.

Guidelines Reference No.
from 40 CFR §158.155-190

Product Composition and Manufacture	61-(1-3)
Analysis and Certification of Product Ingredients	62-(1-3)
Physical and Chemical Characteristics	63-(2-20)

SUMMARY

- For the Aceto 98% T (EPA Reg. No. 2749-181),
- For the Kaw Valley, Inc. 97% T (EPA Reg. No. 44215-129),
- For the Mobay Corp. 98% T (EPA Reg. No. 3125-9),
- For the Mobay Corp. 98% T (EPA Reg. No. 11556-30),
- For the Mobay Corp. 82% FI (EPA Reg. No. 11556-55),

PRODUCT IDENTITY AND COMPOSITION

61-1. Product Identity and Disclosure of Ingredients

The Guidance Document dated 6/84 requires generic and product specific data pertaining to product composition. In response, Mobay Corporation (1985; MRID 00152133) has submitted information on product identity including a Confidential Statement of Formula (CSF) for its 98% T (EPA Reg. No. 3125-9). These data are presented in Confidential Appendix A. These data do not satisfy the data requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) for the 98% T (EPA Reg. No. 3125-9) regarding product composition because nominal concentrations were not provided for impurities present at >0.1% by weight of the TGAI and other impurities of toxicological concern. Additional data are required.

In response to the Guidance Document, Kaw Valley, Inc. (1986; MRID 00162307) submitted information on product identity

including a CSF for its 97% T (EPA Reg. No. 44215-129). These data are presented in Confidential Appendix A. These data satisfy requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product composition for the 97% T (EPA Reg. No. 44215-129).

No data concerning product identity and disclosure of ingredients were submitted for the following MUPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181), (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30), and (iii) Mobay 82% FI (EPA Reg. No. 11556-55). The Guidance Document requirement for this topic remains outstanding for these products.

61-2. Description of Beginning Materials and Manufacturing Process

The Guidance Document dated 6/84 requires generic and product specific data pertaining to all product chemistry topics. In response, Mobay Corporation (1985; MRID 00152133) submitted information concerning the beginning materials and manufacturing process for the 98% T (EPA Reg. No. 3125-9). These data are discussed in Confidential Appendix B. These data do not satisfy the requirements of 40 CFR §158.160 and §158.162 (Guideline Reference No. 61-2) regarding beginning materials and the manufacturing process respectively for the 98% T because the following were not provided: (i) technical specifications for the diluent; (ii) a description of the equipment used and the conditions (e.g., temperature, pressure, pH, humidity) controlled during each step of the process; (iii) the duration for each step of the process; and (iv) a description of the procedures used to assure consistent composition of the substance produced (quality control). In addition, the relative amounts of beginning materials, and the producer/supplier of each beginning material used in the production of the 98% T were not supplied. Additional data are required.

In response to the Guidance Document, Kaw Valley, Inc. (1986; MRID 00162307) submitted information concerning the beginning materials and manufacturing process for the 97% T (EPA Reg. No. 44215-129). This information is presented in Confidential Appendix B. This information satisfies the requirements of 40 CFR §158.160 and §158.162 (Guideline Reference No. 61-2) regarding beginning materials and the production process respectively for the 97% T (EPA Reg. No. 44215-129). No additional data are required.

No data concerning starting materials and the manufacturing processes were submitted for the following MUPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181), (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30), and (iii) Mobay 82% FI (EPA Reg. No.

11556-55). The Guidance Document requirement for this topic is still outstanding for these products.

61-3. Discussion of Formation of Impurities

The Guidance Document requires generic and product specific information pertaining to the formation of impurities. In response, Kaw Valley, Inc. (1986; MRID 00162307) has submitted a discussion of the formation of impurities in the 97% T (EPA Reg. 44215-129). These discussions are presented in Confidential Appendix C. These data satisfy the requirements of 40 CFR §158.167 (Guideline Reference No. 61-3) for the 97% T (EPA Reg. No. 44215-129) regarding formation of impurities. No additional data are required.

No discussions were submitted concerning the formation of impurities in the following MUPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181), (ii) Mobay Corp. 98% Ts (EPA Reg. No. 11556-30 and 3125-9), and (iii) Mobay 82% FI (EPA Reg. No. 11556-55). The Guidance Document requirement for this topic is still outstanding for these products.

ANALYSIS AND CERTIFICATION OF PRODUCT INGREDIENTS

62-1. Preliminary Analysis

The Guidance Document requires generic and product specific preliminary analysis data. Mobay Corporation (1985; MRID 00148973) has submitted preliminary analysis data for the 98% T (EPA Reg. No. 3125-9). These data are presented in Confidential Appendix D. These data do not satisfy the requirements of 40 CFR §158.170 (Guideline Reference No. 62-1) regarding preliminary analysis for the Mobay 98% T (EPA Reg. No. 3125-9) because validation data (precision and accuracy) were not submitted for the analytical methods. Additional data are required.

In response to the Guidance Document, Kaw Valley, Inc. (1986; MRID 00162307) submitted preliminary analysis data for the 97% T (EPA Reg. No. 44215-129). These data are presented in Confidential Appendix D. [These data do not satisfy the requirements of 40 CFR §158.170 (Guideline Reference No. 62-1) regarding preliminary analysis for the Kaw Valley 97% T (EPA Reg. No. 44215-129) because the validation data for the analytical methods did not include accuracy. Additional data are required.

No data concerning preliminary analysis were submitted for the following MUPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181), (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30), and (iii) Mobay 82% FI (EPA Reg. No. 11556-55). The Guidance Document

requirement for this topic is still outstanding for these products.

62-2. Certification of Limits

The Guidance Document requires generic and product specific data concerning certification of limits. In response, Mobay Corporation (1985; MRID 00152133) submitted certified limits for its 98% T (EPA Reg. No. 3125-9). These data appear in Confidential Appendix A. These data do not satisfy the requirements of 40 CFR §158.175 (Guidelines Reference No. 62-2) regarding certified limits for the Mobay 98% T (EPA Reg. No. 3125-9) because the registrant did not explain how the certified limits were determined (ie: preliminary analysis data of 5 batches) and the analytical methods used were not validated methods. A revised CSF depicting the above information on EPA Form 8570-4 (Rev. 2-85) needs to be submitted.

In response to the Guidance Document, Kaw Valley, Inc. (1986; MRID 00162307) submitted certified limits for the 97% T (EPA Reg. No. 44215-129). These data appear in Confidential Appendix A. These data do not satisfy the requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) regarding certified limits for the Kaw Valley 97% T product (EPA Reg. No. 44215-129) because the analytical methods used were not validated methods. Additional data are required.

No data concerning certified limits were submitted for the following MUPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181), (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30), and (iii) Mobay 82% FI (EPA Reg. No. 11556-55). The Guidance Document requirement for this topic is still outstanding for these products.

62-3. Analytical Methods to Verify Certified Limits

The Guidance Document requires generic and product specific information concerning enforcement analytical methods. In response, Mobay Corporation (1985; MRID 00148973) submitted a differential scanning calorimetry (DSC) method which was used for the determination of the active ingredient in the preliminary analysis. A sample is placed in an aluminum container, sealed, and heated in a Perkin-Elmer Model DSC-4 instrument. Trichlorfon AI content of the technical product is calculated by a Perkin-Elmer DSC-4 computer program; instrument parameters were supplied. Method precision was 0.21% as calculated from duplicate sample analysis.

Mobay Corporation (1985; MRID 00152133) also submitted a dehydro-halogenation procedure for the determination of active ingredient

in the manufacturing-use products. Ethanolamine is combined with the sample in anhydrous ethanol. After the mixture has stood at room temperature for one hour, 2.5N nitric acid at 0 to 5 C is added quickly. The resulting solution is titrated with 0.1N silver nitrate using a silver electrode.

The analytical methods for determination of the active ingredient and impurities in the Mobay 98% T (EPA Reg. No. 3125-9) discussed above and in Confidential Appendix E do not satisfy the requirements of 40 CFR §158.180 (Guideline Reference No. 62-3) regarding enforcement analytical methods because complete validation data (precision and accuracy) were not submitted. Additional data are required.

In response to the Guidance Document, Kaw Valley, Inc. (1986; MRID 00162307) submitted a GC and a GC/MS method for the separation and quantification of the active ingredient in the technical sample. The sample is dissolved in methylene chloride prior to analysis. The GC is equipped with a flame ionization detector. The GC/MS system is equipped with electron impact ionization and a total ion current detector. Detector sensitivity was determined using authentic samples. GC conditions were reported, and chromatograms and MS spectra submitted.

The analytical methods submitted by Kaw Valley, Inc. for determination of the active ingredient trichlorfon and impurities discussed above and in Confidential Appendix E do not satisfy the requirements of 40 CFR §158.180 (Guideline Reference No. 62-3) regarding enforcement analytical methods for Kaw Valley 97% T (EPA Reg. No. 44215-129) because validation data (precision and accuracy) were not submitted. Additional data are required.

No enforcement analytical methods have been submitted for the following MUPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181), (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30), and (iii) Mobay 82% FI (EPA Reg. No. 11556-55). The Guidance Document requirement for this topic is still outstanding for these products.

PHYSICAL AND CHEMICAL CHARACTERISTICS

The Guidance Document requires data concerning physical and chemical characteristics. In response, Mobay Corporation (1983, 1985; MRIDs 00147436 and 00152133) submitted information regarding the physical and chemical characteristics of Mobay 98% T (EPA Reg. No. 3125-9). These properties are presented in Table 2. These data do not satisfy the requirements of 40 CFR §158.190 (Guidelines Reference Nos. 63-2 through 63-13) because stability data are inadequate because stability of the technical product following exposure to metal ions and sunlight were not supplied.

Additionally, the methods for determination of density and corrosiveness were also not supplied. Data for the octanol-water partition coefficient were reviewed by the Agency (M. Firestone; DEB No. 382 dated 2/3/86) and deemed adequate. Additional data are required.

In response to the Guidance Document, Kaw Valley, Inc. (1986, 1987; MRIDs 00162307 and 40731804) submitted physical chemical characteristics for its 97% T (EPA Reg. No. 44215-129). These properties are presented in Table 2. These data do not satisfy the requirements of 40 CFR §158.190 (Guidelines Reference Nos. 63-2 through 63-13) because the data submitted on stability does not include exposure to metal ions and solubility data does not include solubility on solvents other than water. Additional data are required.

Physicochemical data have not been submitted for the following MUPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181), (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30), and (iii) Mobay 82% FI (EPA Reg. No. 11556-55). The Guidance Document requirement for this topic is still outstanding for these products.

Table 2. Physical and chemical properties of trichlorfon purified active ingredient (PAI), technical grade of the active ingredient (TGAI), and manufacturing-use products (MUP).

Guideline Reference No., 40 CFR §158.190; Name of Property	Description [Method] (Registrant and Product; EPA Reg. No.; MRID) ^a
63-2. Color	white (Mobay 98% T; 3125-9; 00152133)
	white (Kaw Valley 97% T; 44215-129; 00162307)
63-3. Physical state	crystalline solid (Mobay 98% T; 3125-9; 00152133)
	crystalline solid (Kaw Valley 97% T; 44215-129; 00162307)
63-4. Odor	weak characteristic odor (Mobay 98% T; 3125-9; 00152133)
	mild, sweetly pungent odor; mild lacrimator odor when higher air concentrations are encountered (Kaw Valley 97% T; 44215-129; 00162307)
63-5. Melting point	most melting occurs at 75-78.5C, melting continues to 84 C [DTA] (Mobay 98% T; 3125-9; 00152133)
	first melt at 74 C, liquid state at 76 C and fully melted at 87 - 93 C (Kaw Valley 97% T; 44215-129; 00162307)
63-6. Boiling point	not required TGAI is a solid
63-7. Density, bulk density or specific gravity	60-65 lb/cu.ft (bulk density) (Mobay 98% T; 3125-9; 00152133)
	0.683 g/ml (bulk density) (Kaw Valley 97% T; 44215-129; 00162307)

(Continued.)

Table 1. (Continued.)

Guidelines Reference No., 40 CFR §158.190; Name of Property	(Registrant and Product; Substrate; EPA Reg. No.; MRID) ^a												
63-8. Solubility	<table border="1"> <thead> <tr> <th data-bbox="678 393 816 421">Solvent</th> <th data-bbox="926 393 1372 427">Solubility @ 20 C (g/L)</th> </tr> </thead> <tbody> <tr> <td data-bbox="678 427 773 455">water</td> <td data-bbox="1103 427 1158 455">136</td> </tr> <tr> <td data-bbox="678 455 832 483">n-hexane</td> <td data-bbox="1141 455 1196 483">0.5</td> </tr> <tr> <td data-bbox="678 483 964 510">dichloromethane</td> <td data-bbox="1103 483 1158 510">690</td> </tr> <tr> <td data-bbox="678 510 816 538">toluene</td> <td data-bbox="1125 510 1158 538">30</td> </tr> <tr> <td data-bbox="678 538 865 566"><u>2-propanol</u></td> <td data-bbox="1103 538 1158 566"><u>520</u></td> </tr> </tbody> </table> <p data-bbox="678 580 1273 644">[OECD Guideline No. 105] (Mobay 98% T; 3125-9; 00152133)</p> <p data-bbox="678 676 1219 768">8 g/100 g water at 25 C (Kaw Valley 97% T; 44215-129 00162307)</p>	Solvent	Solubility @ 20 C (g/L)	water	136	n-hexane	0.5	dichloromethane	690	toluene	30	<u>2-propanol</u>	<u>520</u>
Solvent	Solubility @ 20 C (g/L)												
water	136												
n-hexane	0.5												
dichloromethane	690												
toluene	30												
<u>2-propanol</u>	<u>520</u>												
63-9. Vapor Pressure	<p data-bbox="678 800 1108 829">2.8 x 10⁻⁶ mbar at 20 C</p> <p data-bbox="678 836 1372 900">[OECD Guideline No. 104] (Mobay 98% T, PAI; 3125-9; 00152133)</p> <p data-bbox="678 932 1240 1023"><1 mm Hg (Kaw Valley 97% T; 44215-129; 00162307)</p>												
63-10. Dissociation constant	<p data-bbox="678 1055 1433 1215">does not dissociate; trichlorfon is not capable of reverse splitting [OECD 112] (Mobay 98% T; 3125-9; 00152133) (Kaw Valley 97% T; 44215-129; 00162307)</p>												
63-11. Octanol/water partition coefficient	<p data-bbox="678 1247 1372 1310">log P_{ow} = 0.52 (Mobay 98% T, PAI; 3125-9; 00147436)</p> <p data-bbox="678 1342 1367 1438">P_{ow} = 2.0 for total organophosphates (Kaw Valley 97% T; 44215-129; 00162307)</p>												
63-12. pH	<p data-bbox="678 1470 1433 1534">5.5 (10% solution with distilled water) (Mobay 98% T; 3125-9; 00152133)</p> <p data-bbox="678 1566 1405 1706">2.60 to 3.07 in 0.1 to 0.00625M water solutions (Kaw Valley 97% T; 44215-129; 00162307)</p>												

(Continued.)

