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

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

NOV 24 1992

MEMORANDUM

SUBJECT: Methyl Parathion Product and Residue Chemistry Reregistration Standard Updates (CBRS #'s 7635, 7573 and 7863; Barcode No.'s D160929,D163203 and D160581.).

FROM: E. Zager, Chief
Chemistry Branch II: Reregistration Support
Health Effects Division (H7509C)

TO: Lois Rossi, Chief
Reregistration Branch
Special Review & Reregistration Division (H7508W)

and

E. Saito, Acting Chief
Chemical Coordination Branch
Health Effects Division (H7509C)

Attached are the updates to the Product and Residue Chemistry Chapters of the Methyl Parathion Reregistration Standard. These updates were prepared by Dynamac Corporation under supervision of CBRS, HED. They have undergone secondary review in the Branch and have been revised to reflect Agency policies.

Revised data requirement tables are included.

If you need additional input please advise.

Attachment 1: Methyl Parathion Product Chemistry Reregistration Standard Update.

Attachment 2: Methyl parathion Residue Chemistry Reregistration Standard Update.

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Attachment 3: Confidential Appendices A and B to the Methyl Parathion Product Chemistry Update.

cc (With Attachments 1, 2 and 3): RBP, Methyl Parathion Reregistration Standard file, Methyl Parathion Subject File, Circ. and Dynamac.

cc: Without Attachments: RF

ATTACHMENT 1

DYNAMAC
CORPORATION

Final Report

METHYL PARATHION
Shaughnessy No. 053501
Task 4: Product Chemistry
Reregistration Standard Update

August 15, 1991

Contract No. 68-D8-0080

Submitted to:
Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
The Dynamac Building
2275 Research Boulevard
Rockville, MD 20850-3268

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METHYL PARATHION

SHAUGHNESSY NO. 053501

REREGISTRATION STANDARD UPDATE

PRODUCT CHEMISTRY

TASK 4

INTRODUCTION

A Product Search Listing conducted on 2/5/91 identifies four registered manufacturing-use products (MPs) of methyl parathion: the A/S Cheminova 80% formulation intermediate (FI; EPA Reg. No. 4787-4), the Micro-Flo Company 80% FI (EPA Reg. No. 51036-156), the Mobay Corporation 80% FI (EPA Reg. No. 3125-35), and the Cedar Chemical Corporation 80% FI (EPA Reg. No. 56077-2). The Micro-Flo 80% FI was transferred from Landia Chemical Company (EPA Reg. No. 9859-267) on 10/31/88.

The Methyl Parathion Guidance Document dated 12/8/86 requires generic and product-specific chemistry data for the methyl parathion manufacturing-use products. In addition, a 6/87 Data Call-In requested information on the potential for formation of halogenated dibenzo-p-dioxin and dibenzofuran contaminants. In response to these requirements, Cheminova submitted data (1987; MRIDs 40406601, 40482401, and 40601501, and a Confidential Statement of Formula (CSF)) and Landia submitted data (1986; MRIDs 40004701-40004703) which were reviewed by the Agency for their respective 80% FIs. Landia has submitted additional data (1987; MRIDs 40410401-40410403) for its 80% FI and Micro-Flo has submitted CSFs for its 80% FI. These data are reviewed in this Update document for their adequacy in fulfilling the outstanding data requirements.

Corresponding to each of the Topics Discussed 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 methyl parathion.

	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

The following Methyl parathion Product Chemistry data are required:

- For the Cheminova 80% FI (EPA Reg. No. 4787-4), data pertaining to starting materials and manufacturing process, discussion of the formation of impurities, pH, oxidizing/reducing action, flammability, explodability, storage stability, viscosity, miscibility, corrosiveness and stability (TGAI).

- For the Micro-Flo 80% FI (EPA Reg. No. 51036-156) produced from the unregistered technical source, data pertaining to product composition, starting materials and manufacturing process, discussion of the formation of impurities, preliminary analysis, certified limits, enforcement analytical methods, and solubility (TGAI).

- For the Micro-Flo 80% FI (EPA Reg. No. 51036-156) repackaged from the EPA-registered product, data pertaining to product composition and certified limits.

- For the Mobay 80% FI (EPA Reg. No. 3125-35), all data specified in the Methyl Parathion Guidance Document and in the dioxin DCI dated 6/87.

- For the Cedar Chemicals 80% FI (EPA Reg. No. 56077-2), all data specified in the Methyl Parathion Guidance Document and in the dioxin DCI dated 6/87.

PRODUCT IDENTITY AND COMPOSITION

61-1. Product Composition

The Methyl Parathion Guidance Document dated 12/8/86 requires additional product-specific data concerning product composition. In response to the Guidance Document, the registrants have submitted the following data.

Cheminova submitted (1987; MRID 40482401) data pertaining to the product identity of the 80% FI (EPA Reg. No. 4787-4) which were reviewed by the Agency (G. Makhijani; CBRS Memorandum No. 3280, dated 3/25/88) and were found to satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1). No additional data are required.

Micro-Flo submitted CSFs (product jacket) regarding the product identity of the 80% FI (EPA Reg. No. 51036-156) produced by two sources which are presented in the Micro-Flo Confidential Appendix A. These data cannot be thoroughly reviewed until the

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registrant clarifies which producer is the source of the "basic" and which is the source of the "alternate" formulation, or if one of these producers is no longer used. These data do not satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product composition for the Micro-Flo 80% FI (EPA Reg. No. 51036-156) produced from an unregistered technical source because: (i) the components of a related group of compounds present at >0.1% were not identified; (ii) nominal concentrations were not determined individually for all impurities; (iii) the nominal concentration was not submitted for an additional impurity; (iv) nominal concentrations for the active ingredient and those impurities included in preliminary analysis do not reflect preliminary analysis results; and (v) an impurity detected at >0.1% in the preliminary analysis is not listed on the CSF. These data do not satisfy the requirements of 40 CFR §158.155 (Guideline Reference Nos. 61-1) regarding product composition for the Micro-Flo 80% FI (EPA Reg. No. 51036-156) repackaged from an EPA-registered product because the nominal concentration listed on the CSF is not based on the nominal concentration (label claim) of the active ingredient in the source product. Additional data are required.

No data pertaining to product identity have been submitted for the Mobay and Cedar Chemicals 80% FIs (EPA Reg. Nos. 3125-35 and 56077-2, respectively); all data requirements specified in the Methyl Parathion Guidance Document remain outstanding for these products.

61-2. Starting Materials and Manufacturing Process

The Methyl Parathion Guidance Document dated 12/8/86 specifies generic and product-specific data requirements for methyl parathion regarding starting materials and the manufacturing/formulation processes. Additional data pertaining to the potential for the formation of halogenated dibenzo-p-dioxins/dibenzofurans as a result of the manufacturing process are also required (Data Call-In (DCI) dated 6/87) to determine if analytical data on dioxins/dibenzofurans are necessary. In response, the registrants have submitted the following information.

Cheminova submitted (1987; MRID 40406601) information on the starting materials and manufacturing process for the 80% FI (EPA Reg. No. 4787-4) and its unregistered technical source which was reviewed by the Agency (S. Malak; CBRS Memorandum No. 3107, dated 2/11/88) and was found to satisfy the requirements of 40 CFR §158.160-165 (Guideline Reference No. 61-2). Cheminova has not submitted the additional information required by the dioxin DCI pertaining to the potential for formation of halogenated dibenzo-p-dioxins/dibenzofurans during the manufacture of the 80% FI. Additional data are required.

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Landia submitted (1986; MRID 40004701) data pertaining to the starting materials and the manufacturing process for the 80% FI (EPA Reg. No. 9859-267) produced from the unregistered technical source, which were reviewed by the Agency (W. Anthony/S. Hummel; CBRS Memorandum No. 1795, dated 5/28/87); additional information on the starting materials was required. Landia has resubmitted (1987; MRID 40410401) the manufacturing process including the technical specifications of the starting materials for this formulation. These data do not satisfy the requirements of 40 CFR §158.160-165 (Guideline Reference No. 61-2) regarding starting materials and the manufacturing process for the 80% FI produced from the unregistered technical source because copies of the material safety data sheets from the manufacturer(s) of the starting materials were not submitted. Upon notification from Micro-Flo that the manufacturing process has not changed since the transfer of ownership from Landia, these data may be applied to the reregistration of the Micro-Flo 80% FI (EPA Reg. No. 51036-156) produced from the unregistered technical source. All data requirements pertaining to the 80% FI repackaged from the EPA-registered product will be satisfied by the registrant of the source product. No data have been submitted regarding the additional information required by the DCI pertaining to the potential for formation of halogenated dibenzo-p-dioxins/dibenzofurans during the manufacture of the 80% FI. Additional data are required.

No data pertaining to starting materials and the manufacturing process have been submitted for the Mobay and Cedar Chemicals 80% FIs (EPA Reg. Nos. 3125-35 and 56077-2, respectively); all data requirements specified in the Methyl Parathion Guidance Document and in the dioxin DCI dated 6/87 remain outstanding for these products.

61-3. Discussion of the Formation of Impurities

The Methyl Parathion Guidance Document dated 12/8/86 specifies generic and product-specific data requirements for methyl parathion regarding discussion of formation of impurities. Additional data pertaining to a discussion of the potential formation of halogenated dibenzo-p-dioxins/dibenzofurans in the methyl parathion MPs is also required (Data Call-In dated 6/87) to determine if analytical data on dioxins/dibenzofurans are necessary. In response, the registrants submitted the following data.

Cheminova submitted (19??; MRID 00055859) a discussion of the formation of impurities in the 80% FI (EPA Reg. No. 4787-4) and its unregistered technical source which was reviewed and accepted for the Methyl Parathion Registration Standard dated 11/8/85. Although the Guidance Document requires new data, the Agency has accepted these data (S. Malak; CBRS Memorandum No. 3107, dated

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2/11/88 and G. Makhijani; CBRS Memorandum No. 3280, dated 3/25/88) for the Cheminova 80% FI. Cheminova has not submitted the additional information required by the dioxin DCI pertaining to a discussion of the possible formation of halogenated dibenzo-p-dioxins/dibenzofurans in the 80% FI. Additional data are required.

Landia submitted (1986; MRID 40004701) a discussion of the formation of impurities in the 80% FI (EPA Reg. No. 9859-267) produced from the unregistered technical source which was reviewed and accepted by the Agency (W. Anthony/S. Hummel; CBRS Memorandum No. 1795, dated 5/28/87). No data have been submitted pertaining to the additional information required by the dioxin DCI concerning a discussion of the possible formation of halogenated dibenzo-p-dioxins/dibenzofurans in the 80% FI. Upon notification from Micro-Flo that the manufacturing process has not changed since the transfer of ownership from Landia, these data may be applied to the reregistration of the Micro-Flo 80% FI (EPA Reg. No. 51036-156) produced from the unregistered technical source. All data requirements pertaining to the 80% FI repackaged from the EPA-registered product will be satisfied by the registrant of the source product. Additional data are required.

No data have been submitted pertaining to the discussion of formation of impurities in the Mobay and Cedar Chemicals 80% FIs (EPA Reg. Nos. 3125-35 and 56077-2, respectively); all data requirements specified in the Methyl Parathion Guidance Document and in the dioxin DCI dated 6/87 remain outstanding for these products.

ANALYSIS AND CERTIFICATION OF PRODUCT INGREDIENTS

62-1. Preliminary Analysis

The Methyl Parathion Guidance Document dated 12/8/86 specifies generic and product-specific data requirements for methyl parathion regarding preliminary analysis. In response, the registrants have submitted the following data.

Cheminova submitted (1987; MRID 40482401) preliminary analysis data for the 80% FI (EPA Reg. No. 4787-4) which were reviewed by the Agency (G. Makhijani; CBRS Memorandum No. 3280, dated 3/25/88) and were found to satisfy the requirements of 40 CFR §158.170 (Guideline Reference No. 62-1) for the unregistered TGAI and 80% FI. In response to the dioxin DCI dated 6/87, Cheminova submitted (1987; MRIDs 40482401 and 40601501) preliminary analysis data for their 80% FI which were reviewed by the Agency (S. Funk; CBRS Memorandum No. 6491, dated 6/20/90). The Agency found none of the certified impurities to be halogenated dibenzo-p-dioxins/dibenzofurans precursors, but noted that impurities

were considered only to ≥0.1% while halogenated dioxins are of concern at levels as low as 0.1 ppb. As requested in the DCI dated 6/87, detailed manufacturing information and a discussion of the theoretical formation of halogenated dibenzo-p-dioxin/ dibenzofurans must be submitted to determine if further analytical quantitation is required. No additional data are required.

Landia submitted (1986; MRID 40004702) preliminary analysis data for the 80% FI (EPA Reg. No. 9859-267) produced from the unregistered technical source which were reviewed by the Agency (W. Anthony/S. Hummel: CBRS 1795, dated 5/28/87); additional information concerning the sample identification was requested. Landia has submitted (1987; MRID 40410402) additional preliminary analysis data for the 80% FI produced from the unregistered technical source. These data are presented in the Micro-Flo Confidential Appendix B and do not satisfy the requirements of 40 CFR §158.170 (Guideline Reference No. 62-1) for the Micro-Flo 80% FI (EPA Reg. No. 51036-156) produced from the unregistered technical source because several impurities listed on the Micro-Flo CSF dated 10/10/89 at >0.1%, were not included in this analysis. The registrant must either submit new data reflecting preliminary analysis of five representative batches of the TGAI or the FI for all components listed on the CSF, or certify that the manufacturing process has not changed since the transfer of ownership from Landia and modify the CSF accordingly. We note that if preliminary analysis is performed on the 80% FI, the impurities must be identified and quantitated to 0.08%. Additional data are required. All data requirements pertaining to the 80% FI repackaged from the EPA-registered product will be satisfied by the registrant of the source product. Additional data are required.

No preliminary analysis data have been submitted for the Mobay and Cedar Chemicals 80% FIs (EPA Reg. Nos. 3125-35 and 56077-2, respectively); all data requirements specified in the Methyl Parathion Guidance Document remain outstanding for these products.

62-2. Certified Limits

The Methyl Parathion Guidance Document dated 12/8/86 specifies product-specific data requirements for methyl parathion regarding certification of ingredient limits. In response to the Guidance Document, the registrants have submitted the following data.

Cheminova submitted (1987; MRID 40482401) data and a CSF dated 6/16/88 for the 80% FI (EPA Reg. No. 4787-4) which were reviewed by the Agency (G. Makhijani; CBRS Memorandum No. 3280, dated 3/25/88, and CBRS Memorandum No. 4023, dated 8/3/88) and were

found to satisfy the requirements of 40 CFR §158.175 (Guideline Reference No. 62-2). No additional data are required.

Micro-Flo submitted CSFs (product jackets) for the certified limits of the 80% FI (EPA Reg. No. 9859-267) manufactured by two sources. These data cannot be thoroughly reviewed until the registrant clarifies which producer is the source of the "basic" and which is the source of the "alternate" formulation, or if one of these producers is no longer used. These data are presented in the Micro-Flo Confidential Appendix A and do not satisfy the requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) regarding certified limits for the Micro-Flo 80% FI (EPA Reg. No. 51036-156) produced from the unregistered technical source because the certified limits for two components listed on the CSF do not encompass the levels detected in preliminary analysis. These data do not satisfy the requirements of 40 CFR §158.175 (Guideline Reference No. 62-2) for the formulation repackaged from an EPA-registered product because the registrant has not established certified limits for the active ingredient based on the nominal concentration (label claim) of the active ingredient in the source product. Additional data are required.

No data have been submitted pertaining to the certified limits of the Mobay and Cedar Chemicals 80% FIs (EPA Reg. Nos. 3125-35 and 56077-2, respectively); all data requirements specified in the Methyl Parathion Guidance Document remain outstanding for these products.

62-3. Enforcement Analytical Methods

The Methyl Parathion Guidance Document dated 12/8/86 specifies product-specific data requirements for methyl parathion regarding analytical methods to verify certified limits. In response to the Guidance Document, the registrants have submitted the following data.

Cheminova submitted (1987; MRIDs 40482401 and 40601501) methods for the enforcement of certified limits for the 80% FI (EPA Reg. No. 4787-4) which were reviewed by the Agency (G. Makhijani; CBRS Memorandum No. 3280, dated 3/25/88, and CBRS Memorandum No. 3804, dated 5/25/88) and were found to satisfy the requirements of 40 CFR §158.180 (Guideline Reference No 62-3). No additional data are required.

Landia submitted (1986; MRID 40004702) methods for the enforcement of certified limits for the 80% FI (EPA Reg. No. 9859-267) which were reviewed by the Agency (W. Anthony/S. Hummel; CBRS Memorandum No. 1795, dated 5/28/87); more detailed labeling of the chromatograms and sample calculations were required. Landia has resubmitted (1987; MRID 40410402) the analytical method descriptions and included properly labeled

chromatograms and sample calculations. These data satisfy the requirements of 40 CFR §158.180 (Guideline Reference No 62-3) regarding enforcement analytical methods for the methyl parathion active ingredient and impurities; however, if preliminary analysis is conducted on the 80% FI, recovery data will be required to support levels of detection to 0.08% for the related components. Upon notification from Micro-Flo that the manufacturing process has not changed since the transfer of ownership from Landia, these data may be applied to the reregistration of the Micro-Flo 80% FI (EPA Reg. No. 51036-156) produced from the unregistered technical source. All data requirements pertaining to the 80% FI repackaged from the EPA-registered product will be satisfied by the registrant of the source product. No additional data are required.

No methods have been submitted pertaining to the enforcement of certified limits for the Mobay and Cedar Chemicals 80% FIs (EPA Reg. Nos. 3125-35 and 56077-2, respectively); all data requirements specified in the Methyl Parathion Guidance Document remain outstanding for these products.

PHYSICAL AND CHEMICAL CHARACTERISTICS

The Methyl Parathion Guidance Document dated 12/8/86 specifies generic and product-specific data requirements for physical and chemical characteristics pertinent to the technical grade of the active ingredient and the manufacturing-use products. In response to the Guidance Document, the registrants have submitted the following data.

Cheminova submitted (1987; MRIDs 40406601 and 40482401) physical and chemical characteristics of the methyl parathion purified active ingredient (PAI), technical grade of the active ingredient (TGAI), and the 80% manufacturing-use product (MP) which were reviewed by the Agency (S. Malak; CBRS Memorandum No. 3107, dated 2/11/88, and G. Makhijani; CBRS Memorandum No. 3280, dated 3/25/88). These data satisfy the corresponding requirements of 40 CFR §158.190 (Guideline Reference Nos. 63-2 through 63-8, 63-10, and 63-12) regarding physical and chemical characteristics of the TGAI and the 80% MP (EPA Reg. No. 4787-4). In addition, the Agency (S. Malak and G. Makhijani) accepted data previously submitted (19??; MRID 00055860) for the Methyl parathion Registration Standard dated 11/8/85 for octanol/water partition coefficient and vapor pressure. The registrant has not submitted data pertaining to the following characteristics of the 80% MP: pH, oxidizing/reducing action, flammability, explodability, storage stability, viscosity, miscibility, and corrosiveness (Guideline Reference Nos. 63-12 and 63-14 through 63-20). In addition, information on the stability of the unregistered TGAI to metal, metal ions, and sunlight remains outstanding. Additional data are required.

Landia submitted (1986; MRID 40004703) physical and chemical characteristics of the methyl parathion purified active ingredient (PAI), technical grade of the active ingredient (TGAI), and the 80% MP (EPA Reg. No. 9859-267) which were reviewed by the Agency (W. Anthony/S. Hummel; CBRS Memorandum No. 1795, dated 5/28/87); data were outstanding for color, physical state, odor, density, solubility, and stability of the TGAI and for storage stability of the 80% MP. Landia has submitted additional information (1987; MRID 40410403) pertaining to the physicochemical characteristics of the TGAI and 80% MP (EPA Reg. No. 9859-267) which are presented in Table 1. These data satisfy the corresponding requirements of 40 CFR §158.190 (Guideline Reference Nos. 63-2 through 63-20) regarding physical and chemical characteristics of the TGAI and the 80% MP except that data on the solubility of the TGAI in polar and nonpolar solvents besides water are required (Guideline Reference No. 63-8). Upon notification from Micro-Flo that the manufacturing process has not changed since the transfer of ownership from Landia, these data may be applied to the reregistration of the Micro-Flo 80% FI (EPA Reg. No. 51036-156) produced from the unregistered technical source. All data requirements pertaining to the 80% FI repackaged from the EPA-registered product will be satisfied by the registrant of the source product. Additional data are required.

No data have been submitted pertaining to the physicochemical properties of the Mobay and Cedar Chemicals 80% MPs (EPA Reg. Nos. 3125-35 and 56077-2, respectively); all data requirements specified in the Methyl Parathion Guidance Document remain outstanding for these products.

Table 1. Physical and chemical properties of the Landia 80% manufacturing-use product (MP; EPA Reg. No. 9859-267) and its unregistered TGAI produced from the unregistered technical source. Data are located in MRID 40410403.

Guidelines Reference No., 40 CFR §158.190; Name of Property		Description (Substrate) [Method]
63-2.	Color	**1 YR 9/4; white** (TGAI) [ASTM 1535]
63-3.	Physical state	**crystalline solid at 25 C** (TGAI)
63-4.	Odor	**mild "garlic-like" at 25 C** (TGAI)
63-7.	Density, bulk density, or specific gravity	**1.358 g/ml at 25 C** (TGAI) [CIPAC MT 3]
63-8.	Solubility	**Solvent Solubility at 25 C** **water 33 ppm** (TGAI) [FR 40 26879 and 16253)
63-13.	Stability	**relatively stable under normal storage conditions; a.i. reduced 2.1% after 7 days at 50 C in polyseal capped glass bottles; at 0 C remains crystallized and stable; relatively immiscible in water, known to be subject to hydrolysis, more so in alkali than in acid; photolysis is reported to be slow; exposure to monoammonium phosphate for 24 hours resulted in blackened, tar-like residues indicating some reactivity; exposure to aluminum or iron for 24 hours resulted in trace amounts of layered material indicating apparent catalytic decomposition of the a.i., no corrosion of the metal was apparent** (TGAI) [44 FR 16267, CIPAC MT 39, 41, and 46]
63-17.	Storage stability	**loss of 1.6% w/w methyl parathion, no changes in product color or odor, and no loss of integrity of the container when stored for 1 year at 20 C in one gallon phenolic resin lined, steel containers (similar to commercial packaging)** (MP)

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MASTER RECORD IDENTIFICATION NUMBERS

MRID documents containing data which have been reviewed by the Agency are designated in shaded blocks in the following bibliographic listing of Product Chemistry Citations (used). A summary of the subject memoranda and their associated MRID documents is presented below.

AGENCY MEMORANDA

CBRS No. 1795
Subject: Methyl Parathion, Technical: New Source for Active Ingredient.
From: W. Anthony/S. Hummel
To: A. Rispin/D. Edwards
Dated: 5/28/87
MRID(s): 40004701 40004702 40004703

CBRS No. 3107
Subject: Methyl Parathion Product Chemistry in Response to the Methyl parathion Registration Standard Data Gaps.
From: S. Malak
To: A. Rispin/D. Edwards
Dated: 2/11/88
MRID(s): 40406601

CBRS No. 3280
Subject: Methyl Parathion MP - EPA Registration No. 4787-4 Cheminova - Response to the Product Chemistry Chapter.
From: G. Makhijani
To: A. Rispin/D. Edwards
Dated: 3/25/88
MRID(s): 40482401

CBRS No. 3804
Subject: Methyl Parathion MP - EPA Registration No. 4787-4 Cheminova - Response to the Product Chemistry Chapter.
From: G. Makhijani
To: A. Rispin/D. Edwards
Dated: 5/25/88
MRID(s): 40601501

CBRS No. - 4023
Subject: Methyl Parathion - Technical. EPA Registration No. 4787-4 - Cheminova - Response to the Product Chemistry Chapter.
From: G. Makhijani
To: A. Rispin/D. Edwards
Dated: 8/3/88
MRID(s): CSF dated 6/16/88

CBRS No. 6491
Subject: Product Chemistry Data Review for Technical Methyl Parathion to Determine the Potential for Halogenated Dibenzo-p-Dioxin/Dibenzofuran Formation.
From: S. Funk
To: E. Feris
Dated: 6/20/90
MRID(s): 40482401 40601501

Product Chemistry Citations (used):

[00055859 A/S Cheminova (197?) Chemical Analysis of Methyl parathion: Pr-Ch-mp-3. Unpublished study recieved Sep 22, 1980 under 4787-4; CDL: 243416-A. *Reviewed in Methyl parathion Registration Standard Chapter dated 11/8/85.]

[00055860 A/S Cheminova (1980) Physical and Chemical Properties: [Methyl parathion]: Pr-Ch-mp-3. Unpublished study received Sep 22,1980 under 4787-4; CDL:243416-B. *Reviewed in Methyl parathion Registration Standard Chapter dated 11/8/85.]

40004701 Tucker, D., comp. (1986) Product Identity and Composition in Support of Registration of Methyl Parathion Technical: Laboratory Project I.D. MICRO-FLO MP-MU-3. Unpublished compilation. 33 p.

40004702 Tucker, D., comp. (1986) Analysis and Certification of Product Ingredients in Support of Registration of Methyl Parathion Technical: Laboratory Project I.D. MICRO-FLO MP-MU-3. Unpublished compilation. 50 p.

40004703 Tucker, D., comp. (1986) Physical and Chemical Characteristics in Support of Registration of Methyl Parathion: Laboratory Project I.D. MICRO-FLO MP-MU-3. Unpublished compilation. 9 p.

40406601 A/S Cheminova (1987) Product Chemistry--Methyl Parathion Technical: Study No. KLy/870625-MP3. Unpublished study. 17 p.

40410401 Tucker, D., comp. (1987) Product Identity and Composition According to Pesticide Assessment Guidelines Subdivision D, Series 61, ... for the Manufacturing Use Product - Methyl Parathion Technical: Lab. Proj. ID MICRO-FLO MP-EU-3. Unpublished compilation prepared by Chempax. 47 p.

40410402 Tucker, D., comp. (1987) Analysis, Analytical Methods, Certification of Ingredient Limits According to Pesticide Assessment Guidelines Subdivision D, Series 62, ... for the Manufacturing Use Product - Methyl Parathion Technical. Unpublished compilation prepared by Chempax. 84 p.

40410403 Tucker, D., comp. (1987) Physical and Chemical Properties According to Pesticide Assessment Guidelines Subdivision D, Series 63, ... for the Manufacturing Use Product - Methyl Parathion Technical: Lab. Proj. ID MICRO-FLO MP-EU-3. Unpublished compilation prepared by Chempax. 97 p.

40482401 A/S Cheminova (1987) Product Chemistry--Methyl Parathion Technical ... Supplementary Information ...: Study No. MVF/01.12.87-MP-3. Unpublished study prepared by A/S Cheminova in association with the Ministry of the Environment, Denmark. 42 p.

40601501 A/S Cheminova (1987) Product Chemistry--Methyl Parathion Technical ...: Supplementary Information: Submission/Pr-Ch-MP-3-conf/-5/04.19.88. Unpublished study. 14 p.

Product Chemistry (not used):
(These MRIDs pertain to end-use products)

00159992 FMC Corp. (1986) :Product Chemistry of Pounce Insecticide:. Unpublished compilation. 29 p.

00163545 Tucker, D., comp. (1986) Product Chemistry in Support of Registration of Ethyl-methyl Parathion 6-3 EC. Unpublished compilation prepared by Micro-Flo Co. 67 p.

40139801 Platte Chemical Co., Inc. (1987) Clean Crop Methyl Parathion 5-E: Product Chemistry Information: Study No. 87-4A. Unpublished compilation. 8 p.

40212601 Drexel Chemical Co. (1987) Product Specific Chemistry for Drexel Methyl Parathion 6E. Unpublished compilation. 32 p.

40299901 Tucker, D. (1987) 12 Month Storage Stability Study for Methyl Parathion 4E: Laboratory Project ID: MICRO-FLO MP4-EU-1. Unpublished study prepared by Chempax. 7 p.

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40300101 Tucker, D. (1987) 12 Month Storage Stability Study for Ethyl-Methyl :Parathion: 6-3: Laboratory Project ID: MICRO-FLO EM6-3-EU-1. Unpublished study prepared by Chempax. 6 p.

40300601 Tucker, D. (1987) 12 Month Storage Stability Study for Methyl Parathion 6E. Unpublished study prepared by Chempax. 7 p.

40300701 Tucker, D. (1987) 12 Month Storage Stability Study for Methyl Parathion 7.5E. Unpublished study prepared by Chempax. 7 p.

40372401 Tucker, D. (1987) Product Chemistry Data: Methyl Parathion : Laboratory Project ID: CN MP4-EU-1. Unpublished compilation prepared by Chempax. 61 p.

40372501 Tucker, D. (1987) Product Chemistry Data: Methyl Parathion: Laboratory Project ID: CN MP6-EU-1. Unpublished compilation prepared by Chempax. 59 p.

40373101 Tucker, D. (1987) Product Chemistry According to Pesticide Assessment Guidelines ...: Methyl Parathion. Unpublished compilation prepared by Chempax. 65 p.

40540301 Jessen, J. (1988) Product Chemistry ...: Prokil Ethyl-methyl Parathion 6-3. Unpublished compilation prepared by Gowan Co. 18 p.

40544501 Jessen, J. (1988) Product Chemistry for End Use Product: Prokil Methyl Parathion 5: Project ID: Methyl5. Unpublished study prepared by Gowan Co. 18 p.

41060101 Tucker, D. (1988) Twelve Month Storage Stability According to the Pesticide Assessment Guidelines...for the End Use Product Parathion-methyl Parathion 6-3: Laboratory Project ID CN EM6-3-EU-1. Unpublished study prepared by KEMX Consulting in cooperation with Chempax. 8 p.

41061501 Tucker, D., comp. (1988) Twelve Month Storage Stability ... for the End Use Product Methyl Parathion Emulsifiable Concentrate Four: Proj. ID CN MP4-EU-1. Unpublished study prepared by Chempax. 9 p.

41153701 Drexel Chemical Co. (1989) Supplement to Product Specific Chemistry for Drexel Methyl Parathion 6E: Storage Stability and Corrosion Characteristics. Unpublished study. 4 p.

41190101 Williams, D.; Herold, A. (1989) Supplemental Product Chemistry Information: Clean Crop Methyl Parathion 5-E. Unpublished study prepared by Platte Chemical Co. 5 p.

41621401 Broomberg, S. (1990) Storage Stability Report: Gowan Methyl Parathion 5 EC: Lab Project Number: MP5ECSS. Unpublished study prepared by Gowan Co. 4 p.

TABLE A. GENERIC DATA REQUIREMENTS FOR THE METHYL PARATHION (CHEMINOVA) 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)?
40 CFR §158.155-190 Product Chemistry				
Product Composition				
61-2. Starting Materials and Manufacturing Process	TGAI	Partially	40406601	Yes[4]
61-3. Formation of Impurities	TGAI	Partially	00055859	Yes[5]
Analysis and Certification of Product Ingredients				
62-1. Preliminary Analysis	TGAI	Yes	40482401 40601501	No
Physical and Chemical Characteristics[6]				
63-2. Color	TGAI	Yes	40406601	No
63-3. Physical State	TGAI	Yes	40406601	No
63-4. Odor	TGAI	Yes	40406601	No
63-5. Melting Point	TGAI	Yes	40406601	No
63-6. Boiling Point	TGAI	Yes	40406601	No
63-7. Density, Bulk Density, or Specific Gravity	TGAI	Yes	40406601	No
63-8. Solubility	TGAI or PAI	Yes	40406601	No
63-9. Vapor Pressure	TGAI or PAI	Yes	00055860	No
63-10. Dissociation Constant	TGAI or PAI	Yes	40406601	No
63-11. Octanol/Water Partitioning Coefficient	PAI	Yes	00055860	No
63-12. pH	TGAI	Yes	40406601	No
63-13. Stability	TGAI	Partially	40406601	Yes[7]
Other Requirements:				
64-1. Submittal of Samples	N/A	N/A	N/A	No

1. Data requirements pertain to the Cheminova unregistered technical.

TABLE A. (Continued).

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

3. Underlining indicates documents that have been reviewed in this Update Document.

4. Cheminova has responded to the data requirements for the TGAI; however, Cheminova must submit the additional information required by the Dioxin DCI dated 6/87 concerning the formation of halogenated dibenzo-p-dioxin/dibenzofurans during the manufacturing process.

5. Cheminova has responded to the data requirements for the TGAI; however, the registrant must submit the additional information required by the Dioxin DCI dated 6/87 regarding a discussion of the possible formation of halogenated dibenzo-p-dioxin/dibenzofurans.

6. 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).

7. Cheminova has responded to data requirements for the TGAI; however, information on the stability of the unregistered technical in the presence of metals and metal ions, and sunlight must be submitted.

TABLE B. PRODUCT SPECIFIC DATA REQUIREMENTS FOR METHYL PARATHION (CHEMINOVA) 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)?
40 CFR §158.155-190 Product Chemistry				
Product Composition				
61-1. Product Composition	MP	Yes	40482401	No
61-2. Starting Materials & Production/Formulation Process	MP	Partially	40406601	Yes[4]
61-3. Formation of Impurities	MP	Partially	00055859	Yes[5]
Analysis and Certification of Product Ingredients				
62-1. Preliminary Analysis	MP	Yes	40482401 40601501	No
62-2. Certified Limits	MP	Yes	40482401	No
62-3. Enforcement Analytical Methods	MP	Yes	40482401 40601501	No
Physical and Chemical Characteristics[6]				
63-2. Color	MP	Yes	40406601	No
63-3. Physical State	MP	Yes	40406601	No
63-4. Odor	MP	Yes	40406601	No
63-7. Density, Bulk Density, or Specific Gravity	MP	Yes	40482401	No
63-12. pH	MP	No	N/A	Yes[7]
62-14. Oxidizing or Reducing Action	MP	No	N/A	Yes[7]
62-15. Flammability	MP	No	N/A	Yes[7]
63-16. Explodability	MP	No	N/A	Yes[7]
63-17. Storage Stability	MP	No	N/A	Yes[7]
63-18. Viscosity	MP	No	N/A	Yes[7]
63-19. Miscibility	MP	No	N/A	Yes[7]
63-20. Corrosion Characteristics	MP	No	N/A	Yes[7]
Other Requirements:				
64-1. Submittal of Samples	N/A	N/A	N/A	No

1. Data requirements pertain to the Cheminova 80% FI (EPA Reg. No. 4787-4).

TABLE B. (Continued).

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

3. Underlining indicates documents that have been reviewed in this Update Document.

4. Cheminova has responded to the data requirements for the 80 % FI; however, the registrant must submit the additional information required by the Dioxin DCI dated 6/87 concerning the formation of halogenated dibenzo-p-dioxin/dibenzofurans during the manufacturing process.

5. Cheminova has responded to the data requirements for the 80% FI; however, the registrant must submit the additional information required by the Dioxin DCI dated 6/87 regarding a discussion of the possible formation of halogenated dibenzo-p-dioxin/dibenzofurans

6. 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, explodability, storage stability, viscosity, miscibility, and corrosion characteristics).

7. Cheminova has not responded to the data requirements for the 80% FI; all product chemistry data concerning this topic are required.

TABLE A. GENERIC DATA REQUIREMENTS FOR THE METHYL PARATHION (MICRO-FLO) 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)?
40 CFR §158.155-190 Product Chemistry				
Product Composition				
61-2. Starting Materials and Manufacturing Process	TGAI	Partially	40004701 40410401	Yes[4]
61-3. Formation of Impurities	TGAI	Partially	40004701	Yes[5]
Analysis and Certification of Product Ingredients				
62-1. Preliminary Analysis	TGAI	Partially	40004702 40410402	Yes[6]
Physical and Chemical Characteristics[7]				
63-2. Color	TGAI	Yes	40410403	No
63-3. Physical State	TGAI	Yes	40410403	No
63-4. Odor	TGAI	Yes	40410403	No
63-5. Melting Point	TGAI	Yes	40004703	No
63-6. Boiling Point	TGAI	Yes	40004703	No
63-7. Density, Bulk Density, or Specific Gravity	TGAI	Yes	40410403	No
63-8. Solubility	TGAI or PAI	Partially	40410403	Yes[8]
63-9. Vapor Pressure	TGAI or PAI	Yes	40004703	No
63-10. Dissociation Constant	TGAI or PAI	Yes	40004703	No
63-11. Octanol/Water Partitioning Coefficient	PAI	Yes	40004703	No
63-12. pH	TGAI	Yes	40004703	No
63-13. Stability	TGAI	Yes	40410403	No
Other Requirements:				
64-1. Submittal of Samples	N/A	N/A	N/A	No

1. The Micro-Flo 80% FI (EPA Reg. No. 51036-156) is produced from two different sources. Data requirements pertain to the unregistered technical source of the 80% FI; data requirements for the TGAI of the Micro-Flo 80% FI produced from an EPA-registered product will be satisfied by the registrant of the source product.

TABLE A. (Continued).

The Micro-Flo 80% FI was transferred from the Landia Chemical Company (EPA Reg. No. 9859-267) on 10/31/88. Upon notification from Micro-Flo that the manufacturing process has not changed since the transfer of ownership from Landia, data submitted by Landia may be applied to the 80% FI produced from the unregistered technical source and its TGAI. If the manufacturing process has changed, all data requirements will remain outstanding.

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

3. Underlining indicates documents that have been reviewed for this Update document.

4. Landia has responded to the data requirements for the unregistered technical used to produce the 80% FI; however, material safety data sheets from the manufacturer(s) of the starting materials must be submitted. In addition, the registrant must submit the information required by the Dioxin DCI dated 6/87 concerning the potential for formation of halogenated dibenzo-p-dioxins/dibenzofurans during the manufacturing process.

5. Landia has responded to the data requirements for the unregistered technical used to produce the 80% FI; however, the registrant must submit the additional information required by the Dioxin DCI dated 6/87 regarding a discussion regarding the possible formation of halogenated dibenzo-p-dioxins/dibenzofurans.

6. Landia has responded to the data requirements for the unregistered technical used to produce the 80% FI; however, the preliminary analysis did not include all impurities listed on the CSF at >0.1%. The registrant must either submit new data reflecting preliminary analysis of five representative batches of the TGAI or the FI for all components listed on the CSF, or certify that the manufacturing process has not changed since the transfer of ownership from Landia and modify the CSF accordingly. If preliminary analysis is performed on the 80% FI, the impurities must be identified and quantified to 0.08%.

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).

8. Landia has responded to the data requirements for the unregistered technical used to produce the 80% FI; however, data on the solubility of the TGAI in polar and nonpolar solvents besides water must be submitted.

TABLE B. PRODUCT SPECIFIC DATA REQUIREMENTS FOR METHYL PARATHION (MICRO-FLO) 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)?
40 CFR §158.155-190 Product Chemistry				
Product Composition				
61-1. Product Composition	MP	Partially	CSFs (jacket)	Yes[4]
61-2. Starting Materials & Production/Formulation Process	MP	Partially	40004701 40410401	Yes[5]
61-3. Formation of Impurities	MP	Partially	40004701	Yes[6]
Analysis and Certification of Product Ingredients				
62-1. Preliminary Analysis	MP	Partially	40004702 40410402	Yes[7]
62-2. Certified Limits	MP	Partially	CSFs (jacket)	Yes[8]
62-3. Enforcement Analytical Methods	MP	Partially	40004702 40410402	Yes[9]
Physical and Chemical Characteristics[10]				
63-2. Color	MP	Yes	40004703	No
63-3. Physical State	MP	Yes	40004703	No
63-4. Odor	MP	Yes	40004703	No
63-7. Density, Bulk Density, or Specific Gravity	MP	Yes	40004703	No
63-12. pH	MP	Yes	40004703	No
62-14. Oxidizing or Reducing Action	MP	Yes	40004703	No
62-15. Flammability	MP	Yes	40004703	No
63-16. Explodability	MP	Yes	40004703	No
63-17. Storage Stability	MP	Yes	40410403	No
63-18. Viscosity	MP	Yes	40004703	No
63-19. Miscibility	MP	Yes	40004703	No
63-20. Corrosion Characteristics	MP	Yes	40004703	No
Other Requirements:				
64-1. Submittal of Samples	N/A	N/A	N/A	No

1. Data requirements pertain to the Micro-Flo 80% FI (EPA Reg. No. 51036-156) produced from an unregistered technical source and from an EPA-registered product. The Micro-Flo 80% FI was transferred from the Landia

TABLE B. (Continued).

Chemical Company (EPA Reg. No. 9859-267) on 10/31/88. Upon notification from Micro-Flo that the manufacturing process has not changed since the transfer of ownership from Landia, data submitted by Landia may be applied to the 80% FI produced from the unregistered technical. If the manufacturing process has changed, all data requirements will remain outstanding.

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

3. Underlining indicates documents that have been reviewed for this Update document. CSFs dated 10/10/89 for the 80% FI produced from the unregistered technical source and 7/3/90 for the 80% FI produced from an EPA-registered product were obtained from the product registration jackets.

4. Micro-flo has responded to the data requirements for the 80% FI produced from the unregistered technical source; however, the registrant must submit the following information: (i) identification of the components of a related group of compounds present at >0.1%; (ii) individual nominal concentrations for all impurities; (iii) the nominal concentration for an additional impurity for which no nominal was established; (iv) nominal concentrations which reflect preliminary analysis results for the active ingredient and impurities or an explanation as to why the values differ; and (v) addition of an impurity detected in preliminary analysis at >0.1% to the CSF or a reason for its omission. Micro-Flo has responded to the data requirements for the 80% FI produced from an EPA-registered product; however, the nominal concentration listed on the CSF must be based on the nominal concentration (label claim) of the active ingredient in the source product. In addition, the registrant must clarify which producer is the source of the "basic" and which is the source of the "alternate" formulation, or if one of these producers is no longer used.

5. Landia has responded to the data requirements for the 80% FI produced from the unregistered technical source; however, material safety data sheets from the manufacturer(s) of the starting materials must be submitted. In addition, the registrant must submit the information required by the Dioxin DCI dated 6/87 concerning the potential for formation of halogenated dibenzo-p-dioxins/dibenzofurans during the manufacturing process. Data requirements for the Micro-Flo 80% FI produced from an EPA-registered product will be satisfied by the registrant of the source product.

6. Landia has responded to the data requirements for the 80% FI produced from the unregistered technical source; however, the registrant must submit the additional information required by the Dioxin DCI dated 6/87 regarding a discussion regarding the possible formation of halogenated dibenzo-p-dioxins/dibenzofurans.

TABLE B. (Continued).

Data requirements for the Micro-Flo 80% FI produced from an EPA-registered product will be satisfied by the registrant of the source product.

7. Landia has responded to the data requirements for the 80% FI produced from the unregistered technical source; however, the preliminary analysis did not include all impurities listed on the CSF at >0.1%. The registrant must either submit new data reflecting preliminary analysis of five representative batches of the TGAI or the FI for all components listed on the CSF, or certify that the manufacturing process has not changed since the transfer of ownership from Landia and modify the CSF accordingly. If preliminary analysis is performed on the 80% FI, the impurities must be identified and quantified to 0.08%. Data requirements for the 80% FI produced from an EPA-registered product will be satisfied by the registrant of the source product.

8. Micro-Flo has responded to the data requirements for the 80% FI produced from the unregistered technical source; however, the registrant must either submit new certified limits which encompass preliminary analysis values for two components listed on the CSF or an explanation for the discrepancies. Micro-Flo has responded to the data requirements for the 80% FI produced from an EPA-registered product; however, new certified limits must be established for the active ingredient based on the nominal concentration (label claim) of the active ingredient in the source product. Revised certified limits must be submitted on EPA Form 8570-4 (Rev. 2-85).

9. Landia has responded to the data requirements for the 80% FI produced from the unregistered technical source and data are adequate; however, if preliminary analysis is conducted on the 80% FI, recovery data will be required to support levels of detection to 0.08% for the related compounds. Data requirements for the 80% FI produced from an EPA-registered product will be satisfied by the registrant of the source product.

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, explodability, storage stability, viscosity, miscibility, and corrosion characteristics).

TABLE A. GENERIC DATA REQUIREMENTS FOR THE METHYL PARATHION (MOBAY AND CEDAR CHEMICAL) 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)?
40 CFR §158.155-190 Product Chemistry				
Product Composition				
61-2. Starting Materials and Manufacturing Process	TGAI	No	N/A	Yes[4]
61-3. Formation of Impurities	TGAI	No	N/A	Yes[4]
Analysis and Certification of Product Ingredients				
62-1. Preliminary Analysis	TGAI	No	N/A	Yes[5]
Physical and Chemical Characteristics[6]				
63-2. Color	TGAI	No	N/A	Yes[5]
63-3. Physical State	TGAI	No	N/A	Yes[5]
63-4. Odor	TGAI	No	N/A	Yes[5]
63-5. Melting Point	TGAI	No	N/A	Yes[5]
63-6. Boiling Point	TGAI	No	N/A	Yes[5]
63-7. Density, Bulk Density, or Specific Gravity	TGAI	No	N/A	Yes[5]
63-8. Solubility	TGAI or PAI	No	N/A	Yes[5]
63-9. Vapor Pressure	TGAI or PAI	No	N/A	Yes[5]
63-10. Dissociation Constant	TGAI or PAI	No	N/A	Yes[5]
63-11. Octanol/Water Partitioning Coefficient	PAI	No	N/A	Yes[5]
63-12. pH	TGAI	No	N/A	Yes[5]
63-13. Stability	TGAI	No	N/A	Yes[5]
Other Requirements:				
64-1. Submittal of Samples	N/A	N/A	N/A	No

1. Data requirements pertain to the unregistered technicals (TGAI) used to produce the Mobay Corporation and Cedar Chemical Corporation 80% FIs (EPA Reg. Nos. 3125-35 and 56077-2, respectively).

TABLE A. (Continued).

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

3. Underlining indicates documents that have been reviewed in this Update Document.

4. Mobay and Cedar Chemical have not responded for the unregistered technicals used to produce their 80% FIs; all data reguirements specified in the Methyl parathion Guidance Document, including discussions regarding dioxin formation remain outstanding.

5. Mobay and Cedar Chemical have not responded for the unregistered technicals used to produce their 80% FIs; all data reguirements specified in the Methyl parathion Guidance Document remain outstanding.

6. 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).

TABLE B. PRODUCT SPECIFIC DATA REQUIREMENTS FOR METHYL PARATHION (MOBAY AND CEDAR CHEMICAL) 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)?
40 CFR §158.155-190 Product Chemistry				
Product Composition				
61-1. Product Composition	MP	No	N/A	Yes[4]
61-2. Starting Materials & Production/Formulation Process	MP	No	N/A	Yes[4]
61-3. Formation of Impurities	MP	No	N/A	Yes[4]
Analysis and Certification of Product Ingredients				
62-1. Preliminary Analysis	MP	No	N/A	Yes[5]
62-2. Certified Limits	MP	No	N/A	Yes[5]
62-3. Enforcement Analytical Methods	MP	No	N/A	Yes[5]
Physical and Chemical Characteristics[6]				
63-2. Color	MP	No	N/A	Yes[5]
63-3. Physical State	MP	No	N/A	Yes[5]
63-4. Odor	MP	No	N/A	Yes[5]
63-7. Density, Bulk Density, or Specific Gravity	MP	No	N/A	Yes[5]
63-12. pH	MP	No	N/A	Yes[5]
62-14. Oxidizing or Reducing Action	MP	No	N/A	Yes[5]
62-15. Flammability	MP	No	N/A	Yes[5]
63-16. Explodability	MP	No	N/A	Yes[5]
63-17. Storage Stability	MP	No	N/A	Yes[5]
63-18. Viscosity	MP	No	N/A	Yes[5]
63-19. Miscibility	MP	No	N/A	Yes[5]
63-20. Corrosion Characteristics	MP	No	N/A	Yes[5]
Other Requirements:				
64-1. Submittal of Samples	N/A	N/A	N/A	No

TABLE B. (Continued).

1. Data requirements pertain to the Mobay Corporation and Cedar Chemical Corporation 80% FIs (EPA Reg. Nos. 3125-35 and 56077-2, respectively).

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

3. Underlining indicates documents that have been reviewed in this Update Document.

4. Mobay and Cedar Chemical have not responded for their 80% FIs; all data reguirements specified in the Methyl parathion Guidance Document including discussions regarding dioxin formation, remain outstanding.

5. Mobay and Cedar Chemical have not responded for their 80% FIs; all data reguirements specified in the Methyl parathion Guidance Document remain outstanding.

6. 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, explodability, storage stability, viscosity, miscibility, and corrosion characteristics).

ATTACHMENT 3

CONFIDENTIAL

METHYL PARATHION (MICRO-FLO)

REREGISTRATION STANDARD UPDATE

PRODUCT CHEMISTRY

TASK 4

(Final Report)

CONFIDENTIAL APPENDICES

Appendix A: 3 Page(s)
Appendix B: 2 Page(s)

Confidential Appendices to the Scientific Review of the Reregistration Standard Update Report for the pesticide methyl parathion by the Chemistry Branch II Reregistration Section [Confidential FIFRA Trade Secret/CBI].

RIN 4357-96

Methyl parathion product and residue chemistry chapter update

Page____ is not included in this copy.

Pages 35 through 39 are not included.

The material not included contains the following type of information:

✓ Identity of product inert ingredients.

____ Identity of product impurities.

✓ Description of the product manufacturing process.

✓ Description of quality control procedures.