Table 1. (Continued.)

Guidelines Reference No., 40 CFR §158.190; Name of Property	(Registrant and Product; Substrate; EPA Reg. No.; MRID)^a
63-13. Stability	<p>stable in pH 4 for 3 hours at 90 C, in pH 7 for 3.2 hours at 40 C, and in pH 9 for <30 minutes at 20 C (Mobay 98% T; 3125-9; 00152133)</p> <p>under conditions of heat and UV/IR, purity increased, took on slight yellow tint, and there was no change of appearance; concentration of moisture and DDVP declined following exposure to heat and irradiation [72 hours irradiated with 10.1 mW/cm², and 6 days at 60 C] (Kaw Valley 97% T; 44215-129; 00162307)</p>
63-14. Oxidizing or reducing action	<p>not an oxidizing or reducing agent [in accordance with 40 CFR §158.120] (Mobay 98% T; 3125-9; 00152133) (Kaw Valley 97% T; 44215-129; 00162307)</p>
63-15. Flammability	<p>does not contain combustible ingredient (Mobay 98% T; 3125-9; 00152133) (Kaw Valley 97% T; 44215-9; 00162307)</p>
63-16. Explodability	<p>no impact explosive characteristics (Mobay 98% T; 3125-9; 00152133) (Kaw Valley 97% T; 44215-129; 00162307)</p>
63-17. Storage stability	<p>exhibited 1.5% loss of active ingredient after 4 months of storage at 40 C; 6.5% loss of active ingredient after 24 months of storage at ambient temperatures in open head steel drums with HDPE bag liners in warehouses (Mobay 98% T; 3125-9; 00152133)</p> <p>no appreciable change following 1 to 12 months of storage under warehouse conditions (Kaw Valley 97% T; 44215-129; 00162307)</p>

(Continued.)

Table 1. (Continued.)

Guidelines Reference No., 40 CFR §158.190; Name of Property	(Registrant and Product; Substrate; EPA Reg. No.; MRID)^a
63-18. Viscosity	none submitted not required if MUP is a solid
63-19. Miscibility	none submitted not required if MUP is a solid
63-20. Corrosiveness	noncorrosive to high density polyethylene bag liner (Mobay 98% T; 3125-9; 00152133) noncorrosive to plastic packaging materials after incubation for 6 months at room temperature followed by 6 months at 35 C; was reported to have a corrosion rate of 0.612 - 21.2 um/year (corrosion rate of untreated control was 0-22.0 um/year) [ASTM, Part 31, 1973] (Kaw Valley 97% T; 44215-129; 40731804)

^aTGAI = technical grade of the active ingredient. MUP = manufacturing-use product. FI = formulation intermediate. Hyphenated numbers represent EPA Registration Numbers. Eight-digit numbers are MRID documents from the Pesticide Document Management System (PDMS).

Product Chemistry Citations (used):

00147436 Krohn, J. (1983) Letter sent to Hagen dated Jul 14, 1983: Partition coefficient of trichlorfon and methamidophos: Registration in Egypt. Translation of Verteilungskoeffizienten von trichlorfon und methamidophos: Registrierung in Aegypten prepared by Bayer AG, Mobay report 85931. 1 p.

00148973 Slahck, S. (1985) Composition of Technical Trichlorfon: Report No. 88931. Unpublished study prepared by Mobay Chemical Corporation. 25 p.

00152133 Mobay Chemical Corp. (1985) Product Chemistry of Trichlorfon Technical: Dylox Technical. Unpublished compilation. 22 p.

00162307 Technology Services Group (1986) :Product Chemistry Data for Technical Trichlorfon:. Unpublished compilation. 101 p.

40731804 Labare, A. (1987) Product Chemistry: Corrosivity of Trichlorofon (Technical) to Plastic Packaging Material: Project ID BIOS # 86-06-410-01F,01C. Unpublished study prepared by Biospherics, Inc. 11 p.

Product Chemistry Citations (not used):

(MRIDs pertain to either new registrations, end - use products, or cancelled registrations.)

00145104 Mobay Chemical Corp. (1985) Product Chemistry of Dylox/Metasystox-R 1.5-0.5 SC. Unpublished compilation. 74 p.

✓ 00150011 Mobay Chemical Corp. (1985) Product Chemistry of DYLOX 80 SPA. Unpublished compilation. 37 p. 3125-66

00158290 Talbott, T. (1986) Maximum and Minimum Certified Limits for Dylox 80 Concentrate Formulation: Report No. 90973. Unpublished study prepared by Mobay Chemical Corp. 13 p.

00158291 Barnett, H.; Mayor, W. (1984) Dylox 80 SP Physical and Chemical Properties: Report No. 86582. Unpublished study prepared by Mobay Chemical Corp. 3 p.

3125-198

TABLE A. GENERIC DATA REQUIREMENTS FOR THE TRICHLORFON TECHNICAL GRADE OF THE ACTIVE INGREDIENT.¹

Data Requirement	Test Substance ²	Does EPA have data to satisfy this requirement?	Bibliographic Citation ³	Must additional data be submitted under FIFRA Sec. 3(c)(2)(B)?
<u>40 CFR §158.155-190 Product Chemistry</u>				
<u>Product Composition</u>				
61-2. Beginning Materials and Production Process	TGAI	No	<u>00152133, 00162307</u>	Yes ⁴
61-3. Formation of Impurities	TGAI	No	<u>00162307</u>	Yes ⁵
<u>Analysis and Certification of Product Ingredients</u>				
62-1. Preliminary Analysis	TGAI	No	<u>00148973, 00162307</u>	Yes ⁶
<u>Physical and Chemical Characteristics⁷</u>				
63-2. Color	TGAI	No	<u>00152133, 00162307</u>	Yes ⁸
63-3. Physical State	TGAI	No	<u>00152133, 00162307</u>	Yes ⁹
63-4. Odor	TGAI	No	<u>00152133, 00162307</u>	Yes ¹⁰
63-5. Melting Point	TGAI	No	<u>00152133, 00162307</u>	Yes ¹¹
63-6. Boiling Point	TGAI	No		Yes ¹²
63-7. Density, Bulk Density, or Specific Gravity	TGAI	No	<u>00152133, 00162307</u>	Yes ¹³
63-8. Solubility	TGAI or PAI	No	<u>00152133, 00162307</u>	Yes ¹⁴
63-9. Vapor Pressure	TGAI or PAI	No	<u>00152133, 00162307</u>	Yes ¹⁵
63-10. Dissociation Constant	TGAI or PAI	No	<u>00152133, 00162307</u>	Yes ¹⁶

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement	Test Substance ²	Does EPA have data to satisfy this requirement?	Bibliographic Citation ³	Must additional data be submitted under FIFRA Sec. 3(c) (2) (B)?	Time Frame For Data Submission
63-11. Octanol/Water Partitioning Coefficient	PAI	No	00147436, <u>00162307</u>	Yes ¹⁷	
63-12. pH	TCAI	No	<u>00152133</u> , <u>00162307</u>	Yes ¹⁸	
63-13. Stability	TCAI	No	<u>00152133</u> , <u>00162307</u>	Yes ¹⁹	
<u>Other Requirements:</u>					
64-1. Submittal of Samples	N/A	N/A	N/A	No	

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- Additional data requirements are listed in the following Table B, "Generic Data Requirements for Trichlorfon Manufacturing-Use Products".
- Test substance: PAI = purified active ingredient; TCAI = technical grade of the active ingredient; MP = manufacturing-use product.
- These references were submitted in response to the Trichlorfon Guidance Document dated 6/84. Underlining indicates references containing data reviewed in this update.
- No information is required regarding beginning materials and manufacturing process for the Kaw Valley, Inc. 97% T (EPA Reg. No. 44215-129). Information concerning: (i) technical specifications for the beginning materials; (ii) a description of the equipment used and the conditions (e.g., temperature, pressure, pH, humidity) controlled during each step of the process; (iii) the duration for each step of the process; (iv) a description of the procedures used to assure consistent composition of the substance produced (quality control); and (v) the producer/supplier of each beginning material used in the production of the Mobay 98% T (EPA Reg. No. 3125-9) are required. Complete information concerning starting materials and the manufacturing processes are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181), (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30), and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).

TABLE A. (Continued).

5. No data are required for the Kaw Valley, Inc. 97% T (EPA Reg. 44215-129) concerning the formation of impurities. Complete information concerning the discussion of formation of impurities is required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% Ts (EPA Reg. No. 11556-30 and 3125-9); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
6. Validation data (precision and accuracy) are required for the analytical methods used in the preliminary analysis of the Mobay Corporation 98% T (EPA Reg. No. 3125-9) and the Kaw Valley 97% T (EPA Reg. No. 44215-129). Complete data concerning preliminary analysis are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
7. As required by 40 CFR §158.190 and more fully described in the Pesticide Assessment Guidelines, Subdivision D, Guidelines Reference Nos. 63-2 through 63-13, data must be submitted on physicochemical characteristics (color, physical state, odor, melting point, boiling point, specific gravity, solubility, vapor pressure, dissociation constant, octanol/water partition coefficient, pH, and stability). There are additional data requirements listed in Table B pertaining to physicochemical characteristics of those technical products which are also manufacturing-use products.
8. Color data are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
9. Physical state data are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
10. Odor data are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
11. Melting point data are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
12. Boiling point data are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).

TABLE A. (Continued).

13. The method of determination of density for the Mobay 98% T (EPA Reg. No. 3125-9) is required along with complete information concerning density, bulk density, or specific gravity for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
14. Data concerning the solubility of the Kaw Valley 97% T (EPA Reg. No. 44215-129) in organic solvents are required along with complete data concerning the solubility of the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
15. Complete data on vapor pressure are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
16. Complete data on dissociation constant are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
17. Complete data on octanol/water partition coefficient are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
18. Complete data on pH are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
19. Data concerning the stability of the Kaw Valley 97% T (EPA Reg. No. 44215-129) and the Mobay 98% T (EPA Reg. No. 3125-9) to exposure to metal ions and sunlight are required. Complete data on stability is required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).

TABLE B. PRODUCT SPECIFIC DATA REQUIREMENTS FOR TRICHLORFON MANUFACTURING-USE PRODUCTS.¹

Data Requirement	Test Substance ²	Does EPA have data to satisfy this requirement?	Bibliographic Citation ³	Must additional data be submitted under FIFRA Sec. 3(c)(2)(B)?
<u>40 CFR §158.155-190 Product Chemistry</u>				
<u>Product Composition</u>				
61-1. Product Composition	MP	No	<u>00152133, 00162307</u>	Yes ⁴
61-2. Beginning Materials & Production/Formulation Process	MP	No	<u>00152133, 00162307</u>	Yes ⁵
61-3. Formation of Impurities	MP	No	<u>00162307</u>	Yes ⁶
<u>Analysis and Certification of Product Ingredients</u>				
62-1. Preliminary Analysis	MP	No	<u>00148973, 00162307</u>	Yes ⁷
62-2. Certified Limits	MP	No	<u>00152133, 00162307</u>	Yes ⁸
62-3. Enforcement Analytical Methods	MP	No	<u>00148973, 00152133, 00162307</u>	Yes ⁹
<u>Physical and Chemical Characteristics¹⁰</u>				
63-2. Color	MP	No	<u>00152133, 00162307</u>	Yes ¹¹
63-3. Physical State	MP	No	<u>00152133, 00162307</u>	Yes ¹²
63-4. Odor	MP	No	<u>00152133, 00162307</u>	Yes ¹³
63-7. Density, Bulk Density, or Specific Gravity	MP	No	<u>00152133, 00162307</u>	Yes ¹⁴
63-12. pH	MP	No	<u>00152133, 00162307</u>	Yes ¹⁵

(Continued, footnotes follow)

TABLE B. (Continued).

Data Requirement	Test Substance ²	Does EPA have data to satisfy this requirement?	Bibliographic Citation ³	Must additional data be submitted under FIFRA Sec. 3(c)(2)(B)?	Time Frame For Data Submission
62-14. Oxidizing or Reducing Action	MP	No	<u>00152133, 00162307</u>	Yes ¹⁶	
62-15. Flammability	MP	No	<u>00152133, 00162307</u>	Yes ¹⁷	
63-16. Explodability	MP	No	<u>00152133, 00162307</u>	Yes ¹⁸	
63-17. Storage Stability	MP	No	<u>00152133, 00162307</u>	Yes ¹⁹	
63-18. Viscosity	MP	No	N/A	No ²⁰	
63-19. Miscibility	MP	No	N/A	No ²¹	
63-20. Corrosion Characteristics	MP	No	<u>00152133, 40731804</u>	Yes ²²	
Other Requirements:					
64-1. Submittal of Samples	N/A	N/A	N/A	No	

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1. Additional data requirements are listed in the preceding Table A, "Generic Data Requirements for the Trichlorfon Technical Grade of the Active Ingredient".

2. Test substance: PAI = purified active ingredient; TGAI = technical grade of the active ingredient; MP = manufacturing-use product.