____ Identity of the source of product ingredients.

____ Sales or other commercial/financial information.

____ A draft product label.

____ The product confidential statement of formula.

____ Information about a pending registration action.

____ 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.

ATTACHMENT 2

DYNAMAC
CORPORATION
Environmental Services

Final Report

METHYL PARATHION
Shaughnessy No. 053501

TASK 3: Residue Chemistry
Reregistration Standard Update

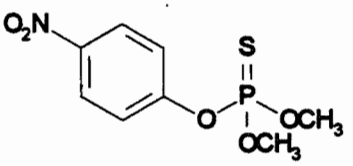
November 20, 1992

Contract No. 68-D2-0053

Submitted to:
U.S. Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
The Dynamac Building
2275 Research Boulevard
Rockville, MD 20850-3268

METHYL PARATHION



(SHAUGHNESSY NO. 053501)

REREGISTRATION STANDARD UPDATE

RESIDUE CHEMISTRY

Task - 3

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4

METHYL PARATHION

(SHAUGHNESSY NO. 053501)

REREGISTRATION STANDARD UPDATE

RESIDUE CHEMISTRY

Task - 3

INTRODUCTION

According to the Agency Site Listing (SP05) of 2/5/91 for the insecticide/acaricide methyl parathion, the following crops with food/feed uses are federally registered: alfalfa (including seed crop), almonds, apples, apricots, artichokes, barley, beans (dry, lima, and succulent), beets, broccoli, Brussels sprouts, cabbage, carrots, cauliflower, celery, cherries, clover (including seed crop), collards, corn (including field, pop, and sweet), cotton, cucumbers, gooseberries, grapes, grasses, hops, kale, kohlrabi, lettuce, melons, mustard greens, nectarines, oats, onions, pastures, peaches, peanuts, pears, peas (including blackeyed peas, cowpeas, field peas, and southern peas), pecans, peppers, plums, potatoes, prunes, pumpkins, rangeland, rice, rutabagas, rye, safflower, sorghum, soybeans, spinach, squash (summer and winter), strawberries, sugar beets, sunflower, sweet potatoes, tobacco, tomatoes, turnips, vetch, and wheat. The Agency Special Local Need Listing (SLN-1) of 2/5/91 additionally identifies registered food/feed uses of methyl parathion on Chinese cabbage, lentils, and rape seed in various states under the SLN program.

An Agency Product Label Search List (PRD-1) conducted 2/5/91 for products containing methyl parathion identifies 80 end-use products (Eps) registered to 24 registrants. Formulations registered for use on the above listed food/feed crops include: the 25% wettable powder (WP), 2 lb/gal microencapsulated (Mcap), the 15.9-74.26% emulsifiable concentrate (EC; ca. 1.5-7.5 lb/gal), the 40% soluble concentrate liquid (SC/L), and the 29.4% liquid-ready-to-use (RTU) formulations. Methyl parathion may be applied using aerial and ground equipment via foliar, dormant, and delayed dormant treatments.

The Methyl Parathion Guidance Document dated 12/86 identifies outstanding data gaps for plant and animal metabolism, storage stability data, and the magnitude of the residue in the following crop groups and members: root and tuber vegetables group (beets, carrots, potatoes, rutabagas, sugar beets, sweet potatoes, and turnips), leaves of root and tuber vegetables group (beet greens, sugar beet tops, and turnip greens), bulb vegetable groups (bulb and green onions), leafy vegetables group (celery, leaf and head lettuce, and spinach), brassica leafy vegetables (broccoli, cabbage, and mustard greens), legume vegetables group (beans, guar beans, lentils, peas, and soybeans), foliage of legume

vegetables group (pea forage and soybean hay), fruiting vegetables group (peppers and tomatoes), cucurbits vegetables group (cucumbers, melons, pumpkins, and squash), pome fruits group (apples), stone fruits group (apricots, cherries, nectarines, peaches, and plums, and prunes), small fruits and berries group (gooseberries, grapes, and strawberries), tree nuts group (almonds, almond hulls, and pecans), cereal grains group (field corn, rice, rye, sorghum, and wheat), forage, fodder, and straw of cereal grains group (corn forage; sorghum forage and fodder; and wheat forage, hay, and straw), grass forage, fodder, and hay group (grass hay of bermuda grass, bluegrass, and bromegrass), non-grass animal feeds group (alfalfa forage and hay), and miscellaneous commodities (artichokes, cottonseed, cotton forage, hops, peanuts, rape seed, safflower, sunflower, and tobacco). The Guidance Document also requires data reflecting methyl parathion residues of concern in the processed products of potatoes, sugar beets, beans, guar beans, soybeans, apples, plums, grapes, tomatoes, wheat, field corn, rice, sorghum, hops, peanuts, rape seed, safflower seed, sunflower seed, and cottonseed.

In response to data requirements specified by the Methyl Parathion Guidance Document, Pennwalt Corporation and A/S Cheminova Company collectively submitted the following: plant metabolism in cotton (MRID 41001401), lettuce (MRIDs 41001402 and 41001404), and potatoes (MRID 41001403); animal metabolism in laying hens (MRID 41001406) and a lactating goat (MRID 41001405); storage stability data (MRID 41488401); and magnitude of the residue in alfalfa (MRID 41517101), artichoke (MRIDs 41379301 and 41717801), beans (MRIDs 41438101, 41457901, 41517102, 41560005 and 41596206), bermudagrass (MRID 41359902), blue grass (MRID 41359903), broccoli (MRID 41379305), cabbage (MRID 41379304), carrots (MRID 41395105), celery (MRIDs 41395102 and 41717802), clover (MRID 41439601 under CBRS No. 7573), field corn (MRIDs 41560002, 41596202, 41717803, and 41717804), sweet corn (MRIDs 41596208 and 41717805), cottonseed (MRIDs 41395103, 41457904, and 41596201), fescue (MRID 41359905), grapes (MRIDs 41457902 and 41457903), lettuce (MRIDs 41379302 and 41596204), mustard greens (MRID 41359901), onions (MRIDs 41395104 and 41596203), peas (MRID 41596207), potatoes (MRID 41438102), rice (MRIDs 41379307, 41560004, and 41596205), sorghum (MRID 41517103), soybeans (MRID 41379303, 41517104, and 41560003), spinach (MRID 41359906), sugar beets (MRID 41379306), sunflower (MRID 41359904), turnips (MRIDs 41395101 and 41717806), and wheat (MRIDs 41560001 and 41596209). These data, up to 3/7/91, are reviewed in this update document for their adequacy in fulfilling the outstanding data requirements.

To date, only Pennwalt Corporation and Cheminova have responded to the data requirements of the Methyl Parathion Guidance Document. Therefore, this update document only addresses data requirements applicable to these two registrants.

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Tolerances have been established for residues of methyl parathion in a variety of raw agricultural commodities [40 CFR §180.121(a) and (b), and 40 CFR §180.319]. The tolerances presented in 40 CFR §180.121(a) include residues of ethyl parathion and its methyl homolog (methyl parathion), whereas 40 CFR §180.121(b) includes tolerances for residues of methyl parathion per se. The tolerance expression in 40 CFR §180.121(a) included both the methyl and ethyl homologs of parathion because these homologs were previously not distinguishable by the available analytical methodology (colorimetric). Gas chromatographic methods are now available which are capable of distinguishing between these two compounds, and, therefore, separate tolerances for each active ingredient are required. An interim tolerance for residues of ethyl parathion or its methyl homolog in or on rye is also listed in 40 CFR §180.319; we recommend the cancellation of this interim tolerance. At the present time, no tolerances exist for residues in animal commodities.

It has been determined by the Agency's Metabolism Committee that the methyl parathion residues of concern are methyl parathion and methyl paraoxon; therefore, these are the residues to be regulated (R. Perfetti, EPA Memorandum with no assigned CBRS No., dated 3/16/92). Upon reregistration of methyl parathion, the tolerance expression will be revised to include the combined residues of methyl parathion and methyl paraoxon. For crop residue studies reviewed in this update, data depicting the combined residues of methyl parathion and methyl paraoxon were evaluated for their adequacy in supporting the established tolerances.

SUMMARY

The following Methyl Parathion residue chemistry data are required:

- Additional plant and animal metabolism information.
- Storage stability data to support all required and previously submitted residue data for methyl parathion.
- Data remain outstanding concerning magnitude of the residue in plant and animal commodities.
- Feeding studies in ruminants and poultry.

QUALITATIVE NATURE OF THE RESIDUE IN PLANTS

Conclusions

The qualitative nature of methyl parathion residues in plants is not completely understood. The Guidance Document dated 12/86 requires data depicting the metabolism of ring-labeled [^{14}C]methyl parathion in cotton, potatoes, and lettuce. In addition, the Guidance Document states that if the metabolism of methyl parathion in these three crops differs significantly, then metabolism data are required for one representative commodity from each crop group for which there are registered uses of methyl parathion.

In response to the Guidance Document, A/S Cheminova Co. submitted residue chemistry data pertaining to the qualitative nature of parathion-methyl residues in or on cotton (1988; MRID 41001401), potatoes (1988; MRID 41001403), and lettuce (1988; MRID 41001404). Our conclusions regarding these metabolism studies are presented below.

Cotton

The qualitative nature of methyl parathion residues in cotton is adequately understood. The portion of the study involving cottonseed was conducted at 0.22x the registered application rate resulting in marginal radioactivity levels in commodities of concern. The Agency prefers that plant metabolism studies be conducted at a rate high enough to result in sufficiently high radioactivity levels to allow for characterization/identification of residues; a rate of at least 1x should generally be used. Non-extractable residues remained uncharacterized in cottonseed (27.3% of TRR, 0.022 ppm) and cotton leaves (6.2% of TRR, 30 ppm) following acid treatment; however, based on revised and current Agency "trigger values" regarding the strategy for characterization of non-extractable residues, no additional attempts to characterize/identify these residues are needed. Approximately 35% and 70% of the TRR was identified in cottonseed and leaves, respectively. Samples from this study were not analyzed by the current enforcement methods to ascertain that the methods are capable of recovering and quantifying all metabolites of concern. This radiovalidation is required. However, samples from the lettuce study may be used.

The study indicates that in greenhouse-grown cotton harvested 10 days following a single foliar application of [phenyl-UL-^{14}C]methyl parathion at 0.22x, the predominant metabolite identified and confirmed in cottonseed was p-nitrophenol (12.0% of TRR, 0.009 ppm). Other compounds that were tentatively or definitively identified in cottonseed were methyl parathion, p-

nitrophenyl glucopyranoside, and monodesmethyl-parathion-methyl (collectively 4.4-9.7% of TRR, 0.004-0.008 ppm).

The study also indicates that in mature cotton leaves treated with [^{14}C]methyl parathion at 0.84 mg ai/200 µL/leaf, the major compound identified was the parent compound, methyl parathion (34.7% of TRR, 168 ppm). The following compounds were also identified and confirmed in cotton leaves: p-nitrophenol (10% of TRR, 48 ppm), p-nitrophenyl glucopyranoside (11.4% of TRR, 55 ppm), monodesmethyl-parathion-methyl (11.3% of TRR, 55 ppm), and monodesmethyl-paraoxon-methyl (3.1% of TRR, 15 ppm). Approximately 71% of TRR in cotton leaves were identified and confirmed.

Though marginal, the metabolism study does provide enough information to allow CBRS to confirm that the residue to be included in the tolerance expression for cotton consists of methyl parathion and its paraoxon.

Potatoes

The qualitative nature of the residue in potatoes is understood. The available metabolism study indicate that ^{14}C-residues in potato tubers harvested 5 days following a single foliar application of [phenyl-UL-^{14}C]methyl parathion at 3x the maximum registered rate are negligible (0.027 ppm). Approximately 25-27% of TRR (≤0.007-0.018 ppm) has been adequately identified as p-nitrophenol, the major metabolite in tubers; methyl parathion *per se* is a minor metabolite, comprising <5% of TRR (≤0.002 ppm). Other minor metabolites (<9% of TRR, 0.004 ppm) that were tentatively identified were monodesmethyl-parathion-methyl, p-nitrophenol-glucoside, and other p-nitrophenol-conjugates. Additional data pertaining to confirmation of metabolite identification in potato tubers will not be required due to the extremely low levels of radioactivity remaining in the unidentified portions.

Lettuce

The qualitative nature of the residue in lettuce leaves is not fully understood. Five metabolites (designated as M5 through M8, and an unknown nonpolar compound) collectively comprising ca. 17% of TRR (1.94 ppm; 14-day PTI) and ca. 16% of TRR (1.58 ppm; 21-day PTI) were not identified. No attempt was made to characterize/identify the non-extractable residues which comprised ca. 38% of TRR (4.26 ppm; 14-day PTI) and 45% of TRR (4.37 ppm; 21-day PTI). Based on current Agency "trigger values" regarding the strategy for characterization of non-extractable residues, additional attempts should have been made to release these non-extractable residues. Samples from this study were not analyzed by the current enforcement methods to ascertain that the

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methods are capable of recovering and quantifying all metabolites of concern.

The submitted study is potentially upgradeable. If sufficient samples are available and the registrant can prove that sample integrity was maintained during prolonged storage and provide storage stability data, then the following additional data are required:

- For the lettuce metabolism study (MRID 41001404), the five metabolites (designated as M5 through M8, and an unknown nonpolar compound) collectively comprising ca. 17% of TRR (1.94 ppm; 14-day PTI) and ca. 16% of TRR (1.58 ppm; 21-day PTI) must be identified and confirmed. In addition, the registrant should attempt to characterize/identify the non-extractable residues which comprised ca. 38% of TRR (4.26 ppm; 14-day PTI) and 45% of TRR (4.37 ppm; 21-day PTI) using treatments such as dilute acid and base at ambient temperatures, surfactants, enzymes, and 6 N acid and/or 10 N base with reflux. Finally, samples from this study must be analyzed by the current enforcement methods to ascertain that the methods are capable of recovering and quantifying all metabolites of concern. If the study cannot be upgraded, then a new lettuce metabolism study needs to be conducted.

Although deficient, the study indicates that in greenhouse-grown lettuce harvested 14 and 21 days following a single foliar application of [phenyl-UL-^{14}C]methyl parathion at 1x the maximum registered single application rate, the predominant metabolite identified and confirmed in lettuce leaf was p-nitrophenol (up to 22% of TRR, 2.47 ppm). Of the extractable residues, ca. 43% were identified and confirmed. Other compounds that were identified include methyl parathion (up to 19% of TRR, 2.16 ppm) and p-nitrophenyl glucopyranoside (up to 3.4% of TRR, 0.33 ppm).

In summary, methyl parathion is metabolized in cotton and potatoes to either monodesmethyl-parathion-methyl or the corresponding paraoxon and to p-nitrophenol. It also may directly metabolize to p-nitrophenol, which may then be conjugated with glucopyranose to form p-nitrophenyl-glucopyranoside. In lettuce, methyl parathion appears to be metabolized to either the monodesmethyl-parathion-methyl or the p-nitrophenol metabolite; the p-nitrophenol in turn can form two conjugates, one of which may be p-nitrophenol-glucopyranoside.

The molecular structures of methyl parathion and its metabolites in plants and animals are depicted in Table 1.

Table 1. Methyl parathion and its putative metabolites.

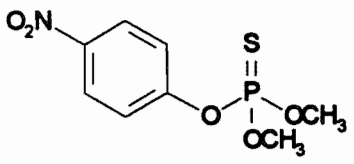
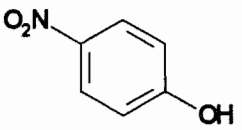
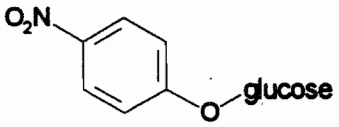
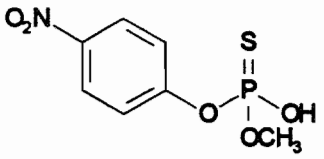
Code	Chemical Name	Substrate	MRID
	Structure		Common Name
I.	O,O-dimethyl-O-p-nitrophenyl phosphorothioate		
		cotton leaves*	41001401
		cotton seeds	41001401
		potato tubers	41001403
		lettuce leaves*	41001404
		poultry fat*, gizzard*, heart, kidney, and skin	41001406
			methyl parathion
II.	p-nitrophenol		
		cotton leaves*	41001401
		cotton seeds*	41001401
		potato tubers	41001403
		lettuce leaves*	41001404
		poultry eggs, fat*, gizzard*, heart, kidney, liver*, and skin	41001406
III.	p-nitrophenyl-glucopyranoside		
		cotton leaves*	41001401
		cotton seeds*	41001401
		potato tubers	41001403
		lettuce leaves*	41001404
IV.	O-methyl-O-p-nitrophenyl phosphorothioate		
		cotton leaves*	41001401
		cotton seeds	41001401
		potato tubers	41001403
		lettuce leaves	41001404
			monodesmethyl-parathion-methyl

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Table 1 *(continued)*.

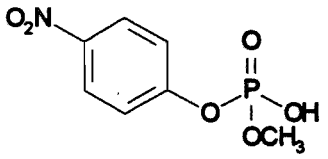
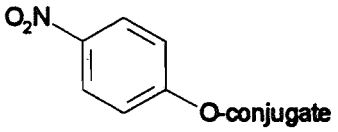
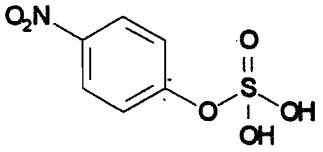
Code	Chemical Name Structure	Substrate Common Name	MRID
V.	O-methyl-O-p-nitrophenylphosphate		
		cotton leaves*	41001401
		potato tubers	41001403
		goat kidney, liver, and milk	41001405
		poultry kidney and muscle	41001406
		monodesmethyl-paraoxon-methyl	
VI.	p-nitrophenol conjugate		
		potato tubers	41004103
VII.	p-nitrophenylsulfate		
		poultry eggs and fat	41001406

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Table 1 *(continued)*.

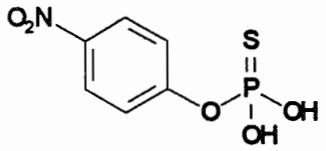
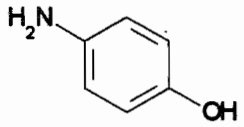
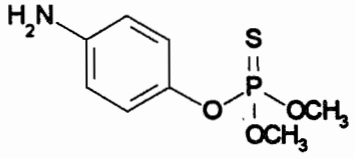
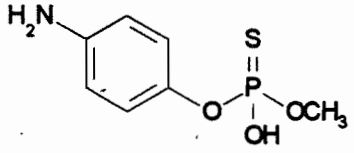
Code	Chemical Name	Substrate	MRID
	Structure		**Common Name**
VIII.	p-nitrophenylthiophosphate		
		poultry kidney and skin	41001406
IX.	p-aminophenol		
		poultry heart and kidney	41001406
X.	O,O-dimethyl-O-p-aminophenylphosphorothioate		
		goat fat and kidney	41001405
			amino-parathion-methyl
XI.	O-methyl-O-p-aminophenylphosphorothioate		
		goat kidney	41001405
		poultry heart and skin	41001406
			desmethyl-amino-parathion-methyl

Table 1 *(continued)*.

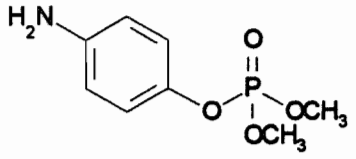
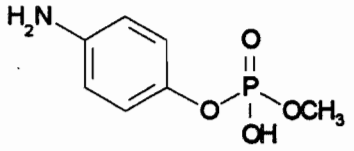
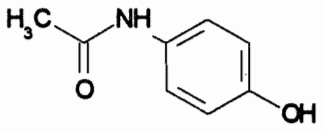
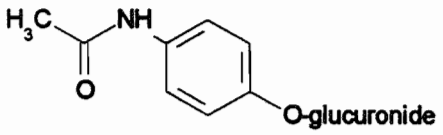
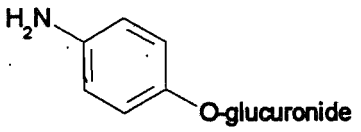
Code	Chemical Name	Substrate	MRID
	Structure		Common Name
XII.	O,O-dimethyl-O-p-aminophenylphosphate		
		goat fat, kidney, milk, and muscle	41001405
			amino-paraoxon-methyl
XIII.	O-methyl-O-p-aminophenylphosphate		
		goat kidney, liver, and muscle	41001405
			desmethyl-amino-paraoxon-methyl
XIV.	N-acetyl-p-aminophenol		
		goat liver	41001405
		poultry gizzard, heart, and liver	41001406
XV.	N-acetyl-p-aminophenylglucuronide		
		goat kidney, liver, and muscle	41001405
		poultry heart, kidney*, liver, and skin	41001406

Table 1 *(continued)*.

Code	Chemical Name	Substrate	MRID
	Structure		Common Name
XVI.	p-aminophenylglucuronide		
		goat milk and muscle	41001405
		poultry heart and kidney	41001406

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* Confirmed by a second method.

References (used):

MRID(s): 41001401. 41001403. 41001404.

References (not used):

[The following reference(s) was not used in this review since the data were superseded by a later study.]

MRID(s): 41001402.

Discussion of the data:

Qualitative Nature of the Residue in Cotton

A/S Cheminova (1989; MRID 41001401) submitted data obtained by Bayer AG pertaining to the metabolism of methyl parathion in the forage and seed of greenhouse-grown cotton cultivated in 5-L buckets. For the metabolism study in cottonseed, [phenyl-UL-^{14}C]methyl parathion (specific activity 2.92 x 10^{11} dpm/g; 131.4 µCi/mg; 34.6 Ci/mole) was diluted with unlabeled methyl parathion to a final specific activity of 73.1 µCi/mg (19.2 Ci/mole, radiochemical purity >99%). One plant received a single foliar application 109 days postplanting, when the bolls were fully developed but unopened ("seed application") at 376 g ai/ha; this rate converts to 0.335 lb ai/A as calculated by study reviewer and is equivalent to 0.22x the maximum single application rate. The plant was harvested 10 days after treatment by cutting off the trunk, branches, leaves, and bolls. We note that a PHI of 1 day is in effect for cotton. The mature bolls were separated

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into husks, cotton, linters, and seeds. Immature bolls were also collected for total radioactive residue analysis only.

For the metabolism study in leaves, [phenyl-UL-^{14}C]methyl parathion (specific activity 12.7 x 10^9 dpm/g; 5.7 μCi/mg; 1.5 Ci/mole) was diluted with unlabeled methyl parathion to a final specific activity of 2.57 μCi/mg (0.67 Ci/mole, radiochemical purity >99%). Five leaves on each of two mature plants received a single application via syringe 189 days postplanting ("leaf application") at 0.84 mg ai/200 μL/leaf (10,590,000 dpm; 4.8 μCi). The treated leaves were harvested 15 days after treatment and the bolls were harvested 35 days after treatment. The treated leaves, untreated leaves, bolls, and branches were collected separately and bolls were separated into husks, cotton, and seeds.

The leaves and bolls from both applications, and the trunk and branches from the seed application were stored at -20 C; the trunk and branches of the leaf application were stored at room temperature and were not analyzed. Seeds were stored up to eight months prior to analysis; leaves were stored 8 to 20 months.

Total radioactive residues (TRR)

The TRR in ground cotton matrices were determined by liquid scintillation spectroscopy (LSS) following combustion. Of the applied radioactivity, 17.5% was recovered from the seed application while 54.8% was recovered from the leaf application. The total radioactive residues in the harvested cotton matrices are presented in Table 2. Metabolite characterizations and identifications were performed on subsamples of mature seeds from the seed application and on subsamples of the treated leaves from the leaf application.

Table 2. Total radioactive residues in cotton.

Sample	Methyl parathion equivalents (ppm)	
	Seed application	Leaf Application
Mature seeds	0.08	0.07
Mature linters	0.12	--
Mature cotton	1.18	0.05
Mature husks	25.75	0.09
Immature seeds	0.07	--
Immature cotton	0.09	--
Immature husks	4.12	--
Leaves (treated)	40.07	484.00
Leaves (untreated)	--	0.90
Trunks & branches	1.15	--

Extraction and hydrolysis of residues

Seed application: Cotton seeds were ground in dry ice with a mill after which the linters were separated from the seed flour. The seed flour was extracted sequentially in a Soxhlet apparatus with n-hexane, acetonitrile, methanol, and water for 8-10 hours each. ^{14}C-Residues in the hexane extract, containing most of the interference-causing cotton seed oil co-extractant were partitioned into the acetonitrile fraction. The remaining hexane fraction (containing ca. 2% of TRR) was discarded. The distribution of radioactivity between these fractions is presented in Table 3.

Table 3. Distribution of radioactivity in fractions of cottonseed treated with [^{14}C]methyl parathion at ca. 0.335 lb ai/A.

Fraction	Methyl parathion equivalents (ppm)	% of TRR
Acetonitrile	0.022	27.9
Methanol	0.022	28.1
Water	0.012	14.2
Subtotal	0.056	70.2
Hexane	0.002	2.5
Non-extractable	0.022	27.3
Total	0.080	100.0

An aliquot of the combined methanol and acetonitrile fractions was evaporated under vacuum and redissolved in methanol; an aliquot of the water fraction was concentrated. Each of the concentrates were impregnated onto the same piece of Florisil and dried under vacuum. The Florisil containing the adsorbed metabolites was placed on top of a Florisil column and the ^{14}C-residues were eluted with an azeotropic mixture of methanol:chloroform:methyl acetate followed by methanol. The eluate was then eluted similarly through a second similar Florisil column. The methanol eluate was discarded and the azeotropic eluate was used for metabolite characterization and identification. The total extractable radioactive residues (acetonitrile, methanol and water fractions) consisted of 83,443 dpm; the chromatographed aliquots consisted of 33,176 dpm, or 40% of the total extractable radioactive residues. Of the 70.2% of TRR determined in the combined water, methanol and acetonitrile fractions (see Table 3), only 50% of TRR was accounted for after Florisil cleanup. The discarded methanol eluate consisted of

9.1% of TRR (0.007 ppm); unassigned radioactivity consisted of 11.1% of TRR (0.009 ppm).

The non-extractable residues remaining after Soxhlet extraction were refluxed in 20% HCl for six hours. Only 6.8% of TRR was extracted into the acidic solution. None of the radioactivity was partitioned into dichloromethane. No further work was performed on this matrix.

Leaf application: The treated leaves were homogenized in liquid nitrogen and an aliquot was successively extracted with 50% aqueous acetone, acetone, and dichloromethane. The homogenates were filtered, combined, and allowed to separate into aqueous and organic phases. The aqueous phase was extracted with dichloromethane and the organic phase with water. The combined organic fractions were filtered and concentrated, as were the aqueous phases, in preparation for analysis via thin-layer chromatography (TLC). The distribution of radioactivity in the extracts is presented in Table 4.

Table 4. Distribution of radioactivity in fractions of mature cotton leaves treated with [^{14}C]methyl parathion at 0.84 mg ai/200 µL/leaf.

Fraction	Methyl parathion equivalents (ppm)[a]	% of TRR
Aqueous	172.79	35.7
Organic	217.80	45.0
Subtotal (extracted)	390.59	80.7
Non-extractable	26.13	5.4
Unaccounted	67.28	13.9
Total	484.00	100.0

[a] Calculated by study reviewer.

Characterization/identification of residues

Seed application: The Florisil column azeotropic eluate from the seed extracts, containing 50% of TRR, was analyzed by thin-layer chromatography (TLC) on silica gel plates utilizing solvent systems A and C through H (Table 5). When co-chromatographed, reference compounds migrated with the same retention time as sample metabolites in at least two different solvent systems, the two compounds were assumed to be identical. Only a small amount of radioactivity from the insoluble residue partitioned (6.8% of TRR) in the acid hydrolysate, which precluded chromatographic

analysis. No further characterization of residues present in the non-extractable fraction was attempted.

Table 5. TLC solvent systems utilized[a].

Solvent System		Composition (v:v)
A	Ethyl acetate:isopropanol:water	65:23:12
B	n-Butanol:formic acid:water (top layer)	50:2:48
C	Cyclohexane:ethyl acetate	60:40
D	Benzene:methanol	95:5
E	n-Hexane:dichloromethane:methanol	70:27:3
F	Dichloromethane:methanol	95:5
G	Dichloromethane:methanol	85:15
H	Ethyl acetate:methanol	80:20
I	Benzene:dichloromethane:methanol	90:45:15
J	Ethyl acetate:n-propanol:water	75:45:15
K	n-Butanol:acetic acid:water	4:1:1

[a] The sorbent was silica gel and detection was by (1) quenching of the UV-induced fluorescence (254 nm), (2) autoradiography, or by (3) linear analyzer scan. Quantitation was done by integration with the linear analyzer.

Leaf application: The organic extract was co-chromatographed with standards using TLC solvent system I (Table 5) and gel permeation chromatography by eluting with cyclohexane:ethyl acetate (1:1; v:v) and quantitation by LSS. Two of the collected fractions were further analyzed using HPLC employing a reverse phase (RP) C-8 column, solvent gradients of water:methanol or water:acetonitrile and diode array and radioactive flow-through detectors; samples were cochromatographed with standards. Identifications were further verified by gas chromatography/mass spectroscopy (GC/MS) using electron impact (EI) ionization. The identities of methyl parathion and p-nitrophenol were confirmed using these procedures.

To isolate and identify monodesmethyl-parathion-methyl, an excised leaf experiment was performed. Young leaves were cut from the plant, immersed in 200 molar solution (233.8 μCi) of formulated [phenyl-UL-^{14}C]methyl parathion and incubated at 20 C and 35 k lux of light for 48 hours. The leaves were homogenized and successively extracted with acetone:water and acetone, filtered, and the ^{14}C-residues from combined extracts were partitioned into dichloromethane. The aqueous fraction was eluted through a RP C-8 column with water and methanol:water (1:9; v:v); each 20-mL fraction was quantitated by LSS. Fractions with sufficient radioactivity were analyzed for the metabolite using TLC and solvent system J (Table 5); fractions containing the metabolite were combined, concentrated and

analyzed by micropreparative HPLC utilizing a RP C-8 column, elution with water followed by methanol:water (5:95; v:v), and a radioactive flow-through detector. The 0.5-mL fractions with peak radioactivity were identified by ^{1}H NMR and negative ion chemical ionization MS-Fast Atom Bombardment (FAB MS); both methods utilized spectra from standard compounds for comparison. Comparisons of the TLC and HPLC chromatographs from the excised leaf extract to the TLC and HPLC chromatographs from the same procedures performed on the aqueous extract of the leaf application confirm the identification of this metabolite.

To isolate and identify p-nitrophenyl-glucopyranoside, the organic and aqueous extracts were co-chromatographed with standard compounds in TLC solvent system J (Table 5). The aqueous extract was also hydrolyzed by ß-glucosidase, yielding the p-nitrophenol aglycone according to TLC comparison with standards in solvent system I.

To isolate and further confirm the monodesmethyl-paraoxon-methyl metabolite, a different procedure was used on a separate sample. Homogenized leaves were successively extracted under ultrasonication with dichloromethane, ethyl acetate, acetone, methyl acetate, an azeotropic mixture of methanol:chloroform:methyl acetate, methanol, acetone:water, and water. The extracts were vacuum filtered and the third through the seventh solvent extracts (acetone through acetone:water) were combined for analysis. The combined extract was analyzed by TLC co-chromatography in solvent system K (Table 5) with the reference compound. This was followed by elution through a cation exchange column with water, methylation with diazomethane, TLC in solvent systems D and K, and comparison of the GC/MS spectrum with the authentic standard compound. This metabolite is reported to comprise 3.1% of TRR in leaves (15 ppm); however, the registrant has not addressed how the metabolite identified by a separate procedure could be associated with the original leaf extract. The distribution and characterization/identification of TRR in cotton seeds and leaves is presented in Table 6.

Table 6. Distribution and characterization/identification of ^{14}C-residues in cotton seeds following a single foliar spray application of [^{14}C]methyl parathion at 0.335 lb ai/A (0.22x) and in cotton leaves following a single application of [^{14}C]methyl parathion via syringe at 0.84 mg ai/200 µL/leaf.

Component	Seeds		Leaves	
	ppm	% TRR	ppm	% TRR
Identified:				
Methyl parathion	0.008	9.7	**168**	**34.7**[a]
p-Nitrophenol	**0.009**	**12.0**	**48**	**10.0**
p-Nitrophenyl glucopyranoside	0.007	8.9	**55**	**11.4**
Monodesmethyl-parathion-methyl	**0.004**	**4.4**	**55**	**11.3**
Monodesmethyl-paraoxon-methyl	--	--	**15**	**3.1**
Subtotal	0.028	35.0	341	70.5
Unidentified:				
Metabolites I and III	--	--	38	7.8
Metabolite VI	--	--	11	2.2
n-hexane phase	0.002	2.5		
Unassigned in TLC	0.012	15.0	64	13.3
Unassigned off Florisil	0.016	20.2		
Subtotal	0.030	37.7	113	23.3
Non-extractable	0.022	27.3	30	6.2
Total	0.080	100.0	484	100

[a] **Bolding** indicates that identification of compound was confirmed by a secondary method.

The qualitative nature of methyl parathion residues in cotton is adequately understood. The portion of the study involving cottonseed was conducted at 0.22x the registered application rate resulting in marginal radioactivity levels in commodities of concern. The Agency generally prefers that plant metabolism studies be conducted at a rate high enough to result in sufficiently high radioactivity levels to allow for characterization/identification of residues; a rate of at least 1x should generally be used. Non-extractable residues remained uncharacterized in cottonseed (27.3% of TRR, 0.022 ppm) and cotton leaves (6.2% of TRR, 30 ppm) following acid treatment. However, based on revised and current Agency "trigger values" regarding the strategy for characterization of non-extractable residues, no additional attempts to characterize/identify these residues are needed. Samples from this study were not analyzed by the current enforcement methods to ascertain that the methods are capable of recovering and quantifying all metabolites of concern.

The study indicates that in greenhouse-grown cotton harvested 10 days following a single foliar application of [phenyl-UL-^{14}C]methyl parathion at 0.22x, the predominant metabolite identified and confirmed in cottonseed was p-nitrophenol (12.0% of TRR, 0.009 ppm). Other compounds that were tentatively or definitively identified in cottonseed were methyl parathion, p-nitrophenyl glucopyranoside, and monodesmethyl-parathion-methyl (collectively 4.4-9.7% of TRR, 0.004-0.008 ppm).

The study also indicates that in mature cotton leaves treated with [^{14}C]methyl parathion at 0.84 mg ai/200 µL/leaf, the major compound identified was the parent compound, methyl parathion (34.7% of TRR, 168 ppm). The following compounds were also identified and confirmed in cotton leaves: p-nitrophenol (10% of TRR, 48 ppm), p-nitrophenyl glucopyranoside (11.4% of TRR, 55 ppm), monodesmethyl-parathion-methyl (11.3% of TRR, 55 ppm), and monodesmethyl-paraoxon-methyl (3.1% of TRR, 15 ppm). Approximately 71% of TRR in cotton leaves were identified and confirmed.

Though marginal, the metabolism study does provide enough information to allow CBRS to confirm that the residue to be included in the tolerance expression for cotton consists of methyl parathion and its paraoxon.

Qualitative Nature of the Residue in Potatoes

A/S Cheminova (1988; MRID 41001403) submitted data pertaining to the metabolism of methyl parathion in potatoes. The study was performed by Bayer AG in West Germany. Six mature (3-month old) potato plants grown outdoors in three lysimeters (2 plants/lysimeter) received a single foliar (hand spray) application of [phenyl-UL-^{14}C]methyl parathion (radiochemical purity 99.9%; specific activity prior to dilution 244 x 10^9 dpm/g; 28.93 Ci/mole) with unlabeled methyl parathion and formulated as an emulsifiable concentrate. Lysimeter A was treated at 1.33 lb ai/A (ca. 1x the maximum single application rate); the final specific activity was 18.4 µCi/mg (4.8 Ci/mole). Lysimeters B and C were treated at 4.1-4.2 lb ai/A (ca. 3x); the final specific activity was 19.2 µCi/mg (5.0 Ci/mole). Samples were harvested either 5 days after treatment (one plant from lysimeter A and both from lysimeter B) or 21 days after treatment (remainder of A and both from C). Currently, a PHI of 5 days is in effect for potatoes. The foliage was cut into pieces and the tubers were cleaned mechanically then dipped into water; radioanalysis of the water yielded no detectable ^{14}C-residues. The leaves and tubers were stored in the freezer immediately after harvest at an unspecified temperature and for an unspecified interval pending analysis.

Total radioactive residues (TRR)

Potato tubers and leaves were homogenized in acetone:water (1:1; v:v) and filtered. The TRR in homogenized potato leaves and tubers (filter cakes) was determined by combustion followed by liquid scintillation spectroscopy (LSS). The radioactivity in the tuber filtrate was determined by LSS directly and added to that of the filter cake to determine the TRR in tubers. From the potato plants harvested 5 days posttreatment, 25.6% and 32.6% of the applied radioactivity was recovered from treatments A and B, respectively. For plants harvested 21 days posttreatment, 22.3% of the applied radioactivity was recovered from both treatments A and C. The TRR in plants from each treatment is presented in Table 7. With the delay in harvest, the TRR decreased in foliage but increased about three-fold in tubers. Metabolite characterizations and identifications were performed using tubers from the high treatment rate (B and C).

Table 7. Total radioactive residues in potato leaves and tubers harvested 5 and 21 days following a single application of [^{14}C]methyl parathion at 1-3x the maximum registered single application rate.

Sample	PTI[a] (Days)	Methyl Parathion equivalents, ppm Treatment Rate 1x (A)	3x (B)	3x (C)
Tubers	5	0.011	0.027	--[b]
	21	0.037	--	0.068
Foliage	5	6.78	30.76	--
	21	4.39	--	13.93

[a] Posttreatment interval.
[b] Not harvested at this sampling interval.

Extraction of residues

Potato tuber samples from plants treated at 3x were homogenized and extracted successively with 50% aqueous acetone, acetone, and dichloromethane, and vacuum-filtered after each extraction. The dichloromethane extracts were partitioned with water. The acetone and aqueous acetone extracts were combined, vacuum-concentrated to water, and partitioned with dichloromethane. All organic phases were combined as were all aqueous phases. The aqueous extract was further purified by acetone precipitation in a boiling water bath.

The non-extractable residues and acetone precipitate were separately subjected to acid hydrolysis and secondary extraction.

Solids or precipitate were mixed with 25% HCl in the presence of toluene and heated for 3-9 hours at 100 C. The phases were then separated by centrifugation and the toluene phase was used for characterization and identification. The distribution of radioactivity in the extracts is presented in Table 8.

Table 8. Distribution of ^{14}C-residues in extracts of mature potato tubers harvested 5 and 21 days (Lysimeters B and C, respectively) following an application of [phenyl-UL-^{14}C]methyl parathion at 3x the maximum registered single application rate.

Matrix	5-day PTI (B) ppm	5-day PTI (B) % TRR[a]	21-day PTI (C) ppm	21-day PTI (C) % TRR[a]
Organic	0.009	31.9	0.011	15.6
Aqueous				
Acetone	0.006	23.6	0.006	8.1
Toluene 1	<0.001	2.9	0.006	8.3
Acidic 1	0.004	14.4	0.013	18.5
Solid 1	0.001	5.2	0.003	4.1
Subtotal	<0.012	46.1	0.028	39.0
Solids				
Toluene 2	<0.001	1.1	0.006	8.9
Acidic 2	0.003	10.8	0.009	12.8
Solid 2	0.003	10.1	0.007	10.1
Subtotal	<0.007	22.0	0.022	31.8
Precipitate	--	--	0.009	13.7
Total	<0.028	100.0	0.070	100.1

[a] The reported percentages have been corrected for recovery by the registrant as follows: 88.3% (5-day PTI) and 97.3% (21-day PTI).

Characterization/identification of residues

Organosoluble residues were analyzed by silica gel TLC co-chromatography with standards in three solvent systems of toluene:dichloromethane:methanol (90:45:15; v:v:v) [LM1], benzene:methanol (95:5; v:v) [LM3], and chloroform:acetone (9:1; v:v) [LM2]. Detection was by quenching of UV-induced fluorescence, linear analyzer scan, or by derivatization with p-nitrobenzyl-pyridine for phosphorus and quantification was by using the integration unit of the linear analyzer.

Aqueous-soluble residues contained in the acetone fraction were analyzed by silica gel TLC in solvent systems of ethyl acetate:1-propanol:water (75:45:15; v:v:v) [LM4] and chloroform:methanol:-formic acid:water (75:20:4:2; v:v:v) [LM5] with the same detection methods. Some samples were further characterized by hydrolysis in ß-glucosidase or cellulase.

The toluene phases from acid hydrolysis were analyzed by the LM1 TLC system mentioned above. The acidic 1 and acidic 2 fractions from the samples harvested 21 days posttreatment were analyzed for radioactive glucose by derivatization and reverse isotope dilution. For derivatization, the acidic phase was neutralized, dried, dissolved in ethyleneglycol monoethyl ether, acetic acid, heated to 80 C, and phenylhydrazine added. After cooling, the precipitate's radioactivity was determined by combustion, specific activity was determined, then re-dissolved in hot ethanol:dimethylformamide and the phenylosazone recrystallized with water for four times. Radioactivity could qualitatively be attributed to glucose in acidic phase 1, but not in acidic phase 2. The distribution and characterization/identification of ^{14}C-residues in potato tubers is presented in Table 9.

Table 9. Distribution and characterization/identification of ^{14}C-residues in potato tubers harvested 5 and 21 days following a single application of [^{14}C]methyl parathion at 3x the maximum registered single application rate.

Component	5-day PTI ppm	5-day PTI % TRR	21-day PTI ppm	21-day PTI % TRR
Identified:				
Methyl parathion	≤0.002	4.9	<0.001	0.6
p-Nitrophenol	≤0.007	26.6	0.018	25.2
Monodesmethyl-parathion-methyl	0.002	8.6	0.002	2.6
p-Nitrophenol-glucoside	--	--	<0.001	0.5
p-Nitrophenol-conjugate	0.002	7.2	0.003	3.7
Subtotal		47.3		32.6
Unidentified:				
Metabolites II	0.002	6.9	≤0.005	7.8
(of methyl paraoxon)	--	--	(0.002	3.2)
Unknown conjugate	<0.001	1.8		
Unassigned radioactivity on TLC	<0.001	2.4	<0.001	0.6
Water soluble radioactivity	0.007	25.2	0.022	31.3
Nonhydrolyzable radioactivity	0.004	15.3	0.010	14.2
Precipitate	--	--	0.009	13.7
Unaccounted for	0.003	1.1	--	--
Total	0.027	100.0	0.068	100.2

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The qualitative nature of the residue in potatoes is understood. The available metabolism study indicate that ^{14}C-residues in potato tubers harvested 5 days following a single foliar application of [phenyl-UL-^{14}C]methyl parathion at 3x the maximum registered rate are negligible (0.027 ppm). Approximately 25-27% of the TRR (≤0.007-0.018 ppm) has been adequately identified as p-nitrophenol, the major metabolite in tubers; methyl parathion per se is a minor metabolite, comprising <5% of TRR (≤0.002 ppm). Other minor metabolites (<9% of TRR, 0.004 ppm) that were tentatively identified were monodesmethyl-parathion-methyl, p-nitrophenol-glucoside, and other p-nitrophenol-conjugates. Additional data pertaining to confirmation of metabolite identification in potato tubers will not be required due to the extremely low levels of radioactivity remaining in the unidentified portions. The terminal residue to be included in the tolerance expression for potatoes consists of methyl parathion and methyl paraoxon.

Qualitative Nature of the Residue in Lettuce

A/S Cheminova (1988; MRID 41001404) submitted data obtained by RCC Umweltchemie AG in Switzerland pertaining to the metabolism of methyl parathion in lettuce. Immature, greenhouse-grown lettuce was treated ca. 39 days after planting with one foliar application of [phenyl-UL-^{14}C]methyl parathion (specific activity 43.4 mCi/g, radiochemical purity 99.9%) formulated as 52.8% EC formulation at 1.1 lb ai/A (1.1x the maximum rate). Eight plants were harvested 14 days posttreatment and 12 plants were harvested 21 days after treatment. The samples were homogenized in dry ice, the dry ice was allowed to evaporate at room temperature and the samples were stored at -20 C for an unspecified interval (ca. >1 year) prior to analysis. Currently, a PHI of 21 days is in effect for lettuce.

Total radioactive residues (TRR)

The TRR was determined by combustion/LSS of subsamples of the homogenized lettuce from each sampling interval. Of the applied radioactivity, 36.6 and 41.6% was recovered from the lettuce plants harvested 14 and 21 days posttreatment, respectively. The TRR decreased slightly with a delay in harvest from 11.38 ppm at 14 days posttreatment to 9.73 ppm at 21 days posttreatment. The current tolerance for residues of methyl parathion in or on lettuce is 1 ppm.

Extraction of residues

Lettuce leaf samples collected 14 and 21 days posttreatment were used for the extraction of ^{14}C-residues. Homogenized, frozen lettuce leaf samples were extracted successively with acetone:water (1:1; v:v), acetone, and dichloromethane, all at

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room temperature, followed by acetone extraction overnight in a Soxhlet apparatus. All extractions were performed by shaking 30 minutes followed by centrifugation from which the supernatant was filtered. The extracts were combined, vacuum-concentrated, and partitioned with dichloromethane. The organic fractions were combined prior to analysis. The aqueous fraction was filtered prior to analysis. The extracts and non-extractable (post-extracted) solids were radioassayed. The distribution of radioactivity among extracts and solids is presented in Table 10.

Table 10. Distribution of ^{14}C-residues in extracts of lettuce leaves treated with a single application of [^{14}C]methyl parathion at ca. 1x the maximum single application rate.

	14-day PTI[a]		21-day PTI	
Fraction	ppm	% TRR	ppm	% TRR
Aqueous	2.17	19.1	2.74	28.2
Organic	4.95	43.4	2.62	26.8
Total extractable	7.12	62.5	5.36	55
Non-extractable	4.26	37.5	4.37	45.0
Total	11.38	100	9.73	100

[a] Posttreatment interval.

Characterization/identification of residues

Aliquots of aqueous-soluble fractions were analyzed by TLC on silica gel plates using chloroform:n-hexane (50:50; v:v; SS2, SS3), chloroform:methanol:HCOOH:water (75:20:4:2; v:v; SS4), chloroform:acetone (90:10; v:v; SS5), or chloroform:methanol:water (60:40:4; v:v:v; SS6). Aliquots of organosoluble fractions were analyzed by TLC on silica gel plates using SS1, SS2, SS4, or SS5. The distribution of identified metabolites from these extracts is presented in Table 11.

Additional aliquots of the extractable fractions (aqueous and organic) were further purified and isolated by TLC on silica gel plates using ethyl acetate:n-propanol:water (75:45:15; v:v:v:) or occasionally benzene:dichloromethane:methanol (90:45:15; v:v:v). Radioactive areas were located by radioactive scanning, scraped off the TLC plate, eluted from a glass column with 50% aqueous acetone, vacuum-concentrated, and analyzed by TLC, HPLC, or hydrolyzed. To confirm the identifications of methyl parathion, p-nitrophenol, and p-nitrophenyl glucopyranoside, the purified extracts were analyzed by HPLC. The HPLC employed a reverse phase C-18 column, a mobile phase of acetonitrile and

acetonitrile:water:phosphoric acid (19.2:80.6:0.2; v:v:v:v), and detection by UV absorbance and a radioactivity monitoring flow cell system.

The aqueous fraction and additional isolated metabolites were subjected to acid and base hydrolysis. Hydrolysis was performed with HCl at 1, 2, or 4 N, or NaOH at 1 or 2 N at 70 C in a nitrogen-purged, tightly closed reaction vial for up to 72 hours. The aqueous fraction that was hydrolyzed with 2 N HCl at 70 C for 15 hours, base neutralized, filtered, and analyzed using SS2 and SS4. This was the only hydrolysate that yielded products that separated in TLC systems; however, the nature of these metabolites were not elucidated. The non-extractable residues (post-extracted solids) were not subjected to any type of exhaustive extraction procedures.

Table 11. Distribution and characterization/identification of ^{14}C-residues in lettuce leaves following a single foliar application of [^{14}C]methyl parathion at 1x the maximum registered single application rate.

Component	14-day PTI		21-day PTI	
	ppm	% TRR	ppm	% TRR
Identified and confirmed[a]:				
Methyl parathion	2.16	18.9	0.97	9.9
p-Nitrophenol	2.47	21.7	2.07	21.2
p-Nitrophenylglucopyranoside	0.30	2.6	0.33	3.4
Subtotal	4.93	43.2	3.37	34.5
Tentatively identified (not confirmed):				
Monodesmethyl-parathion-methyl	0.25	2.2	0.41	4.2
Unidentified:				
M5	0.12	1.0	--	--
M6	0.11	1.0	0.24	2.5
M7	0.30	2.7	0.30	3.1
M8	0.57	5.0	0.81	8.3
Unknown nonpolar	0.84	7.4	0.23	2.4
Subtotal	1.94	17.1	1.58	16.3
Non-extractable (solids)	4.26	37.5	4.37	45.0
Total	11.38	100.0	9.73	100.0

[a] Initial identification was made by TLC and confirmation by HPLC.

The qualitative nature of the residue in lettuce leaves is not fully understood. Five metabolites (designated as M5 through M8, and an unknown nonpolar compound) collectively comprising ca. 17%

of TRR (1.94 ppm; 14-day PTI) and ca. 16% of TRR (1.58 ppm; 21-day PTI) were not identified. No attempt was made to characterize/identify the non-extractable residues which comprised ca. 38% of TRR (4.26 ppm; 14-day PTI) and 45% of TRR (4.37 ppm; 21-day PTI). Based on current Agency "trigger values" regarding the strategy for characterization of non-extractable residues, additional attempts should have been made to release these non-extractable residues. Samples from this study were not analyzed by the current enforcement methods to ascertain that the methods are capable of recovering and quantifying all metabolites of concern. The submitted study is potentially upgradeable. If sufficient samples are available and the registrant can prove that sample integrity was maintained during prolonged storage and provide storage stability data, then the registrant should address the Agency concerns listed above. If the study cannot be upgraded, then a new lettuce metabolism study is required.

Although deficient, the study indicates that in greenhouse-grown lettuce harvested 14 and 21 days following a single foliar application of [phenyl-UL-^{14}C]methyl parathion at 1x the maximum registered single application rate, the predominant metabolite identified and confirmed in lettuce leaf was p-nitrophenol (up to 22% of TRR, 2.47 ppm). Of the extractable residues, ca. 43% were identified and confirmed. Other compounds that were identified include methyl parathion (up to 19% of TRR, 2.16 ppm) and p-nitrophenyl glucopyranoside (up to 3.4% of TRR, 0.33 ppm).

QUALITATIVE NATURE OF THE RESIDUE IN ANIMALS

Conclusions:

The Methyl parathion Guidance Document dated 12/86 concludes that the qualitative nature of the residue in animals is not adequately understood, and requires additional data concerning the metabolism of [^{14}C]methyl parathion in ruminants and poultry. In response to the Guidance Document, Cheminova submitted data concerning the metabolism of methyl parathion in lactating goats (1988; MRID 41001405) and laying hens (MRID 41001406).

Based on current tolerance levels, the expected dietary intake of methyl parathion has been estimated to be 3 ppm for beef and dairy animals and 1.2 ppm for poultry. (See the "Magnitude of the Residue in Animals" section of this document.)

The HED Metabolism Committee of the Agency has determined that methyl parathion and paraoxon are the residues to be included in the tolerance expression in animal commodities (EPA Memorandum of 3/16/92, R. Perfetti). The Committee has also determined that residues of free and conjugated forms of p-aminophenol and p-nitrophenol must be determined when conducting feeding studies.

Ruminants

The qualitative nature of the residue in ruminants is adequately understood provided that the following details of the study are submitted. These are needed to completely validate the experimental methods:

- For ruminants (MRID 41001405), the registrant must provide the following details of the study: (i) the in-life portion of the study including the total feeds consumed by the goats to determine the theoretical dietary intake of methyl parathion, as ppm, in the feed; (ii) the storage intervals for milk and tissue samples; and, (iii) the specific fraction or matrix used for Soxhlet extraction, acid hydrolysis, and enzyme hydrolysis; flow charts must be provided to indicate the point at which these procedures were used.

The goat metabolism study indicates that ^{14}C-residues accumulate in the milk, liver, kidney, muscle, and fat tissues of a lactating goat orally administered with uniformly ring-labeled [^{14}C]methyl parathion at ca. 0.5 mg/kg/day for 3 days. In milk, liver, kidney and muscle, ca. 68-89% of TRR was tentatively identified; only 30.2% of TRR in fat was identified. The major metabolites tentatively identified were: (i) P-O-desmethyl-paraoxon methyl in milk (37.5% of TRR, 0.013 ppm) and liver (23.8% of TRR, 0.139 ppm); (ii) P-O-desmethyl-amino-paraoxon

methyl in kidney (18.2% of TRR, 0.291 ppm); and (iii) amino-paraoxon-methyl in muscle (57.4% of TRR, 0.032 ppm), and fat (26.6% of TRR, 0.004 ppm). Other metabolites that were tentatively identified were: N-acetyl-amino-phenol; N-acetyl-amino-phenylglucuronide; amino-parathion-methyl; P-O-desmethyl-amino-paraoxon-methyl; and p-amino-phenylglucuronide. None of the ^{14}C-residues characterized in goat tissues were identified as methyl parathion, methyl paraoxon, or p-nitrophenol.

Provided that the required additional information is submitted, the metabolism of methyl parathion in goats would be considered to be adequately understood. The terminal residue to be included in the tolerance expression consists of the parent and methyl paraoxon.

Poultry

The qualitative nature of the residue in poultry is adequately understood provided that the details of the study discussed below are submitted. These are needed to completely validate the experimental methods. The identities of the following metabolites were confirmed by HPLC: methyl parathion in gizzard and fat tissues; p-nitrophenol in liver, gizzard, and fat tissues; and N-acetyl-amino-phenyl-glucuronide in kidney tissues.

- For poultry (MRID 41001406), the registrant must provide the following details of the study: (i) the in-life portion of the study including the total feeds consumed by the hens to determine the theoretical dietary intake of methyl parathion, as ppm, in the feed; and (ii) the storage intervals under which the egg and tissue samples were stored until analysis.

The poultry metabolism study indicates that ^{14}C-residues accumulate in the eggs, liver, kidney, muscle, gizzard, heart, fat, and skin of poultry animals orally administered with uniformly ring-labeled [^{14}C]methyl parathion at up to 0.5 mg/kg/day for 3 days. Approximately 56-95% of TRR was either tentatively or definitely identified. The major metabolites identified vary in eggs and poultry tissue types; the following compounds were identified: methyl parathion; p-nitrophenol; p-nitrophenylsulphate; p-nitrophenyl-thiophosphate; N-acetyl-aminophenol; N-acetyl-aminophenylglucuronide; P-S-desmethyl-amino-parathion-methyl; p-aminophenol; p-amino-phenylglucuronide; and P-O-desmethyl-paraoxon methyl.

Provided that the required additional information is submitted, the metabolism of methyl parathion in poultry would be considered to be adequately understood. The terminal residue to be included in the tolerance expression consists of the parent and methyl paraoxon.

References (used):

MRID(s): 41001405. 41001406.

Discussion of the data:

Qualitative Nature of the Residue in Ruminants

Cheminova (1988; MRID 41001405) submitted data pertaining to the metabolism of methyl parathion in ruminants. Uniformly ring-labeled [^{14}C]methyl parathion (specific activity 69.6 mCi/mg; radiochemical purity >99%) was diluted with unlabeled methyl parathion to a final specific activity of 46.04 mCi/g. The test substance was mixed with corn oil and delivered by oral intubation to a single lactating goat for 3 days (one dose per day) at 34.0-35.3 mg/day (ca. 0.5 mg/kg/day). The study reviewer could not verify the feeding level in the diet because information pertaining to actual feed consumption was not available. The registrant calculated a theoretical daily food consumption of 6.25 ppm methyl parathion in the feed (ca. 2x the estimated dietary intake of methyl parathion), based on an estimation that the goat consumes 8% of its body weight daily; actual data reflecting the daily feed consumption of the test animal, as well as other details pertaining to the in-life portion of the study, were not submitted.

Urine and feces were collected daily; milk was collected twice daily. Aliquots of the milk samples were taken for radioactivity measurement and the remainder stored at -20 C until further analysis. The animal was sacrificed one hour after the final dose. Samples of liver, kidney, muscle (composite of round, loin, and flank), and fat (composite of perirenal, omental, and subcutaneous) tissues were taken. Tissues and organs were homogenized; a subsample from each was taken for radioactivity measurement and the remainder was frozen at -20 C until further analysis. Tissue sample analyses were performed by RCC Umweltchemie AG, Switzerland.

Total radioactive residues (TRR)

Homogenized tissues and feces were analyzed for total radioactive residues (TRR) by liquid scintillation spectroscopy (LSS) following combustion; milk and urine were directly analyzed at each sampling interval by LSS. The limit of detection was not specified. The TRR in excreta accounted for approximately 32.5% of the total administered dose, and tissues/organs/blood accounted for 2.2% of the administered dose. The remaining 64.5% of the administered dose was assumed to reside in the digestive tract; no data were submitted to support this assumption. The TRR in goat milk and tissue samples, expressed as ppm methyl

parathion-equivalents and percent of total applied radioactivity, are presented in Table 12.

Table 12. Total radioactive residues (TRR) in milk and tissues of a lactating goat, orally administered [^{14}C]methyl parathion at ca. 0.5 mg/kg/day for 3 days.

Sample	Percent of total applied radioactivity	Residues (ppm methyl parathion equivalents)
Urine	19.3	--
Feces	13.2	--
Cage wash	0.2	--
Milk	0.047	0.020-0.036[a]
Liver	0.5	0.585
Kidney	0.3	1.597
Muscle	1.3	0.055
Fat	0.1	0.014

[a] Milk samples containing 0.036 ppm, collected 8 hours after the second dose (32 hours after first dose), was used for characterization/identification.

Extraction of residues

[^{14}C]Residues were extracted from milk samples (containing 0.036 ppm) with methanol; the precipitated solids (protein pellet) were removed by centrifugation and washed twice with methanol. The methanol fractions were combined, concentrated by vacuum rotary evaporation at 50 C, mixed with doubly-distilled water, and partitioned with n-hexane to remove fat-soluble residues. The radioactivity in the hexane phase, measured by LSS, was negligible (1.3% of TRR). The aqueous phase (MeOH:H_2O) was concentrated and analyzed by TLC. The distribution of total radioactivity in extracts of milk is presented in Table 13.

Table 13. Distribution of total radioactivity in extracts of milk from a lactating goat orally administered [^{14}C]methyl parathion at ca. 0.5 mg/kg/day for 3 days.

Fraction	% of TRR in milk	Methyl parathion equivalents (ppm)[a]
Methanol	92.50	0.0333
Hexane	1.3	0.0005
Solids (protein precipitate)	7.5	0.0027
Total	101.3	0.0365

[a] Calculated by study reviewer.

Samples of homogenized kidney, liver, muscle, and fat were sequentially extracted with methanol:water (8:2; v:v) and methanol. After each extraction, samples were centrifuged and the supernatant (MeOH extract) decanted. ^{14}C-Residues in the combined methanol extracts were concentrated, extracted with dichloromethane and ethyl acetate under neutral conditions, and ethyl acetate under acidic conditions (pH 1/HCl). The organic phases were combined. The aqueous and organic phases were dried over anhydrous sodium sulfate and concentrated. Unless otherwise mentioned below, each phase was subjected to TLC for characterization/identification.

^{14}C-Residues in the organic phase of liver were evaporated to dryness, dissolved in MeOH:H_2O, and partitioned with hexane. The radioactivity detected in the hexane phase was negligible (ca. 1% of TRR). The MeOH:H_2O phase was concentrated, evaporated to dryness, diluted in chloroform:MeOH, and analyzed using TLC.

^{14}C-Residues in the aqueous extract of muscle were evaporated to dryness, taken up in methanol and centrifuged. The solids were discarded and the methanol supernatant was concentrated and analyzed by TLC.

The registrant reports that liver and muscle were subjected to exhaustive Soxhlet extractions using: (i) acetone, methanol:water (8:2; v:v) or methanol, (ii) acid hydrolysis (1 N HCl for 20 hours at 70 C in closed reaction vials), and (iii) ß-glucuronidase enzymatic treatment. The specific fraction or matrix used for these procedures could not be determined from the study report; furthermore, no flow charts were provided to indicate the point at which these procedures were used. The distribution of total radioactivity in extracts of the kidney, liver, muscle, and fat is presented in Table 14.

Table 14. Distribution of total radioactivity in extracts of kidney, liver, muscle, and fat tissue from a lactating goat orally administered [^{14}C]methyl parathion at ca. 0.5 mg/kg/day.

Fraction	% TRR in tissues (ppm)[a]			
	Kidney	Liver	Muscle	Fat
Extractable:				
Organic	39.7(0.63)	34.2(0.20)	66.4(0.0365)	66.9(0.009)
Aqueous	58.2(0.93)	56.4(0.33)	31.6(0.0174)	25.8(0.003)
Soxhlet[b]	ND[c]	2.0(0.01)	1.0(0.0005)	ND
Hydrolysis[b]	ND	1.9(0.00)	0.6(0.0003)	ND
Subtotal	97.9(1.56)	94.5(0.55)	99.6(0.0547)	92.7(0.012)
Non-extractable	2.1(0.03)	5.5(0.03)	0.4(0.0002)	7.7(0.001)
Total	100.0(1.59)	100.0(0.58)	100.0(0.0549)	100.4(0.013)

[a] Calculated by study reviewer.
[b] Radioactivity levels were too low for further analysis; the detection limit was not specified.
[c] ND = not determined.

Characterization/identification of residues

^{14}C-Residues were isolated and identified by thin-layer chromatography (TLC) on silica gel plates using the following solvent systems:

Benzene:dichloromethane (DCM):CH_3OH	90:45:15; v:v:v
Ethyl acetate:n-propanol:H_2O	75:45:15; v:v:v
Trichloromethane (TCM):n-hexane	50:50; v:v
TCM:CH_3OH:HCOOH:H_2O	75:20:4:2; v:v:v:v
TCM:acetone	90:10; v:v
TCM:CH_3OH:H_2O	60:40:4; v:v:v
TCM:CH_3OH	90:10; v:v

Samples were co-chromatographed with standard reference compounds including methyl parathion, methyl paraoxon, and p-nitrophenol. The unlabeled standards were visualized by UV at 254 nm; radioactive zones were detected by a Berthold Automatic TLC-Linear Analyzer. Metabolites were identified by comparing retention times (Rt) to known standards. The distribution of residues in goat tissues and milk is presented in Table 15.

The qualitative nature of the residue in ruminants is adequately understood. However, the following details of the study were not submitted and are needed to completely validate the experiment: (i) the in-life portion of the study including the total feeds consumed by the goats; this omission made it impossible to

determine the theoretical dietary intake of methyl parathion, as ppm, in the feed; (ii) the storage intervals for milk and tissue samples; and, (iii) the specific fraction or matrix used for Soxhlet extraction, acid hydrolysis, and enzyme hydrolysis; flow charts were not provided to indicate the point at which these procedures were used.

The goat metabolism study indicates that ^{14}C-residues accumulate in the milk, liver, kidney, muscle, and fat tissues of a lactating goat orally administered with uniformly ring-labeled [^{14}C]methyl parathion at ca. 0.5 mg/kg/day for 3 days. In milk, liver, kidney and muscle, ca. 68-89% of TRR was tentatively identified; only 30.2% of TRR in fat was identified. The major metabolites tentatively identified were: (i) P-O-desmethyl-paraoxon methyl in milk (37.5% of TRR, 0.013 ppm) and liver (23.8% of TRR, 0.139 ppm); (ii) P-O-desmethyl-amino-paraoxon methyl in kidney (18.2% of TRR, 0.291 ppm); and (iii) amino-paraoxon-methyl in muscle (57.4% of TRR, 0.032 ppm), and fat (26.6% of TRR, 0.004 ppm). Other metabolites that were tentatively identified were: N-acetyl-amino-phenol; N-acetyl-amino-phenylglucuronide; amino-parathion-methyl; P-O-desmethyl-amino-paraoxon-methyl; and p-amino-phenylglucuronide. None of the ^{14}C-residues characterized in goat tissues were identified as methyl parathion, methyl paraoxon, or p-nitrophenol.

Table 15. Nature and quantity of ^{14}C-residues in milk and tissue extracts from a lactating goat orally administered [^{14}C]methyl parathion at ca. 0.5 mg/kg/day.

Compound	Milk		Liver		Kidney		Muscle		Fat	
	%	ppm	%	ppm	%	ppm	%	ppm	%	ppm
P-O-desmethyl-paraoxon-methyl	37.5	0.013	23.8	0.139[a]	2.3	0.037	--	--	--	--
	--	--	--	--	(8.3	0.132)[b]	--	--	--	--
N-acetyl-amino-phenol	--	--	23.7	0.139	--	--	--	--	--	--
N-acetyl-amino-phenyl-glucuronide	--	--	6.4	0.037	13.2	0.211	2.3	0.001	--	--
amino-parathion-methyl	--	--	--	--	1.8	0.029	--	--	3.6	<0.001
amino-paraoxon-methyl	33.8	0.012	--	--	9.3	0.148	57.4	0.032	26.6	0.004
P-S-desmethyl-amino-parathion-methyl	--	--	--	--	18.2	0.291[a]	--	--	--	--
P-O-desmethyl-amino-paraoxon-methyl	--	--	21.8	0.128	14.7	0.235	25.9	0.014	--	--
p-amino-phenylglucuronide	11.1	0.004	--	--	--	--	3.4	0.002	--	--
Total Identified	82.4	0.030	75.7	0.443	67.8	1.083	89.0	0.049	30.2	0.005
Unknowns:										
1[c]	10.1	0.004	--	--	--	--	--	--	--	--
2	--	--	7.6	0.044	1.8	0.029	--	--	8.2	0.001
3	--	--	2.9	0.017	--	--	--	--	--	--
4	--	--	4.4	0.026	--	--	--	--	--	--
5	--	--	--	--	6.4	0.102	3.7	0.002	4.2	0.001
6[d]	--	--	--	--	16.2	0.259	5.3	0.003	16.7	0.002
7	--	--	--	--	1.9	0.030	--	--	7.6	0.001
8	--	--	--	--	3.8	0.060	--	--	--	--
Total	92.5	0.034	90.6	0.530	97.9	1.563	98.0	0.054	66.9	0.010

[a] Based on similar TLC behavior; co-chromatography was not attainable, possibly due to high levels of impurities.

[b] Identified from the aqueous extract; based on similar TLC behavior; co-chromatography was not attainable, possibly due to high levels of impurities.

[c] Based on eluting characteristics in various solvents, the registrant suggests the metabolite to be the N-acetyl derivative of P-O-desmethyl-amino-paraoxon-methyl.

[d] Possible identification as N-acetyl-amino-paraoxon-methyl.

Qualitative Nature of the Residue in Poultry

Cheminova (1988; MRID 41001406) submitted data pertaining to the metabolism of methyl parathion in poultry. Five Leghorn laying hens received uniformly ring-labeled [^{14}C]methyl parathion (specific activity 64.08 mCi/mg; radiochemical purity >99%) orally for 3 days (one dose per day by intubation) at 0.76-0.94 mg/day (ca. 0.50 mg/kg/day). Prior to administration, the labeled material was concentrated under a nitrogen stream, brought to volume in corn oil, and stored at 20 C. The study reviewer could not verify the feeding level in the diet because information pertaining to actual feed consumption was not available. Three additional hens were used as an untreated control. The registrant calculated a theoretical daily food consumption of 6.25 ppm methyl parathion in the feed (ca. 5x the estimated dietary intake of methyl parathion), based on an estimation that the hen consumes 8% of its body weight. Information regarding the in-life portion of the study, including feed consumption, was not included.

Excreta were collected daily; egg samples were taken twice daily and composited from each sampling interval. The hens were sacrificed 3 hours after the final dose. Heart, liver, kidney, gizzard (without lining and contents), muscle (composite of breast and thigh), fat (composite of perirenal and omental) and skin tissue samples were taken. Subsamples of tissues and eggs were taken for radioactivity measurement and the remaining tissues were frozen at -20 C until further analysis. Tissue sample analyses were performed by RCC Umweltchemie AG, Switzerland.

Total radioactive residues (TRR)

Tissue, excreta and egg samples were analyzed for total radioactive residues (TRR) by liquid scintillation spectroscopy (LSS) following combustion. The limit of detection was not specified. The TRR in excreta accounted for approximately 51.7% of the total administered dose, and tissues/organs/blood accounted for approximately 2.0% of the total dose. The remaining 46.3% of the administered dose was assumed to reside in the digestive tract; however, no data were submitted to support this assumption. The distribution of the total administered dose (in percent) in the individual organs/tissues was not reported. The TRR in hen egg and tissue samples, expressed as ppm methyl parathion-equivalents, are presented in Table 16.

Table 16. TRR in egg and tissues of five laying hens orally administered [^{14}C]methyl parathion at ca. 0.5 mg/kg/day for 3 days.

Substrate	Methyl Parathion Equivalents, ppm	
	Range	Mean ± s.d.[a]
Eggs (pooled)[b]	0.001-0.031	
Liver	0.025-0.209	0.076 ± 0.077
Kidney	0.075-0.351	0.235 ± 0.130
Muscle	0.005-0.047	0.017 ± 0.017
Gizzard	0.009-0.084	0.029 ± 0.031
Heart	0.014-0.178	0.051 ± 0.069
Fat	0.011-0.035	0.021 ± 0.011
Skin with attached fat	0.035-0.321	0.114 ± 0.120

[a] Mean values are adjusted for background; standard deviations (s.d.) were calculated by study reviewer.
[b] The pooled egg sample was collected up to 3 hours after the third and final dose.

Extraction of residues

An aliquot of the pooled egg sample was mixed with acetone or methanol, and, after standing at 4 C, the precipitated proteins were removed by centrifugation. The acetone or methanol extract (protein-free fraction) was concentrated by vacuum rotary evaporation and analyzed by TLC. ^{14}C-Residues in the concentrated methanol extracts were partitioned into n-hexane; the radioactivity of the hexane phases was negligible (<0.1% of TRR). After concentration, the ^{14}C-residues in the methanol:aqueous phase were partitioned with dichloromethane and then ethyl acetate; each fraction was analyzed by TLC. The distribution of the TRR in extracts of eggs is presented in Table 17.

Table 17. Distribution of total radioactivity in extracts of pooled eggs from laying hens orally administered [^{14}C]methyl parathion at ca. 0.5 mg/kg/day for 3 days.

Fraction	% of TRR in eggs	
	Precipitation by MeOH	Precipitation by Acetone
Aqueous extract	95.2	91.1
Non-extractable (protein precipitate)	4.8	8.9
Total	100.0	100.0

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The liver, kidney, muscle, gizzard, heart, fat, and skin samples from the five hens were pooled (per organ) and homogenized. Aliquots were sequentially extracted with methanol:water (8:2; v:v) and methanol, and then centrifuged. Exhaustive Soxhlet extractions with methanol were performed on the solids (protein pellets) from the kidney, heart, and muscle samples. Except for the kidney Soxhlet extract, all extracts per each organ were combined, concentrated, and extracted with dichloromethane and ethyl acetate under neutral conditions. The liver aqueous extract was additionally partitioned with dichloromethane under acidic conditions (pH 2) followed by ethyl acetate. Organic fractions were combined. Additional HCl hydrolysis and ß-glucuronidase treatments were performed on the kidney aqueous extract. The radioactivity released by these treatments was not reported.

The organic fractions were concentrated and analyzed by TLC. The organic fractions of the liver and heart samples were evaporated to dryness, dissolved in methanol:water, partitioned with n-hexane, and the resulting organic phase dried, dissolved in methanol, and analyzed by TLC.

The aqueous phases (methanol:water) of the kidney and skin samples were concentrated and analyzed by TLC. The aqueous phases of the liver, heart, and muscle samples were evaporated to dryness, dissolved in methanol:water, and centrifuged. The methanol:water supernatant was analyzed by TLC. The distribution of total radioactivity in extracts of liver, kidney, muscle, gizzard, heart, fat, and skin is presented in Table 18.

Table 18. Distribution of total radioactivity in extracts of liver, kidney, muscle, gizzard, heart, fat, and skin tissues from laying hens orally administered [^{14}C]methyl parathion at ca. 0.5 mg/kg/day.

	Percent total radioactivity in tissues						
Fraction	Liver	Kidney	Muscle	Gizzard	Heart	Fat	Skin
Extractable:							
Organic soluble	72.0	16.5	29.6	61.2	51.2	76.4	65.6
Water soluble	22.4	71.2	61.3	37.7	40.7	13.4	23.2
Soxhlet	ND[a]	2.0					
Total	94.4	89.7	90.9[b]	98.9	91.9[b]	89.8	88.8
Solids	5.6	10.3	9.1	1.1	8.1	10.2	11.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a] ND = not determined.
[b] Includes Soxhlet extractions.

Characterization/identification of residues

^{14}C-Residues were isolated and identified by thin-layer chromatography (TLC) on silica gel plates using the following solvent systems:

Benzene:dichloromethane (DCM):CH_3OH	90:45:15; v:v:v
Ethyl acetate:n-propanol:H_2O	75:45:15; v:v:v
Trichloromethane (TCM):n-hexane	50:50; v:v
TCM:CH_3OH:HCOOH:H_2O	75:20:4:2; v:v:v:v
TCM:acetone	90:10; v:v
TCM:CH_3OH:H_2O	60:40:4; v:v:v
TCM:CH_3OH	90:10; v:v

The registrant did not identify the specific solvent system used for each metabolite. Unlabeled standards were visualized by UV at 254 nm; radioactive zones were detected by a Berthold Automatic TLC-Linear Analyzer. The identification of some metabolites was confirmed using reversed-phase HPLC; the procedure employed an UV detector set at 273 nm, a Lichrosorb 100 RP 18 column, and a radioactivity monitoring flow cell system. Two isocratic mobile phases were used: distilled water and acetonitrile (50:50; v:v) and acetonitrile with acetonitrile:H_2O:phosphoric acid (15:85; v:v). Metabolites were identified by comparison of retention times (Rt) with known standards. The following metabolites were confirmed by HPLC: (i) methyl parathion in gizzard and fat tissues; (ii) p-nitrophenol in liver, gizzard, and fat tissues; and (iii) N-acetyl-amino-phenyl-glucuronide in kidney tissues. The identifications of radioactive residues in hen tissues are presented in Tables 19 and 20.

Table 19. Nature and quantity of ^{14}C-residues in egg, liver, kidney, and muscle extracts from laying hens orally administered [^{14}C]methyl parathion at ca. 0.5 mg/kg/day for 3 days.

Compound	Egg (acetone)[a]		Egg (MeOH)[b]		Liver		Kidney		Muscle	
	%	ppm	%	ppm	%	ppm	%	ppm	%	ppm
methyl parathion	--	--	--	--	--	--	0.6	0.001	--	--
P-O-desmethyl-paraoxon-methyl	--	--	--	--	--	--	6.1	0.014	61.3	0.010
p-nitrophenol	--	--	24.7	0.008	9.8[c]	0.007	2.1	0.005	--	--
p-nitrophenylsulphate	91.1	0.027	70.5	0.021	--	--	--	--	--	--
p-nitrophenyl-thio-phosphate	--	--	--	--	--	--	3.4	0.008	--	--
N-acetyl-amino-phenol	--	--	--	--	62.2	0.048	--	--	--	--
N-acetyl-amino-phenyl-glucuronide	--	--	--	--	22.4	0.017	45.1[c]	0.106	--	--
p-aminophenol	--	--	--	--	--	--	5.8	0.014	--	--
p-aminophenylglucuronide	--	--	--	--	--	--	8.5	0.020	--	--
Total Identified	91.1	0.027	95.2	0.029	94.4	0.072	71.6	0.168	61.3	0.010
Unknowns:										
1	--	--	--	--	--	--	4.6	0.011	--	--
2	--	--	--	--	--	--	11.5	0.027	--	--
Total	91.1	0.027	95.2	0.029	94.4	0.072	87.7	0.206	61.3	0.010

[a] An aliquot of the pooled egg sample was extracted with acetone.

[b] An aliquot of the pooled egg sample was extracted with methanol.

[c] Identification of the metabolite was confirmed by HPLC.

Table 20. Nature and quantity of ^{14}C-residues in gizzard, heart, fat, and skin extracts from laying hens orally administered [^{14}C]methyl parathion at ca. 0.5 mg/kg/day for 3 days.

Compound	Gizzard		Heart		Fat		Skin	
	%	ppm	%	ppm	%	ppm	%	ppm
methyl parathion	13.0[a]	0.004	2.2	0.001	40.2[a]	0.008	10.0	0.011
p-nitrophenol	35.8[a]	0.011	10.0	0.005	36.2[a]	0.008	55.6	0.064
p-nitrophenylsulphate	--	--	--	--	2.8	0.003	--	--
p-nitrophenyl-thiophosphate	--	--	--	--	--	--	1.4	0.002
N-acetyl-amino-phenol	7.3	0.002	24.0	0.012	--	--	--	--
N-acetyl-amino-phenyl-glucuronide	--	--	25.9	0.013	--	--	11.0	0.012
P-S-desmethyl-amino-parathion-methyl	--	--	5.1	0.003	--	--	5.6	0.006
p-amino-phenol	--	--	3.7	0.002	--	--	--	--
p-amino-phenylglucuronide	--	--	2.3	0.001	--	--	--	--
Total Identified	56.1	0.017	73.2	0.037	76.4	0.019	86.4	0.095
Unknowns:								
1	5.1	0.001	--	--	--	--	--	--
2	--	--	3.9	0.002	--	--	--	--
3	--	--	11.1	0.006	--	--	--	--
4	--	--	3.7	0.002	--	--	--	--
5	--	--	--	--	--	--	2.4	0.003
Total	61.2	0.018	91.9	0.047	76.4	0.019	88.8	0.098

[a] Identification of the metabolite was confirmed by HPLC.

The qualitative nature of the residue in poultry is adequately understood. The identities of the following metabolites were confirmed by HPLC: methyl parathion in gizzard and fat tissues; p-nitrophenol in liver, gizzard, and fat tissues; and N-acetyl-amino-phenyl-glucuronide in kidney tissues. However, the following details of the study were not submitted and are needed to completely validate the experimental methods: (i) actual dietary intake by the hens; this information is needed to determine the theoretical dietary intake of methyl parathion, as ppm, in the feed; and (ii) the storage intervals under which the egg and tissue samples were stored until analysis.

The poultry metabolism study indicates that ^{14}C-residues accumulate in the eggs, liver, kidney, muscle, gizzard, heart, fat, and skin of poultry animals orally administered with uniformly ring-labeled [^{14}C]methyl parathion at up to 0.5 mg/kg/day for 3 days. Approximately 56-95% of TRR was either tentatively or definitely identified. The major metabolites identified vary in eggs and poultry tissue types; the following compounds were identified: methyl parathion; p-nitrophenol; p-nitrophenylsulphate; p-nitrophenyl-thiophosphate; N-acetyl-aminophenol; N-acetyl-aminophenylglucuronide; P-S-desmethyl-amino-parathion-methyl; p-aminophenol; p-amino-phenylglucuronide; and P-O-desmethyl-paraoxon methyl.

RESIDUE ANALYTICAL METHODS

Conclusions:

The Methyl Parathion Guidance Document, dated 12/8/86, concluded that adequate methodology is available for determining residues of methyl parathion per se in or on plant and animal commodities. The Pesticide Analytical Manual (PAM) Vol. II lists five methods for the determination of methyl parathion. Of these, three, Methods I(a), I(b), and I(c), are acceptable as enforcement methods for the analysis of nonfatty foods and green beans. The other two methods, Methods I(d) and II, are not acceptable for enforcement due to their lack of specificity and, in the case of Method II, the potential for interference from natural plant constituents. In addition, we note that benzene is used as an extracting solvent in Method II.

All of the data described in this Update were collected using methods modified from Method I(a) in PAM, Vol. II. Residue data submitted by Cheminova were collected by Analytical Development Corp., Biospherics, Inc., and Huntingdon Analytical Services. The analytical method utilized by these laboratories involves extraction and hydrolysis with a methanol:water:HCl mixture (80:19.2:0.8, v:v:v). The hydrolysate is filtered and evaporated under vacuum to aqueous phase. Residues are then extracted into ethyl acetate. Methyl parathion and methyl paraoxon are quantitated in the ethyl acetate extract using a GLC, with either a packed or capillary column, equipped with a flame photometric detector (FPD) operated in the phosphorus mode. A portion of the ethyl acetate extract undergoes a Florisil column clean-up and residues of p-nitrophenol are determined using an RP-HPLC equipped with a UV detector (315 nm). The validated limits of detection are 0.05 ppm for residues of methyl parathion, methyl paraoxon, and p-nitrophenol.

A method designated BR-007-00 was used to collect data submitted by Pennwalt Corporation. This method is similar to the Cheminova method described above with the exception that, in the Pennwalt method, the initial extraction is done with an acidic acetone and water mixture (acetone:water:HCl, 80:18.2:0.8, v:v:v) and large amounts of lipid are cleaned up using gel permeation chromatography. The detection limits are also 0.05 ppm for residues of methyl parathion, methyl paraoxon, and p-nitrophenol. Because of matrix interference, p-nitrophenol residue data for rice samples (MRID 41560004) were collected using an alternate method. Rice samples were extracted in the same manner as described above and diazomethane was added to derivatize p-nitrophenol to 1-methoxy-4-nitrobenzene. Residues were then determined using GLC equipped with a nitrogen-phosphorus detector (NPD). The registrant states that p-nitrophenol residues determined using this method should be corrected for residues of

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methyl paraoxon, which is also derivatized to 1-methoxy-4-nitrobenzene by diazomethane; however, the p-nitrophenol residues in or on rice reported in this update were not corrected for residues of methyl paraoxon.

The Pestrak data base, dated 9/6/90, indicates that methyl parathion is completely recovered using PAM Vol. I Multiresidue Protocols A (using special GC/HPLC), B, D, and E (fatty and non-fatty commodities) and PAM Vol. I method 232.3. Methyl paraoxon is completely recovered using PAM Vol. I method 232.3 but is not recovered using Multiresidue Protocol E (fatty and nonfatty commodities); Multiresidue Protocol D is targeted for study.

The qualitative nature of the residue in plants has not been completely described. At present, however, the residues to be included in the tolerances for plant and animal commodities are methyl parathion and its paraoxon. In addition, methods to determine free and conjugated forms of p-aminophenol and p-nitrophenol in meat, milk, poultry, and egg samples are required. The following additional data are required:

- The method employed to determine methyl parathion and methyl paraoxon should undergo an independent lab validation at which time the Agency will perform a method trial on the procedure.

- Data depicting analytical methods to determine free and conjugated forms of p-aminophenol and p-nitrophenol in meat, milk, poultry, and eggs.

- If the requested additional data on plant metabolism indicate the presence of additional metabolites of toxicological concern, data depicting additional analytical methods will be required.

References (used):

N/A.

Discussion of the data:

N/A

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STORAGE STABILITY DATA

Conclusions:

The Methyl Parathion Guidance Document, dated 12/8/86, requires that the storage intervals and conditions of storage of samples of raw agricultural commodities used to support the established tolerances for residues of methyl parathion be submitted; information depicting the percent decline in residues of methyl parathion at the times and conditions specified must also be submitted.

No storage stability data have been submitted in response to the Guidance Document. However, Cheminova has stated that storage stability studies are currently being conducted and will be submitted upon completion.

The storage intervals for commodities reviewed in this document are summarized in Tables 21 (Pennwalt) and 22 (Cheminova). We note that for the residue studies reviewed in this Update document, several sample extracts were stored for greater than two weeks, and in some cases up to four months, prior to analysis. Supporting frozen storage stability data for the raw agricultural commodity as an extract will be required for these crops.

Table 21. Storage (frozen) duration for Pennwalt data reviewed in this document.

Commodity	MRID	Storage Interval (days)
Legume vegetables:		
Beans	41457901	272-624
Foliage of legume vegetables:		
Soybeans	41560003	265-403
Small fruits and berries:		
Grapes	41457902	173-208
(processing)	41457903	180-259
Cereal grains:		
Corn (field)	41560002	273-583
Rice	41560004	173-399
Wheat	41560001	139-493
Miscellaneous Commodities:		
Cottonseed	41457904	290-474

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Table 22. Storage (frozen) duration for Cheminova data reviewed in this document.

Commodity	MRID	Storage Interval (days)
Root and tuber vegetables:		
Carrots	41395105	250-426
Potatoes	41438102	148-431
Sugar beets	41379306	348-421
Turnips	41717806	79-489
Leaves of root and tuber vegetables:		
Sugar beet tops	41379306	327-398
Turnip greens	41717806	113-639
Bulb vegetables: (Onions)	41395104, 41596203	58-61
Leafy vegetables:		
Celery	41717802	63-435
Lettuce	41379302, 41596204	23-411
Spinach	41359906	52-228
Brassica leafy vegetables:		
Broccoli	41379305	149-345
Cabbage	41379304	34-157
Mustard greens	41359901	40-627
Legume vegetables:		
Beans	41438101, 41517102, 41596206	160-461
Peas	41596207	191-353
Soybeans	41379303, 41517104	292-435
Foliage of legume vegetables:		
Beans	41517102	226-508
Peas	41596207	191-353
Cereal grains:		
Corn (sweet)	41596208, 41717805	77-431
Corn (field)	41717803, 41717804	127-462
Rice	41379307, 41596205	219-459
Sorghum	41517103	216-408
Wheat	41596209	39-512
Forage, fodder, and straw of cereal grains:		
Corn (sweet)	41717805	61-577
Corn (field)	41717803	70-540
Rice	41379307	219-459
Sorghum	41517103	208-462
Wheat	41596209	43-521
Grass, forage, fodder, and hay:		
Forage grass	41359902, 41359903, 41359905	151-285
Non-grass animal feeds:		
Alfalfa	41517101	309-413
Clover	41439601	38-475
Miscellaneous Commodities:		
Artichoke	41717801	242-531
Cottonseed	41395103, 41596201	123-447
Sunflower	41359904	348-351

The following additional data are required:

- The 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. Storage stability data in support of previously submitted residue data are required only for those samples deemed to be useful for tolerance assessment. Data are required which depict the decline in levels of residues of methyl parathion and methyl paraoxon in commodities stored under the range of conditions and for the range of intervals specified. Crop samples bearing measurable, weathered residues or fortified with methyl parathion and methyl paraoxon, and 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 has not been completely described. If the requested plant metabolism data indicate the presence of additional metabolites of toxicological concern, data depicting the stability of those residues during storage will be required.

References (used):

N/A.

Discussion of the data:

N/A

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MAGNITUDE OF THE RESIDUE IN PLANTS

The Methyl Parathion Guidance Document dated 12/86 identifies data requirements for the following crop groups and members: root and tuber vegetables group (beets, garden, roots; carrots; potatoes; rutabagas, roots; sugar beets, roots; sweet potatoes; and turnips, roots), leaves of root and tuber vegetables group (beets, garden, tops; sugar beets, tops; and turnips, tops), bulb vegetable groups (onions), leafy vegetables group (celery; lettuce; and spinach), brassica leafy vegetables (broccoli; cabbage; and mustard greens), legume vegetables group (beans, dry; beans, succulent; guar beans; lentils; peas, dried; peas, succulent; and soybeans), foliage of legume vegetables group (peas, vines; and soybeans, hay), fruiting vegetables group (peppers and tomatoes), cucurbits vegetables group (cucumbers; melons; pumpkins; and squash), pome fruits group (apples), stone fruits group (apricots; cherries; nectarines; peaches; plums; and prunes), small fruits and berries group (gooseberries; grapes; and strawberries), tree nuts group (almonds, hulls; almonds, nutmeats; and pecans), cereal grains group (corn, field, grain; rice, grain; rye, grain; sorghum, grain; sorghum, sweet; and wheat, grain), forage, fodder, and straw of cereal grains group (corn, field, forage; sorghum, forage and fodder; and wheat, forage, hay, and straw), grass forage, fodder, and hay group (grass, hay of bermuda grass, bluegrass, and bromegrass), non-grass animal feeds group (alfalfa, forage and hay), and miscellaneous commodities (artichokes; cotton, seed; cotton, forage; hops, fresh; peanuts; rapeseed; safflower, seed; sunflower, seeds; and tobacco). The Guidance Document also requires data reflecting methyl parathion residues of concern in the processed products of potatoes; sugar beets; beans; guar beans; soybeans; apples; plums; grapes; tomatoes; wheat; corn, field; rice; sorghum, grain; sorghum, sweet; hops; peanuts; rapeseed; safflower, seed; sunflower, seeds; and cotton seed.

Residue data have been submitted by Cheminova for carrots, potatoes, sugar beets, turnips, onions, celery, lettuce, spinach, broccoli, cabbage, mustard greens, beans, peas, soybeans, corn, field and sweet, rice, sorghum, wheat, bermuda grass, blue grass, fescue, alfalfa, clover, artichokes, cotton, and sunflower. Pennwalt submitted residue data for beans, soybeans, grapes, corn, field, rice, wheat, and cotton.

Currently, the Agency no longer requires crop field trials reflecting aerial application in cases where adequate data are available from the use of ground equipment reflecting the same application rate, number of applications, and preharvest intervals, provided that the product label specifies aerial applications are to be made in a minimum of 2 gal/A of (or 10 gal/A in the case of tree crops; see CBRS memorandum dated 12/6/91 by R. Quick: Requirements for Crop Field Trials to

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Support Aerial Applications). The Cheminova product label for EPA Reg. No. 4787-11 and the Platte product label for EPA Reg. No. 34704-10 specify a minimum of 1 gal/A for aerial applications. Therefore, we recommend that the registrant(s) revise product labels to specify a minimum of 2 gal/A for aerial applications; otherwise, crop field trials reflecting aerial applications at 1 gal/A will be required to support these uses. The following actions must be taken:

- The registrant(s) must revise product labels to specify that aerial applications be made in a minimum of 2 gal/A. Alternatively, for product labels which specify aerial applications at 1 gal/A, the registrant must submit data reflecting aerial applications at 1 gal/A for each crop listed.

It has been determined by the Agency's Metabolism Committee that the methyl parathion residues of concern are methyl parathion and methyl paraoxon; therefore, these are the residues to be included in the tolerance expression (R. Perfetti, EPA Memorandum with no assigned CBRS No., dated 3/16/92). Upon reregistration of methyl parathion, the tolerance expression should be revised to include the combined residues of methyl parathion and methyl paraoxon. For crop residue studies reviewed in this update, data depicting the combined residues of methyl parathion and methyl paraoxon were evaluated for their adequacy in supporting the established tolerances.

Note to SRRD: We recommend that the tolerance expression in 40 CFR 180.121 be revised to include separate tolerances for residues of methyl parathion and ethyl parathion and that tolerances for the residues of methyl parathion be revised to tolerances for the combined residues of methyl parathion and methyl paraoxon. In addition, since there are no registered uses of methyl parathion and uses of ethyl parathion have been canceled on the following crops, we recommend that the tolerances for residues in or on these crops be revoked: avocados, blackberries, blueberries (huckleberries), boysenberries, citrus fruits, cranberries, currants, dates, dewberries, eggplant, endive (escarole), figs, filberts, garlic, guar beans, guavas, lentils, loganberries, mangoes, okra, olives, parsley, parsnips, pecans, pineapple, quince, radishes, raspberries, sugarcane, Swiss chard, trefoil, walnuts, and youngberries.

The use patterns discussed in this Residue Update are based on labels submitted by Cheminova and Pennwalt. In addition, Cheminova submitted data in support of a Platte Chemical Company 45.5% EC formulation. When end-use product DCIs are developed (e.g., at the issuance of the RED), RD should require that all end-use product labels (e.g., any unamended basic producer labels, SLNs, and products covered under the generic data

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exemption) be amended such that they are consistent with the basic producer labels.

Root and Tuber Vegetables Group

Carrots

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on carrots [40 CFR §180.121(a)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications to carrots at 1 lb ai/A/application, using ground and aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 15-day PHI has been established. The use of treated carrot tops for food or feed is prohibited. These use directions were obtained from the product label, EPA Reg. No. 4787-11 and Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on carrots following applications according to the maximum registered use patterns of D, WP, and EC formulations. The Guidance Document also requires the registrant(s) to propose label restrictions limiting the number of foliar applications permitted per growing season, which must be supported by the requested data. Since issuance of the Guidance Document the D formulation has been canceled. We note that the registrants submitting data do not currently hold registrations for the WP formulation; however, if any registrant wishes to support the use of the WP formulation, additional data must be submitted.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41395105) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on carrots. The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on carrots harvested 15 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation at ca. 1x (the maximum registered single application rate). Residues of p-nitrophenol were nondetectable (<0.10 ppm) in or on these same samples. Pending the submission of adequate storage stability data and product label amendments, these data adequately satisfy the

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Guidance Document requirements for field residue studies on carrots using the EC formulation. The following action must be taken:

- The registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season or maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 1 lb ai/A/application.

References (used):

MRID(s): 41395105.

Discussion of the data:

Cheminova (1990; MRID 41395105) submitted data from six tests conducted in CA(2), MI(1), TX(2), and WA(1) depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on carrots harvested 15 days following six foliar broadcast applications using ground equipment and aerial equipment of the 4 lb/gal EC formulation at 1.0 or 1.1 lb ai/A/application (1x the maximum registered single application rate). Residues of methyl parathion and its metabolites are presented in the table below.

			Residues (ppm)		
Equipment	PHI	No. of Samples	Methyl Parathion	Methyl Paraoxon	p-Nitrophenol
Ground	15	8	<0.05-0.79	<0.05	<0.10
Aerial	15	6	0.07-0.26	<0.05	<0.10
Control		6	<0.05	<0.05	<0.10

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were: (i) 69-87% from five samples fortified with methyl parathion at 0.05 and 1 ppm; (ii) 72-91% from five samples fortified with methyl paraoxon at 0.05 and 1 ppm; and (iii) 78-119% from four samples fortified with p-nitrophenol at 0.1 and 1 ppm. Samples were stored frozen (ca. -20 C) for 250-426 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(65%), MI(5%), TX(6%), and WA(9%) accounted for ca. 90% of the 1988 U.S. carrot production (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA June 1989, p. 22). Pending the submission of adequate storage stability data, the available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on carrots harvested 15 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation at 1x (the maximum registered single application rate). Residues of p-nitrophenol were nondetectable (<0.10 ppm). The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season which must be supported by residue data.

Potatoes

Tolerance(s):

A tolerance of 0.1 ppm (negligible) has been established for residues of methyl parathion in or on potatoes [40 CFR §180.121(a)].

Use directions and limitations:

The 2 lb/gal Mcap and 45.5% EC (4 lb/gal) formulations are registered for multiple foliar applications to potatoes at 0.25-1.5 lb ai/A/application, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 5-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4581-292, submitted in response to the 10/6/89 Product Label DCI and a Platte Chemical Company label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires: (i) data depicting residues of concern in or on potatoes following applications according to the maximum registered use patterns of the WP and EC formulations; (ii) the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data; and (iii) data depicting residues of concern in the processed products of potatoes. We note that the registrants submitting data do not currently hold registrations for the WP formulation; however, if any registrant wishes to support the use of the WP formulation, additional data must be submitted.

In response to data requirements, Cheminova submitted field residue and processing data (1990; MRID 41438102) depicting

residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on potatoes and potato processed products. The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on potatoes harvested 5 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation up to 1x (the maximum registered single application rate). Residues of p-nitrophenol were nondetectable (<0.10 ppm) in or on these same samples. The submitted processing study data indicate that granules, flakes, chips, and dried and wet peels processed from potatoes (treated at 5x the maximum registered single application rate) bore nondetectable residues of methyl parathion, methyl paraoxon, and p-nitrophenol. Pending the submission of adequate storage stability data and product label amendments, these data adequately satisfy the Guidance Document requirements for field residue and processing studies on potatoes. The following action must be taken:

- The registrant(s) must propose a label restriction specifying the maximum number of foliar applications per growing season or the maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per growing season at 1.5 lb ai/A/application.

References (used):

MRID(s): 41438102.

Discussion of the data:

Cheminova (19890; MRID 41438102) submitted data from eight tests conducted in CA(2), FL(1), ID(3), ME(1), and WI(1) depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on potatoes harvested 5 days following six foliar broadcast applications using ground and aerial equipment with the 4 lb/gal EC formulation at 1.5 lb ai/A/application (1x the maximum registered single application rate). Residues of methyl parathion, methyl paraoxon, and p-nitrophenol were nondetectable (<0.05, <0.05, and <0.10 ppm, respectively) in or on 16 samples. Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol (<0.05, <0.05, <0.10 ppm, respectively) were nondetectable in or on eight untreated samples.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were: (i) 86-97% from four samples fortified with methyl parathion at 0.05 and 1 ppm; (ii) 90-122% from four samples fortified with methyl paraoxon at 0.05 and 1 ppm; and (iii) 79-120% from four samples fortified

with p-nitrophenol at 0.1 and 1 ppm. Samples were stored frozen (-20 C) for 148-431 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

In the same submission Cheminova (1990; MRID 41438102) submitted two processing studies conducted in CA and ID depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol, in the processed commodities of potatoes. Potatoes were harvested 5 days following the last of six foliar broadcast applications of the 4 lb/gal EC formulation at 3 and 7.5 lb ai/A/application (2x and 5x the maximum registered single application rate). Potato samples bearing nondetectable levels (<0.05 ppm) of methyl parathion were processed according to simulated commercial procedures into granules, flakes, chips, and dry and wet peels. Residues of methyl parathion and its metabolites were nondetectable (<0.05 ppm for methyl parathion and methyl paraoxon and <0.10 ppm for p-nitrophenol) in granules, flakes, chips, and wet and dry peels processed fractions. Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol were nondetectable (<0.05 ppm, <0.05 ppm, and <0.10 ppm, respectively) in granules, flakes, chips, and wet and dry peels processed from untreated potatoes.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries of samples fortified with 0.05 ppm of methyl parathion and methyl paraoxon, and 0.1 ppm of p-nitrophenol are presented in the table below.

	Residues (ppm)		
Commodity	Methyl Parathion	Methyl Paraoxon	P-Nitrophenol
Tuber	73, 113	69, 108	82
Granules	75	94	77
Flakes	110	98, 123	104
Chips	84	87	76
Dried peel	81	69	93
Wet peel	87	77	78

Samples were stored frozen (-20 C) for 149-426 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(5%), FL(2%), ID(28%), ME(6%), and WI(6%) and the neighboring states of MI(2%), MN(4%), MT(1%), NV(1%), OR(6%), and WA(18%)

accounted for ca. 80% of the 1988 U.S. potato production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). Pending the submission of adequate storage stability data, the available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on potatoes harvested 5 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation up to 1x (the maximum registered single application rate). Residues of p-nitrophenol were nondetectable (<0.10 ppm) in or on these same samples. The submitted processing study indicates that methyl parathion and its metabolites do not concentrate in granules, flakes, chips, and dried and wet peels processed from potatoes treated at 2x and 5x the maximum registered single application rate.

Sugar beets, roots

Tolerance(s):

A tolerance of 0.1 ppm (negligible) has been established for residues of methyl parathion in or on sugar beet roots [40 CFR §180.121(a)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications to sugar beets at 0.25-0.375 lb ai/A, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 20-day PHI has been established. These use directions were obtained from the Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires: (i) data depicting residues of concern in or on sugar beet roots following applications according to the maximum registered use patterns of WP and EC formulations; (ii) data depicting residues of concern in the processed products of sugar beets; and (iii) the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. We note that the registrant submitting data does not currently hold registrations for the WP formulation; however, if any registrant wishes to support the use of the WP formulation, additional data must be submitted.

In response to data requirements, Cheminova submitted field residue data and processing data (1990; MRID 41438102) depicting residues of methyl parathion and its metabolites methyl paraoxon

and p-nitrophenol in or on sugar beet roots and sugar beet processed products. The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on sugar beet roots harvested 20 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation up to 1x the maximum registered single application rate. Residues of p-nitrophenol were nondetectable (<0.10 ppm) in or on these same samples. The submitted processing study indicates that residues of methyl parathion, methyl paraoxon, and p-nitrophenol were nondetectable (<0.05 ppm, <0.05 ppm, and <0.10 ppm, respectively) in pulp, molasses, and sugar processed from sugar beet roots (treated at 5x the maximum registered single application rate) bearing nondetectable residues of methyl parathion, methyl paraoxon, and p-nitrophenol. Pending the submission of adequate storage stability data and product label amendments, these data adequately satisfy the Guidance Document requirements for field residue and processing studies. The following action must be taken:

- The registrant(s) must propose a label restriction specifying the maximum number of foliar applications per growing season or the maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 0.375 lb ai/A/application.

References (used):

MRID(s): 41379306.

Discussion of the data:

Cheminova (1990; MRID 41379306) submitted data from eight tests conducted in CA(3), ID(3), MN(1), and ND(1) depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on sugar beet roots harvested 20 days following six foliar broadcast applications using ground and aerial equipment of the 4 lb/gal EC formulation at 0.375 and 1.875 lb ai/A/application (1x and 5x the maximum registered rate, respectively). Residues of methyl parathion, methyl paraoxon, and p-nitrophenol were nondetectable (<0.05, <0.05, and <0.10 ppm, respectively) in or on 14 samples. Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol (<0.05, <0.05, <0.10 ppm, respectively) were nondetectable in or on eight untreated samples.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were: (i) 67-92% from four samples fortified with methyl parathion at 0.05 and 1 ppm; (ii) 65-103% from four samples fortified with methyl paraoxon at

0.05 and 1 ppm; and (iii) 98-112% from four samples fortified with p-nitrophenol at 0.1 and 1 ppm. Samples were stored frozen (-20 C) for 348-421 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

In the same submission Cheminova (1990; MRID 41379306) submitted two processing studies conducted in CA and ID depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in the processed commodities of sugar beets. Sugar beet roots were harvested 20 days following the last of six foliar broadcast applications (using ground equipment) of the 4 lb/gal EC formulation at 1.875 lb ai/A/application (5x the maximum registered single application rate) at 7-day intervals. Sugar beet root samples bearing nondetectable levels of methyl parathion residues (<0.05 ppm) were processed according to simulated commercial procedures into pulp, molasses, and sugar. Residues of methyl parathion and its metabolites were nondetectable (<0.05 ppm, <0.05 ppm, and <0.10 ppm, respectively) in two samples each of pulp, molasses, and sugar processed fractions.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries of samples fortified with 0.05 ppm of methyl parathion and methyl paraoxon, and 0.1 ppm of p-nitrophenol are presented in the table below.