3. These references were submitted in response to the Trichlorfon Guidance Document dated 6/84. Underlining indicates references containing data reviewed in this update.

4. No additional data are required for the Kaw Valley, Inc. 97% T (EPA Reg. No. 44215-129). Data regarding the nominal concentrations for impurities present at >0.1% of the TGAI by weight and other impurities of toxicological concern are required for the Mobay Corporation 98% T (EPA Reg. No. 3125-9). Complete data concerning product identity and disclosure of ingredients are required for the following MPs: (i) Aceto

TABLE B. (Continued).

Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).

5. No information is required regarding beginning materials and manufacturing process for the Kaw Valley, Inc. 97% T (EPA Reg. No. 44215-129). Information concerning: (i) technical specifications for the beginning materials; (ii) a description of the equipment used and the conditions (e.g., temperature, pressure, pH, humidity) controlled during each step of the process; (iii) the duration for each step of the process; (iv) a description of the procedures used to assure consistent composition of the substance produced (quality control); and (v) the producer/supplier of each beginning material used in the production of the Mobay 98% T (EPA Reg. No. 3125-9) are required. Complete information concerning starting materials and the manufacturing processes are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).

6. No data are required for the Kaw Valley, Inc. 97% T (EPA Reg. 44215-129) concerning the formation of impurities. Complete information concerning the discussion of formation of impurities is required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% Ts (EPA Reg. No. 11556-30 and 3125-9); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).

7. Validation data (precision and accuracy) are required for the analytical methods used in the preliminary analysis of the Mobay Corporation 98% T (EPA Reg. No. 3125-9) and the Kaw Valley 97% T (EPA Reg. No. 44215-129). Complete data concerning preliminary analysis are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).

8. An explanation as to how the certified limits were determined for the Mobay 98% T (EPA Reg. No. 3125-9) is required. Complete data concerning certified limits are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).

9. Validation data (precision and accuracy) are required for the analytical methods submitted for the determination of the active ingredient and impurities in the Mobay 98% T (EPA Reg. No. 3125-9) and the Kaw Valley 97% T (EPA Reg. No. 44215-129). Enforcement analytical methods with complete validation data are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).

TABLE B. (Continued).

10. As required in 40 CFR §158.190 and more fully described in the Pesticide Assessment Guidelines, Subdivision D, Guidelines Reference Nos. 63-2 through 63-20, data must be submitted on physicochemical characteristics of each manufacturing-use product (color, physical state, odor, specific gravity, pH, oxidizing or reducing action, flammability, explosibility, storage stability, viscosity, miscibility, and corrosion characteristics). Additional data requirements regarding physicochemical properties of manufacturing-use products which contain only the technical grade of the active ingredient are listed in Table A, "Generic Data Requirements for the Trichlorfon Technical Grade of the Active Ingredient."
11. Data on color are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
12. Data on physical state are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
13. Data on odor are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
14. The method of determination of density for the Mobay 98% T (EPA Reg. No. 3125-9) is required along with complete information concerning density, bulk density, or specific gravity for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
15. Complete data on pH are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
16. Complete data on oxidizing/reducing action are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
17. Complete data on flammability are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).

TABLE B. (Continued).

18. Complete data on explodability are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
19. Complete data on storage stability are required for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).
20. Data on viscosity are not required since the products are solid.
21. Data on miscibility are not required since the product is not an emulsifiable liquid and to be diluted with petroleum solvents.
22. The method of determination of corrosion characteristics for the Mobay 98% T (EPA Reg. No. 3125-9) is required along with complete information concerning density, bulk density, or specific gravity for the following MPs: (i) Aceto Chemical Co. 98% T (EPA Reg. No. 2749-181); (ii) Mobay Corp. 98% T (EPA Reg. No. 11556-30); and (iii) Mobay 82% FI (EPA Reg. No. 11556-55).

CONFIDENTIAL

TRICHLORFON
REGISTRATION STANDARD UPDATE
PRODUCT CHEMISTRY
TASK 4
(Final Report)

CONFIDENTIAL APPENDICES

Appendix A: 2 Page(s)
Appendix B: 1 Page(s)
Appendix C: 1 Page(s)
Appendix D: 2 Page(s)
Appendix E: 2 Page(s)

Confidential Appendices to the Scientific Review of the
Registration Standard Update Report for the pesticide trichlorfon
by the Dietary Exposure Branch [Confidential FIFRA Trade
Secret/CBI].

TRICHLORFON PRODUCT AND RESIDUE CHEMISTRY

Page _____ is not included in this copy.

Pages 25 through 32 are not included in this copy.

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 product quality control procedures
 - Identity of the source of product ingredients
 - Sales or other commercial/financial information
 - A draft product label
 - The product confidential statement of formula
 - Information about a pending registration action
 - FIFRA registration data
 - The document is a duplicate of page(s) _____
 - 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.

Final Report

TRICHLORFON
Task 4: Residue Chemistry
Registration Standard Update

April 4, 1990

Contract No. 68-D8-0080

Submitted to:
Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
The Dynamac Building
11140 Rockville Pike
Rockville, MD 20852

TRICHLORFON

REGISTRATION STANDARD UPDATE

RESIDUE CHEMISTRY

Task - 4

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TRICHLORFON

REGISTRATION STANDARD UPDATE

RESIDUE CHEMISTRY

Task - 4

INTRODUCTION

The 2/22/89 update of the Index of Pesticide Chemicals identifies registered food/feed uses for the insecticide Trichlorfon. Trichlorfon is registered for use on the following crops: alfalfa, alfalfa-grass mixtures, artichoke (globe), bananas, barley, beans (succulent and dry), lima beans, beets, blackeyed peas, blueberries, Brussels sprouts, cabbage, carrots, cauliflower, citrus fruits, clover, clover-grass mixtures, collards, corn (field, pop, and sweet), cotton, cowpeas, crowder peas, field peas, flax, grass (rangeland and pasture), lettuce, oats, peanuts, peppers, pumpkin, safflower, southern peas, sugar beets, tobacco, tomatoes, and wheat. In addition, trichlorfon may be applied to alfalfa, birdsfoot trefoil, cabbage, clover, lettuce, and soybeans grown solely for seed production. Trichlorfon formulations variously registered for foliar, soil, and bait use on food/feed crops include the 80% SC/S (soluble concentrate/solid), 60% SC/L (soluble concentrate/liquid), 5 and 8% dust (D), and 5% granular (G). Trichlorfon is also registered for direct application to beef cattle and dairy cattle (nonlactating). Direct treatments with the 80% SC/S, 80% WP, and 8% ready-to-use (RTU) formulations may be made to animals as spray and pour on applications.

The Trichlorfon Guidance Document dated 6/30/84 concludes that additional data are required for plant and animal metabolism, and the magnitude of the residue in carrots, radishes, rutabagas, sugar beet roots and tops, turnips, garlic, onions, spinach, lettuce, celery, Brussels sprouts, broccoli, cabbage, kale, cauliflower, collards, cowpeas (succulent and dried), dried beans, lima beans, snap beans, bean vines, cowpea vines, lima bean vines and hay, peppers, tomatoes, pumpkins, watermelon, citrus fruits, strawberries, barley grain and straw, oat grain and straw, wheat grain and straw, pasture grass (forage and hay), rangeland grass (forage and hay), alfalfa forage and hay, birdsfoot trefoil hay, clover forage and clover hay, artichokes, cottonseed, flax, safflower seed, and tobacco, and the magnitude of the residue in livestock. In response to these requirements, Mobay Chemical Corp. has submitted data pertaining to plant metabolism (1987; MRIDs 40338603, 40338604, 40338605, and 40359401), animal metabolism (1987; MRID 40338601), and the magnitude of the residue in plants (1987-88; MRIDs 00141146, 00149104, 40279304, 40279305, 40279306, 40359402, 40358201, and 40665101). The available data up to December 4, 1989, have been

reviewed by the Agency or are otherwise reviewed here for their adequacy in satisfying outstanding data requirements.

Tolerances for residues of trichlorfon in or on food/feed items are currently expressed in terms of trichlorfon per se [40 CFR §180.198]. A feed additive tolerance has been established for this same residue in dried citrus pulp [40 CFR §186.2325].

SUMMARY

The following Trichlorfon Residue Chemistry data are required:

- Additional data pertaining to the qualitative nature of the residue in plants.
- Additional data pertaining to the qualitative nature of the residue in ruminants (dermal and oral exposure) and poultry.
- Sample storage intervals and conditions must be supplied for all residue data submitted in support of tolerances, whether previously submitted or required in this update. Data are required which depict the decline in levels of trichlorfon in commodities stored under the range of conditions and for the range of intervals specified.
- Residue data on carrots, sugar beets (roots and tops), lettuce, Brussels sprouts, cabbage, cauliflower, collards, beans and bean vines and hay, cowpeas and cowpea vines and hay, peppers, tomatoes, pumpkins, citrus fruits, barley (grain, forage, hay, and straw), oat (grain, forage, hay, and straw), wheat (grain, forage, hay, and straw), grasses (pasture and rangeland), alfalfa forage and hay, birdsfoot trefoil forage and hay, clover forage and hay, artichokes, cottonseed, flaxseed and flax straw, and safflower seed.
- Processing studies on sugar beets, tomatoes, citrus fruits, barley, oats, wheat, cottonseed, flax seed, and safflower seed.

QUALITATIVE NATURE OF THE RESIDUE IN PLANTS

Conclusions:

The Trichlorfon Guidance Document dated 6/30/84 requires additional data depicting the degree of absorption of [¹⁴C]trichlorfon by both leaves and roots of representative crops as well as the subsequent translocation and metabolism of

trichlorfon and/or its metabolites. In addition, an attempt must be made to identify all metabolites including volatile, toxic compounds which may include 2,2-dichlorovinyl dimethylphosphate (DDVP).

In response to this requirement, Mobay Chemical Corp. has submitted data on the metabolism of trichlorfon in tomatoes, potatoes, wheat, and soybeans. Studies on tomatoes, potatoes, and wheat (1987; MRIDs 40338603, 40338604, and 40338605) were reviewed by D. Edwards (EPA Memorandum DEB No. 2837, dated 12/4/87). In this review, it is concluded that the nature of the residue in plants is not adequately delineated because the identity of an unknown metabolite (metabolite "A") accounting for >10% of the total radioactive residues (TRR) in wheat forage and heads was not established, and no data were provided reflecting soil application to a root crop, a use that could lead to direct exposure to the the soil degradate DDVP. In addition, it was noted that inadequate detail was provided regarding the percent of each metabolite released after each extraction and hydrolysis step; this information is necessary in order to evaluate the adequacy of analytical enforcement procedures, and it was noted that none of the currently accepted enforcement methods include hydrolysis steps similar to those used in the recently submitted metabolism studies. A study on soybeans (MRID 40359401) was reviewed by F.B. Suhre (EPA Memorandum DEB No. 3158, dated 2/2/88), who concludes that the nature of the residue in soybeans is not adequately understood because the radioactive residues found in soybean meal were not adequately characterized.

The available tomato metabolism data (MRID 40338603) indicate that the terminal residues in or on tomatoes harvested 21 days following foliar application include dichloroacetic acid (41% of the TRR), dichloroethanol (30%), trichlorfon (7%), dichloroacetaldehyde (6%), and glucose (7%). Trichloroethanol was found in tomatoes harvested 14 days posttreatment; however, at 21 days posttreatment no trichloroethanol was detected. DDVP residues were detected in tomatoes 2.5 hours and 2 days following trichlorfon application. No DDVP residues were found 7 days after treatment.

The major residue found in potato tubers (MRID 40338604) harvested 14 or 21 days following three foliar applications was glucose, accounting for 88% of the TRR. Dichloroethanol comprised ca. 7-8% of the TRR. No DDVP or trichlorfon was found in tubers following foliar application.

In wheat forage and straw (MRID 40338605) the major residue was dichloroacetic acid (42-43% of the TRR), with trichlorfon (13-16%), dichloroethanol (6-9%), and dichloroacetaldehyde (7-13%) accounting for a total of 26-38% of the TRR. Glucose accounted for 4% of the TRR in straw. The major residue in dry heads was dichloroacetic acid (32% of the TRR). Trichlorfon (9%),

dichloroethanol (9%), dichloroacetaldehyde (8%), and glucose (13%) were also detected. An unknown metabolite designated "metabolite A" accounted for 12 and 11% of the TRR in wheat forage and heads, respectively.

The available soybean metabolism data (MRID 40359401) indicate that the major terminal residue in soybean forage is dichloroacetic acid (ca. 40-41% of the TRR). The following residues accounting for a total of 35-37% of the TRR were also identified: trichlorfon (5-8%), dichloroethanol (7-19%), and dichloroacetaldehyde (11-12%). Radioactive components in soybean meal did not cochromatograph with any of the trichlorfon metabolites found in or on forage.

DEB has deferred to Toxicology Branch regarding the toxicological significance of dichloroacetic acid, dichloroethanol, dichloroacetaldehyde, and trichloroethanol (D. Edwards, DEB No. 2837, 12/4/87).

The qualitative nature of the residue in plants is not adequately understood. Therefore, the following additional data are required:

- Data depicting the distribution and metabolism of uniformly ring-labeled [¹⁴C]trichlorfon in or on a root crop. A completely characterized test substance representative of technical trichlorfon (including impurities, if appropriate) used in commercial formulations must be applied soil incorporated under conditions representing normal cropping practices and at rates sufficiently high to permit characterization of ¹⁴C-residues. The identities and quantities of residues in or on mature plant parts must be determined in order to elucidate terminal residues. Confirmation of the identities of residues using a suitable method such as MS or HPLC is also required. Representative samples from these studies and those on tomatoes, wheat, and soybeans must be analyzed by the residue analytical methods developed for data collection and tolerance enforcement to ascertain that all residues of concern are determined.
- The component designated "metabolite A" in wheat forage and green heads in MRID 40338605 must be identified. Confirmation of the identities of residues using a suitable method such as MS or HPLC is also required.
- The registrant must provide additional information from the studies on tomatoes, potatoes, and wheat reported in MRIDs 40338604, -04, and -05 regarding the percent of each metabolite released following each extraction and hydrolysis step.