	Recovery (%)		
Commodity	Methyl Parathion	Methyl Paraoxon	P-nitrophenol
Roots	73	72	71
Pulp	89	83	83
Molasses	76	60	97
Sugar	100, 103	100, 114	97

Samples were stored frozen (-20 C) for 393-418 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(21%), ID(16%), MN(19%), and ND(10%) accounted for ca. 70% of the 1988 U.S. sugar beet production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). Pending the submission of adequate storage stability data, the field available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or

on sugar beet roots harvested 20 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation up to 1x (the maximum registered single application rate). Residues of p-nitrophenol were nondetectable (<0.10 ppm). The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season which must be supported by residue data. The submitted processing study concludes that residues of methyl parathion, methyl paraoxon, and p-nitrophenol were nondetectable (<0.05 ppm, <0.05 ppm, and <0.10 ppm, respectively) in pulp, molasses, and sugar processed from sugar beet roots treated at 5x the maximum registered single application rate, bearing nondetectable residues of methyl parathion, methyl paraoxon, and p-nitrophenol.

Turnips, roots

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on turnips (with or without tops) [40 CFR §180.121(a)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications to turnips at 0.5-0.75 lb ai/A, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 5-day PHI for roots has been established. These use directions were obtained from the Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on turnip roots following applications according to the maximum registered use patterns of EC and WP formulations. The Guidance Document also requires the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. We note that the registrant submitting data does not currently hold registrations for the WP formulation; however, if any registrant wishes to support the use of the WP formulation, additional data must be submitted.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41717806) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on turnip roots. The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on turnip roots

harvested 15 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation up to 1x (the maximum registered single application rate). Residues of p-nitrophenol were <0.1(ND)-0.2 ppm in or on these same samples. These data are inadequate to assess the established tolerance because no data were submitted reflecting the established 5-day PHI. The following additional data are required:

- The registrant(s) must propose a label restriction specifying the maximum number of foliar applications per growing season or the maximum seasonal rate and submit supporting data. Data depicting residues of methyl parathion and methyl paraoxon in or on turnip roots harvested 5 days following the proposed number of foliar applications of the EC formulation at 0.75 lb ai/A/application. Tests must be conducted in CA [representing AZ and OR], GA [representing AL, FL, and NC], IN, PA [representing NJ], TX, and WA since these states accounted for ca. 70% of the 1982 U.S. turnip acreage (1982 Census of Agriculture, Vol. 1, Part 51, p.355). Alternatively, the registrant(s) may amend its label to establish a maximum of six foliar applications per season and increase the PHI to 15 days.

References (used):

MRID(s): 41717806.

References (not used):

[The following reference(s) contain duplicate information]

MRID(s): 41395101.

Discussion of the data:

Cheminova (1990; MRID 41717806) submitted data from 14 tests conducted in CA(4), GA(2), NJ(2), TX(4), and WA(2) depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on turnip roots harvested: (i) 7 days following four foliar broadcast applications at 0.8 lb ai/A/application (ca. 1x the maximum registered single application rate) and two applications at 0.5 lb ai/A/application (ca. 0.7x the maximum registered single application rate) of the 4 lb/gal EC formulation; or (ii) 15 days following six foliar broadcast applications of the 4 lb/gal EC formulation at 0.8 lb ai/A/application (ca. 1x the maximum registered single application rate). Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PTI	No. of Samples	Residues (ppm) Methyl Parathion	Methyl Paraoxon	P-nitrophenol
Aerial	7[a]	4	<0.05	<0.05	<0.10
Ground	7[a]	10	<0.05-0.11	<0.05-0.07	<0.10-0.2
Aerial	15[b]	4	<0.05	<0.05	<0.10
Ground	15[b]	10	<0.05	<0.05	<0.10-0.1
Control		14	<0.05	<0.05	<0.10-0.11

[a] Four applications of the 4 lb/gal EC formulation at 0.8 lb ai/A/application followed by two applications at 0.5 lb ai/A/application.

[b] Six applications of the 4 lb/gal EC formulation at 0.8 lb ai/A/application.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were: (i) 73-110% from 12 samples fortified with methyl parathion at 0.05-5 ppm; (ii) 73-115% from 12 samples fortified with methyl paraoxon at 0.05-1 ppm; and (iii) 60-130% from ten samples fortified with p-nitrophenol at 0.1-4 ppm. Samples were stored frozen (-20 C) for 79-489 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(10%), GA(9%), NJ(4%), TX(7%), and WA(5%) and the neighboring states of AL(4%), AZ(4%), AR(1%), FL(3%), LA(1%), NY(1%), NC(4%), OK(2%), OR(4%), PA(10%), SC(2%), and TN(2%) accounted for ca. 90% of the 1982 U.S. turnip acreage (1982 Census of Agriculture, Vol.1, Part 51, p. 355). Pending the submission of adequate storage stability data, the available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on turnip roots harvested 7-15 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation up to 1x (the maximum registered single application rate). Residues of p-nitrophenol were <0.1(ND)-0.2 ppm. These data are inadequate to assess the established tolerance because no data were submitted reflecting the established PHI of 5 days. In addition, the registrant(s) must propose label restrictions limiting the number of foliar applications per growing season which must be supported by residue data. Additional data are required.

Leaves of Root and Tuber Vegetables Group

Sugar beets, tops

Tolerance(s):

A tolerance of 0.1 ppm has been established for residues of methyl parathion in or on sugar beet tops [40 CFR §180.121(a)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications to sugar beets at 0.25-0.375 lb ai/A, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 60-day pregrazing/feeding interval has been established. These use directions were obtained from the Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on sugar beet tops following applications according to the maximum registered use patterns of WP and EC formulations. The Guidance Documents also requires the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. We note that the registrants submitting data do not currently hold registrations for the WP formulation; however, if any registrant wishes to support the use of the WP formulation, additional data must be submitted.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41379306) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on sugar beet tops. The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on sugar beet tops harvested 60 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation at 1x (the maximum registered single application rate). Residues of methyl paraoxon and p-nitrophenol were <0.05(ND) and <0.1(ND)-0.26 ppm, respectively in or on these same samples. Pending the submission of adequate storage stability data and product label amendments, these data adequately satisfy the Guidance Document requirements for field residues studies on sugar beet tops. The following action must be taken:

- The registrant(s) must propose a label restriction specifying the maximum number of foliar applications per growing season or the maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 0.375 lb ai/A/application.

References (used):

MRID(s): 41379306.

Discussion of the data:

Cheminova (1990; MRID 41379306) submitted data from six tests conducted in CA(2), ID(2), MN(1), and ND(1) depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on sugar beet tops harvested 60 days following six foliar broadcast applications using ground and aerial equipment of the 4 lb/gal EC formulation at 0.375 lb ai/A/application (1x the maximum registered rate). Residues of methyl parathion and its metabolites are presented in the table below.

			Residues (ppm)		
Equipment	PHI	No. of Samples	Methyl Parathion	Methyl Paraoxon	p-Nitrophenol
Ground	60	8	<0.05	<0.05	<0.10-0.18
Aerial	60	4	<0.05	<0.05	<0.210-0.26
Control		6	<0.05	<0.05	<0.10

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were: (i) 64-109% from five samples fortified with methyl parathion at 0.05 and 1.0 ppm; (ii) 70-118% from five samples fortified with methyl paraoxon at 0.05 and 1.0 ppm; and (iii) 77-123% from five samples fortified with p-nitrophenol at 0.1 and 1.0 ppm. Samples were stored frozen (-20 C) for 327-398 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(21%), ID(16%), MN(19%), and ND(10%) accounted for ca. 70% of the 1988 U.S. sugar beet production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). Pending the submission of adequate storage stability data, the available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on sugar beet

tops harvested 60 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation at 1x (the maximum registered single application rate). Residues of p-nitrophenol were <0.1(ND)-0.26 ppm. The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season which must be supported by residue data.

Turnips, tops

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on turnip greens [40 CFR §180.121(a)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications to turnips at 0.5-0.75 lb ai/A, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 21-day PHI for tops has been established. These use directions were obtained from the Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on turnip tops following applications according to the maximum registered use patterns of EC and WP formulations. The Guidance Document also requires the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. We note that the registrants submitting data do not currently hold registrations for the WP formulation; however, if any registrant wishes to support the use of the WP formulation, additional data must be submitted.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41717806) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on turnip tops. The available data indicate that the established tolerance of 1 ppm for residues of methyl parathion in or on turnip tops may be too low. Residues of methyl parathion up to 1.82 ppm were reported for turnip tops harvested 21 days following six foliar broadcast treatments with the 4 lb/gal EC formulation at 1x (the maximum registered single application rate). Residues of methyl paraoxon and p-nitrophenol were <0.05 (nondetectable; ND)-0.06 ppm and <0.10(ND)-2.27 ppm, respectively in or on these same samples.

The registrant(s) must revise product labels to specify the maximum number of foliar applications per growing season which must be supported by residue data. In addition, the registrant(s) must propose a higher tolerance; alternatively, the registrant(s) may amend the product label to reduce the application rate and/or lengthen the PHI. Pending the submission of adequate storage stability data, the available data will support a label amendment to establish a maximum of six foliar applications/season and the proposal of a 2 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on turnip tops. The following action must be taken:

- The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate, supported by appropriate residue data. The available data support a maximum of six applications per season.

- The registrant(s) must propose a higher tolerance for turnip tops; the available data would support the proposal of a 2 ppm tolerance for turnip tops. Alternatively, the registrant(s) may amend the product label to reduce the application rate and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data.

References (used):

MRID(s): 41717806.

References (not used):

[The following reference(s) contain duplicate information]

MRID(s): 41395101.

Discussion of the data:

Cheminova (1990; MRID 41717806) submitted data from 14 tests conducted in CA(4), GA(2), NJ(2), TX(4), and WA(2) depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on turnip tops harvested: (i) 7 days following four foliar broadcast applications at 0.8 lb ai/A/application (ca. 1x the maximum registered single application rate) and two applications at 0.5 lb ai/A/application (ca. 0.7x the maximum registered single application rate); or (ii) 21 days following six foliar broadcast applications using ground and aerial equipment of the same formulation at 0.8 lb ai/A/application (ca. 1x the maximum registered single application rate). Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PTI	No. of Samples	Residues (ppm) Methyl Parathion	Methyl Paraoxon	p-Nitrophenol
Aerial	7[a]	4	<0.05-0.94	<0.05-0.14	0.47-1.32
Ground	7[a]	10	<0.05-3.83	<0.05-0.13	<0.10-1.82
Aerial	21[b]	4	<0.05-0.08	<0.05	0.20-1.44
Ground	21[b]	10	<0.05-1.82[c]	<0.05-0.06	<0.10-2.27
Control		14	<0.05	<0.05	<0.10-0.15

[a] Four applications of the 4 lb/gal EC formulation at 0.8 lb ai/A/application followed by two applications at 0.5 lb ai/A/application.
[b] Six applications of the 4 lb/gal EC formulation at 0.8 lb ai/A/application.
[c] Four of the samples bore tolerance-exceeding residues.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were: (i) 72-119% from 11 samples fortified with methyl parathion at 0.05-4.0 ppm; (ii) 71-125% from nine samples fortified with methyl paraoxon at 0.05-1.0 ppm; and (iii) 76-121% from 11 samples fortified with p-nitrophenol at 0.1-3.0 ppm. Samples were stored frozen (-20 C) for 113-639 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(4%), GA(10%), NJ(2%), TX(7%), and WA(<0.5%) and the neighboring states of AL(8%), AZ(5%), AR(3%), FL(10%), LA(1%), NC(4%), OK(1%), SC(2%), and TN(20%) accounted for ca. 80% of the 1982 U.S. turnip acreage (1982 Census of Agriculture, Vol. 1, Part 51, p. 355). The available data indicate that the established tolerance of 1 ppm may be too low. Residues of methyl parathion up to 1.82 ppm were reported for turnip tops harvested 21 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation at 1x (the maximum registered single application rate). The registrant(s) must revise product labels to specify the maximum number of foliar applications per growing season or the maximum seasonal rate which must be supported by residue data.

Bulb Vegetables Group

Onions

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on onions [40 CFR §180.121(a)].

Use directions and limitations:

The 2 lb/gal Mcap and 45.5% EC (4 lb/gal) formulation are registered for foliar applications to onions at 0.5 lb ai/A/application, using ground or aerial equipment. The labels do not specify a maximum seasonal rate or number of applications allowed per growing season. A 15-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI and Platte Chemical Company label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on dry bulb and green onions following applications according to the maximum registered use pattern of a representative EC formulation. Additionally, the Guidance Document requires the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data.

In response to data requirements, Cheminova submitted field residue data (1990; MRIDs 41395104 and 41596203) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on onions (green and dry bulb). The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on green and dry bulb onions harvested 15 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation at 2x the maximum registered single application rate. Residues of p-nitrophenol were <0.05(ND)-0.62 ppm in or on these same samples. Pending the submission of adequate storage stability data and product label amendments, these data adequately satisfy the Guidance Document requirements for field residue studies on onions using a representative EC formulation. The registrant must propose separate tolerances for dry bulb and green onions. The available data will support label amendments to establish a maximum of six applications/season and proposal of a 1 ppm tolerance for onions, dry bulb, and a 1 ppm tolerance for onions, green.

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The following actions must be taken:

- The registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season or maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 1 lb ai/A/application.

- The registrant(s) must propose separate tolerances for dry bulb and green onions, supported by appropriate residue data. The available data support the proposal of a 1 ppm tolerance for dry bulb onions and a 1 ppm tolerance for green onions.

References (used):

MRID(s): 41395104. 41596203.

Discussion of the data:

Cheminova (1990; MRIDs 41395104 and 41596203) submitted data from 12 tests conducted in AZ(1), CA(5), MI(1), NJ(1), NY(1), TX(2), and WA(1) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on onions (green and dry bulb) harvested 15 days following the last of six foliar broadcast applications using ground equipment and aerial helicopter equipment of the 4 lb/gal EC formulation at 0.5 or 1 lb/ai/A (1 or 2x the maximum registered rate). Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	Rate (lb ai/A/ application)	Residues (ppm)[a] Methyl parathion and Methyl paraoxon combined	p-Nitrophenol
Green onions:			
Ground	0.5	<0.29 (2)	0.14,0.23 (2)
Ground	1.0	0.09-0.71 (6)[b]	0.07-0.62 (6)
Aerial	1.0	<0.10 (2)	0.05,0.07 (2)
Control		<0.10-<0.25 (5)	<0.05-0.09 (5)
Dry bulb onions:			
Ground	1.0	<0.10-0.63 (9)[c]	<0.05-0.09 (9)
Aerial	1.0	<0.10-0.21 (4)[d]	0.05 (4)
Control		<0.10-<0.16 (7)	<0.05 (7)

[a] Number in parentheses indicates the number of samples.
[b] Includes two samples bearing methyl parathion residues of 0.09 and 0.10 ppm for which residues of methyl paraoxon were not determined.
[c] Includes two samples bearing methyl parathion residues of 0.11 and 0.13 ppm for which residues of methyl paraoxon were not determined.
[d] Includes two samples bearing methyl parathion residues of 0.20 and 0.21 ppm for which residues of methyl paraoxon were not determined.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were (i) 71-106% from 14 samples fortified with methyl parathion at 0.05-1 ppm; (ii) 85-138% from 11 samples fortified with methyl paraoxon at 0.05-1 ppm; and (iii) 72-148% from 13 samples fortified with p-nitrophenol at 0.05-1 ppm. Samples were stored frozen (ca. -20 C) for 58-61 days prior to analysis by Huntingdon Analytical Services. Storage stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of AZ (1%), CA(32%), MI(4%), NJ(<0.5%), NY(6%), TX(8), and WA(7%) and the neighboring state of CO(11%), ID(8%), NM(6%), OR(14%), UT(1%), and WI(1%) accounted for ca. 100% of the 1988 U.S. onion production (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA; June 1989. p. 14). Pending the submission of adequate storage stability data, the available field data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on green and dry bulb onions harvested 15 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC

formulation at 2x (the maximum registered single application rate). Residues of p-nitrophenol were <0.05(ND)-0.62 ppm. The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season which must be supported by residue data. In addition, the registrant must propose separate tolerances for the combined residues of methyl parathion and methyl paraoxon in or on dry bulb and green onions; the available data will support proposal of a 1 ppm tolerance for dry bulb onions and a 1 ppm tolerance for green onions.

Leafy Vegetables Group (except Brassica Vegetables)

Celery

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on celery [40 CFR §180.121(a)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for foliar applications to celery at 0.75-1.0 lb ai/A/application, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 15-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and a Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on celery following application according to the maximum registered use pattern of D, WP, and EC formulations. The Guidance Document also requires the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. Since issuance of the Guidance Document the D formulation has been canceled. We note that the registrants submitting data do not currently hold registrations for the WP formulations; however, if any registrant wishes to support use of this formulation, additional data are required.

In response to data requirements, Cheminova submitted field residue data depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on celery. The available residue data indicate that the established tolerance of 1 ppm for residues of methyl parathion in or on celery may be too low. Residues of methyl parathion exceeded the tolerance (up to 4.65 ppm) in or on 17 samples of celery

harvested 15 days following two foliar broadcast treatments (using aerial and ground equipment) of the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of methyl paraoxon and p-nitrophenol were <0.05(ND)-0.07 ppm and <0.1(ND)-0.13 ppm, respectively. The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season. In addition, the registrant(s) must propose a higher tolerance for celery; alternatively, the registrant(s) may amend the product label to reduce the application rate and/or lengthen the PHI. Pending submission of adequate storage stability data, the available data will support a label amendment to establish a maximum of two applications/season and the proposal of a 5 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on celery. The following action must be taken:

- The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate, supported by appropriate residue data. The available data support a maximum of two applications per season.

- The registrant(s) must propose a higher tolerance for celery. The available data would support the proposal of a 5 ppm tolerance for celery. Alternatively, the registrant(s) may amend the product label to reduce the application rate and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data.

References (used):

MRID(s): 41717802.

References (not used):

[The following reference(s) contain duplicate information.]

MRID(s): 41395102.

Discussion of the data:

Cheminova (1990; MRID 41717802) submitted data from 12 tests conducted in CA(8), FL(1), MI(1), and NY(2) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on celery harvested 15 or 22 days following the last of two foliar broadcast applications using ground equipment and aerial equipment of the 4 lb/gal EC formulation at 0.5 and 1 lb/ai/A. Residues of methyl parathion and its metabolites are presented in the table below.

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Equipment	PTI	No. of Samples	Rate lbs. ai/A	Residues (ppm) Methyl parathion	Methyl paraoxon	p-Nitrophenol
Aerial	15	4	0.5	0.06-1.3	<0.05	<0.10
Ground	15	12	0.5	0.34-2.52	<0.05	<0.10
Aerial	22	4	0.5	0.05-0.29	<0.05	<0.10
Ground	22	12	0.5	0.10-1.72	<0.05	<0.10
Aerial	**15**	**6**	**1.0**	**0.06-2.08[a]**	**<0.05-0.07**	**<0.10-0.10**
Ground	**15**	**18**	**1.0**	**0.32-4.65[b]**	**<0.05**	**<0.10-0.13**
Aerial	22	6	1.0	0.07-1.16[c]	<0.05	<0.10
Ground	22	18	1.0	0.20-4.35[d]	<0.05	<0.10-0.12
Control		25		<0.05	<0.05	<0.10-0.10

[a] Fifteen samples exceeded the established tolerance.
[b] Two samples exceeded the established tolerance and the highest value was extrapolated as it was above the highest calibration standard.
[c] One sample exceeded the established tolerance.
[d] Fourteen samples exceeded the established tolerance.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were (i) 69-124% from 40 samples fortified with methyl parathion at 0.05-5 ppm; (ii) 80-115% from 24 samples fortified with methyl paraoxon at 0.05-1 ppm; and (iii) 70-122% from 23 samples fortified with p-nitrophenol at 0.10-4 ppm. Samples were stored frozen (ca. -20 C) for 63-435 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(68%) FL(19%), MI(6%), and NY(1%) accounted for ca. 90% of the 1988 U.S. celery production (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA June 1989, p. 8). The available residue data indicate that the established tolerance of 1 ppm may be too low. Residues of methyl parathion exceeded the tolerance (up to 4.65 ppm) in or on 17 samples of celery harvested 15 days following two foliar broadcast treatments (using aerial and ground equipment) of the 4 lb/gal EC formulation at 1x (the maximum registered single application rate). Residues of methyl paraoxon and p-nitrophenol were <0.05(ND)-0.07 ppm and <0.1(ND)-0.13 ppm, respectively in or on these same samples. The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season and/or revise the PHI, which must be supported by residue data. Alternatively, the registrant(s) may propose a higher tolerance (toxicological

considerations permitting) for the combined residues of methyl parathion and methyl paraoxon in or on celery.

Lettuce

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on lettuce [40 CFR §180.121(a)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for foliar applications to lettuce at 0.625-1 lb ai/A/application, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 21-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and a Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on lettuce following application according to the maximum registered use pattern of D, WP, and EC formulations. The Guidance Document also requires the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. Since issuance of the Guidance Document the D formulation has been canceled. We note that the registrants submitting data do not currently hold registrations for the WP formulations; however, if any registrant wishes to support use of this formulation, additional data are required.

In response to data requirements, Cheminova submitted field residue data depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on lettuce. The available residue data indicate that the established tolerance of 1 ppm for residues of methyl parathion in or on lettuce may be too low. Residues of methyl parathion up to 1.55 ppm were reported for leaf and head lettuce harvested 21 days following six foliar broadcast treatments with the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of methyl paraoxon and p-nitrophenol were <0.05(ND) and <0.1(ND)-0.36 ppm, respectively in or on these same samples. The registrant(s) must revise product labels to specify the maximum number of foliar applications per growing season which must be supported by residue data. In addition, the registrant(s) must propose a higher tolerance; alternatively, the registrant(s) may amend product labels to reduce the application rate and/or

lengthen the PHI. Pending the submission of adequate storage stability data, the available data will support a label amendment to establish a maximum of six foliar applications/season and the proposal of a 2 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on lettuce. The following action must be taken:

- The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate, supported by appropriate residue data. The available data support a maximum of six applications per season.

- The registrant(s) must propose a higher tolerance for lettuce. The available data would support the proposal of a 2 ppm tolerance for lettuce. Alternatively, the registrant(s) may amend the product label to reduce the application rate and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data.

References (used):

MRID(s): 41379302. 41596204.

Discussion of the data:

Cheminova (1990; MRIDs 41379302 and 41596204) submitted data from 16 tests conducted in AZ(2), CA(4), FL(2), MI(2), NJ(2), and TX(4). These studies depicted residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on leaf and head lettuce harvested 21 days following the last of six foliar broadcast applications using ground and aerial equipment of the 4 lb/gal EC formulation at 1 lb/ai/A (1x the maximum registered single application rate). Residues of methyl parathion and its metabolites are presented in the table below.

			Residues (ppm)		
Equipment	PHI	No. of Samples	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Aerial	21	12	<0.05	<0.05	<0.05-0.07
Ground	21	36	<0.05-1.55[a]	<0.05	<0.05-0.36
Control		24	<0.05	<0.05	<0.05

[a] Three samples exceeded the established tolerance.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-

Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were (i) 81-114% from 24 samples fortified with methyl parathion at 0.05-1 ppm; (ii) 95-123% from 21 samples fortified with methyl paraoxon at 0.05-1 ppm; and (iii) 67-137% from 22 samples fortified with p-nitrophenol at 0.05-1 ppm. Samples were stored frozen (ca. -20 C) for 23-411 days prior to analysis by Huntington Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of AZ(19%), CA(73%), FL(3%), MI(<0.5%), NJ(1%), NY(1%), and TX(1%) accounted for ca. 100% of the 1988 U.S. lettuce production (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA June 1989, p. 12). The available residue data indicate that the established tolerance of 1 ppm may be too low. Residues of methyl parathion in or on leaf and head lettuce harvested 21 days following six foliar broadcast treatments using aerial and ground equipment of the 4 lb/gal EC formulation at 1x (the maximum registered single application rate) were up to 1.55 ppm. Residues of methyl paraoxon and p-nitrophenol were <0.05(ND) and <0.1(ND)-0.36 ppm, respectively. The registrant(s) must propose label restrictions reducing the maximum single application rate, limiting the number of foliar applications per growing season and/or revise the PHI, which must be supported by residue data. Alternatively, the registrant(s) may propose a higher tolerance for the combined residues of methyl parathion and methyl paraoxon in or on lettuce.

Spinach

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on spinach [40 CFR §180.121(a)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for foliar applications to spinach at 0.625-1.0 lb ai/A/application, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 21-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and a Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on spinach following application according to the maximum registered use pattern of D, WP, and EC formulations. The Guidance Document also requires the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. Since issuance of the Guidance Document the D formulation has been canceled. We note that the registrants submitting data do not currently hold registrations for the WP formulations; however, if any registrant wishes to support use of this formulation, additional data are required.

In response to data requirements, Cheminova submitted field residue data depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on spinach. The available residue data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on spinach harvested 21 days following three to six foliar broadcast treatments (using aerial and ground equipment) with the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of p-nitrophenol were <0.05(ND)-0.45 ppm in or on these same samples. Pending the submission of adequate storage stability data and product label amendments, these data adequately satisfy the Guidance Document requirements for field residue studies on spinach using a representative EC formulation. The following action must be taken:

- The registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season or the maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 1 lb ai/A/application.

References (used):

MRID(s): 41359906.

Discussion of the data:

Cheminova (1990; MRID 41359906) submitted data from 14 tests conducted in CA(6), CO(2), NJ(2), and TX(4) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on spinach harvested 15 or 21 days following the last of three to six foliar broadcast applications using ground equipment and aerial equipment with the 4 lb/gal EC formulation at 0.5 and 1 lb ai/application/A. Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PTI	No. of Samples	Residues (ppm) Methyl parathion	Methyl paraoxon	p-Nitrophenol
Aerial[a]	15	4	<0.05	<0.05	0.06-0.22
Ground[a]	15	10	<0.05-0.3	<0.05-0.1	<0.05-1.17
Aerial[b]	21	4	<0.05	<0.05	<0.05-0.15
Ground[b]	21	10	<0.05-0.09	<0.05	<0.05-0.45
Control		14	<0.05	<0.05	<0.05

[a] Three, four, and six applications at 1 lb ai/A with the last application at a reduced rate of 0.5 lb ai/A.
[b] Three, four, five and six applications at 1 lb ai/application/A.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were: (i) 77-106% from 12 samples fortified with methyl parathion at 0.05-1 ppm; (ii) 88-109% from 11 samples fortified with methyl paraoxon at 0.05-1 ppm; and (iii) 73-111% from 11 samples fortified with p-nitrophenol at 0.05-1 ppm. Samples were stored frozen (ca. -20 C) for 52-228 days prior to analysis by Huntington Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(25%), CO(5%), NJ(6%), and TX(25%) and the neighboring states of AZ(1%), AR(4%), NY(5%), OK(6%), and PA(1%) accounted for ca. 80% of the 1982 U.S. spinach acreage (1982 Census of Agriculture, Vol. 1, Part 51, p. 352). Pending the submission of adequate storage stability data, the available residue data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on spinach harvested 21 days following three to six foliar broadcast treatments (using aerial and ground equipment) of the 4 lb/gal EC formulation at 0.5x and 1x (the maximum registered single application rate). Residues of p-nitrophenol were <0.05(ND)-0.45 ppm. The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season which must be supported by residue data.

Brassica (Cole) Leafy Vegetables Group

Broccoli

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on broccoli [40 CFR §180.121(a)]. A crop group tolerance of 1 ppm has also has been established for residues of methyl parathion in or on brassica leafy vegetables [40 CFR §180.121(b)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for foliar applications to broccoli at 0.5-1.5 lb ai/A/application, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. Cheminova has established a 21-day PHI and Platte has established a 7-day PHI for applications at 0.5 lb ai/A and a 21-day PHI for applications greater than 0.5 lb ai/A. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and a Platte Chemical Company label, EPA Reg. No. 35704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on broccoli following applications according to the maximum registered use pattern of D, WP, and EC formulations. Additionally, the Guidance Document requires the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. We note that the registrants submitting data do not currently hold registrations for the WP formulation; however, if any registrant wishes to support the use of this formulation, additional data are required.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41379305) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on broccoli. The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on broccoli harvested 7 and 21 days following six foliar broadcast treatments (using ground or aerial equipment) with the 4 lb/gal EC formulation at ca. 1x the maximum registered application rate. Residues of p-nitrophenol were <0.05-0.33. Pending the submission of adequate storage stability data and product label amendments, these data adequately satisfy Guidance Document requirements for field

residue studies on broccoli using a representative EC formulation.

The following action must be taken:

- The registrants must propose a label amendment specifying the maximum number of foliar applications per growing season or maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 1.5 lb ai/A/application.

References (used):

MRID(s): 41379305.

Discussion of the data:

Cheminova (1990; MRID 41379305) submitted data from twelve tests conducted in CA(6), OR(2), and TX(4) depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on broccoli following six foliar broadcast applications of the 4 lb/gal EC formulation, using ground and aerial equipment. Broccoli was harvested 21 days following six applications at 1.5 lb ai/A or 7 days following four applications at 1.5 lb ai/A/application plus two applications at ca. 0.5 lb ai/A/application. Residues of methyl parathion and its metabolites are presented in the table below.

			Residues (ppm)		
Equipment	PTI	No. of Samples	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Ground	7	8	<0.05-0.10	<0.05-0.14	<0.05-0.33
Aerial	7	4	<0.05	<0.05	<0.05-0.13
Ground	21	8	<0.05-0.05	<0.05	<0.05-0.18
Aerial	21	4	<0.05	<0.05	<0.05-0.08
Control		12	<0.05	<0.05	<0.05

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were: (i) 80-102% from 14 samples fortified with methyl parathion at 0.05-5 ppm; (ii) 86-118% from 14 samples fortified with methyl paraoxon at 0.05-5 ppm; and (iii) 84-107% from 14 samples fortified with p-nitrophenol at 0.05-5 ppm. Samples were stored frozen (ca. -20 C) for 149-345 days prior to analysis. Storage stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(91%), OR(2%), and TX(4%) accounted ca. 100% of the 1988 U.S. broccoli production (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA June 1989, p. 20). Pending the submission of adequate storage stability data the available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on broccoli harvested 7 and 21 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation up to 1x (the maximum registered application rate). Residues of p-nitrophenol were <0.05-0.33. The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season which must be supported by residue data.

Cabbage

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on cabbage [40 CFR §180.121(a)]. A crop group tolerance of 1 ppm has also has been established for residues of methyl parathion in or on brassica leafy vegetables [40 CFR §180.121(b)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) and 2 lb/gal Mcap formulations are registered for foliar applications to cabbage at 0.5-1.5 lb ai/A/application, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. Cheminova and Pennwalt have established 21-day PHIs and Platte has established a 10-day PHI for applications at 0.5 lb ai/A and a 21-day PHI for applications greater than 0.5 lb ai/A. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI, the product label, EPA Reg. No. 4787-11 dated 3/7/75, and a Platte Chemical Company label, EPA Reg. No. 35704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on cabbage (with and without wrapper leaves) following applications according to the maximum registered use pattern of WP, EC, and Mcap formulations. Additionally, the Guidance Document requires the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. We note that the registrants submitting data do not currently hold registrations for the WP formulation;

however, if any registrant wishes to support the use of this formulation, additional data are required.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41379304) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on cabbage. The available field data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on cabbage harvested 10 and 21 days following six foliar broadcast treatments (using ground or aerial equipment) with the 4 lb/gal EC formulation at 1x the maximum registered application rate. Residues of p-nitrophenol were <0.05-2.16 ppm. However, these data do not satisfy Guidance Document data requirements for the following reasons: (i) product labels must be amended to specify a maximum number of foliar applications per season; (ii) no storage stability data were submitted to support the available field residue data; and (iii) no data were submitted reflecting the use of the Mcap formulation. Pending the submission of adequate storage stability data and product label amendments, these data adequately satisfy Guidance Document requirements for field residue studies on cabbage using a representative EC formulation. The following additional data are required:

- The registrants must propose a label amendment for the EC formulation specifying the maximum number of foliar applications per growing season or maximum seasonal rate which must be supported by residue data. The available data support a maximum of six foliar applications per season at 1.5 lb ai/A/application.

- The registrant(s) must propose label restrictions limiting the number of foliar sprays permitted per crop. Data depicting residues of methyl parathion and methyl paraoxon in or on cabbage (with and without leaves) harvested 21 days following the proposed number of foliar applications of a Mcap formulation at 1.5 lb ai/A/application. Tests must be conducted in CA, FL, NY, NC, TX, and WI since these states accounted for ca. 70% of the 1982 U.S. production of cabbage (1982 Census of Agriculture, Vol. 1, Part 51, p. 338).

References (used):

MRID(s): 41379304.

Discussion of the data:

Cheminova (1990; MRID 41379304) submitted data from sixteen tests conducted in CA(4), FL(2), NJ(2), NY(4), TX(1), and WI(1) depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on cabbage following multiple foliar broadcast

(21

applications of the 4 lb/gal EC formulation, using ground and aerial equipment. Cabbage was harvested 10 days following five applications at 1.5 lb ai/A and a final application at 0.5 lb ai/A, or 21 days following six applications at 1.5 lbs ai/A (ca. 1x the maximum registered rate). Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PTI	No. of Samples	Residues (ppm) Methyl parathion[a]	Methyl paraoxon	p-Nitrophenol
Ground	10	24	<0.05-<0.5	<0.05-0.22	<0.05-2.16
Aerial	10	8	<0.05-<0.5	<0.05-0.24	<0.05-0.69
Ground	21	24	<0.05-<0.5	<0.05-0.23	<0.05-1.38
Aerial	21	8	<0.05-<0.5	<0.05-0.08	<0.05-0.57
Control		32	<0.05-<0.5	<0.05	<0.05-0.21

[a] The elevated detection limit was used in the California studies because an overspray of Metasystox R resulted in a co-eluting compound in samples with wrapper leaves.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were: (i) 76-104% from 21 samples fortified with methyl parathion at 0.05-5.08 ppm; (ii) 73-118% from 22 samples fortified with methyl paraoxon at 0.048-4.8 ppm; and (iii) 74-113% from 22 samples fortified with p-nitrophenol at 0.05-5.08 ppm. Samples were stored frozen (ca. -20 C) for 34-157 days prior to analysis. Storage stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(8%), FL(16%), NJ(3%), NY(15%), TX(16%), and WI(9%) accounted for ca. 70% of the 1982 U.S. cabbage production (1982 Census of Agriculture, Vol.1, Part 51, p. 338). Pending the submission of adequate stability studies, the available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on cabbage harvested 10 and 21 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation up to 1x (the maximum registered application rate). Residues of p-nitrophenol were <0.05-2.16 ppm. The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season which must be supported by residue data. No data were submitted reflecting the use of a Mcap formulation. Additional data are required.

Mustard greens

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on mustard greens [40 CFR §180.121(a)]. A crop group tolerance of 1 ppm has also has been established for residues of methyl parathion in or on brassica leafy vegetables [40 CFR §180.121(b)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for foliar applications to mustard greens at 0.5-1.5 lb ai/A/application, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. Cheminova has established a 21-day PHI and Platte has established a 10-day PHI for applications at 0.5 lb ai/A and a 21-day PHI for applications greater than 0.5 lb ai/A. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and a Platte Chemical Company label, EPA Reg. No. 35704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on mustard greens following applications according to the maximum registered use pattern of WP, and EC formulations. Additionally, the Guidance Document requires the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. We note that the registrants submitting data do not currently hold registrations for the WP formulation; however, if any registrant wishes to support the use of this formulation, additional data are required.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41359901) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on mustard greens. The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on mustard greens harvested 10 and 21 days following six foliar broadcast treatments (using ground or aerial equipment) with the 4 lb/gal EC formulation at 1x the maximum registered application rate. Residues of p-nitrophenol were <0.05-1.24 ppm. Pending the submission of adequate storage stability data and product label amendments, these data adequately satisfy the Guidance Document requirements for field residue studies on mustard greens using a representative EC formulation.

The following action must be taken:

- The registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season or maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 1.5 lb ai/A/application.

References (used):

MRID(s): 41359901.

Discussion of the data:

Cheminova (1990: MRID 41359901) submitted data from 14 tests conducted in CA(4), FL(2), LA(2), OH(2), and TX(4) depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on mustard greens following six foliar broadcast applications of the 4 lb/gal EC formulation, using ground and aerial equipment. Mustard greens were harvested 10 days following six applications at 1.5 lb ai/A with the third or sixth application at a reduced rate of 0.5 lb ai/A, or 21 days following six applications at 1.5 lb ai/A (1x the maximum registered rate). Residues of methyl parathion and its metabolites are presented in the table below.

			Residues (ppm)		
Equipment	PTI	No. of Samples	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Ground	10	10	<0.05-0.51	<0.05-0.09	0.06-1.24
Aerial	10	4	<0.05-0.10	<0.05	0.78-1.09
Ground	21	10	<0.05-0.09	<0.05	<0.05-0.69
Aerial	21	4	<0.05	<0.05	0.16-0.39
Control		14	<0.05	<0.05	<0.05

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were: (i) 88-102.6% from 13 samples fortified with methyl parathion at 0.05-1.0 ppm; (ii) 68.6-116% from 11 samples fortified with methyl paraoxon at 0.5-1.0 ppm; (iii) 64.8-109.8% from 12 samples fortified with p-nitrophenol at 0.5-1.0 ppm. Samples were stored frozen (ca. -20 C) for 40-627 days prior to analysis. Storage stability studies supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(18), FL(7), LA(3), OH(3), and TX(12) and the surrounding states of AL(1), AR(3), AZ(12), GA(5), IN(1), MI(3), MS(4), and OK(1) accounted for ca. 70% of the 1982 U.S. mustard greens production (1982 Census of Agriculture, Vol.1, Part 51, p. 346). Pending the submission of adequate storage stability data, the available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on mustard greens harvested 10 and 21 days following six foliar broadcast treatments (using ground or aerial equipment) of the 4 lb/gal EC formulation up to 1.5x (the maximum registered application rate). Residues of p-nitrophenol were <0.05-1.24 ppm. The registrant(s) must propose label restrictions to limit the number of foliar applications per growing season.

Legume Vegetables (Dry or Succulent) Group

Beans, dry and succulent

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on beans [40 CFR §180.121(a)].

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for multiple foliar applications to dry and succulent beans at 0.5-1 lb ai/A/application, using ground and aerial equipment. A maximum of three applications is allowed per growing season for succulent beans; the maximum number of seasonal applications allowed for dry beans is not specified. A 3-day PHI has been established for succulent beans and 15-day PHI for dry beans. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications to green and lima beans at 0.5-1.5 lb ai/A/application using ground and aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. Cheminova has established a 15-day PHI for dry beans and a 21-day PHI for green and lima beans. Platte has established a 15-day PHI for applications to dry and green beans at 0.5 lb ai/A/application and a 21-day PHI for applications >0.5-1.5 lb ai/A/application. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and the Platte Chemical Company label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires: (i) data depicting residues of concern in or on green and lima beans (beans plus pods) following applications according to the maximum registered use patterns of WP, EC, and Mcap formulations; (ii) data depicting residues of concern in or on dry beans following applications according to the maximum registered use patterns of WP and EC formulations; (iii) data reflecting residues of concern in cannery residue processed from both dry and snap beans; (iv) the registrant(s) to propose separate tolerances for methyl parathion residues in or on lima, snap, and dry; and (v) label restrictions limiting the number of foliar applications permitted per growing season, which must be supported by the requested data. We note that the registrants submitting data do not currently hold registrations for the WP formulations; however, if any registrant wishes to support use of this formulation, additional data are required.

In response to data requirements, Pennwalt submitted lima and succulent bean field residue data (1990; MRIDs 41457901 and 41560005), and Cheminova submitted lima, succulent, and dry bean field residue data and processing data (1989 and 1990; MRIDs 41438101, 41517102, and 41596206).

The available lima bean residue data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established 1 ppm tolerance for beans in or on lima beans harvested 15 days following six foliar broadcast applications of the 2 lb/gal Mcap formulation at 1 lb ai/A, or harvested 21 days following six foliar broadcast applications of the 4 lb/gal EC formulation at 1.5 lb ai/A. Residues of p-nitrophenol were <0.05(ND)-1.02 ppm in or on these same samples. Pending submission of adequate storage stability data and amended product labels, no additional data are required for lima beans.

Tolerance-exceeding residues (>1.32 ppm) of methyl parathion and methyl paraoxon were reported for succulent beans harvested 3 days (the established PHI) following six applications of the Mcap formulation at 1 lb ai/A; combined residues of methyl parathion and methyl paraoxon were below tolerance (<0.70 ppm) in or on succulent beans harvested 7 days posttreatment. The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on snap beans harvested 21 days following six applications of the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of p-nitrophenol were <0.10-2.88 ppm in or on these same samples. The registrant(s) must amend the product label for the Mcap formulation to establish a 7-day PHI; alternatively the registrant may propose a higher tolerance for succulent beans. Pending submission of adequate storage

stability data and amended product labels, no additional data are required for succulent beans.

The available dry bean residue data indicate that the combined residues of methyl parathion and methyl paraoxon were nondetectable (<0.10 ppm) in or on dry beans harvested 15 days following six foliar broadcast treatments with the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of p-nitrophenol were <0.1(ND)-0.6 ppm in or on these same samples. Pending submission of adequate storage stability data and amended product labels, no additional data are required for dry beans.

The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season. In addition, the registrant(s) must propose separate tolerances for the combined residues of methyl parathion and methyl paraoxon in or on succulent and dry beans, which must be supported by residue data. The following actions must be taken:

- The registrant(s) must propose a label amendment for the Mcap and EC formulation specifying the maximum number of foliar applications per growing season or the maximum seasonal application rate, which must be supported by residue data. The available data support a maximum of six foliar applications. In addition, the registrant(s) must amend the Mcap product label to establish a 7-day PHI for succulent beans; alternatively propose a higher tolerance for this crop.

- The registrant(s) must propose separate tolerances for the combined residues of methyl parathion and methyl paraoxon in or on succulent and dried beans, which must be supported by residue data.

The available processing data (1990; MRID 41596206) are inadequate to determine the potential for concentration of methyl parathion or methyl paraoxon residues in cannery residue since whole beans did not bear measurable weathered residues prior to processing. However, data pertaining to bean vines will substitute for cannery residue data. No additional data pertaining to cannery residue are required.

References (used):

MRID(s): 41438101. 41457901. 41517102. 41560005. 41596206.

Discussion of the data:

Pennwalt submitted lima bean (1990; MRID 41457901) data from five tests conducted in CA(2), DE(2), and NJ(1) and succulent bean (1990; MRID 41560005) data from six tests conducted in CA(2), FL(1), NY(1), OR(1), and WI(1) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol. Lima beans were harvested 15 days and succulent beans were harvested 3 or 7 days following the last of six foliar broadcast applications (using ground and aerial equipment) with the 2 lb/gal Mcap formulation at 1 lb ai/A/application (1x the maximum registered seasonal rate). Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PTI	No. of Samples	Residues (ppm) Methyl parathion	Methyl paraoxon	p-Nitrophenol
Lima Beans					
Aerial	15	5	<0.05-0.05	<0.05	<0.05-0.23
Ground	15	6	<0.05	<0.05	<0.05-0.47
Control		5	<0.05	<0.05	<0.05
Succulent Beans					
Aerial	3	4	0.36-1.32	<0.05	0.22-0.48
Ground	3	8	0.39-0.71	<0.05-0.06	0.14-0.58
Aerial	7	4	0.15-0.65	<0.05	0.13-0.56
Ground	7	8	0.09-0.4	<0.05	0.15-0.47
Control		5	<0.05	<0.05	<0.05

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD (Pennwalt method BR-007-00) method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method (Pennwalt method BR-007-00) with a detection limit of 0.05 ppm. Recoveries from samples fortified with methyl parathion and methyl paraoxon at 0.05-10 ppm, and p-nitrophenol at 0.05-5 ppm are presented in the table below.

Commodity	Recovery (%)[a] Methyl parathion	Methyl paraoxon	p-Nitrophenol
Lima Beans	60-106 (12)	62-108 (12)	74-120 (10)
Succulent Beans	87-119 (11)	74-124 (11)	55-148 (13)

[a] Number in parentheses indicates the number of samples.

Samples were stored frozen (-15 C) for 272-624 days prior to analysis by EN-CAS Analytical Laboratories and Huntington Analytical Services. Storage stability data supporting these

storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Cheminova submitted lima bean data (1989; MRID 41438101) from four tests conducted in CA(2) and DE(2); succulent (snap) bean data (1990; MRID 41596206) from nine tests conducted in CA(3), FL(1), NY(2), OR(2), and WI(1); and dry bean data (1990; MRID 41517102) from six tests conducted in CA(2), MI(1), NE(2), and ND(1) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol. Lima and succulent beans were harvested 21 days and dry beans were harvested 15 days following six foliar broadcast applications of the 4 lb/gal EC formulation at 1.5 lb/ai/A (1x the maximum registered single application rate). Residues of methyl parathion and its metabolites are presented in the table below.

			Residues (ppm)		
Equipment	PHI	No. of Samples	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Lima Beans:					
Aerial	21	4	<0.05	<0.05	0.14-0.43
Ground	21	4	<0.05	<0.05	0.29-1.02
Control		4	<0.05	<0.05	<0.10
Succulent Beans:					
Aerial	21	4	<0.05	<0.05	<0.10-0.78
Ground	21	2[b]	<0.05	<0.05	<0.10
		12	<0.05	<0.05	0.50-2.88
Control		9	<0.05	<0.05	<0.10
Dry Beans:					
Aerial	15	4	<0.05	<0.05	<0.10-0.49
Ground	15	8	<0.05	<0.05	0.13-0.60
Control		6	<0.05	<0.05	<0.10[a]

[a] Only five samples were analyzed for residues of p-nitrophenol.
[b] Only four applications at 1.5 lb ai/A/application.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries from samples fortified with methyl parathion at 0.05-5 ppm, methyl paraoxon at 0.05-1 ppm, and p-nitrophenol at 0.1-1 ppm are presented in the table below.

Commodity	Recovery (%)[a]		
	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Lima Beans	74-96 (4)	72-92 (4)	82, 99 (2)
Dry Beans	71-93 (7)	68-102 (8)	64-122 (7)
Succulent Beans	73-106 (10)	71-112 (10)	65-111 (10)

[a] Number in parentheses indicates number of samples.

Samples were stored frozen (ca. -20 C) for 160-461 days prior to analysis by Biospherics Incorporated. Storage stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Cheminova (1990; MRID 41596206) also submitted data from a processing study conducted in CA and OR depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol, in the processed commodities of succulent beans. Beans were harvested 21 days following the last of six foliar applications of the 4 lb/gal EC formulation at 3 lb ai/A/application (CA) or 7 lb ai/A/application (OR) (2x and 5x the maximum registered single application rate, respectively). Bean samples bearing nondetectable (<0.05 ppm) residues of methyl parathion residues were processed according to simulated commercial procedures into cut pods and cannery waste (cannery residue). Residues of methyl parathion and its metabolites in processed fractions are presented in the table below.

Commodity[a]	Residues (ppm)		
	Methyl Parathion	Methyl Paraoxon	p-Nitrophenol
California			
Whole pods(2)	<0.05	<0.05	0.50,0.71
Cut pods(1)	<0.05	<0.05	1.11
Cannery waste(1)	<0.05	<0.05	2.33
Oregon			
Whole pods(2)	<0.05	<0.05	0.51,0.52
Cut pods(1)	<0.05	<0.05	1.51
Cannery waste(1)	0.06	<0.05	2.34

[a] Number in parentheses indicates number of samples.

Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol each were nondetectable (<0.05 ppm) in or on a composite untreated sample of each processed commodity. Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol

data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were: (i) 73% from one sample each of pods and waste fortified with methyl parathion at 0.05 ppm; (ii) 71% from one sample of pods and 95% from one sample of waste fortified with methyl paraoxon at 0.05 ppm; and (iii) 65% from one sample of pods and 119-126% from three samples of waste fortified with p-nitrophenol at 0.1 ppm. Samples were stored frozen (-20 to -30 C) for 227-234 days prior to analysis by Biospherics Incorporated. Storage stability data to support these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(100%), DE(<0.5%), and NJ(<0.5%) accounted for ca. 100% of the 1988 U.S. lima bean production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989); CA(<0.5%), FL(<0.5%), NY(9%), OR(22%), and WI(32%) and the neighboring states of MI(7%), MN(2%), PA(3%), and WA(1%) accounted for ca. 80% of the 1988 U.S. snap bean production (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA June 1989, p. 36); and CA(15%), MI(12%), NE(20%), and ND(14%) and the neighboring states of CO(13%), KS(2%), MN(2%), and WY(4%) accounted for ca. 80% of the 1988 U.S. dry bean production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989).

The available lima bean residue data indicate that residues of methyl parathion will not exceed the established tolerance in or on lima beans: (i) harvested 15 days following six foliar broadcast applications using aerial and ground equipment of the 2 lb/gal Mcap formulation at 2x (the maximum registered seasonal rate); and (ii) harvested 21 days following six foliar broadcast applications using aerial and ground equipment of the 4 lb/gal EC formulation at 1x (the maximum registered single application rate). Residues of methyl paraoxon and p-nitrophenol were <0.05(ND) and <0.05(ND)-1.02 ppm, respectively in or on these same samples. No data were submitted reflecting applications of the EC formulation at 0.5 lb ai/A/application with a 15-day PHI.

The available snap bean data indicate that residues of methyl parathion will not exceed the established tolerance in or on snap beans: (i) harvested 21 days following four or six applications using ground and aerial equipment of the 4 lb/gal EC formulation at 1x (the maximum registered single application rate); and (ii) harvested 7 days (the established PHI is 3 days) following six applications of the Mcap formulation using ground and aerial equipment at 1 lb ai/A/application (2x the maximum registered seasonal rate). Residues of methyl paraoxon and p-nitrophenol were <0.05(ND) and <0.10-2.88 ppm, respectively, in or on these same samples. The available Mcap formulation data pertaining to snap beans are inadequate to assess the established tolerance because no data were submitted reflecting a 1x application rate with a 3-day PHI. No data were submitted reflecting applications

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of the EC formulation at 0.5 lb ai/A/application with a 15-day PHI. The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season. In addition, the registrant(s) must propose separate tolerances for succulent beans, which must be supported by residue data.

The available dry bean residue data indicate that residues of methyl parathion in or on dry beans harvested 15-days following six foliar broadcast treatments using aerial and ground equipment of the 4 lb/gal EC formulation at 1x (the maximum registered single application rate) were <0.05(ND). Residues of methyl paraoxon and p-nitrophenol were <0.05(ND) and <0.1(ND)-0.60 ppm in or on these same samples. The registrant(s) must propose a label restrictions limiting the number of foliar applications per growing season and propose a separate tolerance for dry beans which must be supported by residue data.

The available processing residue data are inadequate to determine the potential for concentration of methyl parathion residues in cannery residue since whole beans did not bear measurable weathered residues prior to processing. However, data pertaining to bean vines will substitute for cannery residue data. No additional data pertaining to cannery residue are required.

Peas, dried and succulent

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on peas [40 CFR §180.121(a)].

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for multiple foliar applications to peas at 0.5 lb ai/A/application using ground or aerial equipment. Application to winter peas may not be made within 7 days of bloom or if bloom is evident in the area. A maximum seasonal rate of 1 lb ai/A/year is specified. A 10-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications to peas at 0.5 or 1 lb ai/A/application using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 10-day PHI has been established for applications made at 0.5 lb ai/A and a 15-day PHI for applications made at >0.5-1 lb ai/A. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and Platte Chemical

Company label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires the following: (i) data depicting residues of concern in or on dried and succulent peas following applications according to the maximum registered use pattern of D, WP, and EC formulations; (ii) label restrictions limiting the number of foliar applications permitted per growing season, which must be supported by the requested data; and (iii) the registrant(s) to propose separate tolerances for residues of methyl parathion in or on dried and succulent peas. In addition, the Guidance Document requires data depicting methyl parathion residues of concern in or on peas following ultra low volume applications. We note that the registrants submitting data do not hold registrations which include use of ultra low volume applications or currently hold registrations for the WP formulations; however, if any registrant wishes to support these uses, additional data are required. Since issuance of the Guidance Document the D formulation has been canceled.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41596207) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on dried and succulent peas. The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on dried and succulent peas harvested 10 or 15 days following four to six foliar broadcast treatments (total of 3.5-6 lb ai/A) with the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of p-nitrophenol were <0.05(ND)-0.37 ppm in or on these same samples.

The available data do not satisfy Guidance Document requirements for the following reasons: (i) no data were submitted from WA representing ca. 30% of the green pea production; (ii) no data were submitted from ID or WA, representing ca. 100% of the dried pea production; and (iii) the registrant(s) must propose a separate tolerance for residues in or on dried and succulent peas.

The following additional data are required:

- The registrant(s) must propose a label amendment limiting the number of foliar applications per season to peas, which must be supported by field residue data (the available data will support a maximum of six applications per season). Data depicting residues of methyl parathion and methyl paraoxon in or on dried and succulent peas harvested 10 and 15 days after the proposed number of applications of a EC formulation at 1 lb ai/A; for peas harvested 10 days posttreatment, the final treatment must be applied at 0.5 lb ai/A. Tests must reflect the use of ground and aerial equipment. Tests on dried peas must be conducted in WA(64%) and ID(36%), since these states accounted for ca. 100% of the 1988 U.S. production of dried peas (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989). Tests on succulent peas must be conducted in WA(29%) since this state, plus the data submitted in MRID 41596207 [DE(4%), MN(17%), and WI(17%)], account for ca. 80% of the 1988 U.S. production of green peas (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA June 1989, p. 42). In addition, the registrant(s) must propose separate tolerances for residues in or on dried and succulent peas.

References (used):

MRID(s): 41596207.

Discussion of the data:

Cheminova (1990; MRID 41596207) submitted data from 17 tests conducted in DE(7), MN(4), ND(2), and WI(4), depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on dried and succulent peas harvested 9-15 days following the last of four to six foliar broadcast applications using ground and aerial equipment with the 4 lb/gal EC formulation at 1 lb ai/A/application with the last application at 0.5 lb ai/A or all applications at 1 lb ai/A/application. Residues of methyl parathion and its metabolites are presented in the table below.

Total rate (lb ai/A)	PTI (days)	No. of samples	Residues (ppm) Methyl parathion	Methyl paraoxon	p-Nitrophenol
Dried Peas:					
3.5[a]	10	2	<0.05	<0.05	0.19, 0.21
5.5[b]	10	6	<0.05-0.16	<0.05	0.05-0.2
6[c]	10	2	<0.05	<0.05	<0.05, 0.09
4[d]	15	2	<0.05	<0.05	0.14
6	15	6	<0.05-0.18	<0.05	0.05-0.29
Control		9	<0.05	<0.05	<0.05-0.09
Succulent Peas:					
3.5	10	2	<0.05	<0.05	<0.05
4	10	2	<0.05, 0.08	<0.05	<0.05, 0.11
4.5[e]	9,10	4	<0.05	<0.05	<0.05
5.5	10	2	0.19, 0.21	<0.05	0.10, 0.18
6	15	2	0.60, 0.68	<0.05	0.21, 0.37
5[f]	14,15	4	<0.05	<0.05	<0.05
Control		7	<0.05	<0.05	<0.05

[a] Three applications at 1 lb ai/A/application followed by a fourth application at 0.5 lb ai/A.
[b] Five applications at 1 lb ai/A/application followed by a sixth application at 0.5 lb ai/A.
[c] Six applications at 1 lb ai/A/application.
[d] Four applications at 1 lb ai/A/application.
[e] Four applications at 1 lb ai/A/application followed by a fifth application at 0.5 lb ai/A.
[f] Five applications at 1 lb ai/A/application.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries from samples fortified with methyl parathion, methyl paraoxon, and p-nitrophenol at 0.05-5 are presented in the table below.

Commodity	Recovery (%)[a] Methyl parathion	Methyl paraoxon	p-Nitrophenol
Succulent Peas	76-102 (9)	81-110 (9)	78-117 (8)
Dried Peas	72-117 (8)	72-92 (8)	89-117 (7)

[a] Number in parentheses indicates the number of samples.

Samples were stored frozen (-1 to -20 C) for 191-353 days prior to analysis by Analytical Development Corporation. Storage

stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is inadequate since the test states of DE(4%), MN(17%), and WI(17%) accounted for ca. 40% of the 1988 U.S. green pea production (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA June 1989, p. 42) and the test states of DE, MN, and ND accounted for ca. 0% of the 1988 U.S. production of dried peas (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989). The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on dried and succulent peas harvested 10 and 15 days following up to six foliar broadcast treatments using aerial and ground equipment with the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of p-nitrophenol were <0.05(ND)-0.37 ppm in or on these same samples. The registrant(s) must propose separate tolerances for methyl parathion residues in or on dried and succulent peas, and propose a label restriction limiting the number of foliar applications per growing season which must be supported by residue data. Additional data are required.

Soybeans

Tolerance(s):

A tolerance of 0.1 ppm has been established for residues of methyl parathion in or on soybeans [40 CFR §180.121(a)].

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for two foliar applications to soybeans at 0.25-1 lb ai/A/application using ground or aerial equipment. A 20-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

The 4 lb/gal EC formulation is registered for multiple foliar application on soybeans at 0.375-1 lb ai/A/application using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 20-day PHI has been established. These use directions were obtained from the Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on soybeans following

applications according to the maximum registered use pattern of D and WP formulations. The Guidance Document also requires residue data pertaining to the processed products of soybeans. Since issuance of the Guidance Document the D formulation has been canceled. We note that the registrants submitting data do not currently hold registrations for WP formulations; however, if any registrant wishes to support use of this formulation, additional data are required.

In response to data requirements, Cheminova (1990; MRIDs 41379303 and 41517104) submitted field residue and processing data depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on soybeans and soybean processed commodities. The combined residues of methyl parathion and methyl paraoxon were nondetectable (<0.10 ppm) in or on soybeans harvested 14-15 days following two foliar broadcast treatments using ground equipment with the 4 lb/gal EC formulation at 0.5x the maximum registered single application rate. Residues of p-nitrophenol were nondetectable (<0.05 ppm) in or on these same samples. These data are inadequate to assess the established tolerance because no data reflected the maximum registered rate of 1 lb ai/A. The following additional data are required:

- The registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season or the maximum seasonal rate. Data depicting residues of methyl parathion and methyl paraoxon in or on soybeans harvested 15 days following the proposed number of foliar applications of an EC formulation at 1 lb ai/A/application. Tests must reflect the use of ground and aerial equipment. Tests must be conducted in AR(5%), IL(15%) [representing IN(8%)], IA(16%) [representing MN(8%), MO(7%), and NE(5%)], and OH(6%) since these states accounted for ca. 70% of the 1988 U.S. production of soybeans (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989).

The available processing residue data indicate that the combined residues of methyl parathion and methyl paraoxon concentrate ca. 3x in refined oil and ca. 4x in crude oil, but do not concentrate in hulls and meal. No data were submitted depicting residues in soapstock or grain dust processed from soybeans treated with methyl parathion. Pending submission of adequate field residue and storage stability data, the registrant(s) must propose a food additive tolerance for soybeans refined oil at 3x.

The following additional processing data are required:

- o A processing study depicting the potential for concentration of residues of methyl parathion and methyl paraoxon in soapstock and grain dust from the processing of soybeans bearing measurable, weathered residues. If residues concentrate in any product, an appropriate food/feed additive tolerance must be proposed. Following submission of adequate field residue and storage stability data, the registrant(s) must propose a food additive tolerance for the combined residues of methyl parathion and methyl paraoxon in soybeans refined oil at 3x.

References (used):

MRID(s): 41379303. 41517104.

Discussion of the data:

Cheminova (1990; MRID 41379303) submitted data from six tests conducted in GA(1), IL(1), IA(1), LA(1), MN(1), and NC(1) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on dry soybeans harvested 14 or 15 days following the last of two foliar broadcast applications using ground equipment with the 4 lb/gal EC formulation at 0.5 lb ai/A (0.5x the maximum registered rate). Residues of methyl parathion, methyl paraoxon, and p-nitrophenol were nondetectable (<0.05 ppm) in or on 12 samples of treated soybeans. Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol each were nondetectable (<0.05 ppm) in or on six untreated samples.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were: (i) 70-84% from seven samples fortified with methyl parathion at 0.05-5 ppm; (ii) 75-95% from seven samples fortified with methyl paraoxon at 0.05-5 ppm; and (iii) 72-89% from seven samples fortified with p-nitrophenol at 0.05-5 ppm. Samples were stored frozen (-10 to -30 C) for 292-387 days prior to analysis by Analytical Development Corporation. Storage stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Cheminova (1990; MRID 41517104) submitted processing studies conducted in IA and MO depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in the processed commodities of soybeans. Soybeans were harvested 15 days following the last of two foliar applications of the 4 lb/gal EC formulation at 2.5 lb ai/A/application (2.5x the

maximum registered single application rate) and processed according to simulated commercial procedures into hulls, meal, crude oil and refined oil. Residues of methyl parathion and its metabolites in various processed fractions are presented in the table below.

Commodity	Residues (ppm)[a]		
	Methyl Parathion	Methyl Paraoxon	P-Nitrophenol
IA			
Dry seed	0.15	<0.05	0.15
Hulls	0.12	<0.05	0.12
Meal	<0.05	<0.05	0.19
Crude oil	0.71	<0.10 (4x)	<0.10
Refined oil	0.57	<0.10 (3x)	<0.10
MO			
Dry seed	<0.05	<0.05	<0.05
Hulls	<0.05	<0.05	<0.05
Meal	<0.05	<0.05	<0.05
Crude oil	<0.10	<0.10	<0.10
Refined oil	<0.10	<0.10	<0.10

[a] Number in parentheses indicates concentration factor for the combined residues of methyl parathion and methyl paraoxon.

Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol each were nondetectable (<0.05 ppm) in or on two samples of untreated soybeans and each processed product. Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm for seed, hulls, and meal and 0.10 ppm for crude and refined oil. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries of methyl parathion, methyl paraoxon, and p-nitrophenol from samples fortified at 0.05-5 ppm are presented in the table below.

Commodity	Recovery (%)[a]		
	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Dry Seed	70, 76 (2)	71, 71	76, 87
Hulls	34-62 (5)	65-92	65-86
Meal	65-100 (7)	60-87	78-95
Crude Oil	85-94 (5)	89-96	54-69
Refined Oil	52-66 (5)	62-68	36-93

[a] Number in parentheses indicates the number of samples.

Samples were stored frozen (-10 to -30 C) for 400-435 days prior to analysis by Analytical Development Corporation. Storage

stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of GA(1%), IL(15%), IA(16%), LA(3%), MN(8%), and NC(2%) and the neighboring states of AL(1%), AR(5%), IN(8%), KS(3%), KY(2%), MS(3%), MO(7%), NE(5%), ND(1%), SC(1%), SD(1%), TN(2%), VA(1%), and WI(1%) accounted for ca. 90% of the 1988 U.S. soybeans production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). The combined residues of methyl parathion and methyl paraoxon were nondetectable (<0.10 ppm) in or on soybeans harvested 14-15 days following two foliar broadcast treatments using ground equipment with the 4 lb/gal EC formulation at 0.5x the maximum registered single application rate. Residues of p-nitrophenol were nondetectable (<0.05 ppm) in or on these same samples. These data are inadequate to assess the established tolerance because no data reflected the maximum registered rate of 1 lb ai/A. The available processing data indicate that methyl parathion residues concentrate ca. 3x in refined oil and ca. 4x in crude oil but do not concentrate in hulls and meal. No data were submitted depicting residues in soapstock and grain dust processed from soybeans treated with methyl parathion. Additional data are required.

Legume Vegetables Group, Foliage of

Beans, vines and hay

Tolerance(s):

Currently, no tolerances exist for residues of methyl parathion in or on beans, vines and hay.

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for multiple foliar applications to dry and succulent beans at 0.5-1 lb ai/A/application using aerial and ground equipment. A limit of three applications per growing season has been established for succulent beans; the maximum number of seasonal applications allowed for dry beans is not specified. PHIs of 3 and 15 days have been established for succulent beans and dry beans, respectively. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications to green and lima beans at 0.5-1.5 lb ai/A/application using ground and aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. Cheminova has

established a 15-day PHI for dry beans and a 21-day PHI for green and lima beans. Platte has established a 15-day PHI for applications at 0.5 lb ai/A and a 21-day PHI for applications >0.05 lb ai/A. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and the Platte Chemical Company label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on vines and hay of dry beans following applications according to the maximum registered use patterns of EC and WP formulations. The Guidance Document additionally requires registrant(s) to propose tolerances for residues in or on bean vines and hay, and a pregrazing interval for bean vines. We note that the registrant submitting data do not currently hold registrations for WP formulations; however, if any registrant wishes to support use of this formulation, additional data are required.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41517102) depicting residues of methyl parathion, and its metabolites methyl paraoxon, and p-nitrophenol in or on bean vines and hay. The combined residues of methyl parathion and methyl paraoxon were <0.10(ND)-1.17 ppm and <0.10(ND)-<0.71 ppm in or on bean vines harvested 15 and 21 days, respectively, following six foliar applications of the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of p-nitrophenol were 0.28-5.27 ppm in or on these same samples.

The combined residues of methyl parathion and methyl paraoxon were <0.10(ND)-3.84 ppm in or on bean hay harvested 15 days following the same treatment; residues of p-nitrophenol were 0.36-8.06 ppm in or on these same samples. Pending the submission of adequate storage stability data, the registrant(s) must propose tolerances for the combined residues of methyl parathion and methyl paraoxon in or on bean vines and hay. In addition, the registrant(s) must propose a label restriction limiting the number of foliar applications per growing season. The available data will support a label amendment to establish a maximum of six foliar applications/season and the proposal of 2 ppm tolerance and a 4 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on bean vines and hay, respectively.

The following actions must be taken:

- The registrant(s) must propose a label restriction limiting the number of foliar applications per growing season. Data are available to support a maximum of six foliar applications per season. The registrant(s) must propose tolerances for the combined residues of methyl parathion and methyl paraoxon in or on bean vines and hay. The available data would support the proposal of a 2 ppm tolerance for bean vines, and a 4 ppm tolerance for bean hay.

References (used):

MRID(s): 41517102.

Discussion of the data:

Cheminova (1990; MRID 41517102) submitted data from six tests conducted in CA(2), MI(1), NE(2), and ND(1), depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on dry bean vines harvested 0-28 days and dry bean hay harvested 15 days following the last of six foliar broadcast applications (using ground and aerial equipment) with the 4 lb/gal EC formulation at 1.5 lb ai/A/application (1x the maximum registered rate). Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PTI	No. of Samples	Residues (ppm) Methyl parathion and methyl paraoxon combined	p-Nitrophenol
Vines:				
Aerial	0	4	9.67-25.3	1.24-5.29
Ground	0	8	11.74-51.1	1.16-6.23
Aerial	7	4	<0.54-0.67	1.27-5.35
Ground	7	8	<0.17-3.13	1.01-4.71
Aerial	**15**	**4**	**<0.11-<0.23**	**0.28-1.92**
Ground	**15**	**8**	**<0.10-1.17**	**1.32-5.27**
Aerial	**21**	**4**	**<0.10-<0.16**	**0.45-1.84**
Ground	**21**	**8**	**<0.10-<0.71**	**0.69-4.12**
Aerial	28	4	<0.10-<0.14	0.42-1.22
Ground	28	8	<0.10-<0.53	0.80-6.69
Control		30	<0.10-<0.15	<0.10-0.12
Hay:				
Aerial	15	4	<0.10-3.84	0.33-5.88
Ground	15	8	<0.10-1.50	0.68-8.06
Control		6	<0.10-<0.12	<0.10-0.26

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries from samples fortified with methyl parathion at 0.05-5 ppm, methyl paraoxon at 0.05-1 ppm, and p-nitrophenol at 0.10-2 ppm are presented in the table below.

Commodity	Recovery (%)[a] Methyl parathion	Methyl paraoxon	p-Nitrophenol
Vines	70-118 (27)	71-104 (16)	67-130 (22)
Hay	76-110 (8)	87-102 (4)	76-118 (7)

[a] Number in parentheses indicates the number of samples.

Samples were stored frozen (-10 to -30 C) for 226-508 days prior to analysis by Biospherics Incorporated. Storage stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(15%), MI(12%), NE(20%), and ND(14%) and the neighboring states of CO(13%), KS(2%), MN(2%), and WY(4%) accounted for ca. 80% of the 1988 U.S. bean production (Ag. Statistics Board, NASS, USDA

Crop Database, Aug. 1989). The combined residues of methyl parathion and methyl paraoxon were <0.10-1.17 ppm and <0.10-<0.71 ppm in or on bean vines harvested 15 and 21 days, respectively, following six foliar applications of the 4 lb/gal EC formulation at 1x the maximum registered single application rate. The combined residues of methyl parathion and methyl paraoxon were <0.10-3.84 ppm in or on bean hay harvested 15 days following the same treatment. The registrant(s) must propose a tolerance for the combined residues or methyl parathion and methyl paraoxon in or on beans, vines, and beans, hay.

Peas, vines and hay

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on pea forage [40 CFR §180.121(a)]. No tolerance has been established for residues of methyl parathion in or on pea hay.

Note to SRRD: We recommend that the commodity designation "pea forage" in 40 CFR §180.121(a) be changed to "peas, vines," according to presently accepted commodity definitions.

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for multiple foliar applications to peas at 0.5 lb ai/A/application using ground or aerial equipment. Application to winter peas may not be made within 7 days of bloom or if bloom is evident in the area. A maximum seasonal rate of 1 lb ai/A/year is specified. A 15-day PHI has been established for forage cut for hay and a 15-day pregrazing interval is in effect. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications to peas at 0.5-1 lb ai/A/application using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. The established PHIs are 10 days for applications made at 0.5 lb ai/A and 15 days for applications made at >0.5-1 lb ai/A. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and Platte Chemical Company label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires the following: (i) data depicting methyl parathion residues of concern in or on pea vines and hay following applications according to the maximum registered use pattern of D, WP, and EC formulations; (ii) the registrant(s) to propose a tolerance for residues of methyl parathion in or on hay; (iii) label amendments limiting the number of foliar applications permitted per growing season; and (iv) data depicting methyl parathion residues of concern following use of the ultra low volume equipment. Since issuance of the Guidance Document the D formulation has been canceled. We note that the registrant submitting data do not currently hold registrations for use of ultra low volume equipment or use of the WP formulation; however, if any registrant wishes to support use of this formulation, additional data are required.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41596207) depicting residues of methyl parathion, and its metabolites methyl paraoxon, and p-nitrophenol in or on pea vines and hay. Tolerance-exceeding residues of methyl parathion (up to 58 ppm) were reported for pea vines (forage) harvested 10-15 days following up to six foliar broadcast treatments of the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of methyl paraoxon and p-nitrophenol were <0.05(ND)-0.52 ppm and 0.05-9.20 ppm, respectively in or on these same samples. The combined residues of methyl parathion and methyl paraoxon were <0.10(ND)-13.2 ppm in or on pea hay harvested 14-15 days following the same treatments; residues of p-nitrophenol were 0.16-3.4 ppm in or on these same samples.

The available data do not satisfy Guidance Document requirements because no data were submitted from WA representing ca. 30% of U.S. pea production and the available data were not supported by storage stability data. In addition, the registrant(s) must: (i) propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on pea hay; (ii) amend the product labels restricting the number of foliar applications per growing season; and (iii) propose a higher tolerance for pea vines or revise the product labels to reflect a reduction in the maximum single application rate and/or a longer PHI.

The following additional data are required:

- The registrant(s) must amend product labels specifying a maximum number of foliar applications per growing season or a maximum seasonal rate. Data depicting residues of methyl parathion and methyl paraoxon in or on pea vines and hay harvested 15 days following the last of the proposed number of applications at 1 lb ai/A/application. Tests must reflect the use of ground and aerial equipment. Tests must be conducted in WA(29%); this state along with DE(4%), MN(17%), ND(0%), and WI(17%) where data are available accounted for ca. 70% of the 1988 U.S. green pea production (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA June 1989, p. 42). In addition, the registrant(s) must propose a higher tolerance for pea vines or revise product labels to reflect a reduction in the maximum single application rate and/or a longer PHI. Product label and tolerance amendments must be supported by adequate field residue data. Following the submission of adequate field residue data, the registrant(s) must propose a tolerance for residues of methyl parathion in or on pea hay. Alternatively, the registrant(s) may propose a restriction against the grazing of pea vines and hay.

References (used):

MRID(s): 41596207.

Discussion of the data:

Cheminova (1990; MRID 41596207) submitted data from 16 tests conducted in DE(6), MN(4), ND(2), and WI(4), depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on pea vines and hay harvested 0-26 days following the last of four to six foliar broadcast applications (using ground and aerial equipment) with the 4 lb/gal EC formulation at 1 lb ai/A/application with the last application at 0.5 lb ai/A or all applications at 1 lb ai/A/application. Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PTI	No. of Samples	Residues (ppm) Methyl parathion and methyl paraoxon combined	p-Nitrophenol
Vines:				
Aerial	0	8	<0.10-53.6	<0.05-4.1
Ground	0	24	2.15-45.8	0.07-4.6
Aerial	5,6	8	<0.10-58.0	<0.05-5.5
Ground	5	24	<0.10-14.8	0.07-6.5
Aerial	**10**	**8**	**<0.10-18.4[a]**	**0.07-2.6**
Ground	**9,10**	**24**	**<0.10-10.7[b]**	**0.08-7.4**
Aerial	**15**	**8**	**<0.10-58.5[c]**	**0.05-7**
Ground	**14,15**	**24**	**<0.10-9.71[d]**	**0.07-9.2**
Aerial	20	8	<0.10-14.5	0.08-2.7
Ground	19,20	24	<0.10-6.31	0.16-5.7
Aerial	25	8	<0.10-<6.85	<0.05-1.8
Ground	24-26	24	<0.10-<8.25	0.11-4.1
Control		53	<0.10-<3.15[e]	<0.05-1.1
Hay:				
Aerial	10	6	<0.10-27.2	0.18-2.4
Ground	9,10	14	<0.10-3.18	0.36-2.8
Aerial	15	4	<0.10-<0.53	0.16-0.31
Ground	14-15	10	<0.20-13.2	0.55-3.4
Control		16	<0.10-<0.95[f]	<0.05-0.62

[a] Includes two samples bearing tolerance-exceeding residues of methyl parathion (15.3 and 18.2 ppm).
[b] Includes 12 samples bearing tolerance-exceeding residues of methyl parathion (1.4-10.4 ppm).
[c] Includes two samples bearing tolerance-exceeding residues of methyl parathion (35.4 and 58 ppm).
[d] Includes 12 samples bearing tolerance-exceeding residues of methyl parathion (2.40-9.50 ppm).
[e] Includes six untreated samples bearing detectable residues of methyl parathion (0.19-3.1 ppm).
[f] Includes four untreated samples bearing detectable residues of methyl parathion (0.25-0.90 ppm).

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries from vine samples fortified at 0.05-60 ppm and hay samples fortified at 0.05-24 ppm with methyl parathion, methyl paraoxon, and p-nitrophenol are presented in the table below.

Commodity	Recovery (%)[a] Methyl parathion	Methyl paraoxon	p-Nitrophenol
Vines	71-112 (49)	70-120 (50)	65-121 (39)
Hay	70-194 (15)	70-116 (17)	81-118 (12)

Samples were stored frozen (-1 to -20 C) for 191-353 days prior to analysis by Analytical Development Corporation. Storage stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is inadequate since the test states of DE(4%), MN(17%), ND(0%), and WI(17%) accounted for ca. 40% of the 1988 U.S. green pea production (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA June 1989, p. 42). Tolerance-exceeding residues (up to 58 ppm) were reported for pea vines harvested 10-15 days following up to six foliar broadcast treatments with the 4 lb/gal EC formulation at 1x the maximum registered single application rate. The combined residues of methyl parathion and methyl paraoxon were <0.10(ND)-13.2 ppm in or on pea hay harvested 14-15 days following the same treatments. The registrant(s) must: (i) propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on pea hay; (ii) amend the product labels restricting the number of foliar applications per growing season; and (iii) revise the product labels to reflect a reduction in the maximum single application rate, a longer the PHI, and/or propose a higher tolerance for pea vines. Additional data are required.

Soybeans, forage and hay

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on soybean hay [40 CFR §180.121(a)]. No tolerance has been established for residues of methyl parathion in or on soybean forage.

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for two foliar applications to soybeans at 0.25-1 lb ai/A/application using ground or aerial equipment. A 20-day PHI and pregrazing interval is in effect. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

The 4 lb/gal EC formulation is registered for multiple foliar application on soybeans at 0.375-1 lb ai/A/application using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 20-day PHI and pregrazing interval is in effect. These use directions were obtained from the Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on soybean hay and straw following applications according to the maximum registered use pattern of D, EC, and Mcap formulations. The Guidance Document also requires registrants to propose tolerances for residues of methyl parathion in or on soybean forage and straw, and label modifications specifying a pregrazing interval for forage. Current Agency policy no longer requires data for soybean straw; however data are required for soybean forage and hay. Since issuance of the Guidance Document the D formulation has been canceled. We note that the registrant submitting data does not currently hold registrations for WP formulations; however, if any registrant wishes to support use of this formulation, additional data are required.

In response to data requirements, Pennwalt submitted field residue data (1990; MRID 41560003) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol. Tolerance-exceeding residues of methyl parathion (up to 12 ppm) were reported for soybean hay harvested 15 days following two foliar broadcast treatments with the 2 lb/gal Mcap formulation at 1x the maximum registered single application rate. Residues of methyl paraoxon and p-nitrophenol were <0.05(ND)-0.05 ppm and 0.06-0.23 ppm, respectively in or on these same samples. The combined residues of methyl parathion and methyl paraoxon were <0.47-12.9 ppm in or on soybean forage harvested 15 days following the same treatment; residues of p-nitrophenol were 0.06-0.79 ppm in or on these same samples.

The available data do not satisfy Guidance Document requirements for the following reasons: (i) no data were submitted reflecting use of the EC formulation; (ii) no data reflected the established PHI following applications of the Mcap formulation; and (iii) no storage stability data were submitted to support the available data. In addition, the registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on soybean forage and propose label restrictions limiting the number of foliar applications per growing season.

The following additional data are required:

- The registrant(s) must propose label amendments limiting the maximum number of foliar applications per growing season or the maximum seasonal rate. Data depicting residues of methyl parathion and methyl paraoxon in or on soybean forage and hay harvested 20 days following the proposed maximum number of applications of the EC and Mcap formulations at 1 lb ai/A/application. Tests with the EC formulation must reflect the use of ground and aerial equipment. Tests must be conducted in AR(5%), IL(15%) [representing IN(8%)], IA(16%) [representing MN(8%), MO(7%), and NE(5%)], and OH(6%) since these states accounted for ca. 70% of the 1988 U.S. production of soybeans (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989). Upon submission of adequate residue data, the registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on soybean forage. Alternatively, the registrant(s) may propose a restriction against the grazing of soybean forage and hay.

References (used):

MRID(s): 41560003.

Discussion of the data:

Pennwalt (1989; MRID 41560003) submitted data from eight tests conducted in GA(1), IL(2), IA(2), LA(1), MN(1), and NC(1) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on soybean forage and hay harvested 15 days (16 days in one study) following the last of two foliar broadcast applications (using ground and aerial equipment) with the 2 lb/gal Mcap formulation at 1 lb ai/A/application. Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PTI	No. of Samples	Residues (ppm) Methyl parathion and methyl paraoxon combined	p-Nitrophenol
Forage:				
Aerial	15	4	<2.48-12.9	0.21-0.79
Ground	15	4	<0.47-<3.15	0.06-0.59
Control		4	<0.10,<0.15	<0.05,0.06
Hay:				
Aerial	15	4	<0.39-12.3[a]	0.15-1.01
Ground	15	4	<0.47-2.94[b]	0.06-0.23
Control		4	<0.10-<0.66	<0.05-0.08

[a] Includes three samples bearing tolerance-exceeding residues of methyl parathion (4.04-12.0 ppm).
[b] Includes one sample bearing tolerance-exceeding residues of methyl parathion (2.89 ppm).

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method (Pennwalt method BR-007-00) with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method (Pennwalt method BR-007-00) with a detection limit of 0.05 ppm. Recoveries from samples fortified with methyl parathion, methyl paraoxon, and p-nitrophenol at 0.05-10 ppm are presented in the table below.

Commodity	Recovery (%)[a] Methyl parathion	Methyl paraoxon	p-Nitrophenol
Forage	83, 93 (2)	82-103 (3)	57-78 (4)
Hay	70-100 (3)	69-119 (3)	64, 93 (2)

[a] Number in parentheses indicates number of samples.

Samples were stored frozen (-15 C) for 265-403 days prior to analysis by Huntington Analytical Services. Storage stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of GA(1%), IL(15%), IA(16%), LA(3%), MN(8%), and NC(2%) and the neighboring states of AL(1%), AR(5%), IN(8%), KS(3%), KY(2%), MO(7%), MS(3%), NE(5%), ND(1%), SC(1%), SD(1%), TN(2%), VA(1%), and WI(1%) accounted for ca. 90% of the 1988 U.S. soybean production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). Tolerance-exceeding residues (up to 12 ppm) were reported for soybean hay harvested 15 days following two foliar broadcast treatments with the 2 lb/gal Mcap formulation at 1x the maximum

registered single application rate. The combined residues of methyl parathion and methyl paraoxon were <0.47-12.9 ppm in or on soybean forage harvested 15 days following the same treatment. The available data do not satisfy Guidance Document requirements for the following reasons: (i) no data were submitted reflecting use of the EC formulation; (ii) no data reflected the established PHI following applications of the Mcap formulation; and (iii) no storage stability data were submitted to support the available data. Additional data are required.

Small Fruits and Berries Group

Grapes

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on grapes [40 CFR §180.121(a)].

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for multiple foliar applications to grapes at 1-3 lb ai/A/application, using ground or aerial equipment. A 14-day PHI is in effect. The maximum number of applications allowed per growing season is not specified. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications to grapes at up to 0.75 lb ai/A (0.25-1 lb ai/100 gal), with ground or aerial equipment. A 14-day PHI is in effect. The maximum number of applications allowed per growing season is not specified. These use directions were obtained from a Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires: (i) data depicting residues of concern in or on grapes following applications according to the maximum registered use patterns of the Mcap formulation; (ii) the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data; and (iii) data reflecting residues of concern in the processed products of grapes.

In response to data requirements, Pennwalt Corporation submitted field residue and processing data (1990; MRIDs 41457902 and 41457903) depicting residues of methyl parathion, and its

metabolites methyl paraoxon and p-nitrophenol in or on grapes. Tolerance-exceeding residues of methyl parathion (up to 14 ppm) were reported for grapes harvested 14 days following the last of four foliar applications of the 2 lb/gal Mcap formulation at 1x the maximum registered single application rate; combined residues of methyl parathion and methyl paraoxon were 0.74-15.9 ppm. Residues of p-nitrophenol were 0.1-1.2 ppm in or on these same samples. The registrant(s) must propose a higher tolerance or make revisions to the product label for the 2 lb/gal Mcap formulation (EPA Reg. No. 4581-292) to lengthen the established PHI and propose label restrictions limiting the maximum seasonal application rate or a maximum number of applications per season.

The available processing data indicate that the combined residues of methyl parathion and methyl paraoxon do not concentrate in wet pomace, dry pomace, raisins, raisin waste, or juice. Pending the submission of adequate storage stability data, these data adequately satisfy Guidance Document requirements for processing studies. The following additional actions must be taken:

- The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate, supported by appropriate residue data.

- The registrant(s) must propose a higher tolerance for grapes. Alternatively, the registrant(s) may amend the product label to reduce the application rate and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data.

References (used):

MRID(s): 41457902. 41457903.

Discussion of the data:

Pennwalt Corporation (1990; MRID 41457902) submitted data from three tests conducted in CA depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on grapes harvested 14 days following the last of four foliar applications (using ground and aerial equipment) with the 2 lb/gal Mcap formulation at 3 lb ai/A/application (1x the maximum registered single application rate). Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	No. of Samples	Residues (ppm) Methyl parathion and methyl paraoxon combined	P-Nitrophenol
Ground	8	5.2-15.9	0.38-1.2
Aerial	4	0.74-4.6[a]	0.1-0.39
Control	3	<0.10	<0.05

[a] Includes two samples bearing tolerance-exceeding residues of methyl parathion (1.6 and 4.3 ppm).

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method (Pennwalt method BR-007-00) with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method (Pennwalt method BR-007-00) with a detection limit of 0.05 ppm. Recoveries were: (i) 98-126% from 20 samples fortified with methyl parathion at 0.05-25 ppm; (ii) 66-130% from 20 samples fortified with methyl paraoxon at 0.05-5 ppm; and (iii) 65-150% from 20 samples fortified with p-nitrophenol at 0.05-5 ppm. Samples were stored frozen (ca. -15 C) for 173-208 days prior to analysis by EN-CAS Analytical Laboratories. Storage stability data reflecting these intervals have not been submitted for residues of methyl parathion and its metabolites.

Pennwalt Corporation (1990; MRID 41457903) submitted a processing study conducted in NY depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in the processed commodities of grapes. Grapes were harvested 14 days following the last of four foliar applications of the 2 lb/gal Mcap formulation at 15 lb ai/A/application (5x the maximum registered single application rate). A grape sample bearing methyl parathion residues of 158 and 172 ppm (average of 165 ppm) was processed according to simulated commercial procedures into wet pomace, dry pomace, raisin, raisin waste, and juice. Residues of methyl parathion and its metabolites in various processed fractions (one sample each) are presented in the table below.

Commodity	Residues (ppm)	
	Methyl parathion and methyl paraoxon combined	P-Nitrophenol
Whole grapes	179[a]	11
Wet pomace	61.3	10
Dry pomace	180	19
Raisin	6.9	3
Raisin waste	10.3	4.6
Juice	5.2	0.57

[a] Average of two analyses: 172 and 186 ppm.

Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol each were nondetectable (<0.05 ppm) in or on a composite untreated sample of each processed commodity. Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method (Pennwalt method BR-007-00) with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method (Pennwalt method BR-007-00) with a detection limit of 0.05 ppm. Recoveries of processed samples fortified at 0.05-100 ppm with methyl parathion, 0.05-25 ppm with methyl paraoxon, and 0.05-25 ppm with p-nitrophenol are presented in the table below.

Commodity	Recovery (%)[a]		
	Methyl Parathion	Methyl Paraoxon	P-Nitrophenol
Whole grapes	98-120 (9)	84-114 (9)	65-120 (8)
Wet pomace	81-126 (12)	56-144 (12)	98-133 (12)
Dry pomace	85-120 (8)	46-106 (8)	56-201 (8)
Raisin	80-132 (12)	77-124 (12)	60-134 (13)
Raisin waste	72-100 (8)	56-97 (8)	64-177 (8)
Juice	94-132 (12)	92-140 (12)	60-132 (13)

[a] Sample number indicated in parentheses.

Samples were stored frozen (ca. -15 C) for 180-259 days prior to analysis by EN-CAS Analytical Laboratories. Storage stability data reflecting these intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(92%) and NY(3%) accounted for ca. 100% of the 1987 U.S. grape production (Agricultural Statistics Board, NASS, USDA Crop Database, Jan. 1988). Tolerance-exceeding residues (up to 14 ppm) were reported for grapes harvested 14 days following the last of four foliar applications of the 2 lb/gal Mcap formulation at 1x the maximum registered single application rate; combined

residues of methyl parathion and methyl paraoxon were 0.74-15.9 ppm. Residues of p-nitrophenol were 0.1-1.2 ppm in or on these same samples. The registrant(s) must propose a revised tolerance or revisions to the product label for its 2 lb/gal Mcap formulation (EPA Reg. No. 4581-292) to lengthen the established PHI and/or propose label restrictions limiting the maximum seasonal application rate or a maximum number of applications per season. The available processing data indicate that residues of methyl parathion and methyl paraoxon do not concentrate in wet pomace, dry pomace, raisins, raisin waste, or juice. Pending the submission of adequate storage stability data, these data adequately satisfy Guidance Document requirements for processing studies.

Cereal Grains Group

Corn, field, grain, and sweet (K+CWHR)

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on corn [40 CFR §180.121(a)].

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for multiple foliar applications to field and sweet corn at 0.25-1 lb ai/A/application. Applications may be made beginning at the onset of damage at 10- to 14-day intervals using ground equipment or in a minimum of 0.5 gal of total spray/A using low volume aerial equipment. The established PHIs are 3 days for sweet corn and 12 days for field corn. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

The 45.5% EC (4 lb/gal) formulation is registered for multiple broadcast foliar applications to corn at 0.25-0.5 lb ai/A/application, using ground or aerial equipment. A 12-day PHI has been established. These use directions were obtained from the Platte Chemical product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 concludes that the previously submitted data are sufficient and adequate to support a 1 ppm tolerance for residues of methyl parathion in or on sweet corn (kernels plus cob with husk removed; K+CWHR) harvested 3 days after multiple applications at 1 lb ai/A/application. However, the registrant(s) must propose a tolerance for residues of methyl parathion in or on sweet corn

(K+CWHR) per se; additionally, label restrictions limiting the number of foliar applications allowed per season and limiting the application interval to 2 to 7 days are required.

The Guidance Document also specifies the following requirements for field corn: (i) data depicting methyl parathion residues of concern in or on field corn grain following applications according to the maximum registered use patterns of the Mcap and EC formulations; (ii) the registrant(s) must propose a tolerance for residues of methyl parathion in or on field corn grain per se; (iii) data reflecting residues of concern in the processed products of field corn grain, including crude and refined oil; and (iv) the registrant(s) must propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data.

In response, Cheminova (1990; MRID 41717805) submitted data depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on sweet corn. The available field residue data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance for corn in or on sweet corn (K+CWHR) harvested 3 days following the last of six foliar applications of the 4 lb/gal EC formulation at 1 lb ai/A/application. Residues of p-nitrophenol were nondetectable (<0.10 ppm) in or on these same samples. We note that one sample bore methyl parathion residues of 16.5 ppm; upon reanalysis, residues were nondetectable (<0.05 ppm). The following requirements remain outstanding for sweet corn:

- The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on sweet corn (K+CWHR); the available data would support proposal of a 1 ppm tolerance for sweet corn (K+CWHR). Additionally, the registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season and/or the maximum seasonal rate. The available data will support a maximum of six foliar applications per season.

In response to data requirements, Cheminova (1990; MRID 41717803) and Pennwalt (1990; MRID 41560002) submitted field residue depicting residues of methyl parathion and its metabolites, methyl paraoxon and p-nitrophenol in or on field corn grain. Pending submission of adequate storage stability data, the available field residue data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on field corn grain harvested 12 days following the last of six foliar applications of the 4 lb/gal EC formulation or five foliar applications of the 2 lb/gal Mcap formulation at 1x the maximum registered single application rate. Residues of p-nitrophenol were nondetectable (<0.10 ppm) in or on

these same samples. The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on field corn grain. The registrant(s) must also amend product labels specifying a maximum number of applications per season and/or a maximum seasonal rate.

Cheminova also submitted (1990; MRID 41717804) data depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol, in the processed commodities of field corn. Pending submission of adequate storage stability data, the available processing data indicate that the combined residues of methyl parathion and methyl paraoxon do not concentrate in grits, meal, flour, starch, and crude and refined oil from the wet and dry milling of field corn grain. The following action must be taken:

- The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on field corn grain; the available data would support the proposal of a 1 ppm tolerance for field corn grain. In addition, the registrant(s) must propose label restrictions limiting the number of applications per growing season, which must be supported by the residue data. The available data support six applications of the EC formulation per season and five applications of the Mcap formulation per season at 1 lb ai/A/application.

References (used):

MRID(s): 41560002. 41717803. 41717804. 41717805.

References (not used):

[The following reference(s) contain duplicate information.]

MRID(s): 41596202. 41596208.

Discussion of the data:

Corn, sweet (K+CWHR): Cheminova (1990; MRIDs 41596208 and 41717805) submitted data from seven tests conducted in the states of CA(2), FL(1), NY(1), TX(1), WA(1), WI(1) depicting residues of methyl parathion and its metabolites, methyl paraoxon and methyl p-nitrophenol, in or on sweet corn (K+CWHR) harvested 3 days following the last of six foliar applications using ground and aerial equipment at 3-day intervals of the 4 lb/gal EC formulation at 1 lb ai/A/application (2x the maximum registered single application rate). Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PHI	No. of Samples	Residues (ppm) Methyl parathion	Methyl paraoxon	p-Nitrophenol
Ground	3	6	<0.05-0.09	<0.05	<0.10
Aerial	3	8	<0.05-16.5[a]	<0.05-0.33[a]	<0.10-2.13[a]
Control		7	<0.05	<0.05	<0.10

[a] Includes one sample bearing tolerance-exceeding methyl parathion residues of 16.5 ppm and methyl paraoxon residues of 0.33 ppm. Reanalysis of this sample resulted in residues of methyl parathion, methyl paraoxon, and p-nitrophenol of <0.05, <0.05, and <0.10 ppm, respectively.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were: (i) 87-121% from nine samples fortified with methyl parathion at 0.05-1 ppm; (ii) 65-127% from nine samples fortified with methyl paraoxon at 0.05-1 ppm; (iii) 69-126% from nine samples fortified with p-nitrophenol at 0.1-1 ppm. Samples were stored frozen (ca. -20 to -30 C) for 77-431 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(3%), FL(8%), NY(6%), TX(<0.5%), WA(14%), and WI(19%) and the neighboring states of ID(5%), IL(4%), MA(1%), MI(1%), MN(17%), NJ(1%), OR(11%), and PA(1%) accounted for ca. 90% of the 1988 U.S. production of sweet corn (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989). Pending the submission of adequate storage stability data, the available field residue data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on sweet corn harvested three days following the last of six foliar applications of the 4 lb/gal EC formulation at 2x (the maximum registered single application rate). However, one sample bore methyl parathion residues of 16.5 ppm; upon reanalysis, residues were nondetectable (<0.05 ppm). The registrant(s) needs to provide additional information regarding this high residue value. Residues of p-nitrophenol were nondetectable (<0.10 ppm) in or on these same samples. The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on sweet corn (K+CWHR), as well as label restrictions limiting the number of foliar applications allowed per season and limiting the application interval to 2 to 7 days. Additional data are required.

Corn, field, grain: Pennwalt Corporation (1990; MRID 41560002) submitted data from 13 tests conducted in CA(2), GA(1), IL(2), IN(2), IA(1), MN(1), NE(1), OH(1), TX(1), and VA(1) depicting residues of methyl parathion and its metabolites, methyl paraoxon and p-nitrophenol, in or on field corn grain harvested 12 days following the last of five foliar applications using ground, aerial, and chemigation equipment with the 2 lb/gal Mcap formulation at 1 lb ai/A/application (1x the maximum registered single application). Residues of methyl parathion and its metabolites are presented in the table below.

			Residues (ppm)		
Equipment	PHI	No. of Samples	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Ground	12	10	<0.05	<0.05	<0.05
Aerial	12	7	<0.05-0.21	<0.05	<0.05
Chemig.	12	2	<0.05	<0.05	<0.05
Control		4	<0.05	<0.05	<0.05

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method (Pennwalt method BR-007-00) with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method (Pennwalt method BR-007-00) with a detection limit of 0.05 ppm. Recoveries were as follows: (i) 94-132% from eight samples fortified with methyl parathion at 0.05-0.5 ppm; (ii) 97-153% from eight samples fortified with methyl paraoxon at 0.05-0.5 ppm; (iii) 61-100% from seven samples fortified with p-nitrophenol at 0.05-0.5 ppm. Samples were stored frozen (ca. -20 C) for 273-583 days prior to analysis by Huntingdon Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Cheminova (1990; MRID 41717803) submitted data from 22 tests conducted in CA(2), GA(2), IL(2), MN(2), MO(1), NE(2), OH(4), TX(5), and VA(2) depicting residues of methyl parathion and its metabolites, methyl paraoxon and p-nitrophenol, in or on field corn grain harvested 12 days following the last of six foliar applications using ground equipment with the 4 lb/gal EC formulation at 1 lb ai/A/application (1x). Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PHI	No. of Samples	Residues (ppm) Methyl parathion	Methyl paraoxon	p-Nitrophenol
Ground	12	19	<0.05-0.09	<0.05	<0.10
Aerial	12	4	<0.05	<0.05	<0.10
Control		12	<0.05	<0.05	<0.10

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were as follows: (i) 63-121% from 16 samples fortified with methyl parathion at 0.05-1 ppm; (ii) 68-131% from 15 samples fortified with methyl paraoxon at 0.05-1 ppm; (iii) 61-124% from 15 samples fortified with p-nitrophenol at 0.1-1 ppm. Samples were stored frozen (ca. -20 C) for 127-440 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Cheminova (1990; MRID 41717804) also submitted data from two tests conducted in MO and TX depicting residues of methyl parathion and its metabolites, methyl paraoxon and p-nitrophenol, in the processed commodities of field corn grain harvested 12 days following the last of six foliar applications using ground equipment with the 4 lb/gal EC formulation at 5 lb ai/A/application (10x the maximum registered single application rate for the EC formulation). The grain was processed according to simulated commercial procedures. The grain was dry milled into large, medium, and small grits; coarse meal; meal; flour; crude oil, and refined oil. The grain was also wet milled into starch, crude oil, and refined oil. Residues of methyl parathion and its metabolites in various processed fractions are presented in the table below.

Commodity	No. of Samples	Residues (ppm)[a] Methyl parathion and methyl paraoxon combined	p-Nitrophenol
Whole grain	3	<0.10-<0.63	<0.10
Coarse meal	2	<0.10,<0.32	<0.10
Meal	2	<0.10,<0.31	<0.10
Flour	2	<0.10,<0.29	<0.10
Large grits	2	<0.10,<0.17	<0.10
Medium grits	2	<0.10,<0.16	<0.10
Small grits	2	<0.10,<0.48	<0.10
Starch	2	<0.10	<0.10
Crude oil	4	<0.10-<0.82 (1.3x)	<0.10
Refined oil	4	<0.10-<0.65 (1x)	<0.10

[a] Number in parentheses indicates concentration factor.

Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol were nondetectable (<0.05, <0.05, and <0.10 ppm, respectively), in or on three samples of untreated grain and in two samples of each commodity processed from untreated grain. Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were as follows: (i) 67-122% from 15 samples fortified with methyl parathion at 0.05-1 ppm; (ii) 70-124% from 14 samples fortified with methyl paraoxon at 0.05-1 ppm; (iii) 69-109% from 14 samples fortified with p-nitrophenol at 0.1-1 ppm. Samples were stored frozen (ca. -20 to -30 C) for 78-462 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(1%), GA(1%), IL(14%), MN(7%), MO(3%), NE(17%), OH(5%), TX(3%), and VA(<0.5%) and the neighboring states of CO(3%), IN(8%), IA(18%), KS(3%), KY(2%), MD(1%), MI(2%), NC(2%), PA(1%), SD(3%), TN(1%), and WI(3%) accounted for ca. 100% of the 1988 U.S. corn grain production (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989). Pending submission of adequate storage stability data, the available field residue data indicate that residues of the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on field corn grain harvested 12 days following the last of six foliar applications of the 4 lb/gal EC formulation or five foliar applications of the 2 lb/gal Mcap formulation at 1x the maximum registered single application rate. Residues of p-nitrophenol were nondetectable (<0.10 ppm) in or on these same samples. The registrant(s) must propose a tolerance for the combined residues

of methyl parathion and methyl paraoxon in or on field corn grain. The registrant(s) must also amend product labels specifying a maximum number of applications per season and/or a maximum seasonal rate. Pending submission of adequate storage stability data, the available processing data indicate that the combined residues of methyl parathion and methyl paraoxon and residues of p-nitrophenol do not concentrate in coarse meal, meal, flour, large grits, medium grits, small grits, starch, and crude and refined oils.