- The registrant must identify the radioactive residues detected in soybean meal (MRID 40359401). Confirmation of the identities of residues using a suitable method such as MS or HPLC is also required.

Although incomplete, the available data indicate that trichlorfon undergoes dehydrochlorination and rearrangement to form 2,2-dichlorovinyl dimethylphosphate (DDVP) or hydrolysis to trichloroethanol. DDVP is hydrolyzed to form dichlorovinylethanol which immediately rearranges to dichloroacetaldehyde or dichloroethanol. Dichloroacetic acid and dichloroethanol are formed from dichloroacetaldehyde and then conjugated. Further dechlorination of these metabolites occurs prior to their entering the two-carbon biosynthetic pathway leading to glucose formation.

References (used):

MRID(s): 40338603. 40338604. 40338605. 40359401.

Discussion of the data:

N/A.

QUALITATIVE NATURE OF THE RESIDUE IN ANIMALS

Conclusions:

The Trichlorfon Guidance Document dated 6/30/84 requires additional data on the metabolism of trichlorfon in ruminants. A poultry metabolism study is conditionally required based on the outcome of the ruminant study. In addition, a metabolism study reflecting dermal application of the 80% SC/S formulation to cattle is required.

Mobay Chemical Corp. (1987; MRID 40338601) submitted a goat metabolism study, which is the subject of an agency review (D. Edwards, EPA Memorandum DEB No. 2837, dated 12/4/87). The reviewer concludes that the nature of the residue in livestock is not adequately understood because 16-46% of the TRR in tissues is unidentified polar residues and the registrant's contention that these residues are proteins and sugars was not supported by any data. DEB also noted that the loss of 9-13% of the TRR in milk, liver, and fat during the concentration of extracts was not adequately explained and that alternate sample handling procedures should be attempted. Furthermore, it was concluded that a poultry metabolism study is required, since the ruminant study demonstrated that free and conjugated residues transfer to tissues.

As with plants, DEB has noted that none of the analytical procedures for detection of residues in meat or milk employs the hydrolysis steps required to release conjugated residues.

The DEB review also addressed the need for metabolism studies reflecting direct animal treatments (high-pressure spray on beef cattle and pour-on application to dairy cattle).

DEB has deferred to Toxicology Branch regarding the toxicological significance of desmethyl trichlorfon, desmethyl DDVP, and dichloroethanol.

The available data indicate that the major residue in kidney (39% of the TRR), muscle (23%), and fat (65%) is DCA glucuronide, also detected in liver (5%). Another, unspecified conjugate of DCA accounted for 20% of the TRR in muscle and 5-6% in liver, kidney, and fat. Un-metabolized trichlorfon was detected in kidney (7%) and muscle (6%) and trichlorfon glucuronide accounted for 5% of the total residue in kidney and 2% in liver. Desmethyl trichlorfon comprised 8% of the TRR in kidney and 4% each in liver and fat; desmethyl DDVP was found in liver at 1%. Dichloroethanol (DCE), conjugated DCE, and free DCA were detected in tissues at 1-3% of the total residues. In milk, the major radioactive residues were glucose and free dichloroacetic acid accounting for 64 and 22% of the TRR, respectively. No DDVP was detected in tissues or milk. However, a large percentage of the extractable residues remains unidentified (16-46%). The qualitative nature of the residue in animals is not adequately understood. The following additional data are required:

- Metabolism studies must be conducted utilizing ruminants and poultry. Animals must be dosed orally for a minimum of 3 days with uniformly ring-labeled [¹⁴C]trichlorfon fed in the diet at a level sufficient to make residue identification and quantification possible. Milk and eggs must be collected twice daily during the dosing period. Animals must be sacrificed within 24 hours of the final dose. The distribution and identity of residues must be determined in eggs, milk, liver, kidney (except poultry), muscle and fat. Confirmation of the identities of residues using a suitable method such as MS or HPLC is also required. Alternative to an additional ruminant metabolism study, the registrant must submit additional data from analysis of extracts (from the study described in MRID 40338601) processed using procedures that will minimize loss of residues due to volatilization, and subjected to further analyses in order to identify extracted polar residues. Representative samples from [¹⁴C]trichlorfon metabolism studies must be analyzed by the residue analytical methods developed for data collection and tolerance

enforcement to ascertain that the methods are capable of adequately recovering and quantifying all residues of concern.

DEB has pointed out that metabolism studies reflecting registered direct applications to livestock are required also, and although Mobay Chemical Co. has indicated that they intend to remove from product labels the high-pressure spray treatment to beef cattle and pour-on application to dairy cattle, it is noted that additional metabolism data are required unless all registrants amend their labels to delete these uses (D. Edwards, DEB No. 4064, 10/24/88). The following additional data are required:

- Metabolism studies in which cattle receive direct dermal applications of ring-labeled [¹⁴C]trichlorfon. Beef cattle must be treated using high-pressure spray equipment and dairy animals must be given pour-on treatment. Animals must be treated at a concentration that will result in sufficient residues in the tissues for characterization. Animals must be sacrificed 24 hours after treatment and residues characterized in milk, muscle, fat, kidney, and liver.

References (used):

MRID(s): 40338601.

Discussion of the data:

N/A.

RESIDUE ANALYTICAL METHODS

Conclusions:

The Trichlorfon Guidance Document dated 6/30/84 did not require additional data pertaining to residue analytical methodology. The qualitative nature of the residue in plants and animals has not been adequately described; however, DEB has noted in reviews of plant and animal metabolism data that current methodology does not employ hydrolysis steps necessary to release bound residues as demonstrated in the available metabolism studies (refer to the "Qualitative Nature of the Residue..." sections for details), and that, therefore, methodology needs to be developed that is capable of recovering bound and conjugated residues. Following review of the requested plant and animal metabolism data, the specific needs for revised methodology will be determined. PAM Vol. II (Pesticide Reg. Sec. 120.198, dated 7/1/70) currently

lists as Method I a GLC/EC method for analysis of residues in milk and as Method B a GLC/MC procedure for determination of residues in or on plant samples; a GLC method for analysis of animal tissues is included as Method B.

Trichlorfon is completely recovered using Multiresidue Protocol D, with special GLC/HPLC equipment, and procedure 232.3 (Storherr), but is not recovered, nor is recovery expected, using Protocol E for fatty or non-fatty foods (FDA Pestrak data base, PAM Vol. I Appendix dated 12/13/89).

The following additional data are required:

- Additional validated methodology may be required in order to recover bound and conjugated residues. The specific requirements for the revised methods will be determined following review of the requested plant and animal metabolism data (refer to "Qualitative Nature of the Residue in Plants" and "Qualitative Nature of the Residue in Animals" for additional details).

References (used):

MRID(s): N/A.

Discussion of the data:

N/A.

STORAGE STABILITY DATA

Conclusions:

No additional data regarding storage stability of residues of trichlorfon were required in the Trichlorfon Guidance Document dated 6/30/84. The Agency now requires that storage intervals and sample storage conditions be reported for all residue data submitted in support of tolerances or otherwise required by the Agency, and that the residue data be accompanied by data depicting the stability of all residues of concern in storage (Pesticide Assessment Guidelines, Subdivision O).

The following data are required:

- The sample storage conditions and intervals must be supplied for all required and previously submitted residue data for plant and animal commodities. Storage stability data in support of previously submitted residue data are required for only those samples deemed to be useful for tolerance assessment. Data are also required which depict the decline in levels of trichlorfon residues of concern in commodities stored under the range of conditions and for the range in intervals specified. Crop samples bearing measurable weathered residues or fortified meat and milk samples must be analyzed immediately after harvest or fortification and again after storage intervals that allow for reasonable unforeseen delays in sample analysis. In laboratory tests using fortified samples, the pure active ingredient and pure metabolites must be used. However, if field weathered samples are used, the test substance must be a typical end-use product. For additional guidance on conducting storage stability studies, the registrant is referred to an August, 1987 Position Document on the Effects of Storage Validity of Pesticide Residue Data available from NTIS under order no. PB 88112362/AS.

- The nature of the residue in plants and animals is not adequately understood. If the requested data on plant and animal metabolism indicate the presence of additional metabolites of toxicological concern, data depicting the stability of these residues during storage will be required.

References (used):

N/A.

Discussion of the data:

N/A.

MAGNITUDE OF THE RESIDUE IN PLANTS

The Trichlorfon Guidance Document dated 6/30/84 identifies field residue data requirements for carrots, radishes, rutabagas, sugar beet roots and tops, turnips, garlic, onions, spinach, lettuce, celery, Brussels sprouts, broccoli, cabbage, kale, cauliflower, collards, cowpeas (succulent and dried), dried beans, lima beans, snap beans, bean vines, cowpea vines, lima bean vines and hay, peppers, tomatoes, pumpkins, watermelon, citrus fruits, strawberries, barley grain and straw, oat grain and straw, wheat grain and straw, pasture grass (forage and hay), rangeland grass (forage and hay), alfalfa forage and hay, birdsfoot trefoil hay, clover forage and clover hay, artichokes, cottonseed, flax,

safflower seed, and tobacco. Data have been submitted on pumpkins, tomatoes, citrus fruits, wheat, cottonseed, and tobacco. Data requirements as outlined in the Trichlorfon Guidance Document dated 6/30/84 remain in effect for all other crops (refer to Table A. Generic Data Requirements for Trichlorfon for details).

Note to SRRD: The data gaps which appear in this update are based on the assumption that the use patterns for trichlorfon have not changed since publication of the Guidance Document.

The Agency has recently determined that DDVP (a potential metabolite of trichlorfon) may be of toxicological concern and may occur as a residue of trichlorfon in plants grown for food, particularly root crops on which soil treatment is permitted (beets and sugar beets), and crops harvested at a short posttreatment interval following foliar treatment, such as alfalfa, bananas, corn, citrus, and cotton (D. Edwards, DEB No. 2837, 12/4/87). Therefore, the following additional data are now required:

- Data depicting the magnitude of DDVP residues in or on representative commodities (or appropriate substitutes - refer to 40 CFR 180.34) from each crop group on which use of trichlorfon is permitted. Application regimens must approximate those most likely to result in maximum residues (highest rate, lowest PHI, maximum number of applications). Also tests must be geographically representative (refer to Agricultural Statistics, USDA and Census of Agriculture, U.S. Department of Commerce). These trials should not be completed, however, until all plant metabolism issues have been resolved since it may be necessary to conduct analyses for additional residues of toxicological concern.

Fruiting Vegetables (except Cucurbits) Group

Tomatoes

Tolerances(s):

A tolerance of 0.1 ppm has been established for residues of trichlorfon in or on tomatoes [40 CFR §180.198].

Use directions and limitations:

The 5% G and 5% D formulations are registered for broadcast or banded soil bait application to tomatoes at 1 lb ai/A. Formulations registered for multiple foliar applications to tomatoes are the 5 and 8% D at 1-1.25 lb ai/A and the 6 lb/gal SC/L and 50-80% SC/S formulations at 1 lb ai/A. Applications may be made using ground and aerial equipment. A 21-day PHI is in effect for foliar applications and a 28-day PHI is in effect for soil bait applications. Tomatoes to be cooked (canned) before marketing may be harvested on the day of treatment following treatment with dust formulations. The grazing of livestock on bait treated fields is not permitted.

Conclusions:

The Trichlorfon Guidance Document dated 6/30/84 requires additional data depicting residues of trichlorfon in or on tomatoes harvested following aerial and ground application of a representative SC/S formulation at 1 lb ai/A; tests representing the states of FL and TX were required. In addition, data are required depicting residues resulting from both ground and aerial applied soil and foliar treatments with a representative G formulation at 1 lb ai/A; tests conducted in AR, CA, FL, NJ, SC, and TX were required. A cooking study is also required. Additionally, a processing study is conditionally required pending the outcome of the residue field trials.

The available data (MRID 40279305) indicate that residues of trichlorfon will not exceed the established tolerance of 0.1 ppm in or on tomatoes harvested 21 days following five foliar applications at 1x the maximum registered rate. However, no data were submitted depicting residues in or on tomatoes resulting from registered use of a representative G formulation. The submitted processing data (MRID 4027906) indicate that concentration occurs in juice (1.1x), puree (1.4x), and wet pulp (1.3x); residues concentrate up to 1.5x in paste and 2.16x in dry pulp. In addition, data from a cooking study were not submitted. The following additional data are required:

- Data depicting trichlorfon residues of concern in or on tomatoes harvested following broadcast soil bait application of a representative G formulation at 1 lb ai/A. Tests must be conducted using ground and aerial equipment. Tests must be conducted in CA(25%) and FL(51%) which accounted for ca. 80% of 1986 U.S. fresh market tomato production; CA produced ca. 87% of U.S. tomatoes for processing (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988).
- The registrant must propose a feed additive tolerance for trichlorfon residues of concern in dry pomace. The available data indicate that a level of 0.25 ppm would be appropriate, toxicological considerations permitting.

DEB has noted that the differing PHIs for fresh-market and processing tomatoes is not enforceable (D. Edwards, DEB No. 2837, 12/4/87); therefore, data on tomatoes cooked following harvest on the day of treatment are not required, and the following label amendments are required:

- The registrant must amend all pertinent labels to specify that the 21-day PHI pertains to all tomatoes treated with trichlorfon, whether or not they are to be cooked and/or canned prior to marketing.

References (used):

MRID(s): 40279305. 40279306.

Discussion of the data:

Mobay Chemical Corp. (1986; MRID 40279305) submitted data from five tests conducted in FL(2) and TX(3) depicting residues of trichlorfon in or on tomatoes harvested 0-28 days following five foliar applications (using aerial and ground equipment) of the 80% SC/S formulation at 1 lb ai/A (1x the maximum registered rate) in 5-40 gal/A. Residues were <0.01 (nondetectable)-0.63 ppm in or on 20 samples harvested 0-14 days posttreatment. Residues were <0.01 ppm (nondetectable) in or on each of five samples harvested 21 and 28 days posttreatment. Apparent residues were <0.01 ppm (nondetectable) in or on untreated samples. All samples were stored frozen (temperature unspecified) for 322 days prior to analysis by thermionic emission GLC, as described in Report 21386. The limit of detection was 0.01 ppm. Recoveries were 70-95% from four samples fortified with trichlorfon at 0.01-0.05 ppm.