Rice, grain

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on rice [40 CFR §180.121(a)].

Use directions and limitations:

The 2 lb/gal Mcap and 45.5% EC (4 lb/gal) formulations are registered for multiple foliar applications to rice at 0.25-0.75 lb ai/A/application, using aerial or ground equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 15-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI and the Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires: (i) data depicting residues of concern in or on rice grain following aerial applications according to the maximum registered use patterns of Mcap, WP, and EC formulations; (ii) data depicting residues of concern in the milled fractions of rice; and (iii) the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the required residue data. We note that the registrant submitting data do not currently hold registrations for the WP formulations; however, if any registrant wishes to support use of this formulation, additional data are required.

In response to data requirements, Cheminova (1990; MRID 41379307) and Pennwalt (1990; MRID 41560004) submitted field residue data depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on rice grain. The available data indicate that the established tolerance may be too low. Residues of methyl parathion exceeded the tolerance (up to 2.35 ppm) in or on rice grain harvested 15 days following the last of six foliar applications of the 2 lb/gal Mcap and 4 lb/gal

EC formulations at 1x the maximum registered single application rate. Residues of methyl paraoxon and p-nitrophenol were 0.08-1.28 ppm and 0.18-0.49 ppm, respectively, in or on these same samples.

The registrant(s) must amend product labels to specify a maximum seasonal application rate or a maximum number of applications per season. The registrant(s) must propose a higher tolerance for rice grain; alternatively, the registrant(s) may amend product labels to specify a reduced application rate and/or an increased PHI. Pending submission of adequate storage stability data, the available data will support a label amendment to establish a maximum of six applications/season and a proposal of a 5 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon. The following action must be taken:

- The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate, supported by appropriate residue data. The available data support a maximum of six applications per season.

- The registrant(s) must propose a higher tolerance for rice grain; the available data would support the proposal of a 5 ppm tolerance for rice grain. Alternatively, the registrant(s) may amend product label(s) to reduce the application rate and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data.

Cheminova also submitted (1990; MRID 41596205) data depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol, in the processed commodities of rice. The available processing data indicate that the combined residues of methyl parathion and methyl paraoxon concentrate up to 5x in rice hulls, but not in polished rice or bran. Following submission of adequate field residue and storage stability data, the registrant(s) must propose a feed additive tolerance for rice hulls at 5x. The following action must be taken:

- Following the submission of adequate field residue and storage stability data, a feed additive tolerance must be proposed for the combined residues of methyl parathion and methyl paraoxon in rice hulls at 5x.

References (used):

MRID(s): 41379307. 41560004. 41596205.

Discussion of the data:

Cheminova (1990; MRID 41379307) submitted data from four tests conducted in AR(1), CA(1), LA(1), and TX(1) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol, in or on rice grain harvested 15 days following the last of six foliar broadcast applications using aerial equipment of the 4 lb/gal EC formulation at 0.8 lb ai/A/application (ca. 1x the maximum registered single application rate). Residues of methyl parathion and its metabolites are presented in the table below.

			Residues (ppm)		
Equipment	PHI	No. of Samples	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Aerial	15	8	0.18-2.35[a]	0.08-0.17	0.18-1.07
Control		4	<0.05-0.34	<0.05	<0.05-0.22

[a] Includes two samples bearing tolerance-exceeding residues (2.15 and 2.35 ppm).

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were 93-108% from 10 samples fortified at 0.05-5 ppm with methyl parathion and were 102-131% and 80-124%, respectively from nine samples fortified with methyl paraoxon and p-nitrophenol at 0.05-5 ppm. Samples were stored frozen (ca. -20 C) for 219-459 days prior to analysis by Huntingdon Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Pennwalt Corporation (1990; MRID 41560004) submitted data from four tests conducted in AR(1), CA(1), LA(1), and TX(1) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on rice grain harvested 15 days following the last of six foliar broadcast applications, using aerial equipment, with the 2 lb/gal Mcap formulation at 0.75 lb ai/A/application (1x the maximum registered single application rate). The residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PHI	No. of Samples	Residues (ppm) Methyl parathion	Methyl paraoxon	p-Nitrophenol
Aerial	15	7	0.28-2.04[a]	0.26-1.28	0.18-0.49
Control		4	<0.05-0.25	<0.05-0.06	0.06-0.15

[a] Includes four samples bearing tolerance-exceeding residues (1.67-2.04 ppm).

Methyl parathion and methyl paraoxon residue data were collected using a GLC/NPD method (Pennwalt method BR-007-00) with detection limits of 0.05 ppm. p-Nitrophenol data were also collected using a GLC/NPD method with a detection limit of 0.05 ppm; matrix interference prevented the use of the HPLC-UV method usually employed. Although the registrant stated that residues of p-nitrophenol determined using this method should be corrected for residues of methyl paraoxon, residues reported above are uncorrected. Recoveries were: (i) 101-111% from seven samples fortified with methyl parathion at 0.05-10 ppm; (ii) 83-117% from seven samples fortified with methyl paraoxon at 0.05-10 ppm; and (iii) 104-183% from nine samples fortified with p-nitrophenol at 0.05-10 ppm. Samples were stored frozen (ca. -30 C) for 173-399 days prior to analysis by Colorado Analytical Research & Development Corporation. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Cheminova (1990; MRID 41596205) submitted data from two processing studies conducted in CA and TX depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol, in the processed commodities of rice. Rice grain was harvested 15-16 days following the last of six foliar applications using ground equipment with the 4 lb/gal EC formulation at ca. 4 lb ai/A/application (ca. 5x the maximum registered single application rate). Rice grain samples bearing methyl parathion residues of 2.04 ppm and 17.36 ppm were processed according to simulated commercial procedures into brown rice, hulls, polished rice, and bran. Residues of methyl parathion and its metabolites in various processed fractions are presented below.

Commodity	Residues (ppm)[a] Methyl parathion and methyl paraoxon combined	p-Nitrophenol
California:		
Grain	18.13	4.27
Brown Rice	<3.08	1.11
Hulls	79.64 (4x)	13.92
Polished Rice	<0.57	0.63
Bran	10.81	2.36
Control:		
Grain	<0.10	0.13
Brown Rice	<0.10	<0.05
Hulls	<0.10	0.31
Polished Rice	<0.10	<0.05
Bran	<0.10	0.05
Texas:		
Grain	2.75	2.16
Brown Rice	<0.50	0.99
Hulls	13.40 (5x)	4.35
Polished Rice	<0.18	0.63
Bran	2.34	3.05
Control:		
Grain	<0.10	<0.05
Brown Rice	<0.10	<0.05
Hulls	<0.10	<0.05
Polished Rice	<0.10	<0.05
Bran	<0.10	<0.05

[a] Number in parentheses indicates concentration factor.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries values for samples fortified at 0.05-20 ppm with methyl parathion, methyl paraoxon, and p-nitrophenol are presented in the table below.

Commodity	Recovery (%)[a]		
	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Grain	86-100 (9)	92-101 (9)	86-133 (8)
Polished Rice	93-108 (4)	106-122 (4)	96-115 (4)
Brown Rice	88-104 (6)	90-115 (6)	95-126 (6)
Hulls	74-113 (8)	82-124 (8)	72-131 (8)
Bran	80-102 (7)	88-110 (7)	76-124 (6)

[a] Number in parentheses indicated the number of samples.

Samples were stored frozen (ca. -10 to -30 C) for 218-452 days prior to analysis by Huntingdon Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate, since the test states of AR(41%), CA(18%), LA(15%), and TX(15%) accounted for ca. 90% of the 1988 U.S. rice grain production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). The available field residue data indicate that the established tolerance of 1 ppm may be too low. Residues of methyl parathion exceeded the tolerance (up to 2.35 ppm) in or on rice grain harvested 15 days following the last of six foliar applications of the 2 lb/gal Mcap and 4 lb/gal EC formulations at 1x. The registrant(s) must amend product labels to specify a maximum seasonal application rate or a maximum number of applications per season. The registrant(s) must propose a higher tolerance for rice grain; alternatively, the registrant(s) may amend product labels to specify a reduced application rate and/or an increased PHI. Pending submission of adequate storage stability data, the available data will support a label amendment to establish a maximum of six applications/season and a proposal of a 5 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon.

The available processing data indicate that the combined residues of methyl parathion and methyl paraoxon concentrate in rice hulls up to 5x. The registrant(s) must propose a food/feed additive tolerance for the combined residues of methyl parathion and methyl paraoxon in rice hulls.

Sorghum, grain (milo) and sweet

Tolerance(s):

A tolerance of 0.1 ppm has been established for residues of methyl parathion in or on sorghum [40 CFR §180.121(a)].

Use directions and limitations:

The data submitters for methyl parathion, Pennwalt and Cheminova, do not currently hold registrations for use of methyl parathion on sorghum. The Platte Chemical product label (EPA Reg. No. 34704-10) which was submitted by Cheminova with MRID 41517103, is not registered for use on sorghum. It is not known whether Pennwalt or Cheminova wish to register this use.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires: (i) data depicting residues of concern in or on sorghum grain and sweet sorghum following applications according to the maximum registered use pattern of the EC formulation; (ii) data depicting residues of concern in the dry milled products and starch processed from sorghum grain and syrup processed from sweet sorghum; and (iii) the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41517103) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol, in or on sorghum grain (milo). Residues of methyl parathion were 0.08-1.19 ppm in or on 12 samples of sorghum grain (milo) harvested 21-22 days following the last of six foliar applications of the 4 lb/gal EC formulation at 1 lb ai/A/application. Residues of methyl paraoxon and p-nitrophenol were <0.05(ND)-0.09 ppm and 0.05-0.47 ppm, respectively, in or on these same samples. These data do not support the established tolerance since tolerance-exceeding residues were reported.

Cheminova does not currently hold registrations for the use of methyl parathion on sorghum grain (milo) or sweet sorghum. If Cheminova wishes to support the use of methyl parathion on sorghum, grain (milo) or sweet, label amendments must be proposed, supported by appropriate residue data. The available data do not support the established tolerance since tolerance-exceeding residues were reported; therefore, if the registrant wishes to rely on the submitted residue data, a higher tolerance must be proposed. No data were submitted reflecting residues of methyl parathion in or on sweet sorghum or in the processed products of sorghum grain (milo) and sweet sorghum.

If Cheminova wishes to support the use of methyl parathion on sorghum, then the following additional data are required:

- Label amendments specifying use directions for methyl parathion on sorghum grain (milo) and/or sweet sorghum, supported by appropriate residue data. The submitted

data do not support the established tolerance since tolerance-exceeding residues were reported; therefore, if the registrant wishes to rely on the submitted data, a higher tolerance must also be proposed.

- Data depicting residues of methyl parathion and methyl paraoxon in or on seeds of sweet sorghum (sorgo) harvested 21 days following the proposed maximum number of foliar applications of the EC formulation at 1 lb ai/A/application. Tests must be conducted in AR(24%) and TN(43%) since these states accounted for ca. 70% of the 1982 U.S. production of sorghum for syrup (1982 Census of Agriculture, Vol. 1, Part 51, p. 383). Alternatively, data for sweet sorghum and its processed commodity may be exempted if the registrant(s) submit an appropriate label restriction excluding methyl parathion use on sweet sorghum.

- A processing study depicting the potential for concentration of residues of methyl parathion and methyl paraoxon in milled products (flour and starch) and grain dust from the processing of sorghum grain (milo) bearing measurable, weathered residues. If residues concentrate in any product, appropriate food/feed additive tolerances must be proposed.

- A processing study depicting the potential for concentration of residues of methyl parathion and methyl paraoxon in syrup processed from sweet sorghum bearing measurable, weathered residues. If residues concentrate in any product, appropriate food/feed additive tolerances must be proposed. Alternatively, data for sweet sorghum and its processed commodity may be exempted if the registrant(s) submit an appropriate label restriction excluding methyl parathion use on sweet sorghum.

References (used):

MRID(s): 41517103.

Discussion of the data:

Cheminova (1990; MRID 41517103) submitted data from ten tests conducted in MO(4), NE(2), and TX(4) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on sorghum grain (milo) harvested 21-22 days following the last of six foliar broadcast applications (using ground and aerial equipment) with the 4 lb/gal EC formulation at 1 lb ai/A/application. The residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PHI	No. of Samples	Residues (ppm) Methyl parathion	Methyl paraoxon	p-Nitrophenol
Aerial	21-22	4	0.08-0.19	<0.05	0.09-0.24
Ground	21	8	0.16-1.19	<0.05-0.09	0.05-0.47
Control		6	<0.05	<0.05	<0.05-0.06

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were: 86-110% from nine samples fortified with methyl parathion at 0.05-1 ppm; 97-121% from nine samples fortified with methyl paraoxon at 0.05-1 ppm; and 78-113% from nine samples fortified with p-nitrophenol at 0.05-1 ppm. Samples were stored frozen (ca. -10 to -30 C) for 216-408 days prior to analysis by Huntingdon Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate, since the test state of MO(7%), NE(18%), and TX(23%) and the neighboring states of AR(4%), CO(1%), IL(1%), KS(35%), LA(1%), NM(2%), OK(3%), and SD(2%) accounted for ca. 100% of the 1988 U.S. sorghum grain production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). Residues of methyl parathion in or on sorghum grain harvested 21-22 days following the last of six foliar applications of the 4 lb/gal EC at 1x (the maximum registered single application rate) were 0.08-1.19 ppm. Residues of methyl paraoxon and p-nitrophenol were <0.05-0.09 ppm and 0.05-0.47 ppm, respectively, in or on the same samples. These data do not support the established tolerance.

Cheminova does not currently hold registrations for the use of methyl parathion on sorghum, grain (milo) or sweet sorghum. If Cheminova wishes to support the use of methyl parathion on sorghum, grain or sweet, then label amendments must be proposed, supported by appropriate residue data. The available data do not support the established tolerance since tolerance-exceeding residues were reported; therefore, if the registrant wishes to rely on the submitted residue data, then a higher tolerance must be proposed. No data were submitted reflecting residues of methyl parathion in or on sweet sorghum or in the processed products of sorghum grain (milo) and sweet sorghum. If Cheminova wishes to support the use of methyl parathion on sorghum, grain and/or sweet, then additional data are required.

Wheat, grain

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on wheat [40 CFR §180.121(a)].

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for foliar applications to wheat at 0.25-0.75 lb ai/A/application. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 15-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4581-292.

The 45.5% EC (4 lb/gal) formulation is registered for foliar applications to wheat at 0.25-1.25 lb ai/A/application, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 15-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and a Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires: (i) data depicting residues of concern in or on wheat grain following applications according to the maximum registered use patterns of D, EC, WP, and Mcap formulations; and (ii) data depicting residues of concern in the milled fractions of wheat; and (iii) the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season, which must be supported by the requested residue data. Since issuance of the Guidance Document, the D formulation has been canceled. We note that the registrant submitting data do not currently hold registrations for the WP formulations; however, if any registrant wishes to support use of this formulation, additional data must be submitted.

In response to data requirements, Pennwalt (1990; MRID 41560001) submitted field residue data depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol, in or on wheat grain. The available field residue data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on wheat grain harvested 15-16 days following the last of three foliar applications of the 2 lb/gal Mcap formulation at 0.75 lb ai/A/application (1x the maximum registered single application rate). Residues of p-nitrophenol were <0.05(nondetectable)-0.17 ppm in or on these same samples. Following the submission of

amended product labels and adequate storage stability data, no additional field residue data are required to support the use of the Mcap formulation on wheat grain. The following action must be taken:

- The registrant(s) must revise Mcap product labels to specify a maximum number of foliar applications per growing season and/or a maximum seasonal rate. The available data support a maximum of two applications of the Mcap formulation at 0.75 lb ai/A/application.

In response to data requirements, Cheminova (1990; MRID 41596209) submitted field residue and processing data depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol, in or on wheat grain. Tolerance-exceeding residues of methyl parathion (up to 5.09 ppm) were reported for wheat grain harvested 14 days following the last of six foliar applications of the 4 lb/gal EC formulation at 1.25 lb ai/A/application (1x the maximum registered single application rate); combined residues of methyl parathion and methyl paraoxon were <0.10(ND)-5.58 ppm. Residues of p-nitrophenol were <0.05(ND)-0.87 ppm in or on these same samples. The registrant(s) must propose a higher tolerance for the combined residues of methyl parathion and methyl paraoxon in or on wheat grain. The available data will support a label amendment to establish a maximum of six applications per season and a proposal of a 6 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on wheat grain. Alternatively, the registrant(s) may propose label amendments to reduce the application rate, limit the maximum number of foliar applications per season (less than six), and/or lengthen the PHI, which must be supported by appropriate residue data. The following data remain outstanding for the EC formulation:

- The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate. The available data (MRID 41596209) indicate that six applications of the EC formulation at 1x will result in tolerance-exceeding residues in or on wheat grain harvested 14 days posttreatment. The registrant(s) must propose a higher tolerance for wheat grain; the available data would support the proposal of a 6 ppm tolerance for wheat grain. Alternatively, the registrant(s) may amend the product label for the EC formulation to reduce the application rate, and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data.

The available processing data indicate that the combined residues of methyl parathion and methyl paraoxon may concentrate in wheat bran (ca. 2x) and in shorts (ca. 3x), but do not concentrate in

middlings and flour. Following the submission of adequate storage stability data, the registrant(s) must propose food/feed additive tolerances for these commodities. Current Agency policy also requires data on grain dust.

The following additional processing data are required:

- A processing study depicting the potential for concentration of residues of methyl parathion and methyl paraoxon in grain dust processed from wheat grain bearing measurable, weathered residues. If residues concentrate in this item, an appropriate feed additive tolerance must be proposed.

- When an appropriate tolerance for residues in or on wheat grain is determined and following the submission of adequate storage stability data, food/feed additive tolerances must be proposed for the combined residues of methyl parathion and methyl paraoxon in wheat bran at 2x and wheat shorts at 3x.

References (used):

MRID(s): 41560001. 41596209.

Discussion of the data:

Pennwalt (1990; MRID 41560001) submitted data from eight tests conducted in CA(2), ND(1), OH(1), OK(1), TX(1), VA(1), and WA(1) depicting residues of methyl parathion and its metabolites, methyl paraoxon and p-nitrophenol in or on seven varieties of spring wheat grain harvested 15-16 days following the last of three foliar applications (using ground and aerial equipment) with the 2 lb/gal Mcap formulation at 0.75 lb ai/A/application (1x the maximum registered single application rate). Residues of methyl parathion and its metabolites are presented in the table below.

			Residues (ppm)	
Equipment	PHI	No. of Samples	Combined methyl parathion and paraoxon	p-Nitrophenol
Aerial	15-16	6	<0.10-<0.58	<0.05-0.08
Ground	15-16	8	<0.10-<0.60	<0.05-0.17
Control		3	<0.10	<0.05

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method (Pennwalt method BR-007-00) with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method (Pennwalt method BR-007-00) with a detection limit

of 0.05 ppm. Recoveries were 96-125%, 96-121%, and 78-81% from four samples fortified at 0.05 and 1 ppm with methyl parathion, methyl paraoxon, and p-nitrophenol, respectively. Samples were stored frozen (ca. -20 C) for 139-493 days prior to analysis by Huntingdon Analytical Services. Storage stability studies supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Cheminova (1990; MRID 41596209) submitted data from 17 tests conducted in the states of CA(1), KS(4), MO(1), ND(2), OH(2), TX(1), VA(1), and WA(5) depicting residues of methyl parathion and its metabolites, methyl paraoxon and p-nitrophenol, in or on wheat grain harvested 0 or 14 days following the last of six foliar applications of the 4 lb/gal EC formulation at 0.25-1.25 lb ai/A/application (0.2-1x the maximum registered rate), using ground and aerial equipment. The applications were made according to the following treatment schedules: (i) two applications at 1.25 lb ai/A/application followed by three applications at 0.75 lb ai/A/application with a final application at 0.25 lb ai/A (a total of 5 lb ai/A); (ii) four applications at 1.25 lb ai/A/application followed by two applications at 0.75 lb ai/A/application (a total of 6.5 lb ai/A); or (iii) six applications at 1.25 lb ai/A/application (a total of 7.5 lb ai/A). Residues of methyl parathion and its metabolites resulting from the different treatments are presented in the table below.

Equipment	PTI	No. of Samples	Total lbs ai/A	Residues (ppm) Combined methyl parathion and paraoxon	p-Nitrophenol
Aerial	0	4	5.0	<0.29-1.69	0.06-0.38
Ground	0	14	5.0	<0.12-4.56	<0.05-0.34
Aerial	14	4	6.5	<0.13-0.53	0.09-0.20
Ground	14	14	6.5	<0.10-4.07[a]	<0.05-0.85
Aerial	**14**	**4**	**7.5**	**<0.26-<0.38**	**0.08-0.14**
Ground	**14**	**17**	**7.5**	**<0.10-5.58[b]**	**<0.05-0.87**
Control		19		<0.10-<0.11	<0.05-0.15

[a] Includes five samples bearing tolerance-exceeding residues of methyl parathion (1.02-3.68 ppm).
[b] Includes five samples bearing tolerance-exceeding residues of methyl parathion (1.06-5.09 ppm).

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were as follows: (i) 52-122% from 22 samples fortified with methyl parathion at 0.05-5 ppm; (ii) 76-124% from 22 samples fortified with methyl paraoxon at 0.05-5 ppm; (iii) 69-117% from 22 samples fortified with p-

nitrophenol at 0.05-5 ppm. Samples were stored frozen at -20 C for 41-428 days prior to analysis by Huntingdon Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

In the same submission, Cheminova (1990; MRID 41596209) submitted two processing studies conducted in MO and WA depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol, in the processed commodities of wheat. Wheat grain was harvested 14 days following the last of six foliar applications using ground equipment at 7-day intervals of the 4 lb/gal EC formulation at 6.25 lb ai/A/application (5x the maximum registered single application rate). Wheat grain samples bearing methyl parathion residues of 7.45 ppm (MO) and 12.2 ppm (WA) were processed according to simulated commercial procedures into bran, flour (low grade), flour (patent), middlings, Red Dog (milled byproducts), rough (clean RAC), and shorts and germs. Residues of methyl parathion and its metabolites in various processed fractions (one sample each) are presented in the table below.

Commodity	Residues (ppm)[a]	
	Methyl parathion and methyl paraoxon combined	p-Nitrophenol
Missouri:		
Grain	7.38	2.41
Bran	15.4 (2.0)	5.00 (2.1)
Flour	3.03	0.62
Flour (low grade)	1.63	0.77
Middlings	5.04	1.22
Red Dog	5.59	1.61
Shorts and Germs	24.3 (3.3)	4.30 (1.8)
Washington:		
Grain	12.3	1.42
Bran	21.3 (1.7)	3.44 (2.6)
Flour (patent)	3.74	1.20
Middlings	6.70	1.06
Red Dog	4.80	1.03
Shorts and Germs	11.4	2.04 (1.4)

[a] Number in parentheses indicates concentration factor.

Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol each were nondetectable (<0.05 ppm, respectively) in two samples of each commodity processed from untreated wheat grain. Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were: i) 67-127%

from 61 samples fortified with 0.05-30 ppm methyl parathion; ii) 71-126% from 65 samples fortified with 0.05-30 ppm methyl paraoxon; and iii) 69-123% from 64 samples fortified with 0.05-30 ppm p-nitrophenol. Samples were stored frozen (ca. -15 to -25 C) for ca. 39-512 days prior to analysis by Huntingdon Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(2%), KS(18%), MO(4%), ND(6%), OH(3%), OK(10%), TX(5%), VA(1%), and WA(7%), and the neighboring states of AR(3%), CO(4%), ID(4%), IL(4%), IN(2%), KY(1%), LA(1%), MN(3%), MT(3%), NE(4%), NC(1%), OR(3%), SD(2%), and TN(1%) accounted for ca. 90% of the 1988 U.S. wheat grain production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). The available field residue data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on wheat grain harvested 15-16 days following the last of <u>three</u> foliar applications of the 2 lb/gal Mcap formulation at 0.75 lb ai/A/application (1x the maximum registered single application rate). Residues of p-nitrophenol were <0.05(nondetectable)-0.17 ppm in or on these same samples. Following the submission of amended product labels and adequate storage stability data, no additional field residue data are required to support the use of the Mcap formulation on wheat. The registrant(s) must revise Mcap product labels to specify a maximum number of foliar applications per growing season and/or a maximum seasonal rate. The available data support a maximum of two applications of the Mcap formulation at 0.75 lb ai/A/application.

Tolerance-exceeding residues of methyl parathion (up to 5.09 ppm) were reported for wheat grain harvested 14 days following the last of <u>six</u> foliar applications of the 4 lb/gal EC formulation at 1.25 lb ai/A/application (1x the maximum registered single application rate); combined residues of methyl parathion and methyl paraoxon were <0.10(ND)-5.58 ppm. Residues of p-nitrophenol were <0.05(ND)-0.87 ppm in or on these same samples. The registrant(s) must propose a higher tolerance for the combined residues of methyl parathion and methyl paraoxon in or on wheat grain. The available data will support a label amendment to establish a maximum of six applications per season <u>and</u> a proposal of a 6 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on wheat grain. Alternatively, the registrant(s) may propose label amendments to reduce the application rate, limit the maximum number of foliar applications per season (less than six), and/or lengthen the PHI, which must be supported by appropriate residue data.

The available processing data indicate that the combined residues of methyl parathion and methyl paraoxon may concentrate in wheat bran (ca. 2x) and in shorts (ca. 3x), but do not concentrate in

middlings and flour. Following the submission of adequate storage stability data, the registrant(s) must propose food/feed additive tolerances for these commodities. Current Agency policy also requires data on grain dust.

Additional data and product amendments are required.

Forage, Fodder, and Straw of Cereal Grains Group

Corn, field, forage and fodder, and sweet corn forage

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on corn forage [40 CFR §180.121(a)]. No tolerances have been established for residues of methyl parathion in or on corn fodder or silage.

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for multiple broadcast foliar applications to field and sweet corn at 0.25-1 lb ai/A/application, using ground equipment or in a minimum of 0.5 gal of total spray/A using low volume aerial equipment. A 12-day precutting (forage) and pregrazing interval is in effect. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

The 4 lb/gal EC formulation is registered for multiple broadcast foliar applications to corn at 0.25-0.5 lb ai/A/application, using ground or aerial equipment. A 12-days PHI has been established. These use directions were obtained from the Platte Chemical product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Science Chapter dated 11/85 requires data depicting methyl parathion residues of concern in or on corn forage following treatment with a EC and Mcap formulation. In addition, the Science Chapter requires registrant(s) to propose tolerances for residues of methyl parathion in or on corn silage and fodder, and label restrictions limiting the number of foliar applications permitted per growing season, which must be supported by the requested data. Current Agency policy does not require tolerances or data for corn silage.

In response to data requirements, Cheminova submitted (1990; MRIDs 41717803 and 41717805) field residue data depicting residues of methyl parathion, and its metabolites methyl paraoxon

and p-nitrophenol in or on field corn forage, fodder, and silage and sweet corn forage and fodder following treatment with the EC formulation.

Forage: The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on field corn forage and sweet corn forage harvested 12 days following the last of six foliar applications of the 4 lb/gal EC formulation at 1 lb ai/A/application (2x the maximum registered single application rate). Residues of p-nitrophenol were up to 5.84 ppm in or on these same samples. The registrant(s) must revise product labels to specify the maximum number of foliar applications per growing season which must be supported by residue data. Pending the submission of adequate storage stability data, the available data will support a label amendment to establish a maximum of six foliar applications/season at 1 lb ai/A/application.

Fodder: The combined residues of methyl parathion and methyl paraoxon were <0.10-20.7 ppm in or on field corn fodder and sweet corn fodder harvested 12 days following the last of six foliar applications of the 4 lb/gal EC formulation at 1 lb ai/A/application (2x the maximum registered single application rate). The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on field corn fodder. The available data will support a proposal of a 21 ppm tolerance for field corn fodder; however, the registrant may want to submit a tolerance proposal and supporting residue data based on treatment at 1x the maximum registered single application rate. No data were submitted reflecting treatment with the Mcap formulation.

The following additional data are required:

- The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate, supported by appropriate residue data. Data depicting residues of methyl parathion and methyl paraoxon in or on field and sweet corn forage harvested 12 days following the last of the proposed number of foliar applications of the Mcap formulation at 1 lb ai/A/application. Tests must reflect the use of ground and low volume aerial equipment. Tests must be conducted in CA(5%), CO(3%), IA(6%) [representing NE(4%)], MI(4%) [representing OH(3%)], NY(8%) [representing PA(7%)], SD(3%), VA(3%), and WI(13%) [representing MN(7%)] since these states accounted for ca. 70% of the 1988 U.S. production of corn silage.

- The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on field corn fodder, which must be supported by

adequate field residue data. The available data will support the proposal of a 21 ppm tolerance for field corn fodder.

References (used):

MRID(s): 41717803. 41717805.

References (not used):

[The following reference(s) contain duplicate information.]

MRID(s): 41596202. 41596208.

Discussion of the data:

Field Corn: Cheminova (1990; MRID 41717803) submitted data from 22 tests conducted in CA(2), GA(2), IL(2), MN(2), MO(1), NE(2), OH(4), TX(5), and VA(2) depicting residues of methyl parathion and its metabolites, methyl paraoxon and p-nitrophenol, in or on field corn forage, fodder, and silage harvested 0-31 days following the last of six foliar applications (using ground and aerial equipment) of the 4 lb/gal EC formulation at 1 lb ai/A/application. Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PTI	No. of Samples	Residues (ppm) Methyl parathion and methyl paraoxon combined	p-Nitrophenol
Forage:				
Ground	0	16	<0.11-94.2	0.26-2.68
Aerial	0	4	2.07-5.29	0.21-0.80
Ground	6	16	<0.10-<2.52	<0.10-1.41
Aerial	6	4	<0.37-<0.80	0.16-0.54
Ground	**12**	**16**	**<0.10-55.3[a]**	**<0.10-5.84**
Aerial	**12**	**4**	**<0.10-<0.18**	**<0.10-0.57**
Ground	18	16	<0.10-<0.70	<0.10-4.16
Aerial	18	4	<0.14-<0.18	<0.10
Ground	24	14	<0.10-<0.48	<0.10-0.60
Aerial	24	4	<0.17-<0.22	<0.10-0.98
Ground	31	2	<0.10	<0.10-0.13
Control		50	<0.10-<0.26	<0.10-0.26
Fodder:				
Ground	**12**	**16**	**<0.10-20.72**	**<0.10-5.37**
Aerial	**12**	**4**	**<0.84-6.01**	**0.40-2.34**
Control		10	<0.10-<0.27	<0.10-0.11
Silage:				
Ground	**12**	**4**	**<0.10-<0.59**	**0.12-0.61**
Aerial	**12**	**2**	**<0.10-<0.19**	**0.21-0.44**
Control		3	<0.10	<0.10

[a] Includes two samples bearing tolerance-exceeding residues of methyl parathion (36.9 and 55.0 ppm); these samples appear to be outliers.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recovery data from samples fortified with methyl parathion at 0.05-5 ppm, methyl paraoxon at 0.05-1 ppm, and p-nitrophenol at 0.1-1 ppm are presented in the following table.

Commodity	Recovery (%)[a] Methyl parathion	Methyl paraoxon	p-Nitrophenol
Forage	61-117 (32)	62-101 (30)	60-122 (32)
Fodder	81-109 (12)	78-128 (14)	74-115 (12)
Silage	61-102 (4)	69-85 (3)	70-110 (2)

[a] Number in parentheses indicates the number of samples.

Samples were stored frozen (ca. -20 to -30 C) for 70-540 days prior to analysis by Biospherics Incorporated. Storage stability

data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Sweet Corn: Cheminova (1990; MRID 41717805) submitted data from seven tests conducted in the states of CA(2), FL(1), NY(1), TX(1), WA(1), WI(1) depicting residues of methyl parathion and its metabolites, methyl paraoxon and p-nitrophenol in or on sweet corn forage and fodder harvested 0-24 days following the last of six foliar applications (using ground and aerial equipment) with the 4 lb/gal EC formulation at 1 lb ai/A/application. Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PTI	No. of Samples	Residues (ppm) Methyl parathion and methyl paraoxon combined	p-Nitrophenol
Forage:				
Aerial	0	8	<0.10-18.86	0.11-2.52
Ground	0	6	<0.18-18.44	0.22-5.55
Aerial	6	8	<0.10-1.51	0.36-1.16
Ground	6	6	<0.10-1.13	0.19-7.31
Aerial	**12**	**8**	**<0.10-0.73**	**0.10-1.24**
Ground	**12**	**6**	**<0.10-<0.44**	**<0.10-2.61**
Aerial	18	8	<0.10-0.30	<0.10-0.27
Ground	18	6	<0.10-<0.37	<0.10-2.17
Aerial	24	8	<0.10-<0.17	<0.10-0.77
Ground	24	6	<0.10-<0.15	0.11-0.46
Control		35	<0.10	<0.05
Fodder:				
Aerial	3	8	<0.10-2.12	0.18-1.49
Ground	3	6	<0.16-2.38	<0.10-2.87
Control		7	<0.10	<0.10

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recovery data from samples fortified with methyl parathion at 0.05-10 ppm, methyl paraoxon

at 0.05-1 ppm, and p-nitrophenol at 0.1-3 ppm are presented in the following table.

Commodity	Recovery (%)[a] Methyl parathion	Methyl paraoxon	p-Nitrophenol
Forage	63-109 (25)	66-119 (23)	71-120 (22)
Fodder	70-121 (9)	88-136 (9)	66-128 (9)

[a] Number in parentheses indicates the number of samples.

Samples were stored frozen (ca. -20 to -30 C) for 61-577 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(5%), FL(<0.5%), GA(1%), IL(2%), MN(7%), MO(2%), NE(4%), NY(8%), OH(3%), TX(1%), VA(3%), WA(1%), and WI(13%) represent the major U.S. corn silage production regions (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on field corn forage and sweet corn forage harvested 12 days following the last of six foliar applications of the 4 lb/gal EC formulation at 1 lb ai/A/application. Residues of p-nitrophenol were up to 5.84 ppm in or on these same samples. It should be noted that two samples of field corn forage receiving the same treatment bore tolerance-exceeding residues of methyl parathion of 36.9 and 55.0. Since these samples were the only samples that bore tolerance-exceeding residues out of 34 samples overall, it was determined that they were outliers. The combined residues of methyl parathion and methyl paraoxon were <0.10-20.7 ppm in or on field corn fodder and sweet corn fodder harvested 12 days posttreatment. The registrant(s) must revise product labels to specify the maximum number of foliar applications per growing season which must be supported by residue data. The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on field corn fodder. The available data will support a proposal of a 21 ppm tolerance for field corn fodder; however, the registrant may want to submit a tolerance proposal and supporting residue data based on treatment at 1x the maximum registered single application rate. Pending the submission of adequate storage stability data, the available data will support a label amendment to establish a maximum of six foliar applications/season at 1 lb ai/A/application. Additional data are required.

Rice, straw

Tolerance(s):

No tolerance has been established for residues of methyl parathion in or on rice straw.

Use directions and limitations:

The 2 lb/gal Mcap and 45.5% EC (4 lb/gal) formulations are registered for multiple foliar applications to rice at 0.25-0.75 lb ai/A/application, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 15-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI and the Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Residue Chemistry Chapter dated 11/8/85 concludes that data required for rice straw may be translated from data required on wheat straw. In addition, the Science Chapter requires the registrant(s) to propose a tolerance for residues of methyl parathion in or on rice straw or amend the product labels to establish a feeding restriction.

In support of their registration, Cheminova submitted (1990; MRID 41379307) field residue data depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol, in or on rice straw. Residues of methyl parathion up to 8.02 ppm were reported for rice straw harvested 15 days following the last of six foliar applications of the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of methyl paraoxon and p-nitrophenol were <0.05(ND)-0.19 ppm and <0.05(ND)-6.21 ppm, respectively, in or on these same samples. These data alone are inadequate to propose a tolerance for residues of methyl parathion in or on rice straw since no data are available reflecting application using ground equipment. However, residue data pertaining to wheat straw (ground applications) may be translated to support a tolerance proposal for rice straw. The registrant(s) must alter product labels to specify a maximum seasonal application rate or a maximum number of applications per season and propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on rice straw. Pending the submission of adequate storage stability data, the available data will support a label amendment to establish a maximum of six applications/season and a proposal of a 9 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on rice straw.

The following actions must be taken:

- The registrant(s) must amend product labels to specify a maximum number of applications per season or a maximum seasonal rate, which must be supported by residue data. The available data support a maximum of six applications per season.

- The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on rice straw. The available data would support proposal of a 9 ppm tolerance for rice straw.

References (used):

MRID(s): 41379307.

Discussion of the data:

Cheminova (1990; MRID 41379307) submitted data from eight tests conducted in AR(2), CA(2), LA(2), and TX(2) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on rice straw harvested 15 days following the last of six foliar broadcast applications (using aerial equipment only) with the 4 lb/gal EC formulation at 0.8 lb ai/A/application (ca. 1x the maximum registered rate). The residues of methyl parathion and its metabolites are presented in the table below.

			Residues (ppm)		
Equipment	PHI	No. of Samples	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Aerial	15	8	<0.05-8.02	<0.05-0.19	1.17-6.21
Control		4	<0.05	<0.05	<0.05-0.15

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries from 12 samples fortified with 0.05-10 ppm of methyl parathion, methyl paraoxon, and p-nitrophenol were, 87-114%, 89-124%, and 71-132%, respectively. Samples were stored frozen (ca. -10 to -30 C) for 219-459 days prior to analysis by Huntingdon Analytical Services. Storage stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate, since the test states of AR(41%), CA(18%), LA(15%), and TX(15%) accounted for ca. 90% of the 1988 U.S. rice production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). The available field residue data indicate that residues of methyl parathion were up to 8.02 ppm in or on rice straw harvested 15 days following the last of six foliar applications of the 4 lb/gal EC formulation at 1x. No data were submitted reflecting application using ground equipment. However, residue data pertaining to wheat straw (ground applications) may be translated to support a tolerance proposal for rice straw. The registrant(s) must alter product labels to specify a maximum seasonal application rate or a maximum number of applications per season and propose a tolerance for the residues of methyl parathion in or on rice straw; the available data will support a label amendment to establish a maximum of six applications/season and a proposal of a 9 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on rice straw.

Sorghum (milo), forage, fodder, and hay, and sweet sorghum forage and fodder

Tolerance(s):

Tolerances of 3 ppm have been established for residues of methyl parathion in or on sorghum forage and fodder [40 CFR §180.121(a)].

Use directions and limitations:

The data submitters for methyl parathion, Pennwalt and Cheminova, do not currently hold registrations for use of methyl parathion on sorghum. The Platte Chemical product label (EPA Reg. No. 34704-10) which was submitted by Cheminova with MRID 41517103, is not registered for use on sorghum. It is not known whether Pennwalt or Cheminova wish to register this use.

Conclusions:

The Methyl Parathion Residue Chemistry Chapter dated 11/8/85 requires the registrant(s) to: (i) submit data depicting the methyl parathion residues of concern in or on sorghum hay, silage, and fodder; (ii) propose a pregrazing interval for forage; (iii) propose tolerances for residues of methyl parathion in or on sorghum silage and hay or alternately propose feeding restrictions; and (iv) propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. We note that Agency policy no longer requires data or tolerances for sorghum (milo) silage.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41517103) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on sorghum (milo) fodder, forage, silage, and hay. The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on sorghum (milo) forage harvested 7-21 days following the last of six applications of the 4 lb/gal EC formulation at 1 lb ai/A/application. However, the available data indicate that the combined residues of methyl parathion and methyl paraoxon will exceed the established tolerance (up to 3.2 ppm) in or on sorghum (milo) fodder receiving the same treatment. Combined residues of methyl parathion and methyl paraoxon were <0.12-<0.88 ppm in or on sorghum (milo) hay receiving the same treatment. Residues of p-nitrophenol were 0.11-2.16 ppm in or on these same forage, fodder, and hay samples.

Cheminova does not currently hold registrations for the use of methyl parathion on sorghum (milo) or sweet sorghum. If Cheminova wishes to support the use of methyl parathion on sorghum (milo) forage, fodder, and hay, then label amendments must be proposed, supported by appropriate residue data. The available data do not support the established tolerance for sorghum (milo) fodder since tolerance-exceeding residues were reported; therefore, if the registrant wishes to rely on the submitted residue data, a higher tolerance must be proposed. In addition, the registrant must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on sorghum (milo) hay. The available data will support the proposal of a 4 ppm tolerance and a 1 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on sorghum (milo) fodder and sorghum (milo) hay, respectively, and proposal of the following use directions for the EC formulation: a maximum of 6 applications at 1 lb ai/A/application per season and a 21-day PHI.

If Cheminova wishes to support the use of methyl parathion on sorghum (milo) forage, fodder, and hay, then the following additional data are required:

- The registrant must propose label restrictions limiting the number of foliar applications per growing season on sorghum (milo) forage, fodder, and hay and must propose a pregrazing interval for forage, which must be supported by the requested residue data.

- A tolerance must be proposed for the combined residues of methyl parathion and methyl paraoxon in or on sorghum (milo) hay, which must be supported by appropriate residue data.

No data have been submitted for sweet sorghum forage and fodder. If Cheminova wishes to support the use of methyl parathion on sweet sorghum forage and fodder, data pertaining to sorghum (milo) forage and fodder may be translated to satisfy data requirements.

References (used):

MRID(s): 41517103.

Discussion of the data:

Cheminova (1990; MRID 41517103) submitted data from 10 tests conducted in MO(4), NE(2), and TX(4) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on sorghum (milo) fodder, forage, hay, and silage harvested 0-31 days following the last of six foliar broadcast applications using ground and aerial equipment with the 4 lb/gal EC formulation at 1 lb ai/A/application. The residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PTI	No. of Samples	Residues (ppm) Methyl parathion and methyl paraoxon combined	p-Nitrophenol
Fodder:				
Aerial	21	4	<0.10-<0.30	0.36-0.52
Ground	21	8	<0.21-3.20[a]	0.33-2.16
Control		6	<0.10-<0.14	<0.05-0.09
Forage:				
Aerial	0	2	6.62,9.53	0.90-1.21
Ground	0	6	7.39-20.3	0.42-2.53
Aerial	7	2	<0.32,<0.34	0.64-0.72
Ground	7	6	<0.43-1.86	0.21-1.24
Aerial	14	2	<0.19,0.22	0.13-0.32
Ground	14	6	<0.14-<0.74	0.15-0.76
Aerial	21	2	<0.29,0.31	0.19-0.24
Ground	21	6	<0.16-<1.30	0.11-0.45
Aerial	28	2	<0.14,<0.28	0.30-0.35
Ground	28	6	<0.10-<0.40	0.05-0.62
Aerial	35	2	<0.14,<0.28	0.38-0.40
Ground	35	6	<0.12-<0.23	0.06-0.62
Control		24	<0.10-<0.18	<0.05-0.08
Hay:				
Aerial	21	2	<0.15,<0.35	0.42-0.71
Ground	21	6	<0.12-<0.88	0.15-2.04
Control		4	<0.10	<0.05
Silage:				
Aerial	21	2	<0.16,0.32	0.18-0.21
Ground	21	6	<0.15-<0.31	0.07-0.53
Control		4	<0.10	<0.05

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recovery data from samples fortified with methyl parathion, methyl paraoxon, and p-nitrophenol at 0.05-20 ppm are presented in the table below.

Commodity	Recovery (%)[a]		
	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Fodder	79-117 (11)	75-127 (12)	62-131 (12)
Forage	64-117 (22)	79-132 (21)	70-132 (22)
Hay	82-108 (6)	81-116 (6)	63-92 (6)
Silage	76-108 (8)	86-128 (8)	69-104 (7)

[a] Number in parentheses indicates the number of samples.

Samples were stored frozen (ca. -10 to -30 C) for 208-462 days prior to analysis by Huntingdon Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate, since the test states of MO(7%), NE(18%), and TX(23%) and the neighboring states of AR(4%), CO(1%), IL(1%), KS(35%), LA(1%), NM(2%), OK(3%), and SD(2%) accounted for ca. 100% of the 1988 U.S. sorghum grain production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). The available data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on sorghum (milo) forage harvested 7-21 days following the last of six applications of the 4 lb/gal EC formulation at 1 lb ai/A/application. However, the available data indicate that the combined residues of methyl parathion and methyl paraoxon will exceed the established tolerance (up to 3.2 ppm) in or on sorghum (milo) fodder receiving the same treatment. Combined residues of methyl parathion and methyl paraoxon were <0.12-<0.88 ppm in or on sorghum (milo) hay receiving the same treatment. Residues of p-nitrophenol were 0.11-2.16 ppm in or on these same forage, fodder, and hay samples.

Cheminova does not currently hold registrations for the use of methyl parathion on sorghum (milo) or sweet sorghum. If Cheminova wishes to support the use of methyl parathion on sorghum (milo) forage, fodder, and hay, then label amendments must be proposed, supported by appropriate residue data. The available data do not support the established tolerance for sorghum (milo) fodder since tolerance-exceeding residues were reported; therefore, if the registrant wishes to rely on the submitted residue data, a higher tolerance must be proposed. In addition, the registrant must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on sorghum (milo) hay. The available data will support the proposal of a 4 ppm tolerance and a 1 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on sorghum (milo) fodder and sorghum (milo) hay, respectively, and proposal of the following use directions for the EC

formulation: a maximum of 6 applications at 1 lb ai/A/application per season and a 21-day PHI.

No data have been submitted for sweet sorghum forage and fodder. If Cheminova wishes to support the use of methyl parathion on sweet sorghum forage and fodder, data pertaining to sorghum (milo) forage and fodder may be translated to satisfy data requirements.

Wheat, forage and straw

Tolerance(s):

Currently, no tolerance exists for residues of methyl parathion in or on wheat forage and straw.

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for foliar applications to wheat at 0.25-1.25 lb ai/A/application, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 15-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and a Platte Chemical Company label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

The 2 lb/gal Mcap formulation is registered for foliar applications to wheat at 0.25-0.75 lb ai/A/application. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A 15-day PHI has been established. These use directions were obtained from the product label, EPA Reg. No.4581-292.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires the registrant(s) to propose feeding and grazing restrictions for wheat forage, hay, and straw; or submit tolerance proposals, a pregrazing interval for forage, and data depicting residues of concern in or on wheat forage, hay, and straw harvested following applications according to the maximum registered use patterns of D, EC, WP, and Mcap formulations. The Guidance Document also requires the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data. Since issuance of the Guidance Document the D formulation has been canceled. We note that the registrant submitting data does not currently hold registrations for the WP formulations, however, if any registrant wishes to support use of this formulation, additional data must

be submitted. In addition, we note that current Agency policy no longer requires data or tolerances for wheat hay.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41596209) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on wheat forage, hay, and straw following treatment with the EC formulation. The combined residues of methyl parathion and methyl paraoxon were <0.12-1.68 ppm and <0.10-5.82 ppm in or on wheat forage and wheat straw samples, respectively, harvested 14 days following four applications of the 4 lb/gal EC formulation at 1.25 lb ai/A/application and two applications of the same formulation at 0.75 lb ai/A/application. Combined residues of methyl parathion and methyl paraoxon were <0.10-10.6 ppm in or on wheat straw harvested 14 days following the last of six applications of the EC formulation at 1.25 lb ai/A/application. Residues of p-nitrophenol were <0.05-4.65 ppm in or on these same samples. The registrant(s) must propose tolerances for the combined residues of methyl parathion and methyl paraoxon in or on wheat forage and straw and label restrictions limiting the number of foliar applications per growing season which must be supported by appropriate residue data. The available data will support a label amendment to establish a maximum of a four applications at 1.25 lb ai/A/application followed by two applications at 0.75 lb ai/A/application (total of 6.5 lb ai/A/season) and proposal of a 2 ppm tolerance for wheat forage and a 6 ppm tolerance for wheat straw. No data were submitted reflecting application of the Mcap formulation.

The following additional data are required:

- The registrant(s) must amend product labels to specify a maximum number of foliar applications per growing season or a maximum seasonal rate. Data depicting residues of methyl parathion and methyl paraoxon in or on wheat forage and straw harvested 15 days following the last of the proposed number of applications of the Mcap formulation at 0.75 lb ai/A/applications. Tests must be conducted in IL(4%), KS(18%) [representing CO(4%), MO(4%), NE(4%), and OK(10%)], ND(6%), TX(5%), and WA(7%) [representing ID(4%)] since these states accounted for ca. 70% of the 1988 U.S. production of wheat (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989). Upon submission of adequate residue data, the registrant(s) must propose tolerances for the combined residues of methyl parathion and methyl paraoxon in or on wheat forage and straw. Alternatively, the registrant may propose a restriction against the feeding of wheat forage and submit data and a tolerance proposal for wheat straw only.

References (used):

MRID(s): 41596209.

Discussion of the data:

Cheminova (1990; MRID 41596209) submitted data from 17 tests conducted in CA(1), KS(4), MO(1), ND(2), OH(2), TX(1), VA(1), and WA(5) depicting residues of methyl parathion and its metabolites, methyl paraoxon and p-nitrophenol in or on wheat forage, hay, and straw harvested 0-14 days following the last of six foliar applications of the 4 lb/gal EC formulation at 0.25-1.25 lb ai/A/application (0.2-1x), using ground and aerial equipment. The applications were made according to the following treatment schedules: (i) two applications at 1.25 lb ai/A/application followed by three applications at 0.75 lb ai/A/application and a final application at 0.25 lb ai/A (a total of 5 lb ai/A); (ii) four applications at 1.25 lb ai/A/application followed by two applications at 0.75 lb ai/A/application (a total of 6.5 lb ai/A); or, (iii) six applications at 1.25 lb ai/A/application (a total of 7.5 lb ai/A). Residues of methyl parathion and its metabolites resulting from the different treatments are presented in the table below.