One of the samples from this study bearing 0.012 ppm of trichlorfon residues was processed into juice (containing

residues of 0.013 ppm, concentration factor 1.1x), puree (0.017 ppm, 1.4x), paste (0.018 ppm, 1.5x), wet pulp (0.016 ppm, 1.3x), and dry pulp (0.026 ppm, 2.2x). Apparent residues were <0.01 ppm (nondetectable) in or on control samples of all commodities. Samples were stored and analyzed as described above for fresh tomatoes. Recoveries were 72-83% from five fruit samples, 70-90% from five juice samples, 78-90% from three puree samples, 98-120% from two paste samples, 70-89% from five wet pulp samples, and 70-85% from three dry pulp samples, each fortified with trichlorfon at 0.001-0.01 ppm.

Geographic representation of the data is adequate since the test states of FL(51%) and TX(<1%) accounted for ca. 50% of the 1986 U.S. fresh market tomato production (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988). The available data indicate that residues of trichlorfon will not exceed the established 0.1 ppm tolerance in or on tomatoes harvested 21 days following five foliar applications of the 80% SC/S formulation at 1x the maximum registered rate. However, no data were submitted depicting residues in or on tomatoes resulting from registered use of a representative G formulation. The submitted processing study indicate that concentration occurs in juice (1.1x), puree (1.4x), and wet pulp (1.3x); residues concentrate up to 1.5x in paste and 2.16x in dry pulp. Data from a cooking study were not submitted. Additional data are required.

Cucurbit Vegetables Group

Pumpkins

Tolerance(s):

A tolerance of 0.1 ppm has been established for residues of trichlorfon in or on pumpkins [40 CFR §180.198].

Use directions and limitations:

The 5% G and 5% D formulations are registered for broadcast or banded soil bait application to pumpkins at 1 lb ai/A. Formulations registered for multiple foliar applications to pumpkins include the 5 and 8% D formulations at 1.25-1.5 lb ai/A and the 6 lb/gal SC/L and 50-80% SC/S formulations at 0.5-1 lb ai/A. Applications may be made using ground and aerial equipment. A 14-day PHI is in effect. A maximum of one application is permitted during the growing season.

Conclusions:

The Trichlorfon Guidance Document dated 6/30/84 requires additional data depicting residues of trichlorfon in or on pumpkins harvested 14 days following single ground and aerial soil applications of a representative G formulation at 1 lb ai/A.

The available data (MRID 00149104) indicate that residues of trichlorfon in or on pumpkins will not exceed the established 0.1 ppm tolerance when harvested 14 days following a single ground or aerial soil application of the 80% SC/S formulation at 1 lb ai/A. However, no data were submitted reflecting ground and aerial soil applications of a representative G formulation. The following additional data are required:

- Data depicting trichlorfon residues of concern in or on pumpkins harvested 14 days following a single broadcast soil application of the 5% G formulation at 1 lb ai/A. Tests must be conducted using ground and aerial equipment in CA(12%), IL(20%), NY(6%) or PA(6%), and TX(5%), since these states accounted for ca. 40% of the 1982 U.S. pumpkin acreage (1982 Census of Agriculture, Vol. 1, Part 51, p. 350).

References (used):

MRID(s): 00149104.

Discussion of the data:

Mobay Chemical Corp. (1974; MRID 00149104) submitted data from four tests conducted in CA(1), IL(1), KS(1), and WI(1) pertaining to residues of trichlorfon in or on pumpkins harvested 0-14 days following the last of three foliar applications of the 80% SC/S formulation at 1 lb ai/A/application (1x the maximum registered rate). Trichlorfon residues were 0.05-0.68 ppm in or on four samples of meat from pumpkins harvested on the day of treatment. Residues were <0.01(nondetectable)-0.05 ppm in or 12 samples of meat from fruit harvested 3-14 days posttreatment. Twelve samples of pumpkin seeds contained trichlorfon residues of <0.01 (nondetectable)-1.02 ppm. Apparent residues in or on four untreated samples of meat and three untreated seed samples were <0.01 ppm (nondetectable). One additional untreated seed sample bore apparent residues of 0.02 ppm. Data were collected using a GLC analytical method with flame photometric detection (modification of method described in Report No. 21386). The implied limit of detection was 0.01 ppm. Recovery data were not provided. Samples were stored under unspecified conditions for an unspecified period of time prior to analysis.

Geographic representation of the data is adequate since the test states of CA(12%), IL(20%), KS(1%), and WI(1%) accounted for ca. 34% of the 1982 U.S. pumpkin acreage (1982 Census of Agriculture, Vol. 1, Part 51, p. 350). The available indicate that residues in or on pumpkins will not exceed the established 0.1 ppm tolerance when harvested 14 days following three foliar applications of the 80% SC/S formulation at the 1 lb ai/A. However, no data were submitted reflecting broadcast soil application of a representative G formulation.

Citrus Fruits Group

Tolerance(s):

A tolerance of 0.1 ppm has been established for residues of trichlorfon in or on citrus fruits [40 CFR §180.198].

A feed additive tolerance of 2.5 ppm has been established for residues of trichlorfon in dried citrus pulp [40 CFR §186.2325].

Use directions and limitations:

The 50-80% SC/S formulations are registered for foliar applications to citrus in CA only, at 2-4 lb ai/A. Applications may be made in a minimum of 1 gal/A by aerial equipment and in a minimum of 200 gal/A by ground equipment. A 7-day PHI has been established for a single treatment and a 21-day PHI is in effect for two or three treatments. If more than one application is made, only one may be aerial. No more than three applications may be made during the fruiting season, one by aerial equipment and not more than two using ground equipment.

Conclusions:

The Trichlorfon Guidance Document dated 6/30/84 requires additional field residue data on citrus fruits; it also requires an orange processing study. Data submitted in response to the Guidance Document (MRID 00149104) indicate that residues of trichlorfon are not likely to exceed the established 0.1 ppm crop group tolerance in or on grapefruit and oranges harvested 21 days following application of the 80% SC/S formulation at 1x. However, no data were submitted depicting residues in or on whole unwashed citrus fruit resulting from a single aerial application in one gal/A followed by two ground applications of a representative SC/S formulation. In addition, no data were submitted depicting the potential for concentration of residues in the processed fractions of oranges. The following additional data are required:

- Data depicting trichlorfon residues of concern in or on citrus fruits (oranges, grapefruit, and lemons) harvested 21 days following a full-season treatment regimen including a single aerial foliar application followed by two foliar applications using ground equipment. Data should reflect residues resulting from application of a representative SC/S formulation at 4 lb ai/A/application; the aerial application should be made in 1 gal/A. Tests must be conducted in CA where this use is permitted.
- A processing study depicting the potential for concentration of trichlorfon residues of concern in dried pulp, oil, molasses, and juice processed from oranges bearing measurable, weathered residues. If residues concentrate in any product, an appropriate food/feed additive tolerance must be proposed.

References (used):

MRID(s): 00149104.

Discussion of the data:

Grapefruit: Mobay Chemical Corp. (1974; MRID 00149104) submitted data from a test conducted in CA pertaining to residues of trichlorfon in or on grapefruit harvested 0-21 days following a single aerial application of the 80% SC/S formulation at 4 lb ai/A (1x the maximum registered rate permitted in CA) in 20 gal/A. Trichlorfon residues were 0.29 ppm in or on one whole fruit sample harvested on the day of treatment. One sample harvested 7 days posttreatment bore residues of 0.08 ppm and two samples harvested 14-21 days posttreatment bore residues of 0.02-0.03 ppm. Apparent residues in or on one untreated sample were <0.01 ppm (nondetectable). Data were collected using a GLC analytical method with flame photometric detection (GLC/FPD). The reported limit of detection was 0.01 ppm. No recovery data or sample storage information was provided.

Oranges: Mobay Chemical Corp. (1974; MRID 00149104) submitted data from two tests conducted in CA pertaining to residues of trichlorfon in or on oranges harvested 0-21 days following a single aerial application of the 80% SC/L formulation at 4 lb ai/A (1x the maximum registered rate permitted in CA) in 20 gal/A. Residues were 0.4-0.83 ppm in or on two samples harvested on the day of treatment and 0.08-0.09 ppm in or on two samples harvested 7 days posttreatment. Four samples harvested 14-21 days posttreatment bore 0.02-0.03 ppm of trichlorfon residues. Apparent residues were 0.02 ppm in or on two untreated control samples. Data were collected using a GLC analytical method with a flame photometric detector (GLC/FPD). The reported limit of

detection was 0.01 ppm. Recovery data were not provided. No information pertaining to sample storage was provided.

In summary, the submitted data indicate that residues of trichlorfon are not likely to exceed 0.1 ppm in or on citrus fruits harvested 7 days following a single application of the 80% SC/S formulation at 1x the maximum registered rate. However, no data were submitted depicting residues in or on whole unwashed citrus fruit resulting from a single aerial application in 1 gal/A followed by two ground applications. In addition, no data were submitted depicting the potential for concentration of residues in the processed fractions of oranges. Additional data are required.

Cereal Grains Group

Wheat

Tolerance(s):

A tolerance of 0.1 ppm has been established for residues of trichlorfon in or on wheat grain [40 CFR §180.198].

Use directions and limitations:

The 4-6 lb/gal and 40.5% SC/L and 50% SC/S formulations are registered for multiple foliar applications to wheat at 0.5-1 lb ai/A. The 5% D and 3 and 5% G formulations are registered for broadcast or banded soil application to wheat at 0.9-1 lb ai/A. Applications may be made using ground and aerial equipment. A 21-day PHI is in effect. A maximum of three spray applications may be made during the growing season. Livestock may be present during applications. The grazing of bait-treated fields is prohibited. The feeding of treated straw to dairy or meat animals is not permitted.

Conclusions:

The Trichlorfon Guidance Document dated 6/30/84 requires additional data depicting residues of trichlorfon in or on wheat grain resulting from multiple foliar aerial applications of a representative SC/S or SC/L formulation at 1 lb ai/A from tests conducted in KS, TX or OK, IL or IN, and MT. In addition, a processing study is required conditional upon the outcome of field residue tests. Data submitted in response to the Guidance document (MRID 40359402) indicate that residues of trichlorfon are not likely to exceed 0.1 ppm in or on wheat grain harvested 21 days following three foliar ground applications at 1x the maximum registered rate. However, no data were submitted

depicting residues in or on wheat grain resulting from multiple foliar aerial applications as required by the Guidance Document. In addition, no data were submitted depicting the potential for concentration in the milled fractions of wheat and in grain dust. Therefore, the following additional data are required:

- Data pertaining to trichlorfon residues of concern in or on wheat grain harvested 21 days following the last of three foliar applications of a representative SC/S or SC/L formulation at 1 lb ai/A, applications must be made at 7-day intervals using aerial equipment. Tests must be conducted in KS(17%) or CO(5%), ND(13%) or MN(5%), and in OK(6%) which collectively represent the major wheat growing areas in the United States and ca. 50% of the 1987 U.S. wheat production (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988).
- A processing study depicting the potential for concentration of trichlorfon residues of concern in milled products (bran, flour, middlings, and shorts) and in grain dust from the processing of wheat bearing measurable, weathered residues. If residues concentrate in any product, an appropriate food/feed additive tolerance must be proposed.

References (used):

MRID(s): 40359402.

Discussion of the data:

Mobay Chemical Corp. (1987; MRID 40359402) submitted data from six tests conducted in ID(1), IN(1), KS(1), MN(1), MT(1), and TX(1) pertaining to residues of trichlorfon in or on wheat grain harvested 21-39 days following the last of three foliar applications of the 80% SC/S formulation at 1 lb ai/A/application (1x the maximum registered rate) made at 7- to 14-day intervals using ground equipment. Residues were <0.01 ppm (nondetectable) in or on each of four samples harvested 21 days posttreatment, one sample harvested 30 days posttreatment, and one sample harvested 39 days posttreatment. One additional sample harvested 21 days posttreatment bore 0.02 ppm of trichlorfon residues. Apparent residues in or on each of seven untreated samples were <0.01 ppm (nondetectable). A GLC method (Report No. 21386) using thermionic emission detection was used for analysis of samples. The limit of detection of the method was 0.01 ppm. Recoveries were 70-100% from four samples fortified with trichlorfon at 0.01-0.05 ppm. Samples were stored frozen (temperature unspecified) for up to 713 days prior to analysis.

The test states of ID(4%), IN(2%), KS(17%), MN(5%), MT(7%), and TX(5%), and the neighboring state of ND(13%) accounted for ca. 50% of the 1987 U.S. wheat production (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988); thus geographic representation of the data is adequate. The available data indicate that residues of trichlorfon are not likely to exceed 0.1 ppm in or on wheat grain harvested 21 days following foliar ground application at 1x the maximum registered rate. However, data were not submitted depicting residues in or on wheat grain resulting from multiple foliar aerial applications as required by the Guidance Document. In addition, no data were submitted depicting the potential for concentration of residues in the milled fractions of wheat and in grain dust. Additional data are required.

Miscellaneous Commodities

Cottonseed

Tolerance(s):

A tolerance of 0.1 ppm has been established for residues of trichlorfon in or on cottonseed [40 CFR §180.198].

Use directions and limitations:

The 3 and 5% G (bait) and 5% D formulations are registered for preplant, postplant, and at-plant soil banded or broadcast application to cotton at 1.5 lb ai/A. The 5 and 8% D, and 3% D MAI formulations are registered for multiple foliar application to cotton at 0.6-1.5 lb ai/A. The 4 lb/gal SC/L, 40.5% SC/L, and 50-80% SC/S formulations are registered for similar use at 0.25-1.5 lb ai/A. Ultra-low-volume (ULV) foliar application is permitted using the 4 lb/gal SC/L formulation at 0.25-0.5 lb ai/A. Applications may be made using ground and aerial equipment. A 7-day PHI and a 12-day pregrazing interval are in effect.