Equipment	PTI	No. of Samples	Total lbs ai/A	Residues (ppm) Methyl parathion and paraoxon combined	p-Nitrophenol
Forage:					
Aerial	0	4	5.0	4.28-7.80	0.37-2.19
Ground	0	8	5.0	1.81-6.28	0.10-2.58
Aerial	0	4	6.5	1.40-8.92	0.14-2.87
Ground	0	8	6.5	7.86-16.7	0.98-3.72
Aerial	7	4	6.5	0.29-1.39	0.40-2.52
Ground	7	8	6.5	0.43-3.72	0.60-2.77
Aerial	**14**	**4**	**6.5**	**<0.12-0.36**	**0.34-2.15**
Ground	**14**	**8**	**6.5**	**0.22-1.68**	**0.64-2.04**
Aerial	21	4	6.5	<0.10-0.46	0.22-2.86
Ground	21	8	6.5	<0.16-<0.45	0.32-1.36
Aerial	28	4	6.5	<0.10-0.31	0.12-2.60
Ground	28	8	6.5	<0.11-<0.34	0.07-0.72
Control		30		<0.10-<0.18	<0.05-0.10
Straw:					
Aerial	0	4	5.0	<0.54-2.68	0.33-0.51
Ground	0	14	5.0	<1.21-23.5	0.21-1.65
Aerial	**14**	**4**	**6.5**	**0.36-0.93**	**1.17-1.91**
Ground	**14**	**14**	**6.5**	**<0.10-5.82**	**<0.05-3.87**
Aerial	**14**	**4**	**7.5**	**<0.82-1.93**	**0.51-1.30**
Ground	**14**	**14**	**7.5**	**<0.10-10.6**	**<0.05-4.65**
Control		15		<0.10	<0.05-0.42
Hay:					
Aerial	0	4	5.0	2.49-4.98	0.73-1.26
Ground	0	8	5.0	3.18-5.64	0.51-2.06
Aerial	**14**	**4**	**6.5**	**<0.12-0.48**	**0.70-2.03**
Ground	**14**	**8**	**6.5**	**0.21-2.20**	**0.72-4.95**
Control		12		<0.10	<0.05

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recovery data from samples fortified with methyl parathion, methyl paraoxon, and p-nitrophenol at 0.05-5 ppm are presented in the following table.

Commodity	No. of Samples	Recovery (%) Methyl parathion	Methyl paraoxon	p-Nitrophenol
Forage	22	71-109%	85-137%	64-119%
Hay	12	85-114%	84-131%	67-121%
Straw	20	80-125%	67-127%	63-118%

Samples were stored frozen at -20 C for 43-521 days prior to analysis by Huntingdon Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(2%), KS(18%), MO(4%), ND(6%), OH(3%), TX(5%), VA(1%), and WA(7%), and the neighboring states of AR(3%), CO(4%), ID(4%), IL(4%), IN(2%), KY(1%), LA(1%), MN(3%), MT(3%), NE(4%), NC(1%), OK(10%), OR(3%), SD(2%), and TN(1%) accounted for ca. 90% of the 1988 U.S. wheat production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). Pending the submission of adequate storage stability data, the available field residue data indicate that residues of methyl parathion were up to 1.49 ppm in or on wheat forage and up to 10.4 ppm in or on wheat straw harvested 14 days following the last of six foliar applications of the 4 lb/gal EC formulation. The registrant(s) must propose tolerances for residues of methyl parathion in or on wheat forage and straw and label restrictions limiting the number of foliar applications per growing season, which must be supported by the available data. The available data will support a label amendment to establish a maximum of a four applications at 1.25 lb ai/A/application followed by two applications at 0.75 lb ai/A/application (total of 6.5 lb ai/A/season) and proposal of a 2 ppm tolerance for wheat forage and a 6 ppm tolerance for wheat straw. Additional data are required.

Grass Forage, Fodder, and Hay Group

Grass, forage and hay

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on grass forage [40 CFR §180.121(a)]. No tolerance has been established for residues of methyl parathion in or on grass hay.

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for foliar applications to rangeland, pasture, and grasses grown for seed at 0.25-0.75 lb ai/A/application, using ground or aerial equipment. The labels do not specify a maximum seasonal rate or number of applications allowed per growing season. A 15-day PHI and pregrazing interval is in effect. These use directions were obtained from the product label, EPA Reg. Nos. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

The 45.5% EC (4 lb/gal) formulation is registered for foliar applications to grass forage at 0.5-0.75 lb ai/A/application, using ground or aerial equipment. A 15-day PHI and pregrazing interval is in effect. These use directions were obtained from the Platte Chemical Company product label, EPA Reg. Nos. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires: (i) data depicting residues of concern in or on the hay of Bermudagrass, bluegrass, and bromegrass following applications according to the maximum registered use patterns of Mcap and EC formulations; (ii) the registrant(s) to propose tolerances for residues of methyl parathion in or on hay; and (iii) propose label restrictions limiting the number of foliar applications permitted per growing season.

In response to data requirements, Cheminova submitted field residue data depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on the hay of Bermudagrass (1989; MRID 41359902), bluegrass (1989; MRID 41359903), and fescue (1989; MRID 41359905). The combined residues of methyl parathion and methyl paraoxon were <0.68-<1.65 ppm in or on Bermudagrass hay, 0.28-1.11 ppm in or on bluegrass hay, and 0.16-2.85 ppm in or on fescue hay harvested 15 days following three or six foliar broadcast applications (using ground and aerial equipment) of the 4 lb/gal EC formulation at ca. 1x the maximum registered single application rate. Residues of p-nitrophenol were 0.29-6.4 ppm in or on these same samples of Bermudagrass, bluegrass, and fescue hay.

The available data do not satisfy Guidance Document requirements for the following reasons: (i) no data were submitted reflecting application of the Mcap formulation; (ii) no storage stability data are available to support the submitted data for use of the EC formulation on grass forage and hay; (iii) the registrant(s) must propose a tolerance for residues in or on grass hay; and (iv) the registrant(s) must amend product labels to limit the number of foliar applications permitted per season. Pending submission of adequate storage stability data, the available data

will support a label amendment to the EC formulation to establish a maximum of six applications/season and a proposal of a 3 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on grass hay.

The following additional data are required:

- The registrant(s) must revise Mcap product labels to specify a maximum number of foliar applications per season and/or a maximum seasonal application rate. Data depicting residues of methyl parathion and methyl paraoxon in or on Bermudagrass, bluegrass, and bromegrass or fescue hay harvested 15 days following the last of the proposed number of foliar applications of a representative Mcap formulation at 0.75 lb ai/A. Tests must be conducted at locations representative of Bermudagrass (southern-southeastern U.S.), bluegrass (northeastern-midwestern U.S), and bromegrass (upper midwestern-western U.S) production regions.

- The registrant(s) must revise EC product labels to specify a maximum number of foliar applications per season and/or a maximum seasonal application rate, which must be supported by residue data.

- Following the submission of adequate field residue data, storage stability data and product label amendments, the registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on grass hay, which must be supported by residue data.

References (used):

MRID(s): 41359902. 41359903. 41359905.

Discussion of the data:

Cheminova (1989; MRIDs 41359902, 41359903, and 4139905) submitted data from 15 tests conducted in CA(6), GA(2), MO(4), PA(2), and SC(1) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on Bermudagrass, bluegrass, and fescue hay harvested 15 days following the last of three or six foliar broadcast applications (using ground and aerial equipment) with the 4 lb/gal EC formulation at ca. 0.8 lb ai/A (ca. 1x the maximum registered single application rate). Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	No. of Samples	Residues in ppm: Methyl parathion and methyl paraoxon combined	Residues in ppm: p-Nitrophenol
Bermudagrass:			
Ground	6	<0.68-<1.65	0.69-3
Aerial	4	<0.54-<1.01	0.89-3
Control	5	<0.10	0.31-0.75
Bluegrass:			
Ground	6	0.28-1.11	1.10-4.8
Aerial	4	0.18-0.70	0.85-3.4
Control	5	<0.10	0.09-0.63
Fescue:			
Ground	6	0.16-2.85	0.52-6.40
Aerial	4	<0.10-<0.30	0.29-4.20
Control	5	<0.10-<0.15	<0.05-0.38

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries of methyl parathion, methyl paraoxon, and p-nitrophenol from Bermudagrass, bluegrass, and fescue hay samples fortified at 0.05-5 ppm are presented in tabular form below.

Crop	Recovery (%)[a]: Methyl parathion	Recovery (%)[a]: Methyl paraoxon	Recovery (%)[a]: p-Nitrophenol
Bermudagrass	73-110 (11)	71-113 (11)	81-97 (5)
Bluegrass	74-99 (10)	58-88 (10)	70-87 (6)
Fescue	70-105 (8)	70-106 (8)	71-97 (5)

[a] Number of samples indicated in parentheses.

Samples were stored frozen (ca. -20 C) for 150-285 days prior to analysis by Analytical Development Corporation. Storage stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(1%), GA(3%), MO(11%), PA(4%), and SC(1%) plus the neighboring states of AL(1%), AR(3%), FL(2%), IL(1%), IA(1%), KS(4%), KY(5%), MD(1%), NE(1%), NY(5%), NC(1%), OH(3%), OK(4%), OR(4%), TN(4%), and WV(1%) accounted for ca. 60% of the 1982 U.S. production of tame hay (1982 Census of Agriculture, Vol. 1, Part 51, p. 330). The combined residues of methyl parathion and methyl paraoxon were <0.68-<1.65 ppm in or on Bermudagrass hay, 0.28-1.11 ppm in

or on bluegrass hay, and 0.16-2.85 ppm in or on fescue hay harvested 15 days following three or six foliar broadcast applications (using ground and aerial equipment) of the 4 lb/gal EC formulation at ca. 1x the maximum registered single application rate. Residues of p-nitrophenol were 0.29-6.4 ppm in or on these same samples of Bermudagrass, bluegrass, and fescue hay.

The available data do not satisfy Guidance Document requirements for the following reasons: (i) no data were submitted reflecting application of the Mcap formulation; (ii) no storage stability data are available to support the submitted data for use of the EC formulation on grass forage and hay; (iii) the registrant(s) must propose a tolerance for residues in or on grass hay; and (iv) the registrant(s) must amend product labels to limit the number of foliar applications permitted per season. Pending submission of adequate storage stability data, the available data will support a label amendment to the EC formulation to establish a maximum of six applications/season and a proposal of a 3 ppm tolerance for the combined residues of methyl parathion and methyl paraoxon in or on grass hay.

Non-Grass Animal Feeds Group

Alfalfa, forage and hay

Tolerance(s):

Tolerances of 1.25 and 5 ppm have been established for residues of methyl parathion in or on fresh alfalfa and alfalfa hay, respectively [40 CFR §180.121(a)].

Note to SRRD: We recommend that the commodity designation "fresh alfalfa" in 40 CFR §180.121(a) be changed to "alfalfa, forage," in keeping with presently accepted commodity definitions.

Use directions and limitations:

The 2 lb/gal Mcap formulation is registered for multiple foliar applications to alfalfa at 0.25-1.0 lb ai/A/application, using ground and aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. The established PHIs for the Mcap formulation are 7 days (prior to bloom or at-bloom) for alfalfa grown for seed, and 15 days for alfalfa not grown for seed. A 15-day pregrazing interval is also in effect. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications using ground and aerial equipment. The label

does not specify a maximum seasonal rate or number of applications allowed per growing season. The established PHIs are 15 days for rates ≤1 lb ai/A, and 20 days for rates >1-1.25 lb ai/A. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/85 and the Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires the registrants to propose label restrictions limiting the number of foliar applications per season and to establish pregrazing intervals for D, WP, and EC formulations equal to the established PHIs. If the registrant(s) chooses to limit the number of applications to no more than two per season, then the presently available data provide adequate support for the tolerance for residues in or on hay and may be used to support a tolerance increase for residues in or on forage. If the registrant(s) chooses to propose more than two applications per growing season, data depicting residues of concern in or on hay are required following applications according to the maximum use patterns of registered formulations (D, EC, WP, and Mcap). The Guidance Document also requires data depicting methyl parathion residues of concern in or on alfalfa seed following applications according to the maximum registered use pattern of the EC formulation.

Since issuance of the Guidance Document the D formulation has been canceled. We note that the registrants submitting data do not currently hold registrations for the WP formulations; however, if any registrant wishes to support use of this formulation, additional data are required.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41517101) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on alfalfa seed. The combined residues of methyl parathion and methyl paraoxon were nondetectable (<0.10 ppm) in or on alfalfa seed harvested 83-92 days following two foliar broadcast applications of the 4 lb/gal EC formulation at 1x. Residues of p-nitrophenol were <0.05(ND)-0.08 ppm in or on these same samples. The submitted data do not satisfy the Guidance Document requirements for the following reasons: (i) the registrant did not amend product labels to limit the number of foliar applications per season; (ii) the sampling intervals for the submitted data exceed the established 20-day PHI; and (iii) geographic representation was inadequate. We note that previously submitted data were considered adequate to support the tolerance for residues in or on hay following two applications and may be used to support a tolerance revision for alfalfa forage.

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The following additional data are required:

- The registrant(s) must propose a label amendment limiting the maximum number of foliar applications to two per growing season; or, alternatively submit data depicting residues of methyl parathion and methyl paraoxon in or on alfalfa forage and hay following the proposed number of applications according to the maximum use patterns of representative EC formulations. The registrant(s) must also establish pregrazing intervals for alfalfa forage and hay equal to the PHIs.

- Data depicting residues of methyl parathion and methyl paraoxon in or on alfalfa seed harvested 15 and 20 days following the last of the proposed number of foliar applications of the EC formulation at 1 and 1.25 lb ai/A/application, respectively. Tests must reflect the use of ground and aerial equipment. Tests must be conducted in CA(18%), ID(9%), MT(7%), and SD(35%) since these states accounted for ca. 70% of the 1987 U.S. acreage of alfalfa seeds (1987 Census of Agriculture, Vol. 1 Part 51, p. 340).

References (used):

MRID(s): 41517101.

Discussion of the data:

Cheminova (1990; MRID 41517101) submitted data from four tests conducted in CA(2) and WA(2) depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on alfalfa seeds harvested 83-92 days following two foliar broadcast applications (using aerial and ground equipment) with the 4 lb/gal EC formulation at 1.25 lb ai/A/application (1x the maximum registered rate). Seven samples bore nondetectable (<0.05 ppm) residues of methyl parathion, methyl paraoxon, and p-nitrophenol, each; one additional sample bore nondetectable (<0.05 ppm) residues of methyl parathion and methyl paraoxon, and p-nitrophenol residues of 0.08 ppm. Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol each were nondetectable (<0.05 ppm) in or on four samples.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were 73-106%, 75-120%, and 75-107% from eight samples fortified at 0.05-1 ppm with methyl parathion, methyl paraoxon, and p-nitrophenol, respectively. Samples were stored frozen (ca. -20 C) for 309-413 days prior to analysis by Huntingdon Analytical Services. Storage stability data supporting these storage intervals have

not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is inadequate since the test states of CA(18%) and WA(7%) and the neighboring states of ID(9%), NV(3%), and OR(3%) accounted for ca. 40% of the 1987 U.S. alfalfa seed acreage (1987 Census of Agriculture, Vol. 1 Part 51, p 340). The combined residues of methyl parathion and methyl paraoxon were nondetectable (<0.10 ppm) in or on alfalfa seed harvested 83-92 days following two foliar broadcast applications of the 4 lb/gal EC formulation at 1x. Residues of p-nitrophenol were <0.05(ND)-0.08 ppm in or on these same samples. The submitted data do not satisfy the Guidance Document requirements for the following reasons: (i) the registrant did not amend product labels to limit the number of foliar applications per season; (ii) the sampling intervals for the submitted data exceed the established 20-day PHI; and (iii) geographic representation was inadequate. We note that previously submitted data were considered adequate to support the tolerance for residues in or on hay following two applications and may be used to support a tolerance revision for alfalfa forage. Additional data are required.

Clover, forage and hay

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on clover [40 CFR §180.121(a)].

Note to SRRD: We recommend that the tolerance definition be revised to include separate tolerances for residues of methyl parathion in or on "clover, forage" and "clover, hay".

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for multiple foliar applications using ground and aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. The established PHIs are 15 days for rates ≤1 lb ai/A and 20 days for >1-1.25 lb ai/A. These use directions were obtained from the Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting residues of concern in or on clover forage and hay following applications according to the maximum registered use pattern of the D, EC, and Mcap formulations. The Guidance Documents also requires the registrant(s) to propose label

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restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data, and a pregrazing interval for forage. Since issuance of the Guidance Document the D formulation has been canceled. We note that Pennwalt does not hold registrations for use of the Mcap formulation on clover.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41439601) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on clover forage. The available data indicate that the established tolerance may be too low. Residues of methyl parathion exceeded the tolerance (up to 6.5 ppm) in or on clover forage harvested 15 days following two applications of the 4 lb/gal EC formulation at 1 lb ai/A/application, and exceeded the tolerance (up to 3.7 ppm) in or on clover forage harvested 20 days following two applications at 1.25 lb ai/A/application. Residues of methyl paraoxon and p-nitrophenol were <0.05 ppm(ND) and 0.24-3.9 ppm, respectively in or on these same samples. The submitted data do not adequately satisfy Guidance Document requirements because the product label has not been amended and no data were submitted for clover hay. The registrant(s) must propose separate tolerances for the combined residues of methyl parathion and methyl paraoxon in or on clover forage and clover hay. Pending submission of adequate storage stability data, the available data will support a label amendment to establish a maximum of two applications per season and a proposal of a 7 ppm tolerance for clover forage. The following additional data are required:

- The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate. Data depicting residues of methyl parathion and methyl paraoxon in or on clover hay harvested 15 and 20 days following the last of the proposed number of foliar applications of the EC formulation at 1 and 1.25 lb ai/A/application, respectively. Tests must reflect the use of ground and aerial equipment. These tests must be conducted in areas representing the major regions of U.S. hay production. Upon submission of adequate residue data, the registrant(s) must propose a separate tolerance for clover hay.

- The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on clover forage supported by appropriate residue data.

References (used):

MRID(s): 41439601.

Discussion of the data:

Cheminova (1990; MRID 41439601) submitted data from 7 tests conducted in CA(2), ID(2), MN(1), NY(1) and WI(1) depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on clover forage harvested 0-26 days following two foliar broadcast applications using aerial and ground equipment with the 4 lb/gal EC formulation at 1-1.25 lb ai/A/application (0.8x-1x the maximum registered rate). Residues of methyl parathion and its metabolites are presented in the table below.

				Residues (ppm)		
Equipment	PHI	No. of Samples	Total ai/A	Methyl Parathion	Methyl Paraoxon	p-Nitrophenol
Ground	0	10	2	3.6-59.9	<0.05-0.42	1.1-5.7
Aerial	0	4	2	4.1-45.1	<0.05-0.33	0.59-2.3
Ground	0	10	2.5	6.6-69.4	0.05-0.33	0.91-4.5
Aerial	0	4	2.5	14.3-70.9	0.12-0.56	1.3-2.8
Ground	7	10	2	0.19-7.2	<0.05-0.09	0.52-4.7
Aerial	7	4	2	0.05-3.4	<0.05	1.1-3.4
Ground	7	10	2.5	0.49-15	<0.05-0.11	0.91-9/0
Aerial	7	4	2.5	0.08-5.1	<0.05-0.06	1.1-5.0
Ground	**15**	**10**	**2**	**<0.05-6.5[a]**	**<0.05**	**0.24-3.9**
Aerial	**15**	**4**	**2**	**<0.05-0.19**	**<0.05**	**0.36-0.86**
Ground	15	10	2.5	0.06-8.2[a]	<0.05-0.06	0.31-4.2
Aerial	15	2	2.5	0.26, 0.3	<0.05	1.3
Ground	20,21	10	2	<0.05-2.4[a]	<0.05	0.17-3.6
Aerial	20,21	4	2	<0.05	<0.05	0.12-0.27
Ground	**20,21**	**10**	**2.5**	**<0.05-3.7[a]**	**<0.05**	**0.38-3.3**
Aerial	**20**	**2**	**2.5**	**<0.05, 0.07**	**<0.05**	**0.41-0.53**
Ground	25,26	10	2	<0.05-1.4[b]	<0.05	0.11-1.8
Aerial	25	4	2	<0.05	<0.05	0.11-0.15
Ground	25,26	10	2.5	<0.05-1.8[c]	<0.05	0.10-1.3
Aerial	25	2	2.5	<0.05	<0.05	0.08, 0.16
Control		34		<0.05	<0.05	<0.05-1.3

[a] Includes four samples bearing tolerance-exceeding residues.
[b] Includes one sample bearing tolerance-exceeding residues.
[c] Includes two samples bearing tolerance-exceeding residues.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 or 0.10 ppm. The limit of detection for p-nitrophenol is greater than the validated limit of detection

due to interferences in the control sample. Recoveries were: (i) 61-158% from 29 samples fortified with methyl parathion at 0.05-5 ppm; (ii) 89-119% from 29 samples fortified with methyl paraoxon at 0.05-5 ppm; and (iii) 29-112% from 21 samples fortified with p-nitrophenol at 0.05-5 ppm. Samples were stored frozen (ca. -20 C) for 38-475 days prior to analysis by Analytical Development Corporation. Storage stability data supporting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(7%), ID(3%), MN(5%), NY(4%) and WI(4%) represent the major regions of U.S. hay production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). Tolerance-exceeding residues of methyl parathion were reported for clover forage harvested 15 (up to 6.5 ppm) and 20 days (up to 3.7 ppm) following two applications at 1 or 1.25 lb ai/A/application with the 4 lb/gal EC formulation. The registrant(s) must propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested data. No data were submitted for clover hay. Additional data are required.

Miscellaneous Commodities

Artichokes

Tolerance(s):

A tolerance of 1 ppm has been established for residues of methyl parathion in or on artichokes [40 CFR §180.121(a)].

Use directions and limitations:

The 2 lb/gal Mcap and 45.5% (4 lb/gal) EC formulations are registered for multiple foliar applications to artichokes at 1 lb ai/A/application, using ground or aerial equipment. The product labels do not specify the maximum number of applications allowed per growing season. A 7-day PHI has been established. These use directions were obtained from the following product labels, EPA Reg. Nos.: 4581-292, 4787-11, and 34704-10 (a Platte Chemical Company label which was submitted by Cheminova).

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires data depicting methyl parathion residues of concern in or on artichokes following applications according to the maximum registered use pattern of D, WP, EC, and Mcap formulations using high and low volume ground equipment. Additionally, the Guidance Document requires the registrant(s) to propose label restrictions

limiting the number of foliar applications per growing season which must be supported by the requested residue data. Since issuance of the Guidance Document the D formulation has been canceled. We note that the registrants submitting data do not currently hold registrations for the WP formulations; however, if any registrant wishes to support this formulation, additional data must be submitted.

In response to data requirements, Cheminova submitted data (1990; MRID 41717801) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on artichokes. The available residue data indicate that the established tolerance of 1 ppm for residues of methyl parathion in or on artichokes may be too low. Residues of methyl parathion up to 1.77 ppm were reported for artichokes harvested 7 days following four foliar broadcast treatments (using high and low volume ground equipment) with the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of methyl paraoxon and p-nitrophenol were nondetectable (<0.05 ppm) and 0.52-1.19 ppm, respectively in or on these same samples.

The available data do not satisfy Guidance Document requirements for the following reasons: (i) product labels must be amended to limit the number of foliar applications per growing season; (ii) no data were submitted reflecting use of the Mcap formulation; (iii) no data were submitted reflecting the use of aerial equipment for the EC formulation (registered for aerial applications <2 gal/A); and (iv) the available data are not supported by storage stability data. The following additional data are required:

- The registrant(s) must revise product labels to specify a maximum number of applications per season or a maximum seasonal application rate. Data depicting residues of methyl parathion and methyl paraoxon in or on artichokes harvested following the last of the proposed maximum number of foliar applications of the EC formulation (using aerial equipment) and the Mcap formulation (using ground equipment) at 1 lb ai/A/application. These tests must be conducted in the state of CA which accounted for ca. 100% of the 1982 U.S. artichoke acreage (1982 Census of Agriculture, Vol. 1, Part 51, p. 335). Tolerance-exceeding residues were reported for artichokes harvested 7 days following four foliar applications of the EC formulation; the registrant(s) must amend product labels to reflect a reduction in the maximum single application rate and/or a longer PHI. Alternatively, the registrant may propose a higher tolerance for the combined residues of methyl parathion and methyl paraoxon in or on artichokes. Product label or tolerance amendments must be accompanied by adequate supporting data.

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References (used):

MRID(s): 41717801.

References (not used):

[The following reference(s) contain duplicate information.]

MRID(s): 41379301.

Discussion of the data:

Cheminova (1990; MRID 41717801) submitted data from two tests conducted in CA depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on artichokes harvested 7 days following the last of four foliar broadcast applications of the 4 lb/gal EC formulation at 1 lb ai/A, using low and high volume ground equipment. Residues of methyl parathion and its metabolites are presented in the table below.

		Residues (ppm)		
Equipment	No. of Samples	Methyl parathion	Methyl paraoxon	p-Nitrophenol
Low volume	4	0.87-1.26[a]	<0.05	0.57-0.92
High volume	4	0.41-1.77[b]	<0.05	0.52-1.19
Control	2	<0.05	<0.05	<0.10-0.28

[a] Includes two samples bearing tolerance-exceeding residues.
[b] Includes three samples bearing tolerance-exceeding residues.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.10 ppm. Recoveries were: (i) 74-112% from nine samples fortified with methyl parathion at 0.05-2 ppm; (ii) 79-106% from five samples fortified with methyl paraoxon at 0.05-2 ppm; and (iii) 96-115% from five samples fortified with p-nitrophenol at 0.05-2 ppm. Samples were stored frozen (ca. -20 C) for 242-531 days prior to analysis by Biospherics Incorporated. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test state of CA accounted for ca. 100% of the 1982 U.S. artichoke acreage (1982 Census of Agriculture, Vol. 1, Part 51, p. 335). The available residue data indicate that the established tolerance of 1 ppm may be too low. Residues of methyl parathion in or on artichokes harvested 7 days following four foliar broadcast treatments (using high and low volume ground equipment) of the 4 lb/gal EC

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formulation at 1x (the maximum registered single application rate) were up to 1.77 ppm. Residues of methyl paraoxon and p-nitrophenol were nondetectable (<0.05 ppm) and 0.52-1.19 ppm, respectively, in or on these same samples. The available data do not satisfy Guidance Document requirements for the following reasons: (i) product labels must be amended to limit the number of foliar applications per growing season; (ii) no data were submitted reflecting use of the Mcap formulation; (iii) no data were submitted reflecting the use of aerial equipment for the EC formulation (registered for aerial applications <2 gal/A); and (iv) the available data are not supported by storage stability data. Additional data are required.

Cotton, seed and forage

Tolerance(s):

A tolerance of 0.75 ppm has been established for residues of methyl parathion in or on cottonseed [40 CFR §180.121(a)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulations are registered for multiple foliar application to cotton at 0.25-3 lb ai/A/application, using ground or aerial equipment. The label does not specify a maximum seasonal rate or number of applications allowed per growing season. A PHI of 1 day has been established for machine-harvested cotton and a 7-day PHI has been established for hand-harvested cotton. These use directions were obtained from the product label, EPA Reg. No. 4787-11 dated 3/7/75 and a Platte Chemical Company label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

The 2 lb/gal Mcap is registered for multiple foliar applications to cotton at 0.125-1.5 lb ai/A/application, using ground or aerial equipment. The label does not specify the maximum number of applications allowed per growing season. A 7-day PHI has been established or alternatively the cotton may be machine-harvested any time after application by ultra-low-volume spraying. These use directions were obtained from the product label, EPA Reg. No. 4581-292 submitted in response to the 10/6/89 Product Label DCI.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires: (i) data depicting residues of concern in or on cottonseed and cotton forage following applications according to the maximum registered use pattern of a representative D, WP, EC, and Mcap formulation; (ii) the registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data; (iii) the registrant(s)

to propose á tolerance and pregrazing interval for cotton forage; and (iv) the registrant(s) must submit data reflecting residues of concern in the processed products of cottonseed. Since issuance of the Guidance Document the D formulation has been canceled. We note that the registrants submitting data do not currently hold registrations for the WP formulations; however, if any registrant wishes to support this formulation, additional data must be submitted.

In response to data requirements, Cheminova submitted field and processing residue data (1990; MRIDs 41395103 and 41596201) and Pennwalt submitted field residue data (1990; MRID 41457904) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on cottonseed. The available residue data indicate that the established tolerance of 0.75 ppm for residues of methyl parathion in or on cottonseed may be too low. Tolerance-exceeding residues of methyl parathion were reported for cottonseeds harvested 7 days (up to 1.4 ppm) following 10 foliar applications of the 4 lb/gal EC formulation at 1x the maximum single application rate. Residues of methyl parathion up to 7.9 ppm were reported for cottonseed harvested 3 days following eight foliar broadcast applications of the 2 lb/gal Mcap formulation at 1x the maximum registered single application rate. Residues of methyl paraoxon and p-nitrophenol were <0.05(ND)-0.4 ppm and <0.05(ND)-1.1 ppm, respectively in or on these same samples.

The available data do not satisfy the Guidance Document requirements for the following reasons: (i) no data were submitted reflecting the established 0-day or 7-day PHIs following use of the Mcap formulation; (ii) no data were submitted reflecting the established 1-day PHI following use of the EC formulation; and (iii) no storage stability data were submitted to support the available field and processing data. Tolerance-exceeding residues were reported; therefore, upon submission of adequate residue data, the registrant(s) may have to propose a higher tolerance for the combined residues of methyl parathion and methyl paraoxon in or on cottonseed. Alternatively, the registrant(s) may amend product labels to reduce the application rate, limit the maximum number of applications per season, and/or lengthen the PHI.

No data depicting residues of methyl parathion in or on cotton forage were submitted. The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on cotton forage and provide supporting residue data; alternatively, the registrant(s) may place a feeding restriction on product labels.

The available processing residue data indicate that the combined residues of methyl parathion and methyl paraoxon do not concentrate in meal, hulls, soapstock, and crude and refined oil.

Pending submission of adequate storage stability data, no additional processing data are required.

The following additional field residue data are required:

- The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate and submit the supporting data.

- Data depicting residues of methyl parathion and methyl paraoxon in or on cottonseed harvested 1 day following the last of the proposed number of applications of the EC formulation at 1 lb ai/A/application. Tests must reflect the use of ground and aerial equipment. Tests must be conducted in AZ(7%), CA(18%), MS(12%), and TX(34%) since these states accounted for ca. 70% of the 1988 U.S. cotton production (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989).

- Data depicting residues of methyl parathion and methyl paraoxon in or on cottonseed harvested 0 days and 7 days following the last of the proposed number of applications of the Mcap formulation at 1 lb ai/A/application using ultra low volume (0-day PHI) and ground (7-day PHI) equipment. Tests must be conducted in AZ(7%), CA(18%), MS(12%), and TX(34%) since these states accounted for ca. 70% of the 1988 U.S. cotton production (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989).

- Data depicting residues of methyl parathion and methyl paraoxon in or on cotton forage following the last of the proposed maximum number of foliar applications of the EC and Mcap formulations applied at the maximum registered single application rates for the formulations. Tests must be conducted in AZ(7%), CA(18%), MS(12%), and TX(34%) since these states accounted for ca. 70% of the 1988 U.S. cotton production (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989).

- The registrant(s) must propose a tolerance for combined residues of methyl parathion and methyl paraoxon in or on cotton forage, upon submission of adequate residue data. Alternatively, the registrant(s) may alter product labels to impose a feeding restriction for cotton forage.

References (used):

MRID(s): 41395103. 41457904. 41596201.

Discussion of the data:

Cheminova (1990; MRID 41395103) submitted data from eight tests conducted in CA(4) and TX(4) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on cottonseed harvested 0 and 7 days following the last of 10 foliar broadcast applications (using ground and aerial equipment) of the 4 lb/gal EC formulation at 1 and 3 lb ai/A. Residues of methyl parathion and its metabolites are presented in the table below.

Equipment	PHI	No. of Samples	Total lb ai per A	Residues (ppm) Methyl parathion	Methyl paraoxon	p-Nitrophenol
Aerial	0	4	26	<0.05-2.2	<0.05	<0.05-0.36
Ground	0	4	26	<0.05-4.51	<0.05-0.14	<0.05-0.80
Aerial	7	4	30	<0.05-1.23[a]	<0.05	<0.05-0.50
Ground	7	4	30	0.05-1.43[b]	<0.05	<0.05-0.70
Control		4		<0.05-0.09	<0.05	<0.05-0.06

[a] Includes 2 samples bearing tolerance-exceeding residues (0.90 and 1.23 ppm).
[b] Includes 2 samples bearing tolerance-exceeding residues (0.91 and 1.43 ppm).

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were: (i) 72-107% from seven samples fortified with methyl parathion at 0.05-5 ppm; (ii) 88-127% from eight samples fortified with methyl paraoxon at 0.05-5 ppm; and (iii) 75-114% from eight samples fortified with p-nitrophenol at 0.05-5 ppm. Samples were stored frozen (ca. -20 C) for 331-390 days prior to analysis by Huntingdon Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Pennwalt (1990; MRID 41457904) submitted data from six tests conducted in CA(2), MS(2), and TX(2) depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on cottonseed harvested 0 and 3 days following the last of eight foliar broadcast applications (using ground and aerial equipment) of the 2 lb/gal Mcap formulation at 1.5 lb ai/A. Residues of methyl parathion and its metabolites are presented in the table below.

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Equipment	PHI	No. of Samples	Residues (ppm) Methyl parathion	Methyl paraoxon	p-Nitrophenol
Aerial	0	6	0.35-6	<0.05-0.11	<0.05-0.38
Ground	0	6	0.85-12	<0.05-0.26	0.09-1.10
Aerial	3	6	0.16-4.1[a]	<0.05-0.13	<0.05-0.17
Ground	3	6	0.65-7.9[b]	<0.05-0.13	<0.05-0.38
Control		5	<0.05	<0.05	<0.05

[a] Includes one sample bearing tolerance-exceeding residues (4.1 ppm).
[b] Includes five samples bearing tolerance-exceeding residues (1.2-7.9 ppm).

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method (Pennwalt method BR-007-00) with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method (Pennwalt method BR-007-00) with a detection limit of 0.05 ppm. Recoveries were: (i) 70-118% from 18 samples fortified with methyl parathion at 0.5-10 ppm; (ii) 74-114% from 18 samples fortified with methyl paraoxon at 0.5-10 ppm; and (iii) 68-133% from 18 samples fortified with p-nitrophenol at 0.5-10 ppm. Samples were stored frozen (ca. -15 C) for 290-474 days prior to analysis by EN-CAS Analytical Laboratories. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Cheminova (1990; MRID 41596201) submitted two processing studies conducted in CA and TX depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in the processed commodities of cottonseed. Cottonseeds were harvested 7 days following the last of six foliar applications using ground equipment with the 4 lb/gal EC formulation at 15 lb ai/A/application (10x the maximum registered single application rate). Cottonseed samples were processed according to simulated commercial practices into meal, hulls, soapstock, and crude and refined oil. Residues of methyl parathion and its metabolites in various processed fractions (one sample each) are presented in the table below.

Commodity	Residues (ppm)	
	Methyl parathion and methyl paraoxon combined	P-Nitrophenol
California:		
Whole cottonseeds	14.1	1.68
Meal	<0.58	0.33
Hulls	<5.8	0.94
Soapstock	0.33	0.54
Crude oil	<11.3	0.16
Refined oil	8.3	0.06
Texas:		
Whole cottonseeds	4.2	0.9
Meal	<0.56	2.67
Hulls	<2.09	2.04
Soapstock	<0.14	0.54
Crude oil	<0.35	<0.05
Refined oil	<0.33	<0.05

Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol were <0.05(ND)-0.08 ppm, <0.05(ND) ppm, and <0.05(ND) ppm, respectively in two untreated samples of each processed commodity. Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries from samples fortified at 0.05-10 ppm with methyl parathion, methyl paraoxon, and p-nitrophenol are presented in the table below.

Commodity	Percent Recovery[a]		
	Methyl Parathion	Methyl Paraoxon	P-Nitrophenol
Whole cottonseeds	83-108 (9)	89-125 (9)	91-128 (8)
Meal	87-107 (7)	92-123 (7)	100-118 (6)
Hulls	67-99 (6)	68-99 (6)	63-83 (6)
Soapstock	76-121 (6)	76-125 (6)	73-105 (6)
Crude oil	64-120 (7)	68-127 (6)	61-104 (7)
Refined oil	73-113 (6)	10-112 (6)	81-103 (6)

[a] Number in parentheses indicates the number of samples.

Samples were stored frozen (ca. -20 C) for 123-447 days prior to analysis by Huntingdon Analytical Services. Storage stability data reflecting these storage intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test states of CA(18%), MS(12%), and TX(34%) and the neighboring states of AL(2%), AZ(7%), AR(7%), LA(6%), NM(1%), OK(2%), and TN(4%) accounted for ca. 90% of the 1988 U.S. cotton production (Ag. Statistics Board, NASS, USDA Crop Database, Jan. 1989). The available residue data indicate that the established tolerance of 0.75 ppm for residues of methyl parathion in or on cottonseed may be too low. Tolerance-exceeding residues of methyl parathion were reported for cottonseeds harvested 7 days (up to 1.4 ppm) following 10 foliar applications of the 4 lb/gal EC formulation at 1x the maximum single application rate. Residues of methyl parathion up to 7.9 ppm were reported for cottonseed harvested 3 days following eight foliar broadcast applications of the 2 lb/gal Mcap formulation at 1x the maximum registered single application rate. Residues of methyl paraoxon and p-nitrophenol were <0.05(ND)-0.4 ppm and <0.05(ND)-1.1 ppm, respectively in or on these same samples.

The available data do not satisfy the Guidance Document requirements for the following reasons: (i) no data were submitted reflecting the established 0-day or 7-day PHIs following use of the Mcap formulation; (ii) no data were submitted reflecting the established 1-day PHI following use of the EC formulation; and (iii) no storage stability data were submitted to support the available field and processing data. Tolerance-exceeding residues were reported; therefore, upon submission of adequate residue data, the registrant(s) may have to propose a higher tolerance for the combined residues of methyl parathion and methyl paraoxon in or on cottonseed. Alternatively, the registrant(s) may amend product labels to reduce the application rate, limit the maximum number of applications per season, and/or lengthen the PHI.

No data were submitted reflecting residues of methyl parathion in or on cotton forage. The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on cotton forage and provide supporting residue data; alternatively, the registrant(s) may place a feeding restriction on product labels.

The available processing residue data indicate that combined residues of methyl parathion and methyl paraoxon do not concentrate in meal, hulls, soapstock, and crude and refined oil. Pending submission of adequate storage stability data, no additional processing data are required.

Additional field residue data are required.

Sunflower, seeds and forage

Tolerance(s):

A tolerance of 0.2 ppm has been established for residues of methyl parathion in or on sunflower seed [40 CFR §180.121(a)].

Use directions and limitations:

The 45.5% EC (4 lb/gal) formulation is registered for three foliar applications to sunflowers at 1 lb ai/A/application. A 30-day PHI has been established. These use directions were obtained from the Platte Chemical Company product label, EPA Reg. No. 34704-10, which was submitted by Cheminova.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 requires: (i) data depicting residues of concern in or on sunflower seed and forage following applications according to the maximum registered use pattern of a representative EC formulation; (ii) registrant(s) to propose label restrictions limiting the number of foliar applications per growing season which must be supported by the requested residue data; (iii) registrant(s) to propose a tolerance for residues of methyl parathion in or on sunflower forage and a pregrazing interval; and (iv) registrants to submit data reflecting residues of concern in the processed products of sunflowers.

In response to data requirements, Cheminova submitted field residue data (1990; MRID 41359904) depicting residues of methyl parathion and its metabolites methyl paraoxon and p-nitrophenol in or on sunflower seeds. The available residue data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on sunflower seeds harvested 30 days following three foliar broadcast applications (using aerial and ground equipment) of the 4 lb/gal EC formulation at 1x the maximum registered single application rate. Residues of p-nitrophenol were nondetectable (<0.05 ppm) in or on these same samples. Pending the submission of adequate storage stability data and product label amendments, these data adequately satisfy Guidance Document requirements for sunflower seed field residue studies. However, no data were submitted depicting methyl parathion residues of concern in or on sunflower forage and in the processed products of sunflower seeds.

The following additional data are required:

- Data depicting residues of methyl parathion and methyl paraoxon in or on sunflower forage harvested following three foliar applications of an EC formulation at 1 lb ai/A/application, utilizing aerial and high and low volume ground equipment in separate tests. These tests must be conducted in ND since this state accounted for ca. 80% of the 1988 U.S. production of sunflower (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989). Upon submission of adequate residue data, a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on sunflower forage and a pregrazing interval must be proposed. Alternatively, the registrant(s) may place a grazing restriction on the product labels.

- A processing study depicting the potential for concentration of residues of methyl parathion and methyl paraoxon in meal, hulls, crude oil, refined oil processed from sunflower seeds bearing measurable, weathered residues. If residues concentrate in any product, an appropriate food/feed additive tolerance must be proposed.

References (used):

MRID(s): 41359904.

Discussion of the data:

Cheminova (1990; MRID 41359904) submitted data from two tests conducted in ND depicting residues of methyl parathion, and its metabolites methyl paraoxon and p-nitrophenol in or on sunflower seeds harvested 30 days following the last of three foliar broadcast applications (using ground and aerial equipment) of the 4 lb/gal EC formulation at 1 lb ai/A. Residues of methyl parathion, methyl paraoxon, and p-nitrophenol were nondetectable (<0.05 ppm each) in or on six treated samples. Apparent residues of methyl parathion, methyl paraoxon, and p-nitrophenol were nondetectable (<0.05 ppm) in or on two untreated samples.

Methyl parathion and methyl paraoxon residue data were collected using a GLC/FPD method with detection limits of 0.05 ppm. p-Nitrophenol data were collected using a HPLC-UV method with a detection limit of 0.05 ppm. Recoveries were: (i) 90-105% from four samples fortified with methyl parathion at 0.05-1 ppm; (ii) 111-128% from four samples fortified with methyl paraoxon at 0.05-1 ppm; and (iii) 106-128% from four samples fortified with p-nitrophenol at 0.05-1 ppm. Samples were stored frozen (ca. -20 C) for 348-351 days prior to analysis by Huntingdon Analytical Services. Storage stability data reflecting these storage

intervals have not been submitted for residues of methyl parathion and its metabolites.

Geographic representation is adequate since the test state of ND(82%) accounted for ca. 80% of the 1988 U.S. sunflower production (Ag. Statistics Board, NASS, USDA Crop Database, Aug. 1989). Pending the submission of adequate storage stability data, the available residue data indicate that the combined residues of methyl parathion and methyl paraoxon will not exceed the established tolerance in or on sunflowers harvested 30 days following three foliar broadcast treatments with the 4 lb/gal EC formulation at 1x. No data were submitted depicting residues of concern in or on sunflower forage and in the processed products of sunflower seeds. Additional data are required.

MAGNITUDE OF THE RESIDUE IN ANIMALS

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

Tolerance(s):

There are currently no tolerances established for residues of methyl parathion in milk and the fat, meat, and meat byproducts of cattle, goats, hogs, horses, and sheep.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 concludes that the nature of the residue in plants and animals is not adequately understood. Therefore, the need for tolerances cannot be assessed until the required metabolism data and residue data for crops and processed products used for animal feeds are submitted and reviewed.

Based on the available residue data reviewed in this Update for raw agricultural commodities and byproducts consumed by livestock, a ruminant feeding study is required because detectable residues are found in these feed commodities. The Agency Metabolism Committee has determined that the parent compound and methyl paraoxon are the residues that need to be included in the tolerance expression for animal commodities (EPA Memorandum of 3/16/92, R. Perfetti). The Committee has also determined that residues of free and conjugated forms of p-aminophenol and p-nitrophenol must be determined when conducting feeding studies.

The maximum dietary intake of methyl parathion for ruminants is 3 ppm based on a diet consisting of 50% alfalfa hay, 25% corn grain, and 25% sugar beet molasses. The following additional data are required:

- A feeding study with ruminants which are fed methyl parathion *per se* at levels of 1x, 3x, and 10x the maximum expected dietary intake by ruminants. Animals must be dosed for at least four weeks; if residues in milk have not reached a plateau by the end of four weeks, the dosing period should be continued until residues have reached a plateau. Animals must be sacrificed within 24 hours of the final dose. In this study, the milk, fat, meat, and meat byproducts of ruminants must be analyzed for methyl parathion, methyl paraoxon, and free and conjugated forms of p-aminophenol and p-nitrophenol.

References (used):

N/A.

Discussion of the data:

N/A.

Eggs, and the Fat, Meat, and Meat Byproducts of Poultry

Tolerance(s):

There are currently no tolerances established for residues of methyl parathion in eggs and the fat, meat, and meat byproducts of poultry.

Conclusions:

The Methyl Parathion Guidance Document dated 12/86 concludes that the nature of the residue in plants and animals is not adequately understood. Therefore, the need for tolerances cannot be assessed until the required metabolism data and residue data for crops and processed products used for animal feeds are submitted and reviewed.

Based on the available residue data reviewed in this Update for raw agricultural commodities and byproducts consumed by livestock, a poultry feeding study is required because detectable residues are found in these feed commodities. The Agency Metabolism Committee has determined that the parent compound and methyl paraoxon are the residues that need to be included in the tolerance expression for animal commodities (EPA Memorandum of 3/16/92, R. Perfetti). The Committee has also determined that residues of free and conjugated forms of p-aminophenol and p-nitrophenol must be determined when conducting feeding studies.

The maximum dietary intake of methyl parathion for poultry is 1.2 ppm based on a diet consisting of 5% alfalfa meal, 15% beans, 70% field corn grain, and 10% peanut soapstock. The following additional data are required:

- A feeding study with poultry which are fed methyl parathion per se at levels of 1x, 3x, and 10x the maximum expected dietary intake by poultry. Animals must be dosed for at least four weeks; if residues in eggs have not reached a plateau by the end of four weeks, the dosing period should be continued until residues have reached a plateau. Animals must be sacrificed within 24 hours of the final dose. In this study, the eggs, meat, and meat byproducts of poultry must be analyzed for

methyl parathion, methyl paraoxon, and free and conjugated forms of p-aminophenol and p-nitrophenol.

References (used):

N/A.

Discussion of the data:

N/A.

REDUCTION OF RESIDUE

Reduction of residue information is required for a pesticide whe the Agency determines that tolerance level residues would result in exposures at unsafe levels. Data on residues in food as consumed provide a more precise estimate of dietary exposure, therefore such data should be generated for methyl parathion and its metabolite, methyl paraoxon. This may include monitoring, degradation, and processing (cooking, etc.) studies. Reduction of residue data may be required if the required field trial data do not show reduction of the exceedance to less that 100%. The registrant(s) is urged to contact the Agency regarding appropriate protocols for these studies prior to initiating any experiments.

TOLERANCE REASSESSMENT SUMMARY

It should be noted that data gaps exist for plant and animal metabolism and storage stability. Thus, upon receipt of the information requested in "Qualitative Nature of the Residue in Plants", "Qualitative Nature of the Residue in Animals", and "Storage Stability Data", the conclusions stated below may change.

Tolerances have been established for residues of methyl parathion in a variety of raw agricultural commodities [40 CFR §180.121(a) and (b), and 40 CFR §180.319]. The tolerances presented in 40 CFR §180.121(a) are tolerances for the residues of ethyl parathion and its methyl homolog (methyl parathion), whereas 40 CFR §180.121(b) includes tolerances for residues of methyl parathion per se. We recommend that the tolerance expression in 40 CFR 180.121 be revised to include separate tolerances for residues of methyl parathion and ethyl parathion and that the tolerance expression for methyl parathion be revised to include tolerances for the combined residues of methyl parathion and methyl paraoxon.

The registrant(s) must amend product labels to specify a maximum number of applications per season and/or a maximum seasonal rate for all crops, which must be supported by appropriate residue data.

Provided that product labels are amended, sufficient data are available to ascertain the adequacy of the established tolerances for: alfalfa hay; broccoli; Brussels sprouts; carrots; cauliflower; collards; corn; corn, forage; grass (forage); kale; kohlrabi; mustard greens; mustard seed; onions; potatoes; spinach; sugar beets; and sugar beet tops. The available data would support a revision of the tolerance expression to include the combined residues of methyl parathion and methyl paraoxon for these commodities without an increase in the tolerance level.

Insufficient data are available to ascertain the adequacy of the established tolerances for: alfalfa (fresh); almonds; almond hulls; apples; apricots; artichokes; barley; beet greens (alone); beets (with or without tops); cabbage; celery; cherries; clover; cottonseed; cucumbers; gooseberries; grapes; hops; lettuce; melons; nectarines; oats; peaches; peanuts; pears; peas; peas, forage; pecans; peppers; plums (fresh prunes); pumpkins; rice; rutabagas (with or without tops); safflower seed; sorghum; sorghum fodder; sorghum forage; soybeans; soybean hay; squash; strawberries; summer squash; sunflower seed; sweet potatoes; turnips (with or without tops); turnips greens; vetch; and wheat.

Processing studies are required for apples, hops, peanuts, plums, soybeans (soapstock and grain dust only), sunflower seed,

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tomatoes, and wheat (grain dust only). In addition, processing data from corn, cottonseed, and peanuts may be translated to satisfy processing data requirements for rape seed and safflower seed.

Higher tolerances may need to be proposed for artichokes, celery, grapes, lettuce, pea forage, rice, soybean hay, turnip greens, and wheat.

Feed/food additive tolerances must be proposed for rice, hulls (5x); soybeans, oil, refined (3x); wheat, bran (2x); and wheat, shorts (3x) when appropriate tolerance levels for the corresponding raw agricultural commodities have been determined.

Separate tolerances must be proposed for the following commodities: beans, succulent; beans, dry; clover, forage; clover, hay; corn, sweet (K+CWHR); corn, field, grain; onions, dry bulb; onions, green; peas, succulent; peas, dried; vetch, forage; and vetch, hay. Concomitant with the establishment of these tolerances, the following tolerances should be revoked: beans, clover, corn, onions, peas, and vetch.

Tolerances must be proposed for the following commodities: alfalfa, seed; barley, forage; barley, straw; beans, vines; beans, hay; corn, field, fodder; cotton, forage; grass, hay; oats, forage; oats, straw; peas, hay; peanuts, hay; peanuts, hulls; peanuts, vines; rice, straw; rye, forage; rye, straw; sorghum (milo), hay; soybeans, forage; sunflower, forage; wheat, forage; and wheat, straw. In addition, a permanent tolerance should be proposed for residues of methyl parathion in or on rye, grain; the interim tolerance established under 40 CFR §180.319 should then be revoked.

The following tolerances established under 40 CFR §180.121 (a) should be revoked since there are currently no registered uses of methyl parathion and uses of ethyl parathion have been canceled on these crops: avocados; blackberries; blueberries (huckleberries); boysenberries; citrus fruits; cranberries; currants; dates; dewberries; eggplant; endive (escarole); figs; filberts; garlic; guavas; loganberries; mangoes; okra; olives; parsnips (with or without tops); parsnip greens (alone); pineapple; quince; radishes (with or without tops); radish tops; raspberries; sugarcane; sugarcane fodder; sugarcane forage; Swiss chard; walnuts; and youngberries. In addition, we recommend that the tolerance for rutabaga tops be canceled since rutabaga tops are not presently considered to be a raw agricultural commodity of rutabagas.