Conclusions:

The Trichlorfon Guidance Document dated 6/30/84 requires additional field residue data regarding residues of trichlorfon in or on cottonseed and cotton forage because all of the submitted data were generated using an inadequate cholinesterase inhibition technique; a processing study was conditionally required. Data submitted in response to the Guidance Document (MRID 40279304) indicate that residues of trichlorfon in or on cottonseed may exceed 0.1 ppm following application according to registered use. No data were submitted reflecting registered ULV application or soil application using a G formulation. In

addition, no data were submitted depicting the potential for concentration of residues in the processed fractions of cotton. Therefore, the following additional data are required:

- Data depicting trichlorfon residues of concern in or on cottonseed harvested 7 days following: (i) foliar ULV applications of the 4 lb/gal SC/L formulation at 0.5 lb ai/A; and (ii) soil treatments with the 3 or 5% G formulation (bait) at 1.5 lb ai/A. Tests must be conducted using ground and aerial equipment, in separate tests. Tests must be conducted in CA(20%), MS(12%), and TX(32%), which accounted for ca. 60% of the 1987 U.S. production of cottonseed and represent the major domestic cotton growing regions (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988).
- The registrant must propose a revised tolerance level for trichlorfon residues of concern in or on cottonseed. The appropriate tolerance level will be determined following receipt and review of the additional requested field residue data.
- A processing study depicting the potential for concentration of trichlorfon residues of concern in meal, hulls, soapstock, crude oil, and refined oil from the processing of cottonseed bearing measurable, weathered residues. If residues concentrate in any product, an appropriate food/feed additive tolerance must be proposed.
- Since cotton forage is a raw agricultural commodity of cotton, a tolerance must be proposed for cotton forage accompanied by appropriate supporting residue data.

References (used):

MRID(s): 40279304.

Discussion of the data:

Mobay Chemical Corp. (1987; MRID 40279304) submitted data from five tests conducted in AR(1), CA(1), MS(1), SC(1), and TX(1) pertaining to residues of trichlorfon in or on cottonseed harvested 0-15 days following the last of three foliar broadcast applications of the 80% SC/S formulation at 1.5 lb ai/A (1x the maximum registered rate). Residues were <0.01(nondetectable)-0.29 ppm in or on 10 samples of cottonseed harvested 0-3 days posttreatment. Three samples harvested 7 days posttreatment bore trichlorfon residues of <0.01 ppm (nondetectable); two additional samples harvested at this same interval bore residues of 0.02 and

0.16 ppm. Four samples harvested 14-15 days posttreatment bore residues of <0.01 ppm (nondetectable); one additional sample harvested 14 days posttreatment contained 0.14 ppm of trichlorfon residue. Apparent residues were <0.01 ppm (nondetectable) in or on each of five untreated samples. Analyses were conducted using a GLC analytical method with thermionic emission detection (Report No. 21386). The limit of detection was 0.01 ppm. Recoveries of bromacil were 85-90% from samples fortified with trichlorfon at 0.01-0.1 ppm. Samples were stored frozen (temperature unspecified) for ca. 269 days prior to analysis.

Geographic representation is adequate since the test states of AR(6%), CA(20%), MS(12%), SC(1%), and TX(32%) accounted for ca. 70% of the 1987 U.S. cotton production (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988). The available data indicate that residues of trichlorfon in or on cottonseed may exceed the established tolerance of 0.1 ppm following registered foliar application. No data were submitted reflecting registered ULV application or soil application using a G formulation. A tolerance is needed for cotton forage. In addition, no data were submitted concerning residues of trichlorfon in the processed commodities of cottonseed (meal, hulls, soapstock, crude oil, and refined oil). Additional data are required.

Tobacco

Tolerance:

N/A (nonfood use).

Use directions and limitations:

The 5% G and 5% D formulations are registered for preplant, postplant, and at-plant soil banded or broadcast application to tobacco at 1 and 1.5 lb ai/A, respectively. The 5 and 8% D, and 50-80% SC/S formulations are registered for multiple foliar application to tobacco at 1-1.5 lb ai/A. Applications may be made using ground and aerial equipment. A 3-day PHI is in effect.

Conclusions:

The Trichlorfon Guidance Document dated 6/30/84 requires additional field residue data regarding residues of trichlorfon in or on tobacco; a pyrolysis study was conditionally required pending the outcome of the field residue tests.

The residue data submitted in response to the Guidance Document (1988; MRID 40665101) indicate that residues of trichlorfon exceed 0.1 ppm in or on green tobacco harvested 3 days following the last of two foliar applications of the 80% SC/S formulation

at 1x the maximum registered rate. However, data were not submitted reflecting registered use of a G formulation. Pyrolysis data (1987; MRID 40358201) were submitted as requested by the Guidance Document following detection of trichlorfon residues at levels greater than 0.1 ppm in or on green and cured tobacco. The major pyrolysis product of trichlorfon in tobacco smoke is carbon dioxide; minor products include dichloroethanol (DCE), carbon monoxide, dimethyl O-(2,2-dichlorovinyl) phosphate or DDVP, methyl O-(2,2-dichlorovinyl) phosphate or Desmethyl DDVP, and dichloroacetic acid (DCA).

References (used):

MRID(s): 40665101. 40358201.

Discussion of the data:

Mobay Chemical Corp. (1988; MRID 40665101) submitted data from four tests conducted in NC(1), SC(1), and KY(2) pertaining to residues of trichlorfon in or on green tobacco leaves harvested 3 days following the last of two foliar broadcast applications of the 80% SC/S formulation at 1 lb ai/A/application (1x the maximum registered rate). Residues were <0.5(nondetectable)-0.5 ppm in or on four samples of tobacco leaves. Apparent residues were <0.5 ppm (nondetectable) in or on three untreated controls. Data were collected using a GLC analytical method with a nitrogen/phosphorous detector (NP/D). The limit of detection was 0.5 ppm. Recoveries were 54-96% from five samples fortified with trichlorfon at 0.5-5 ppm. Samples were stored frozen (unspecified temperature) for up to 460 days prior to analysis. Geographic representation is adequate since the test states of KY(27%), NC(38%), and SC(8%) accounted for ca. 70% of the 1987 U.S. tobacco production (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988). The available data indicate that residues of trichlorfon may exceed 0.1 ppm in or on green tobacco harvested 3 days following the last of two foliar applications of the 80% SC/S formulation at 1x the maximum registered rate. However, data were not submitted reflecting registered use of the 5% G formulation.

Mobay Chemical Corp. (1987; MRID 40358201) submitted data from a study conducted in KS pertaining to residues of trichlorfon in green leaves, cured tobacco, and the pyrolysis products derived from cigarette smoke. [1-¹⁴C]Trichlorfon (13.7 mCi/mole specific activity, radiochemical purity >99%) mixed with the 80% SC/S formulation at 1 lb ai/A (1x the maximum registered rate) was applied three times to the foliage of four mature white burley tobacco plants at 7-day intervals using a hand-held pump sprayer. Ten leaf disks were sampled from each tobacco leaf from the four tobacco plants and analyzed by combustion/liquid

scintillation spectrometry (LSS). Leaves were allowed to dry for 39 days in a simulated commercial curing procedure and were weighed, shredded, and analyzed by combustion/LSS. Total radioactive residues (TRR, expressed as trichlorfon equivalents) were 77 ppm in green leaves and concentrated to 290 ppm in cured leaves.

Residues in Cigarette Smoke: The cured tobacco bearing [1-¹⁴C]trichlorfon residues of 290 ppm from the experiment described above was processed into cigarettes using a commercial cigarette maker and inserted into a closed chamber smoking apparatus. Solutions from the main-stream and side-stream traps were poured into sodium sulfate, washed with diethyl ether, concentrated to an oily residue, diluted with chloroform, radioassayed, and aliquots analyzed by normal and reverse phase thin-layer chromatography (TLC) using toluene:methanol:acetic acid (180:22:1) and acetonitrile:methanol:sodium chloride (2:2:1); GLC/MS analyses were conducted as confirmatory procedures.

Of the initial radioactive residues in the cured tobacco, ca. 80% was recovered, 45% from the main-stream smoke and 35% from the side-stream smoke. The cigarette filter accounted for 8% and chamber and ashes for 7%. The characterization of residue was based on one cigarette. Results of the characterization of the main-stream and side-stream smoke are presented below.

Table 1. Percent distribution of radioactivity in the main- and side-stream cigarette smoke.

Metabolite	Main-stream (%)	Side-stream (%)
Carbon dioxide	38	32
Trichlorfon	2	<1
Dichloroethanol (DCE)	2	<1
Carbon monoxide	1	<1
DDVP	<1	--
Desmethyl DDVP	<1	--
Dichloroacetic acid (DCA)	<1	--
Unknown	6	4
Loss	<u>4</u>	<u>5</u>
Total	56	44

Over 76% of the recovered radioactivity was identified. The major pyrolysis product of bromacil in tobacco smoke is carbon dioxide (70% TRR). Dichloroethanol (DCE), carbon monoxide, dimethyl O-(2,2-dichlorovinyl) phosphate or DDVP, methyl O-(2,2-dichlorovinyl) phosphate or Desmethyl DDVP, and dichloroacetic acid (DCA) constitute the minor metabolites.

MAGNITUDE OF THE RESIDUE IN MEAT, MILK, POULTRY, AND EGGS

Milk and the Fat, Meat, and Meat Byproducts of Cattle, Goats, Hogs, Horses, and Sheep

Tolerance(s):

Tolerances of 0.1 ppm have been established for residues of trichlorfon in the fat, meat, and meat byproducts of cattle, goats, horses, and sheep. A tolerance of 0.01 ppm has been established for these same residues in milk [40 CFR §180.198].

Conclusions:

The Trichlorfon Guidance Document dated 6/30/84 requires additional data regarding the magnitude of the residues in milk, and the fat, meat, and meat byproducts of cattle, goats, hogs, horses, and sheep resulting from direct application of trichlorfon. The qualitative nature of the residue in animals is not adequately understood. Also, data gaps exist concerning the magnitude of trichlorfon residues in tomatoes, citrus, wheat, and cottonseed. Following receipt of the requested animal metabolism, field trial, and processing data, the expected dietary intake for beef cattle, dairy cattle, and sheep will be calculated, and the need for additional feeding studies will be reevaluated.

References (used):

N/A.

Discussion of the data:

N/A.

Poultry and Eggs

Tolerance(s):

No tolerances have been established for residues of trichlorfon in poultry commodities.

Conclusions:

The Trichlorfon Guidance Document dated 6/30/84 states that there is no reasonable expectation of finite residues in eggs and that the requirement for data on poultry tissues from feeding studies would be waived if the requested ruminant feeding studies indicate that residues are nondetectable. However, poultry metabolism data are required and the adequacy of tolerances for residues in or on poultry feed items cannot be assessed until the requested crop field trial data are submitted. The need for data on residues in poultry tissues and eggs will be determined following receipt of the data requested for animal metabolism and magnitude of the residue in plants. It should be noted that residue data on ruminants may not be used to fulfill data requirements for poultry.

References (used):

N/A.

Discussion of the data:

N/A.

MASTER RECORD IDENTIFICATION NUMBERS

The following references were obtained from a Guideline Sequence Number search conducted on December 4, 1989 for documents on trichlorfon.

Residue Chemistry Citations (used):

00149104 Mobay Chemical Corp. (1985) Dylox: Residue Data :on Fruits:. Unpublished compilation. 24 p.
40279304 Loeffler, W. (1987) Dylox--Magnitude of Residue on Cotton: Laboratory Project ID: DL-3013-86 D: Dylox Objective No. 3013. Unpublished study prepared by Chemonics Laboratories. 51 p.

40279305 Loeffler, W. (1987) Dylox--Magnitude of Residue on Tomatoes: Laboratory Project ID: DL-1812-86 D: Dylox Objective No. 1812. Unpublished study prepared by Chemonics Laboratories. 58 p.

40279306 Loeffler, W. (1987) Dylox--Magnitude of Residue on Tomatoes and Tomato Processing Products: Laboratory Project ID: DL-1812-86 D: Dylox Objective No. 1812. Unpublished study prepared by Chemonics Laboratories. 42 p.

40338601 Chopade, H.; Bosnak, L.; Lasley, M. (1987) Distribution and Metabolism of Dylox in Lactating Goats: Mobay Report No. 94595. Unpublished study prepared by Mobay Corp. 156 p.

40338603 Gronberg, R.; Lemke, V.; Lasley, M. (1987) The Metabolism of Dylox in Tomatoes: Mobay Report No. 94599. Unpublished study prepared by Mobay Corp. 128 p.

40338604 Gronberg, R.; Lasley, M.; Lemke, V. (1987) The Metabolism of Dylox in Potatoes: Mobay Report No. 94600. Unpublished study prepared by Mobay Corp. 127 p.

40338605 Gronberg, R.; Lemke, V.; Lasley, M. (1987) The Metabolism of Dylox in Wheat: Mobay Report No. 94601. Unpublished study prepared by Mobay Corp. 124 p.

40358201 Gronberg, R.; Lasley, M.; Lemke, V. (1987) Residues of Dylox in Tobacco and Tobacco Smoke: Mobay Report No. 94602. Unpublished study prepared by Mobay Corp. 79 p.

40359401 Gronberg, R.; Lemke, V.; Lasley, M. (1987) The Metabolism of Dylox in Soybeans: Report No. 94824. Unpublished study prepared by Mobay Corp. 160 p.

40359402 Loeffler, W. (1987) Dylox--Magnitude of Residue on Wheat Grain: Laboratory Project ID: DL-3013-86 D: Dylox Objective No. 3013. Unpublished study prepared by Chemonics Laboratories. 73 p.

40665101 Pither, K. (1988) Dylox--Magnitude of Residue on Tobacco: Dylox Objective No. 3815. Unpublished study prepared by Langston Laboratories in cooperation with Mobay Corp. 69 p.

Residue Chemistry Citations (not used):

[The following references contain data that are irrelevant to this update.]

00141146 Mobay Chemical Corp. (1975) :Dylox Residues in Blueberries:. Unpublished Mobay reports 45222 and 45223. 47 p.

00153986 Dorough, H.; Randolph, N.; Wimbish, G. (1966) Residual nature of certain organophosphorus insecticides in grain sorghum and coastal bermuda grass. Bulletin of Environmental Contamination & Toxicology 1(2):46-58.

TABLE A. GENERIC DATA REQUIREMENTS FOR TRICHLORFON.

Data Requirement	Test Substance ¹	Does EPA have data to satisfy this requirement?	Bibliographic Citation ²	Must additional data be submitted under FIFRA Sec. 3(c) (2) (B)?
<u>40 CFR §158.240 Residue Chemistry</u>				
171-2. Chemical Identity ³		(See Index) ⁵		
171-3. Directions for Use ⁴				
171-4. Nature of the Residue (Metabolism) - Plants	PAIRA	Partially	40338603 40338604 40338605 40359401	Yes ⁶
171-4. Nature of the Residue (Metabolism) - Livestock	PAIRA & plant metabolites	Partially	40338601	Yes ⁷
171-4. Residue Analytical Methods	TGAI & metabolites	Partially		Reserved ⁸
171-4. Storage Stability	TEP & metabolites	Partially		Yes ⁹
171-4. Magnitude of Residue in Plants ¹⁰ <u>Root and Tuber Vegetables</u>				
- Beets	TEP	Yes		No
- Carrots	TEP	Partially		Yes ¹¹
- Sugar beets (processed commodities)	TEP	No		Yes ¹²
	TEP	No		Yes ¹³

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement	Test Substance ¹	Does EPA have data to satisfy this requirement?	Bibliographic Citation ²	Must additional data be submitted under FIFRA Sec. 3(c)(2)(B)?
<u>Leaves of Root and Tuber Vegetables</u>				
- Beet tops	TEP	Yes		No ¹⁴
- Sugar beet tops	TEP	No		Yes ¹⁵
<u>Leafy Vegetables (except Brassica)</u>				
- Lettuce	TEP	Partially		Yes ¹⁶
<u>Brassica Leafy Vegetables</u>				
- Brussels sprouts	TEP	No		Yes ¹⁷
- Cabbage	TEP	No		Yes ¹⁸
- Cauliflower	TEP	Partially		Yes ¹⁹
- Collards	TEP	No		Yes ²⁰
<u>Legume Vegetables</u>				
- Beans (succulent and dried)	TEP	Partially		Yes ²¹
- Cowpeas	TEP	Partially		Yes ²²
<u>Foliage of Legume Vegetables</u>				
- Beans Vines & Hay	TEP	No		Yes ²³
- Cowpea Vines & Hay	TEP	Partially		Yes ²⁴
<u>Fruiting Vegetables (Except Cucurbits)</u>				

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement	Test Substance ¹	Does EPA have data to satisfy this requirement?	Bibliographic Citation ²	Must additional data be submitted under FIFRA Sec. 3(c)(2)(B)?
- Peppers	TEP	Partially		Yes ²⁵
- Tomatoes (processed commodities)	TEP TEP	Partially No	<u>40279305</u> <u>40279306</u>	Yes ²⁶ Yes ²⁷
<u>Cucurbit Vegetables</u>				
- Pumpkins	TEP	Partially	<u>00149104</u>	Yes ²⁸
<u>Citrus Fruits</u>				
- Citrus Fruits (processed commodities)	TEP TEP	Partially No	<u>00149104</u>	Yes ²⁹ Yes ³⁰
<u>Cereal Grains</u>				
- Barley (processed commodities)	TEP TEP	Partially No		Yes ³¹ Yes ³²
- Corn (processed commodities)	TEP TEP	Yes No		No No
- Oats (processed commodities)	TEP TEP	Partially No		Yes ³³ Yes ³⁴
- Wheat (processed commodities)	TEP TEP	Partially No	<u>40359402</u>	Yes ³⁵ Yes ³⁶
<u>Forage, Fodder, and Straw of Cereal Grains</u>				
- Barley forage & straw	TEP	Partially		Yes ³⁷
- Corn forage & straw	TEP	Yes		No

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement	Test Substance ¹	Does EPA have data to satisfy this requirement?	Bibliographic Citation ²	Must additional data be submitted under FIFRA Sec. 3(c)(2)(B)?
- Oats forage & straw	TEP	Partially		Yes ³⁸
- Wheat forage & straw	TEP	Partially		Yes ³⁹
<u>Grass Forage, Fodder, and Hay</u>				
- Pasture and rangeland grasses	TEP	Partially		Yes ⁴⁰
<u>Non-grass Animal Feeds</u>				
- Alfalfa forage & hay	TEP	Partially		Yes ⁴¹
- Birdsfoot trefoil forage & hay	TEP	Partially		Yes ⁴²
- Clover forage & hay	TEP	Partially		Yes ⁴³
<u>Miscellaneous Commodities</u>				
- Artichokes	TEP	No		Yes ⁴⁴
- Bananas	TEP	Yes		No
- Cottonseed (processed commodities)	TEP	No	40279304	Yes ⁴⁵
	TEP	No		Yes ⁴⁶
- Flaxseed (processed commodities)	TEP	Partially		Yes ⁴⁷
	TEP	No		Yes ⁴⁸
- Peanuts	TEP	Yes		No

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement	Test Substance ¹	Does EPA have data to satisfy this requirement?	Bibliographic Citation ²	Must additional data be submitted under FIFRA Sec. 3(c)(2)(B)?
(processed commodities)	TEP	No		No
- Safflower seed	TEP	Partially		Yes ⁴⁹
(processed commodities)	TEP	No		Yes ⁵⁰
- Tobacco	PAIRA	No	40358201 40665101	No
171-4. Magnitude of residue in Meat/Milk/Poultry/Eggs	TGAI or plant metabolites	Partially		Reserved ⁵¹

1. Test substance: PAI = purified active ingredient; PAIRA = purified active ingredient, radiolabeled; TEP = Typical end-use product; TGAI = technical grade of the active ingredient; MP = manufacturing-use product.
2. These references were submitted in response to the Trichlorfon Guidance Document dated 6/84. Underlining indicates references containing data reviewed in this update.
3. The same chemical identity data are required as under 40 CFR §158.150-190, with emphasis on impurities that could constitute residue problems. Refer to Product Chemistry Data Requirements tables.
4. DEB has noted that the differing PHIs for fresh-market and processing tomatoes is not enforceable (D. Edwards, DEB No. 2837, 12/4/87); therefore, data on tomatoes cooked following harvest on the day of treatment are not required, and the following label amendments are required: The registrant must amend all pertinent labels to specify that the 21-day PHI pertains to all tomatoes treated with trichlorfon, whether or not they are to be cooked and/or canned prior to marketing.
5. The 2/89 update to the Trichlorfon Index was used to create this document.

TABLE A. (Continued).

6. In reviews of data submitted in response to the Guidance Document, DEB concludes that the nature of the residue in plants is not adequately delineated because the identity of an unknown metabolite (metabolite "A") accounting for >10% of the total radioactive residues (TRR) in wheat forage and heads was not established, and no data were provided reflecting soil application to a root crop, a use that could lead to direct exposure to the soil degradable DWP. In addition, it was noted that inadequate detail was provided regarding the percent of each metabolite released after each extraction and hydrolysis step; this information is necessary in order to evaluate the adequacy of analytical enforcement procedures, and it was noted that none of the currently accepted enforcement methods include hydrolysis steps similar to those used in the recently submitted metabolism studies. It has also been concluded that the radioactive residues found in soybean meal were not adequately characterized. The following additional data are required:
- (i) data depicting the distribution and metabolism of uniformly ring-labeled [¹⁴C]trichlorfon in or on a root crop. A completely characterized test substance representative of technical trichlorfon (including impurities, if appropriate) used in commercial formulations must be applied soil incorporated under conditions representing normal cropping practices and at rates sufficiently high to permit characterization of ¹⁴C-residues. The identities and quantities of residues in or on mature plant parts must be determined in order to elucidate terminal residues. Confirmation of the identities of residues using a suitable method such as MS or HPLC is also required. Representative samples from these studies and those on potatoes, tomatoes, wheat, and soybeans must be analyzed by the residue analytical methods developed for data collection and tolerance enforcement to ascertain that all residues of concern are determined;
 - (ii) the component designated "metabolite A" in wheat forage and green heads in MRID 40338605 must be identified, and confirmation of the identities of residues using a suitable method such as MS or HPLC is also required;
 - (iii) the registrant must provide additional information from the studies on tomatoes, potatoes, and wheat reported in MRIDs 40338604, -04, and -05 regarding the percent of each metabolite released following each extraction and hydrolysis step;
 - (iv) the registrant must identify the radioactive residues detected in soybean meal (MRID 40359401), and confirmation of the identities of residues using a suitable method such as MS or HPLC is also required.
7. DEB review of the ruminant metabolism data submitted in response to the Guidance Document concludes that 16-46% of the TRR in tissues is unidentified polar residues and the registrant's contention that these residues are proteins and sugars was not supported by any data. DEB also noted that the loss of 9-13% of the TRR in milk, liver, and fat during the concentration of extracts was not adequately explained and that

TABLE A. (Continued).

alternate sample handling procedures should be attempted. Furthermore, it was concluded that a poultry metabolism study is required, since the ruminant study demonstrated that free and conjugated residues transfer to tissues. As with plants, DEB has noted that none of the analytical procedures for detection of residues in meat or milk employs the hydrolysis steps required to release conjugated residues. The DEB review also addressed the need for metabolism studies reflecting direct animal treatments (high-pressure spray on beef cattle and pour-on application to dairy cattle).

The following additional data are required:

- (i) metabolism studies must be conducted utilizing ruminants and poultry. Animals must be dosed orally for a minimum of 3 days with uniformly ring-labeled [¹⁴C]trichlorfon fed in the diet at a level sufficient to make residue identification and quantification possible. Milk and eggs must be collected twice daily during the dosing period. Animals must be sacrificed within 24 hours of the final dose. The distribution and identity of residues must be determined in eggs, milk, liver, kidney (except poultry), muscle and fat. Confirmation of the identities of residues using a suitable method such as MS or HFIC is also required. Alternative to an additional ruminant metabolism study, the registrant must submit additional data from analysis of extracts (from the study described in MRID 40338601) processed using procedures that will minimize loss of residues due to volatilization, and subjected to further analyses in order to identify extracted polar residues. Representative samples from [¹⁴C]trichlorfon metabolism studies must be analyzed by the residue analytical methods developed for data collection and tolerance enforcement to ascertain that the methods are capable of adequately recovering and quantifying all residues of concern;
 - (ii) metabolism studies in which cattle receive direct dermal applications of ring-labeled [¹⁴C]trichlorfon. Beef cattle must be treated using high-pressure spray equipment and dairy animals must be given pour-on treatment. Animals must be treated at a concentration that will result in sufficient residues in the tissues for characterization. Animals must be sacrificed 24 hours after treatment and residues characterized in milk, muscle, fat, kidney, and liver.
8. DEB has noted in reviews of plant and animal metabolism data that current methodology does not employ hydrolysis steps necessary to release bound residues and that, therefore, additional validated methodology may be required in order to recover bound and conjugated residues. The specific requirements for the revised methods will be determined following review of the requested plant and animal metabolism data.
9. The Agency now requires that storage intervals and sample storage conditions be reported for all residue data submitted in support of tolerances or otherwise required by the Agency, and that the residue data be

TABLE A. (Continued).

accompanied by data depicting the stability of all residues of concern in storage (Pesticide Assessment Guidelines, Subdivision O). The sample storage conditions and intervals must be supplied for all required and previously submitted residue data for plant and animal commodities. Storage stability data in support of previously submitted residue data are required for only those samples deemed to be useful for tolerance assessment. Data are also required which depict the decline in levels of trichlorfon residues of concern in commodities stored under the range of conditions and for the range in intervals specified. Crop samples bearing measurable weathered residues or fortified meat and milk samples must be analyzed immediately after harvest or fortification and again after storage intervals that allow for reasonable unforeseen delays in sample analysis. In laboratory tests using fortified samples, the pure active ingredient and pure metabolites must be used. However, if field weathered samples are used, the test substance must be a typical end-use product. For additional guidance on conducting storage stability studies, the registrant is referred to an August, 1987 Position Document on the Effects of Storage Validity of Pesticide Residue Data available from NUIS under order no. PB 88112362/AS.

10. The Agency has recently determined that DDVP (a potential metabolite of trichlorfon) may be of toxicological concern and may occur as a residue of trichlorfon in plants grown for food, particularly root crops on which soil treatment is permitted (beets and sugar beets), and crops harvested at a short posttreatment interval following foliar treatment, such as alfalfa, bananas, corn, citrus, and cotton. Therefore, the following additional data are now required: data depicting the magnitude of DDVP residues in or on representative commodities (or appropriate substitutes - refer to 40 CFR 180.34) from each crop group on which use of trichlorfon is permitted. Application regimens must approximate those most likely to result in maximum residues (highest rate, lowest PHI, maximum number of applications). Also tests must be geographically representative (refer to Agricultural Statistics, USDA and Census of Agriculture, U.S. Department of Commerce). These trials should not be completed, however, until all plant metabolism issues have been resolved since it may be necessary to conduct analyses for additional residues of toxicological concern.

11. No data on carrots were submitted in response to the Guidance Document. The following additional data are required: Foliar treatments (aerial and ground) with a representative SC/L or SC/S formulation at 1.5 lb ai/A. The tests must be conducted in CA(54%), WA(10%), and TX(9%), since these states accounted for ca. 70% of the 1986 U.S. carrot production (Agricultural Statistics Board, NASS, USDA, 1987, Vegetables, 1986 Summary). Field site data must include arid regions in CA; alternatively, a label restriction against usage on irrigated carrots may be proposed. The registrant must submit information specifying the method of application used in the tests reviewed in this section of the Trichlorfon Standard dated 7/18/83.

TABLE A. (Continued).

12. No data on sugar beets were submitted in response to the Guidance Document. The following additional data are required: Data depicting trichlorfon residues of concern in or on sugar beet roots harvested 14 days following multiple foliar treatments with a representative SC/L or SC/S formulation at 1.5 lb ai/A. Tests must be conducted in CA(22%), ID(15%), and MN(22%) or ND(11%), since these states accounted for ca. 70% of the 1987 sugar beet production (Agricultural Statistics Board, NASS, USDA, 1988, Crops Database, 1/88).
13. No sugar beet processing data were submitted in response to the Guidance Document. The following data are required: A processing study depicting the potential for concentration of trichlorfon residues of concern in products (dehydrated pulp, molasses, and refined sugar) processed from sugar beets bearing measurable, weathered residues. If residues concentrate in any product, an appropriate food/feed additive tolerance must be proposed.
14. As specified in the Guidance Document, a tolerance of 0.1 ppm (negligible) should be established for trichlorfon residues in or on table beet tops.
15. No data on sugar beet tops were submitted in response to the Guidance Document. The following additional data are required: Data depicting trichlorfon residues of concern in or on sugar beet tops harvested 28 days following multiple foliar treatments with a representative SC/L or SC/S formulation at 1.5 lb ai/A. Tests must be conducted in CA(22%), ID(15%), and MN(22%) or ND(11%), since these states accounted for ca. 70% of the 1987 sugar beet production (Agricultural Statistics Board, NASS, USDA, 1988, Crops Database, 1/88).
16. No data on lettuce were submitted in response to the Guidance Document. The following additional data are required: Data depicting trichlorfon residues of concern in or on lettuce (with and without wrapper leaves) harvested 28 days following multiple (soil and foliar) applications of a representative SC/S formulations at 1 lb ai/A and soil application using a representative G formulation at 1.5 lb ai/A. Soil and foliar applications must be made at three or more weekly intervals with ground and aerial equipment. Tests must be conducted in CA(72%) and FL(4%), since these states accounted for ca. 80% of the 1987 U.S. lettuce production (Agricultural Statistics Board, NASS, USDA, 1987, Vegetables, 1986 Summary).
17. No data on Brussels sprouts were submitted in response to the Guidance Document. The data requested for cauliflower may, by translation, fulfill the requirement for data on Brussels sprouts.

TABLE A. (Continued).

18. No data on cabbage were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in or on cabbage (with and without wrapper leaves) harvested 21 days following foliar applications of a representative SC/L or SC/S formulation at 1 lb ai/A and soil application using a G formulation at 1 lb ai/A. Treatments must be made at three or more weekly intervals with ground and aerial equipment. Tests must be conducted in FL(16%), CA(8%), NY(15%), TX(16%), and WI(9%), since these states accounted for ca. 60% of the 1982 U.S. cabbage production (1982 Census of Agriculture, Vol. 1, Part 51, p. 338).
19. No data on cauliflower were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in or on cauliflower harvested 21 days following soil and foliar applications of a representative SC/S or SC/L formulation and a G formulation (soil only) at 1 lb ai/A. Soil and foliar treatments must be made at three or more weekly intervals with ground and aerial equipment. Tests must be conducted in CA(77%) and AZ(9%), since these states accounted for ca. 90% of the 1986 U.S. cauliflower production (Agricultural Statistics Board, NASS, USDA, 1987, Vegetables, 1986 Summary, p. 22).
20. No data on collards were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in or on collards harvested 28 days following soil and foliar applications of a representative SC/S or SC/L formulation at 1 lb ai/A and a G formulation (soil only) at 1.5 lb ai/A. Soil and foliar treatments must be made at three or more weekly intervals with ground and aerial equipment. Tests must be conducted in AL(7%) or GA(20%), FL(10%), NC(6%) or SC(9%), and TX(8%), since these states accounted for ca. 60% of the 1986 U.S. collards production (1982 Census of Agriculture, Vol. 1, Part 51, p. 342).
21. No data on beans were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in or on beans (succulent and dried) harvested 14 days following soil and foliar applications of a representative SC/S or SC/L formulation and a G formulation (soil only) at 1.5 lb ai/A. Soil and foliar treatments must be made at three or more weekly intervals with ground and aerial equipment. Tests on dry beans must be conducted in CA(12%), CO(10%), ID(11%), MI(21%), NE(13%), and ND(19%), since these states accounted for ca. 80% of 1987 dry bean production (Agricultural Statistics Board, NASS, USDA, 1988, Crops Database, 1/88), and tests with succulent beans must be conducted in NY(10%), OR(23%), and WI(41%), since these states accounted for ca. 70% of the 1986 U.S. snap bean production (Agricultural Statistics Board, NASS, USDA, 1987, Vegetables, 1986 Summary).
22. No data on cowpeas were submitted in response to the Guidance Document. The data requested for beans will translate to cowpeas.

TABLE A. (Continued).

23. No data on bean vines or hay were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in or on bean vines and hay harvested 14 days following soil and foliar applications of a representative SC/S or SC/L formulation and a G formulation (soil only) at 1.5 lb ai/A. Soil and foliar treatments must be made at three or more weekly intervals with ground and aerial equipment. Tests on dry beans must be conducted in CA(12%), CO(10%), ID(11%), MI(21%), NE(13%), and ND(19%), since these states accounted for ca. 80% of 1987 dry bean production (Agricultural Statistics Board, NASS, USDA, 1988, Crops Database, 1/88), and tests with succulent beans must be conducted in NY(10%), OR(23%), and WI(41%), since these states accounted for ca. 70% of the 1986 U.S. snap bean production (Agricultural Statistics Board, NASS, USDA, 1987, Vegetables, 1986 Summary).
24. No data on cowpeas were submitted in response to the Guidance Document. The data requested for beans will translate to cowpeas.
25. No data on peppers were submitted in response to the Guidance Document. The data requested for tomatoes will translate to peppers.
26. Data depicting trichlorfon residues of concern in or on tomatoes harvested following broadcast soil bait application of a representative G formulation at 1 lb ai/A. Tests must be conducted using ground and aerial equipment. Tests must be conducted in CA(25%) and FL(51%) which accounted for ca. 80% of 1986 U.S. fresh market tomato production; CA produced ca. 87% of U.S. tomatoes for processing (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988).
27. The registrant must propose a feed additive tolerance for trichlorfon residues of concern in dry pomace. The available data indicate that a level of 0.25 ppm would be appropriate, toxicological considerations permitting.
28. Data are required depicting trichlorfon residues of concern in or on pumpkins harvested 14 days following a single broadcast soil application of the 5% G formulation at 1 lb ai/A. Tests must be conducted using ground and aerial equipment in CA(12%), IL(20%), NY(6%) or PA(6%), and TX(5%), since these states accounted for ca. 40% of the 1982 U.S. pumpkin acreage (1982 Census of Agriculture, Vol. 1, Part 51, p. 350).
29. Data are required depicting trichlorfon residues of concern in or on citrus fruits (oranges, grapefruit, and lemons) harvested 21 days following a full-season treatment regimen including a single

TABLE A. (Continued).

aerial foliar application followed by two foliar applications using ground equipment. Data should reflect residues resulting from application of a representative SC/S formulation at 4 lb ai/A/application; the aerial application should be made in 1 gal/A. Tests must be conducted in CA where this use is permitted.

30. A processing study is required depicting the potential for concentration of trichlorfon residues of concern in dried pulp, oil, molasses, and juice processed from oranges bearing measurable, weathered residues. If residues concentrate in any product, an appropriate food/feed additive tolerance must be proposed.

31. No data on barley were submitted in response to the Guidance Document. The data requested for wheat will translate to barley.

32. No data on milled fractions of barley were submitted in response to the Guidance Document. The data requested for wheat processing will translate to barley.

33. No data on oats were submitted in response to the Guidance Document. The data requested for wheat will translate to oats.

34. No data on milled fractions of oats were submitted in response to the Guidance Document. The data requested for wheat processing will translate to oats.

35. No data were submitted reflecting the multiple foliar applications using aerial equipment. Data are required pertaining to trichlorfon residues of concern in or on wheat grain harvested 21 days following the last of three foliar applications of a representative SC/S or SC/L formulation at 1 lb ai/A, applications must be made at 7-day intervals using aerial equipment. Tests must be conducted in KS(17%) or CO(5%), ND(13%) or MN(5%), and in OK(6%) which collectively represent the major wheat growing areas in the United States and ca. 50% of the 1987 U.S. wheat production (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988).

36. The Agency now requires data on grain dust from grain subjected to late-season treatments, as well as data on milled fractions. A processing study is required depicting the potential for concentration of trichlorfon residues of concern in milled products (bran, flour, middlings, and shorts) and in grain dust from the processing of wheat bearing measurable, weathered residues. If residues concentrate in any product, an appropriate food/feed additive tolerance must be proposed.

TABLE A. (Continued).

37. No data on barley forage, hay, or straw were submitted in response to the Guidance Document. The data requested for wheat will translate to barley.
38. No data on oat forage, hay, or straw were submitted in response to the Guidance Document. The data requested for wheat will translate to oats.
39. Data are required pertaining to trichlorfon residues of concern in or on wheat forage, hay, and straw harvested 21 days following the last of three foliar applications of a representative SC/S or SC/L formulation at 1 lb ai/A, applications must be made at 7-day intervals using aerial equipment. Tests must be conducted in KS(17%) or CO(5%), ND(13%) or MN(5%), and in OK(6%) which collectively represent the major wheat growing areas in the United States and ca. 50% of the 1987 U.S. wheat production (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988).
40. No data on grasses were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in or on pasture and rangeland grass forage and pasture grass hay harvested on the day of application using a representative SC/L or SC/S formulation at 1 lb ai/A. Aerial and ground applications must be made. Tests on pasture grass must be conducted in MO(11%), OR(4%), KY(5%), NY(5%), and TX(13%), and tests on rangeland grass must be conducted in KS(8%), MI(6%), ND(10%) or SD(12%), NE(17%), and WY(5%); these states represent the major U.S. pasture and rangeland grass production regions (1982 Census of Agriculture, Vol. 1, Part 51, p. 330).
41. No data on alfalfa were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in or on alfalfa forage and hay harvested on the day of application of a P/T and a G formulation at 1 lb ai/A using ground equipment. The tests must be conducted in CA(9%), IA(6%), ND(4%) or SD(6%), NE(5%), MN(7%), and WI(9%), since these states represent the major U.S. alfalfa production regions (Agricultural Statistics Board, NASS, USDA, 1988, Crops Database, 1/88).
42. No data on birdsfoot trefoil were submitted in response to the Guidance Document. The data requested for alfalfa will translate to birdsfoot trefoil.
43. No data on clover were submitted in response to the Guidance Document. The data requested for alfalfa will translate to clover.

TABLE A. (Continued).

44. No data on artichokes were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in or on artichokes harvested following applications of a representative D and a G formulation at 2.5 lb ai/A. Tests must be conducted in CA where this use is permitted.
45. No data were submitted reflecting registered ULV application to cotton or soil application using a G formulation. Data are required depicting trichlorfon residues of concern in or on cottonseed harvested 7 days following: (i) foliar ULV applications of the 4 lb/gal SC/L formulation at 0.5 lb ai/A; and (ii) soil treatments with the 3 or 5% G formulation (bait) at 1.5 lb ai/A. Tests must be conducted using ground and aerial equipment, in separate tests. Tests must be conducted in CA(20%), MS(12%), and TX(32%), which accounted for ca. 60% of the 1987 U.S. production of cottonseed and represent the major domestic cotton growing regions (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988). The registrant must propose a revised tolerance level for trichlorfon residues of concern in or on cottonseed. The appropriate tolerance level will be determined following receipt and review of the additional requested field residue data.
46. No data on cottonseed processing were submitted. A processing study is required depicting the potential for concentration of trichlorfon residues of concern in meal, hulls, soapstock, crude oil, and refined oil from the processing of cottonseed bearing measurable, weathered residues. If residues concentrate in any product, an appropriate food/feed additive tolerance must be proposed.
47. No data on flax were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in or on flax seed and straw harvested 21 days following soil and foliar applications of a representative SC/S or SC/L formulation at 1 lb ai/A. Soil and foliar treatments must be made at three or more weekly intervals with ground and aerial equipment. Tests must be conducted in MN(3%), ND(88%), or SD(9%), since these states produce virtually all of the U.S. flax (Agricultural Statistics Board, NASS, USDA, 1988, Crops Database, 1/88).
48. No flaxseed processing data were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in meal and hulls processed from flaxseed bearing measurable weathered residues. If residues concentrate in any commodity, an appropriate food/feed additive tolerance must be proposed.
49. No data on safflower were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in or on safflower harvested following two foliar applications (made 14 days before bloom and again at bloom) of a representative SC/S or SC/L formulation and a G formulation (soil

TABLE A. (Continued).

only) at 1.5 lb ai/A. Tests must be conducted in CA(76%) and MT(17%), since these states represent >90% of U.S. safflower production (1982 Census of Agriculture, Vol. 1, Part 51, p. 317).

50. No safflower processing data were submitted in response to the Guidance Document. Data are required depicting trichlorfon residues of concern in oil and meal processed from safflower seed bearing measurable weathered residues. If residues concentrate in any commodity, an appropriate food/feed additive tolerance must be proposed.

51. The qualitative nature of the residue in animals is not adequately understood. Also, data gaps exist concerning the magnitude of trichlorfon residues in or on feed items. Following receipt of the requested animal metabolism, field trial, and processing data, the expected dietary intake for beef cattle, dairy cattle, and sheep will be calculated, and the need for additional feeding studies will be reevaluated. Poultry metabolism data are required and the adequacy of tolerances for residues in or on poultry feed items cannot be assessed until the requested crop field trial data are submitted. The need for data on residues in poultry tissues and eggs will be determined following receipt of the data requested for animal metabolism and magnitude of the residue in plants. It should be noted that residue data on ruminants may not be used to fulfill data requirements for poultry.