The following tolerances established under 40 CFR §180.121 (b) should be revoked since there are currently no registered uses of methyl parathion and uses of ethyl parathion have been canceled on these crops: guar beans; parsley; trefoil forage; and trefoil

hay. In addition, we recommend that the individual tolerances for the Brassica leafy vegetables (broccoli, Brussels sprouts, cabbage, cauliflower, collard, kale, kohlrabi, and mustard greens) under 40 CFR §180.121(a) be revoked since a crop group tolerance is already established under 40 CFR §180.121 (b).

The following commodity definitions should be changed in 40 CFR §180.121 in keeping with presently accepted commodity definitions: (i) "beets (with or without tops)" should be changed to "beets, garden, roots"; (ii) "rutabagas (with or without tops)" should be changed to "rutabagas, roots"; (iii) turnips (with or without tops)" should be changed to "turnips, roots"; (iv) "pea forage" should be changed to "peas, vines"; and (v) "fresh alfalfa" should be changed to "alfalfa, forage".

Tolerances do not currently exist nor are they proposed for residues of methyl parathion in animal commodities. Upon receipt of the requested plant and animal metabolism and crop residue data, the need for tolerances in animal commodities will be evaluated.

MASTER RECORD IDENTIFICATION NUMBERS

The following references were obtained from a Guideline Seque Number search conducted on March 7, 1991 for documents on met parathion.

Residue Chemistry Citations (used):

41001401 Linke, P.; Bornatsch, W.; Brauner, A.; et al. (1988) Metabolism of [phenyl-UL-[^{14}C]]Parathion-methyl in Cott Seeds and Leaves: PF-Report No. 3037. Unpublished study prep by Bayer Ag. 77 p.

41001403 Linke, P.; Brauner, A. (1988) Parathion-methyl: Metabolism in Potatoes: Laboratory Project ID: M 173 0 193-4. Unpublished study prepared by Bayer Ag. 62 p.

41001404 Ritter, A. (1988) [^{14}C]-Parathion-methyl: Plant Metabolism Study with Lettuce in the Greenhouse in Accordance with the EPA ... Residue Chemistry... : RCC Project 092114. Unpublished study prepared by RCC Umweltchemie Ag. 75 p.

41001405 Van Dijk, A. (1988) [^{14}C]-Parathion-methyl: Metabol: Absorption, Distribution and Excretion after Repeated Oral Administration to a Lactating Goat: RCC Project 091585. Unpublished study prepared by R C C Umweltchemie Ag. 152 p.

41001406 Van Dijk, A. (1988) [^{14}C]-Parathion-methyl: Metabol: Absorption, Distribution and Excretion after Repeated Oral Administration to Laying Hens: RCC Project 091798. Unpublish study prepared by R C C Umweltchemie Ag. 145 p.

41359901 Canez, V. (1989) The Magnitude of Methyl Parathion Residues on Mustard Greens: Lab Project Number: PAL/MP/MG. Unpublished study prepared by Huntingdon Analytical Services. 315 p.

41359902 Canez, V. (1989) The Magnitude of Methyl Parathion Residues on Bermuda Grass: Lab Project Number: PAL/MP/BE. Unpublished study prepared by Analytical Development Corp. 2 p.

41359903 Canez, V. (1989) The Magnitude of Methyl Parathion Residues on Bluegrass: Lab Project Number: PAL/MP/BL. Unpublished study prepared by Analytical Development Corp. 2 p.

41359904 Canez, V. (1989) The Magnitude of Methyl Parathion Residues on Sunflower: Lab Project Number: PAL/MP/BO. Unpublished study prepared by Huntingdon Analytical Services. 156 p.

41359905 Canez, V. (1989) The Magnitude of Methyl Parathion Residues on Fescue: Lab Project Number: PAL/MP/BO. Unpublished study prepared by Analytical Development Corp. 208 p.

41359906 Canez, V. (1989) The Magnitude of Methyl Parathion Residues on Spinach: Lab Project Number: PAL/MP/SP. Unpublished study prepared by Huntingdon Analytical Services. 380 p.

41379302 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Head and Leaf Lettuce: Lab Project ID: PAL-MP-LE. Unpublished study prepared by Huntingdon Analytical Services and Pan-Agricultural Laboratories, Inc. 525 p.

41379303 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Soybeans: Lab Project ID: PAL-MP-SY. Unpublished study prepared by Analytical Development Corp. and Pan-Agricultural Laboratories, Inc. 205 p.

41379304 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Cabbage: Lab Project Number: PAL-MP-CB. Unpublished study prepared by Analytical Development Corp. and Pan-Agricultural Laboratories, Inc. 422 p.

41379305 Canez, V. (1990) The Magnitude of Methyl Parathion Residue on Broccoli: Lab Project ID PAL-MP-BR. Unpublished study prepared by Analytical Development Corp. and Pan-Agricultural Laboratories, Inc. 293 p.

41379306 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Sugarbeet and Sugarbeet Processed Commodities: Lab Project IDPAL-MP-SB. Unpublished study prepared by Biospherics, Inc. and Pan-Agricultural Laboratories, Inc. 379 p.

41379307 Cooley, T. (1990) The Magnitude of Methyl Parathion Residues on Rice: Lab Project ID: PAL-MP-RI. Unpublished study prepared by Huntingdon Analytical Services and Pan-Agricultural Laboratories, Inc. 253 p.

41395103 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Cottonseed: Final Report: Project Nos. PAL-MP-CS; HAS A031. 001G. Unpublished study prepared by Pan-Agricultural Laboratories, Inc. and Huntingdon Analytical Services. 252 p.

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41438101 Canez, V. (1989) The Magnitude of Methyl Parathion Residues on Lima Beans: Project Nos. PAL-MP-LB; 88-019-02K. Unpublished study prepared by Pan-Agricultural Laboratories, Inc. and Biospherics, Inc. 179 p.

41438102 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Potato and Potato Processed Commodities: Final Report: Lab Project Nos. PAL-MP-PO; 88-019-02H. Unpublished study prepared by Pan-Agricultural Laboratories, Inc. and Biospherics, Inc. 392 p.

41439601 Canez, V. (1989) The Magnitude of Methyl Parathion Residues on Clover Forage: Final Report: Lab Project Nos. PAL-MP-CL-F; 1114-10. Unpublished study prepared by Pan-Agricultural Laboratories, Inc. and Analytical Development Corp. 425 p.

41457901 Pitt, J. (1990) Methyl Parathion and Its Metabolites Methyl Paraoxon and p-Nitrophenol: Magnitude of the Residue in Lima Bean: Lab Project Number: BR-88-39: 50-88. Unpublished study prepared by EN-CAS Analytical Laboratories. 249 p.

41457902 Pitt, J. (1990) Methyl Parathion and Its Metabolites Methyl Paraoxon and p-Nitrophenol: Magnitude of the Residue in Grape: Lab Project Number: BR-88-35: 56-88. Unpublished study prepared by EN-CAS Analytical Laboratories. 176 p.

41457903 Pitt, J. (1989) Methyl Parathion and its Metabolites Methyl Paraoxon and p-Nitrophenol: Magnitude of the Residue in Processed Grape Fractions: Lab Project Number: BR-88-12: 57-88. Unpublished study prepared by EN-CAS Analytical Laboratories. 208 p.

41457904 Pitt, J. (1990) Methyl Parathion and its Metabolites Methyl Paraoxon and P-Nitrophenol: Magnitude of the Residue in Cottonseed: Lab Project Number: 89-0037: 48-88. Unpublished study prepared by EN-CAS Analytical Laboratories. 331 p.

41517101 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Alfalfa Seed: Lab Project Number: PAL-MP-AF. Unpublished study prepared by Huntingdon Analytical Services. 244 p.

41517102 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Dry Beans: Lab Project Number: PAL-MP-DB. Unpublished study prepared by Biospherics, Inc. 293 p.

41517103 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Sorghum: Lab Project Number: PAL-MP-SG. Unpublished study prepared by Huntingdon Analytical Services. 496 p.

41517104 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Soybean and Soybean Processed Commodities: Lab Project Number: PAL-MP-SY-P. Unpublished study prepared by Analytical Development Corp. 205 p.

41560001 Pitt, J. (1990) Methyl Parathion and its Metabolites Methyl Paraoxon and p-Nitrophenol: Magnitude of the Residue in Spring Wheat Grain Project Number: A036/001: 54-88. Unpublished study prepared Huntingdon Analytical Services. 525 p.

41560002 Pitt, J. (1990) Methyl Parathion and its Metabolites Methyl Paraoxon and p-Nitrophenol: Magnitude of the Residue in Field Corn: Lab Project Number: A036/001: 544-88. Unpublished study prepared by Huntingdon Analytical Services. 525 p.

41560003 Pitt, J. (1990) Methyl Parathion and its Metabolites Methyl Paraoxon and p-Nitrophenol: Magnitude of the Residue in Soybean Feedstuff: Lab Project Number: A036/004: 02/1/88. Unpublished study prepared by Huntingdon Analytical Services. 502 p.

41560004 Pitt, J. (1990) Methyl Parathion and its Metabolites Methyl Paraoxon and p-Nitrophenol: Magnitude of the Residue in Rice: Lab Project Number: BR/88/40. Unpublished study prepared by Colorado Analytical Research & Development Corp. 318 p.

41560005 Pitt, J. (1990) Methyl Parathion and its Metabolites Methyl Paraoxon and p-Nitrophenol: Magnitude of the Residue in Snap Bean: Lab Project Number: A036/005B: BR/88/37. Unpublished study prepared by Huntingdon Analytical Services. 327 p.

41596201 LeRoy, R. (1990) The Magnitude of Methyl Parathion Residues on Cottonseed and Cottonseed Processed Commodities: Lab Project No: PAL-MP-CS-P. Unpublished study prepared by Pan-Agricultural Laboratories, Inc., in cooperation with Huntingdon Analytical Services. 261 p.

41596203 Jones, P. (1990) The Magnitude of Methyl Parathion Residues on Green and Bulb Onions: Supplement: Lab Project No: MP-ON-3113; PAL-MP-ON. Unpublished study prepared by Pan-Agricultural Laboratories, Inc. 112 p.

41596204 Jones, P. (1990) The Magnitude of Methyl Parathion Residues on Lettuce: Lab Project Number: MP-LE-3192: PAL-MP-LE: Supplement. Unpublished study prepared by Pan-Agricultural Laboratories, Inc. 110 p.

41596205 LeRoy, R. (1990) The Magnitude of Methyl Parathion Residues on Rice Processed Commodities: Lab Project Number: PAL-MP-RI-P. Unpublished study prepared by Pan-Agricultural Laboratories, Inc., in cooperation with Huntingdon Analytical Services. 246 p.

41596206 LeRoy, R. (1990) The Magnitude of Methyl Parathion Residues on Snap Bean and Snap Bean Processed Commodities: Lab Project Number:PAL-MP-LB. Unpublished study prepared by Pan-Agricultural Laboratories, Inc., in cooperation with Biospherics, Inc. 473 p.

41596207 LeRoy, R. (1990) The Magnitude of Methyl Parathion Residues on Succulent and Dried Peas: Lab Project Number: PAL-MP-PE. Unpublished study prepared by Pan-Agricultural Laboratories, Inc. ,in cooperation with Analytical Development Corp. 744 p.

41596209 LeRoy, R. (1990) The Magnitude of Methyl Parathion Residues on Wheat and Wheat Processed Commodities: Lab Project Number: PAL-MP-WH-P. Unpublished study prepared by Pan-Agricultural Laboratories, Inc., in cooperation with Huntingdon Analytical Services. 965 p.

41717801 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Artichoke: Amended Report: Lab Project Number: PAL-MP-AR. Unpublished study prepared by Biospherics, Inc., in association with Pan-Agricultural Laboratories, Inc. 169 p.

41717802 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Celery: Amended Report: Lab Project Number: PAL-MP-CY. Unpublished study prepared by Biospherics, Inc., in association with Pan-Agricultural Laboratories, Inc. 310 p.

41717803 LeRoy, R. (1990) The Magnitude of Methyl Parathion Residues on Field Corn: Amended Report: Lab Project Number: PAL-MP-CN. Unpublished study prepared by Biospherics, Inc., in association with Pan-Agricultural Laboratories, Inc. 768 p.

41717804 LeRoy, R. (1990) The Magnitude of Methyl Parathion Residues on Field Corn Processed Commodities: Lab Project No: PAL-MP-CN-P. Unpublished study prepared by Biospherics, Inc., in association with Pan-Agricultural Laboratories, Inc. 240 p.

41717805 LeRoy, R. (1990) The Magnitude of Methyl Parathion Residues on Sweet Corn: Amended Report: Lab Project Number: PAL-MP-CN. Unpublished study prepared by Biospherics, Inc., in association with Pan-Agricultural Laboratories, Inc. 340 p.

41717806 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Turnip: Amended Report: Lab Project Number: PAL-MP-TU. Unpublished study prepared by Biospherics, Inc., in association with Pan-Agricultural Laboratories, Inc. 315 p.

Residue Chemistry Citations (not used):

[The following MRIDs contain preliminary or duplicate information.]

41001402 Linke, P. (1987) [^{14}C]-Methylparathion: Metabolism in Lettuce (Bound Residues): Laboratory Project ID: M 1730235-1. Unpublished study prepared by Bayer Ag. 20 p.

41379301 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Artichoke: Lab Project ID PAL-MP-AR. Unpublished study prepared by Biospherics, Inc. and Pan-Agricultural Laboratories, Inc. 163 p.

41395101 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Turnip: Final Report: Project PAL-MP-TU; 88-019-02A. Unpublished study prepared by Pan-Agricultural Laboratories, Inc. and Biospherics, Inc. 309 p.

41395102 Canez, V. (1990) The Magnitude of Methyl Parathion Residues on Celery: Final Report: Project Nos. PAL-MP-CY; 88-019-02B. Unpublished study prepared by Pan-Agricultural Laboratories, Inc. and Biospherics, Inc. 268 p.

41596202 LeRoy, R. (1990) The Magnitude of Methyl Parathion Residues on Field Corn: Lab Project Number: PAL-MP-CN. Unpublished study prepared by Pan-Agricultural Laboratories, Inc., in cooperation with Biospherics, Inc. 637 p.

41596208 LeRoy, R. (1990) The Magnitude of Methyl Parathion Residues on Sweet Corn: Lab Project Number: PAL-MP-CN. Unpublished study prepared by Pan-Agricultural Laboratories, Inc., in cooperation Biospherics, Inc. 248 p.

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[The following MRIDs contain data that were either not submitted in response to the Guidance Document or that are not useful in satisfying residue chemistry data requirements.]

00153356 Pennwalt Corp. (1985) Application for Amended Registration of Penncap-M Microencapsulated Insecticide ULV Application to Cotton. Unpublished compilation. 32 p.

00153953 Burns, J.; Parker, R. (1975) An investigation of the safety of cotton reentry after organophosphate application. Archives of Environmental Contamination and Toxicology 3(3):344-351.

00153959 Durham, W.; Wolfe, H.; Elliott, J. (1972) Absorption and excretion of parathion by spraymen. Arch. Environ. Health 24(6):381-387.

00153966 Lieben, J.; Waldman, R.; Krause, L. (1952) Urinary excretion of paranitrophenol following parathion exposure. Industrial Hygiene and Occupational Medicine 6:491-495.

00153970 Shah, P.; Monroe, R.; Guthrie, F. (1981) Comparative rates of dermal penetration of insecticides in mice. Toxicology and Applied Pharmacology 59:414-423.

00153975 Ware, G.; Morgan, D.; Estesen, B.; et al. (1974) Establishment of reentry intervals for organophosphate-treated cotton fields based on human data: II. Azodrin, ethyl and methyl parathion. Archives of Environmental Contamination and Toxicology 2(2):117-129.

00153981 Archer, T. (1975) Dissipation of parathion and related compounds from field-sprayed lettuce. Journal of Agricultural Food Chemistry 23(5):858-860.

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.

00153987 Dorough, H.; Randolph, N. (1967) Comparative residual nature of certain insecticides applied as low volume concentrate and water emulsion sprays. Bulletin of Environmental Contamination & Toxicology 2(6):340-348.

00153993 Pass, B.; Dorough, H. (1973) Insecticidal and residual properties of EC and encapsulated formulations of methyl parathion sprayed on alfalfa. 66(5):1117-1119.

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00154001 Waldron, A.; Goleman, D. (1969) Ethyl and methyl parathion residues in green and cured alfalfa. J. Agr. Food Chem. 17(5):1066-1069.

00154021 Carey, A.; Gowen, J.; Tai, H.; et al. (1979) Pesticide residue levels in soils and crops from 37 states, 1972--national soils monitoring program (IV). Pesticides Monitoring Journal 12(4): 209-229.

00160304 Lichtenstein, E. (1980) Bound residues in soils and transfer of soil residues in crops. Residue Review 76(1):147-153.

00160313 Polizu, A.;Roman, M.; Manolache, F.; et al. (1968) Remanence du parathion et du methylparathion dans tubercules de pomme de terre et dans le sol a la suite de traitements du sol [Residual parathion and methyl parathion in potato tubers and in soil after soil treament]. Qual. Plant. Mater. Veg. 15(4):380-386.

00160322 Attri, B.; Lal, R. (1972) Residues and residual toxicity of ethyl and methyl parathion on cabbage. Indian J. Ent. 34(4):335-346.

00160323 Attri, B.; Lal, R. (1974) Residues and residual toxicity of ethyl and methyl parathion on cauliflower. Indian J. Agric. Sci. 44(6):361-365.

00160324 Attri, B.; Lal, R. (1974) Residues and residual toxicity of ethyl and methyl parathion on cowpea. Indian J. Agric. Sci. 44(7):481-486.

00161443 Pennwalt Corp., Agchem Div. (1986) Summary of Residue Data of Penncap-M on Succulent Beans. Unpublished compilation. 20 p.

40408912 Miyamoto, J.; Sato, Y.; Yamamoto, K.; et al. (1968) Activation and degradation of sumithion, methylparathion and their oxygen analogs by mammalian enzymes in vitro. Botyu-Kagaku 33(1):1-7.

40408915 Hollingworth, R.; Metcalf, R.;Fukuto, T. (1967) The selectivity of sumithion compared with methyl parathion: Metabolism in the white mouse. J. Agr. Food Chem. 15(2):242-248.

41001407 Van Dijk, A. (1988) [^{14}C]-Parathion-methyl: Absorption, Distribution, Excretion and Metabolism after Single and Repeated Oral Administration to Rats: RCC Project 090876. Unpublished study prepared by R C C Umweltchemie Ag. 125 p.

41488401 Weis, J. (1990) Analytical Support for Freezer Storage Stability of Methyl Parathion in Avian Feed: Supplement: En-cas Protocol #89-0019 WILCEMI. Unpublished study prepared by En-cas Analytical Laboratories, Inc. 18 p.

TABLE A.. GENERIC DATA REQUIREMENTS FOR METHYL PARATHION.

Data Requirement[1]	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)?
40 CFR §158.240 Residue Chemistry					
171-2. Chemical Identity[4]					
171-3. Directions for Use		(See Index)[5]			
171-4. Nature of the Residue (Metabolism) - Plants	PAIRA	Partially	41001401 41001404	41001403	Yes[6]
171-4. Nature of the Residue (Metabolism) - Livestock	PAIRA & plant metabolites	Partially	41001405	41001406	Yes[7]
171-4. Residue Analytical Methods	TGAI & metabolites	Partially			Yes[8]
171-4. Storage Stability	TEP & metabolites	No			Yes[9]
171-4. Magnitude of Residue in Plants[10,11]					
Root and Tuber Vegetables					
- Beets, garden, roots	TEP	Partially			Yes[12]
- Carrots	TEP	Partially	41395105		Yes[13]
- Potatoes	TEP	Partially	41438102		Yes[14]
(processed commodities)	TEP	Yes	41438102		No

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement[1]	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)?
- Rutabagas, roots	TEP	No		Yes[15]
- Sugar beets, roots	TEP	Partially	41379306	Yes[16]
(processed commodities)	TEP	Yes	41379306	No
- Sweet potatoes	TEP	No		Yes[17]
- Turnips, roots	TEP	Partially	41717806	Yes[18]
Leaves of Root and Tuber Vegetables				
- Beets, garden, tops	TEP	No		Yes[19]
- Rutabagas, tops	TEP	No		No[20]
- Sugar beets, tops	TEP	Partially	41379306	Yes[21]
- Turnips, tops	TEP	Partially	41717806	Yes[22]
Bulb Vegetables				
- Garlic	TEP	Yes		No[23]
- Onions	TEP	Partially	41395104 41596203	Yes[24]
Leafy Vegetables (except Brassica Vegetables)				
- Celery	TEP	Partially	41717802	Yes[25]
- Lettuce	TEP	Partially	41379302 41596204	Yes[26]
- Spinach	TEP	Partially	41359906	Yes[27]

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement[1]	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)?
Brassica (Cole) Leafy Vegetables				
- Broccoli	TEP	Partially	41379305	Yes[28]
- Brussels sprouts	TEP	Yes		No[29]
- Cabbage	TEP	Partially	41379304	Yes[30]
- Cauliflower	TEP	Yes		No[31]
- Collards	TEP	Yes		No[32]
- Kale	TEP	Yes		No[33]
- Kohlrabi	TEP	Yes		No[34]
- Mustard Greens	TEP	Partially	41359901	Yes[35]
Legume Vegetables (Dry or Succulent)				
- Beans, dry and succulent	TEP	Partially	41438101 41457901 41517102 41560005	Yes[36]
(processed commodities)	TEP	Partially	41596206	No[37]
- Lentils	TEP	Partially		Yes[38]
- Peas, dried and succulent	TEP	Partially	41596207	Yes[39]
- Soybeans	TEP	Partially	41379303	Yes[40]
(processed commodities)	TEP	Partially	41517104	Yes[41]

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement[1]	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)?
Legume Vegetables, Foliage of				
- Beans, vines and hay	TEP	Partially	41517102	Yes[42]
- Lentils, forage and hay	TEP	Partially		Yes[43]
- Peas, vines and hay	TEP	Partially	41596207	Yes[44]
- Soybeans, forage and hay	TEP	Partially	41560003	Yes[45]
Fruiting Vegetables (Except Cucurbits)				
- Eggplant	TEP	Partially		No[46]
- Peppers	TEP	Partially		Yes[47]
- Tomatoes	TEP	Partially		Yes[48]
(processed commodities)	TEP	No		Yes[49]
Cucurbit Vegetables				
- Cucumbers	TEP	Partially		Yes[50]
- Melons	TEP	Partially		Yes[51]
- Pumpkins	TEP	Partially		Yes[52]
- Squash	TEP	Partially		Yes[53]

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement[1]	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)?
Pome Fruits Group				
- Apples	TEP	Partially		Yes[54]
(processed commodities)	TEP	Partially		Yes[55]
- Pears	TEP	Partially		Yes[56]
Stone Fruits				
- Apricots	TEP	Partially		Yes[57]
- Cherries	TEP	Partially		Yes[58]
- Nectarines	TEP	Partially		Yes[59]
- Peaches	TEP	Partially		Yes[60]
- Plums (fresh prunes)	TEP	Partially		Yes[61]
(processed commodities)	TEP	No		Yes[62]
Small Fruits and Berries				
- Gooseberries	TEP	Partially		Yes[63]
- Grapes	TEP	Partially	41457902	Yes[64]
(processed commodities)	TEP	Yes	41457903	No
- Strawberries	TEP	Partially		Yes[65]
Tree Nuts				
- Almonds, nutmeats	TEP	Partially		Yes[66]

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement[1]	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)?
- Pecans	TEP	Partially			Yes[67]
Cereal Grains					
- Barley, grain	TEP	Partially			Yes[68]
(processed commodities)	TEP	Partially			Yes[69]
- Corn, field, grain	TEP	Partially	41560002 41717805	41717803	Yes[70]
(processed commodities)	TEP	Yes	41717804		No
- Corn, sweet (K+CWHR)	TEP	Partially	41560002 41717805	41717803	Yes[71]
(processed commodities)	TEP	Yes			No
- Oats, grain	TEP	Partially			Yes[72]
(processed commodities)	TEP	Partially			Yes[73]
- Rice, grain	TEP	Partially	41379307	41560004	Yes[74]
(processed commodities)	TEP	Partially	41596205		Yes[75]
- Rye, grain	TEP	Partially			Yes[76]
(processed commodities)	TEP	Partially			Yes[76]
- Sorghum, grain (milo) and sweet	TEP	Partially	41517103		Yes[77]
(processed commodities)	TEP	No			Yes[78]
- Wheat, grain	TEP	Partially	41560001	41596209	Yes[79,80]
(processed commodities)	TEP	Partially	41560001	41596209	Yes[81]

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement[1]	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)?
Forage, Fodder, and Straw of Cereal Grains				
- Barley, forage and straw	TEP	Partially		Yes[82]
- Corn, field, forage and fodder, and sweet corn forage	TEP	Partially	41717803 41717805	Yes[83]
- Oats, forage and straw	TEP	Partially		Yes[82]
- Rice, straw	TEP	Partially	41379307	Yes[84]
- Rye, forage and straw	TEP	Partially		Yes[82]
- Sorghum (milo), forage, fodder, and hay and sweet sorghum forage and fodder	TEP	Partially	41517103	Yes[85]
- Wheat, forage and straw	TEP	Partially	41596209	Yes[86]
Grass Forage, Fodder, and Hay				
- Grass, forage and hay	TEP	Partially	41359902 41359903 41359905	Yes[87]
Non-grass Animal Feeds				
- Alfalfa, forage and hay	TEP	Partially	41517101	Yes[88]
- Clover, forage and hay	TEP	Partially	41439601	Yes[89]

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement[1]	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)?
- Vetch, forage and hay	TEP	Partially		Yes[90]
Miscellaneous Commodities				
- Artichokes	TEP	Partially	41717801	Yes[91]
- Cotton, seed and forage	TEP	Partially	41395103 41457904	Yes[92]
(processed commodities)	TEP	Yes	41596201	No
- Hops, fresh	TEP	Partially		Yes[93]
(processed commodities)	TEP	Partially		Yes[94]
- Mustard seed	TEP	Yes		No
- Peanuts	TEP	Partially		Yes[95]
(processed commodities)	TEP	Partially		Yes[96]
- Rapeseed	TEP	Partially		Yes[97]
(processed commodities)	TEP	Partially		Yes[98]
- Safflower, seed	TEP	Partially		Yes[99]
(processed commodities)	TEP	Partially		Yes[100]
- Sunflower, seeds	TEP	Partially	41359904	Yes[101]
(processed commodities)	TEP	No		Yes[102]
- Tobacco	TEP	Partially		Yes[103]
171-4. Magnitude of residue in Meat/Milk/Poultry/Eggs	TGAI or plant metabolites	No		Yes[104]

(Continued, footnotes follow)

TABLE A. (Continued).

Data Requirement[1]	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)?
171-5. Reduction of Residue	TEP	No		Yes[105]

1. A/S Cheminova Company and Pennwalt Corporation have responded to certain data requirement topics specified in the 12/86 Guidance Document. The data gaps included in this Update address specific deficiencies, if any, in the Cheminova and Pennwalt data and reiterate data gaps for which no data have been submitted. Data requirements which remain unchanged from the 12/86 Guidance Document appear in shaded type.

2. 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.

3. These references were submitted in response to the Methyl Parathion Guidance Document dated 12/86. Underlining indicates documents that have been reviewed for this update.

4. 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.

5. The Product Site Listing (SP05) dated 2/5/91 and pertinent product labels for Cheminova and Pennwalt products were used to create this document.

6. Data on the metabolism of methyl parathion in cotton, potatoes, and lettuce have been submitted in response to the Guidance Document. Data on cotton and potatoes are acceptable; however, the study on lettuce is inadequate but potentially upgradeable.

If sufficient samples are available and the registrant can prove that sample integrity was maintained during prolonged storage and provide storage stability data, then the following additional data are required: For the lettuce metabolism study (MRID 41001404), the five metabolites (designated as M5 through M8, and an unknown nonpolar compound) collectively comprising ca. 17% of TRR (1.94 ppm; 14-day PTI) and ca. 16% of TRR (1.58 ppm; 21-day PTI) must be identified and confirmed. In addition, the registrant should attempt to characterize/identify the non-extractable residues which comprised ca. 38% of TRR (4.26 ppm; 14-day PTI) and

TABLE A. (Continued).

45% of TRR (4.37 ppm; 21-day PTI) using treatments such as dilute acid and base at ambient temperatures, surfactants, enzymes, and 6 N acid and/or 10 N base with reflux. Finally, samples from this study must be analyzed by the current enforcement methods to ascertain that the methods are capable of recovering and quantifying all metabolites of concern. If the study cannot be upgraded, then a new lettuce metabolism study needs to be conducted.

7. Data on the metabolism of methyl parathion in livestock have been submitted in response to the Guidance Document. The qualitative nature of the residue in ruminants is adequately understood. However, the following details of the study were not submitted and are needed to completely validate the experimental methods: For ruminants (MRID 41001405), the registrant must provide the following details of the study: (i) the in-life portion of the study including the total feeds consumed by the goats to determine the theoretical dietary intake of methyl parathion, as ppm, in the feed; (ii) the storage intervals for milk and tissue samples; and, (iii) the specific fraction or matrix used for Soxhlet extraction, acid hydrolysis, and enzyme hydrolysis; flow charts must be provided to indicate the point at which these procedures were used.

The qualitative nature of the residue in poultry is adequately understood. However, the following details of the study were not submitted and are needed to completely validate the experimental methods: For poultry (MRID 41001406), the registrant must provide the following details of the study: (i) the in-life portion of the study including the total feeds consumed by the hens to determine the theoretical dietary intake of methyl parathion, as ppm, in the feed; and (ii) the storage intervals under which the egg and tissue samples were stored until analysis.

8. The qualitative nature of the residue in plants has not been completely described. At present, however, the residues to be regulated in plant and animal commodities are methyl parathion and its paraoxon. The following additional data are required: (i) The method employed to determine methyl parathion and methyl paraoxon should undergo an independent lab validation at which time the Agency will perform a method trial on the procedure; (ii) Data depicting analytical methods to determine free and conjugated forms of p-aminophenol and p-nitrophenol in meat, milk, poultry, and eggs; and (iii) If the requested additional data on plant metabolism indicate the presence of additional metabolites of toxicological concern, data depicting additional analytical methods will be required.

9. The 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. Storage stability data in support of previously submitted residue data are required only for those samples deemed to be useful for tolerance assessment. Data are required which depict the decline in levels of residues of methyl parathion and methyl

TABLE A. (Continued).

paraoxon in commodities stored under the range of conditions and for the range of intervals specified. Crop samples bearing measurable, weathered residues or fortified with methyl parathion and methyl paraoxon, and fortified meat and milk samples must be analyzed immediately after harvest or fortification and again after storage intervals that allow for reasonable unforseen 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 has not been completely described. If the requested plant metabolism data indicate the presence of additional metabolites of toxicological concern, data depicting the stability of those residues during storage will be required.

10. The registrant(s) must revise product labels to specify that aerial applications be made in a minimum of 2 gal/A. Alternatively, for all product labels which specify aerial applications at 1 gal/A, the registrant must submit data reflecting aerial applications at 1 gal/A for each crop listed.

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11. We recommend that the tolerance expression in 40 CFR 180.121 be revised to include <u>separate</u> tolerances for residues of methyl parathion and ethyl parathion and that the tolerance expression for methyl parathion be revised to include tolerances for the combined residues of methyl parathion and methyl paraoxon. The following tolerances established under 40 CFR §180.121 (a) should be revoked since there are currently no registered uses of methyl parathion and uses of ethyl parathion have been canceled on these crops: avocados, blackberries, blueberries (huckleberries), boysenberries, citrus fruits, cranberries, currants, dates, dewberries, eggplant, endive (escarole), figs, filberts, garlic, guavas, loganberries, mangoes, okra, olives, parsnips (with or without tops), parsnip greens (alone), pineapple, quince, radishes (with or without tops), radish tops, raspberries, sugarcane, sugarcane fodder, sugarcane forage, Swiss chard, walnuts, and youngberries. In addition, we recommend that the established tolerance for rutabaga tops be revoked since rutabaga tops are not currently considered to be a raw agricultural commodity of rutabagas. The following tolerances established under 40 CFR §180.121 (b) should be revoked since there are currently no registered uses of methyl parathion and uses of ethyl parathion have been canceled on these crops: guar beans, parsley, trefoil forage, and trefoil hay. In addition, we recommend that the crop group tolerance for Brassica leafy vegetables be revoked since tolerances are already established for the members of this group under 40 CFR §180.121 (a).

TABLE A. (Continued).

12. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data are required for methyl parathion residues of concern in or on garden beet roots as follows: Depiction of residues of concern 21 days after the last of several foliar applications at 7-day intervals of, in separate tests, a Dust (D) formulation at 0.63 lb ai/A, a Wettable Powder (WP) formulation a 1 lb ai/A, and an Emulsifiable Concentrate (EC) formulation at 1 lb ai/A. An analogous set of tests must be conducted depicting residues of concern 15 days after application of 0.5 lb ai/A of the D, WP, and EC formulations, in separate tests: applications prior to the last one should be made at 7-day intervals at the respective maximum registered uses of 0.63, 1, and 1 lb ai/A. Separate tests must be conducted in CA (including irrigated regions), NY, OR, TX, and WI. A label restriction must be proposed which gives the maximum number of applications allowed per season for foliar treatments; the data required above must reflect the proposed number.

13. The registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season or maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 1 lb ai/A/application.

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14. The registrant(s) must propose a label restriction specifying the maximum number of foliar applications per growing season or the maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per growing season at 1.5 lb ai/A/application.

15. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data depicting methyl parathion residues of concern in or on rutabagas roots are required as follows: Depiction of residues of concern 21 days after the last of several foliar applications at 7-day intervals of, in separate tests, EC and WP formulations at 1.5 lb ai/A. Also, data must be submitted depicting residues in or on rutabaga roots harvested 7 days after the last of two foliar applications of an EC formulation at 0.5 lb ai/A which were preceded by several foliar applications, a 7-day interval, at 1.5 lb ai/A up to 21 days before harvest. Both ground and ULV aerial equipment must be used, in separate tests. Tests must be conducted in MN, WI, and WA. A label restriction must be proposed which gives the maximum number of applications allowed per season for foliar treatments; the data required above must reflect the proposed number.

16. The registrant(s) must propose a label restriction specifying the maximum number of foliar applications per growing season or the maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 0.375 lb ai/A/application.

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TABLE A. (Continued).

17. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data depicting methyl parathion residues of concern in or on sweet potatoes are required as follows: Depiction of residues of concern 5 days after the last of several foliar applications at 7-day intervals using, in separate tests, an EC and a WP formulation at 0.8 lb ai/A. Both ground and ULV aerial treatments must be represented. Tests must be conducted in CA (including irrigated regions) and NC. A label restriction must be prepared limiting the number of permissible foliar applications per season; the data requested above must reflect that number.

18. The following additional data are required: The registrant(s) must propose a label restriction specifying the maximum number of foliar applications per growing season or the maximum seasonal rate and submit supporting data. Data depicting residues of methyl parathion and methyl paraoxon in or on turnip roots harvested 5 days following the proposed number of foliar applications of the EC formulation at 0.75 lb ai/A/application. Tests must be conducted in CA [representing AZ and OR], GA [representing AL, FL, and NC], IN, PA [representing NJ], TX, and WA since these states accounted for ca. 70% of the 1982 U.S. turnip acreage (1982 Census of Agriculture, Vol. 1, Part 51, p.355). Alternatively, the registrant(s) may amend its label to establish a maximum of six foliar applications per season and increase the PHI to 15 days.

19. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data are required depicting methyl parathion residues of concern in or on garden beet tops as follows: Depiction of residues of concern 21 days after the last of several foliar applications at 7-day intervals of, in separate tests, a WP and EC formulations at 1 lb ai/A. Both ground and ULV aerial equipment must be used, in separate tests. Tests must be conducted in CA (including irrigated regions), NY, OR, TX, and WI. A label restriction must be proposed which gives the maximum number of applications allowed per season for foliar applications; the data required above must reflect that number.

20. No data are available to support the established tolerance. However, since rutabaga tops are not presently considered to be a raw agricultural commodity of rutabagas, no data are required. We recommend that the established tolerance be canceled.

21. The registrant(s) must propose a label restriction specifying the maximum number of foliar applications per growing season or the maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 0.375 lb ai/A/application.

TABLE A. (Continued).

22. The following actions must be taken: (i) The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate, supported by appropriate residue data. The available data support a maximum of six applications per season; and (ii) The registrant(s) must propose a higher tolerance for turnip tops; the available data would support the proposal of a 2 ppm tolerance for turnip tops. Alternatively, the registrant(s) may amend the product label to reduce the application rate and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data.

23. The available data pertaining to onions satisfy the data requirements for garlic.

24. The following actions must be taken: (i) The registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season or maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 1 lb ai/A/application; and (ii) The registrant(s) must propose separate tolerances for dry bulb and green onions, supported by appropriate residue data. The available data support the proposal of a 1 ppm tolerance for dry bulb onions and a 1 ppm tolerance for green onions.

25. The following actions must be taken: (i) The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate, supported by appropriate residue data. The available data support a maximum of two applications per season; and (ii) The registrant(s) must propose a higher tolerance for celery. Alternatively, the registrant(s) may amend the product label to reduce the application rate and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data. The available data would support the proposal of a 5 ppm tolerance for celery.

26. The following actions must be taken: (i) The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate, supported by appropriate residue data. The available data support a maximum of six applications per season; and (ii) The registrant(s) must propose a higher tolerance for lettuce. Alternatively, the registrant(s) may amend the product label to reduce the application rate and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data. The available data would support the proposal of a 2 ppm tolerance for lettuce.

27. The registrant(s) must propose a label amendment specifying the maximum number of foliar applications

per growing season or the maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 1 lb ai/A/application.

28. The registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season or maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 1.5 lb ai/A/application.

29. The available data pertaining to broccoli satisfy the data requirements for Brussels sprouts.

30. The following additional data are required: (i) The registrants must propose a label amendment for the EC formulation specifying the maximum number of foliar applications per growing season or maximum seasonal rate which must be supported by residue data. The available data support a maximum of six foliar applications per season at 1.5 lb ai/A/application; and (ii) The registrant(s) must propose label restrictions limiting the number of foliar sprays permitted per crop. Data depicting residues of methyl parathion and methyl paraoxon in or on cabbage (with and without leaves) harvested 21 days following the proposed number of foliar applications of a Mcap formulation at 1.5 lb ai/A/application. Tests must be conducted in CA, FL, NY, NC, TX, and WI since these states accounted for ca. 70% of the 1982 U.S. production of cabbage (1982 Census of Agriculture, Vol. 1, Part 51, p. 338).

31. The available data pertaining to broccoli satisfy the data requirements for cauliflower.

32. The available data pertaining to mustard greens satisfy data requirements for collards.

33. The available data pertaining to mustard greens satisfy data requirements for kale.

34. The available data pertaining to broccoli satisfy the data requirements for kohlrabi.

35. The registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season or maximum seasonal rate which must be supported by residue data. The available data support a maximum of six applications per season at 1.5 lb ai/A/application.

36. The following actions must be taken: (i) The registrant(s) must propose a label amendment for the Mcap and EC formulation specifying the maximum number of foliar applications per growing season or the maximum

seasonal application rate, which must be supported by residue data. The available data support a maximum of six foliar applications. In addition, the registrant must amend the Mcap product label to establish a 7-day PHI for succulent beans; or, alternatively propose a higher tolerance for this crop; and (ii) The registrant(s) must propose separate tolerances for the combined residues of methyl parathion and methyl paraoxon in or on succulent and dried beans, which must be supported by residue data.

37. Data pertaining to bean vines will substitute for cannery waste data.

38. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: The established tolerance for methyl parathion residues in or on lentils is not appropriate. Therefore, the following data are required: Residues of concern must be determined in or on lentils harvested 15 days after the last of several foliar aerial applications of the Mcap formulation at 0.5 lb ai/A in 5 gal water/A. Trials must be conducted in ID and WA, the only states in which use of methyl parathion on lentils is permitted. The registrant must also propose a label amendment limiting the number of permissible applications per season to lentils; the maximum permissible number must be reflected in the data requested above.

39. The following additional data are required: The registrant(s) must propose a label amendment limiting the number of foliar applications per season to peas, which must be supported by field residue data (the available data will support a maximum of six applications per season). Data depicting residues of methyl parathion and methyl paraoxon in or on dried and succulent peas harvested 10 and 15 days after the proposed number of applications of a EC formulation at 1 lb ai/A; for peas harvested 10 days posttreatment, the final treatment must be applied at 0.5 lb ai/A. Tests must reflect the use of ground and aerial equipment. Tests on dried peas must be conducted in WA(64%) and ID(36%), since these states accounted for ca. 100% of the 1988 U.S. production of dried peas (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989). Tests on succulent peas must be conducted in WA(29%) since this state, plus the data submitted in MRID 41596207 [DE(4%), MN(17%), and WI(17%)], account for ca. 80% of the 1988 U.S. production of green peas (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA June 1989, p. 42). In addition, the registrant(s) must propose separate tolerances for residues in or on dried and succulent peas.

40. The following additional data are required: The registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season or the maximum seasonal rate. Data depicting residues of methyl parathion and methyl paraoxon in or on soybeans harvested 15 days following the proposed number of foliar applications of an EC formulation at 1 lb ai/A/application. Tests must reflect the use of ground and aerial equipment. Tests must be conducted in AR(5%), IL(15%) [representing IN(8%)],

IA(16%) [representing MN(8%), MO(7%), and NE(5%)], and OH(6%) since these states accounted for ca. 70% of the 1988 U.S. production of soybeans (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989).

41. The following additional data are required: A processing study depicting the potential for concentration of residues of methyl parathion and methyl paraoxon in soapstock and grain dust from the processing of soybeans bearing measurable, weathered residues. If residues concentrate in any product, an appropriate food/feed additive tolerance must be proposed. Following submission of adequate field residue and storage stability data, the registrant must propose food additive tolerances for residues of methyl parathion in soybeans refined oil at 3x.

42. The registrant(s) must propose a label restriction limiting the number of foliar applications per growing season. Data are available to support a limit of six foliar applications per season. The registrant(s) must propose tolerances for residues of methyl parathion in or on bean vines and hay. The available data would support the proposal of a 2 ppm tolerance for bean vines and a 4 ppm tolerance for bean hay.

43. The data requested for pea vines and straw will be used to satisfy data requirements for lentils forage and hay.

44. The following additional data are required: The registrant(s) must amend product labels specifying a maximum number of foliar applications per growing season or a maximum seasonal rate. Data depicting residues of methyl parathion and methyl paraoxon in or on pea vines and hay harvested 15 days following the last of the proposed number of applications at 1 lb ai/A/application. Tests must reflect the use of ground and aerial equipment. Tests must be conducted in WA(29%); this state along with DE(4%), MN(17%), ND(0%), and WI(17%) where data are available accounted for ca. 70% of the 1988 U.S. green pea production (Vegetables, 1988 Summary, Ag. Statistics Board, NASS, USDA June 1989, p. 42). In addition, the registrant(s) must propose a higher tolerance for pea vines or revise product labels to reflect a reduction in the maximum single application rate and/or a longer PHI. Product label and tolerance amendments must be supported by adequate field residue data. Following the submission of adequate field residue data, the registrant(s) must propose a tolerance for residues of methyl parathion in or on pea hay. Alternatively, the registrant(s) may propose a restriction against the grazing of pea vines and hay.

45. The following additional data are required: The registrant(s) must propose label amendments limiting the maximum number of foliar applications per growing season or the maximum seasonal rate. Data depicting residues of methyl parathion and methyl paraoxon in or on soybean forage and hay harvested 20 days following

the proposed maximum number of applications of the EC and Mcap formulations at 1 lb ai/A/application. Tests with the EC formulation must reflect the use of ground and aerial equipment. Tests must be conducted in AR(5%), IL(15%) [representing IN(8%)], IA(16%) [representing MN(8%), MO(7%), and NE(5%)], and OH(6%) since these states accounted for ca. 70% of the 1988 U.S. production of soybeans (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989). Upon submission of adequate residue data, the registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on soybean forage.

46. No data have been submitted for this topic. Currently, there are not registered uses of methyl parathion on eggplant. We recommend that the established tolerance be canceled.

47. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: The data submitted for peppers are inadequate to assess the appropriateness of the established tolerance for methyl parathion residues. Data deficiencies include: no data reflecting a full season application regimen at the maximum registered use rate; no aerial application data; inadequate geographic distribution of trials; and insufficient test formulation, sample storage and analytical specifics. Because of sufficiently different maximum label rates, the requested data from tomatoes will not be directly translatable therefore, the following data are required. [It should be noted that these data, per se would not be appropriate to support a crop group tolerance. Data requirements (for peppers) for establishing the crop group tolerance were specified in that section.] Data for the residues of concern in or on various varieties (bell, chili) of peppers from sampled 15 days after multiple foliar applications at 7-day intervals by ground or aerial equipment in separate trials. Treatments should include EC, D and WP formulations applied at 1.0 lb ai/A in separate treatments and with side-by-side formulation comparisons (EC versus D or WP in a given location) from several locations. Field trials must be located in FL and TX for winter-grown crops and in CA, KY or MI or OH, and NJ for summer-grown crops. The registrant(s) must propose label restrictions limiting the total number of foliar applications permitted per crop, which must be supported by the data.

48. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: The submitted data are not adequate to support the tolerance for methyl parathion residues in or on tomatoes. The following additional data must be submitted: Data depicting the residues of concern in or on tomatoes harvested 15 days after multiple foliar application at 7-day intervals by ground and aerial equipment (in separate trials) from separate treatments of an EC and WP at 1.5 lb ai/A, and of the Mcap and a D at 1.0 lb ai/A. Also, data are needed from tomatoes sampled 10 days after a final application of EC, Mcap, WP or D (in separate treatments) at 0.5 lb ai/A, applied 7 days after a full-season

TABLE A. (Continued).

treatment regimen of either the EC or Mcap at 1.5 lb ai/A applied at 7-day intervals. Trials should be conducted in central CA, southern (desert) CA, NJ, IN or MI or OH, and TX for spring-summer crops and in FL for winter-grown tomatoes. The registrant(s) must also propose label restrictions limiting the number of foliar applications permitted per season, which must be supported by the requested residue data.

49. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Residue data from wet and dried pomace, puree, catsup and juice processed from tomatoes bearing measurable weathered residues. Should residues concentrate in the processed tomato products, the registrant(s) must propose appropriate food/feed additive tolerances.

50. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: There are insufficient data to assess the tolerance for methyl parathion in or on cucumbers. Therefore, the following data are needed: Data for residues of concern in or on cucumbers harvested 10 days after treatment with an EC formulation at 1.0 lb ai/A in multiple foliar applications at 7-day intervals by ground or aerial equipment in separate trials. [Crossover data from D and WP formulations are exempted because their registered use rates (<0.25 lb ai/A) are sufficiently lower than the required EC rate.] Trials are required from CA, FL, MD or NJ, MI or OH, NC or SC, and TX. The registrant(s) must also propose label restrictions limiting the number of foliar application permitted per season, which must be supported by the requested residue data.

51. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: There are insufficient data to assess the tolerance for methyl parathion in or on melons. Therefore, the following data are needed: Data are required depicting the residues of concern in or on cantaloupe from CA and TX, honeydews from AZ, and watermelon from FL, IN, and NC or SC. The crops should be treated with the EC at 0.164 lb ai/A in multiple foliar sprays at 7-day intervals using ground or aerial equipment (in separate trials), then sampled at 7-day post-treatment. The registrant(s) must also propose label restrictions limiting the number of foliar applications permitted per season, which must be supported by the requested data.

52. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data depicting the residues of concern in or on pumpkins harvested 10 days after multiple foliar sprays at 7-day intervals using the 3 lb/gal EC (multiple active ingredient product) at 0.24 lb ai/A. Treatments applied by ground and aerial equipment in separate trials are requested. Test distribution must include CA, IL, NJ, and NY. The registrant(s) must also propose label restrictions

TABLE A. (Continued).

limiting the number of foliar applications per season, which must be supported by the requested residue data.

53. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data depicting methyl parathion residues of concern in or on various varieties of squash, such as crookneck types, scallop types (white bush), vegetable marrow types (zucchini), and acorn or butternut types. The fruit should be treated with multiple foliar sprays (at 7-day intervals) of the EC at 0.15 lb ai/A by either ground or aerial application equipment (in separate trials), then harvested at 15 days post-treatment. Trials should be conducted in CA, FL, MA, and MI. The registrant(s) must also propose label restrictions limiting the number of foliar applications per season, which must be supported by the requested residue data.

54. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data depicting the methyl parathion residues of concern in or on apples sampled 14 days after separate treatments with an EC formulation at 1 lb ai/100 gal and with the Mcap at 2.0 lb ai/A (concentrate) in full-season application regimens (at 7-day application intervals) by ground and aerial equipment (at separate locations). Since no more than 800 gal/A are likely to be applied to apples, 8 lb ai/800 gal/A of the EC formulation should be applied. Also, data are needed from apples harvested 7 days after a final spray of the Mcap at 1.0 lb ai/A (concentrate) applied 7 days after multiple applications at 7-day intervals of the Mcap formulation at 2.0 lb ai/A (concentrate). To provide adequate geographic distribution, trials must be conducted in CA, MI, NC, NY, PA or WV, and WA. The registrant(s) must also propose label restrictions limiting the number and timing of foliar applications permitted per season, which must be supported by the residue data.

55. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data for methyl parathion residues in wet and dried pomace, and juice processed from apples bearing measurable weathered residues. Should residues concentrate in the processed apple products, the registrant(s) must propose appropriate food or feed additive tolerances.

56. The data requested for apples will be translated to assess the established tolerance methyl parathion residues in or on pears, assuming the use patterns and label restrictions remain consistent for the two crops.

57. The data requested for peaches will be translated to assess the established tolerance for methyl parathion residues in or on apricots.

TABLE A. (Continued).

58. The data requested for plums will be translated to assess the established tolerance for methyl parathion residues in or on cherries.

59. The data requested for peaches will be translated to assess the established tolerance for methyl parathion residues in or on nectarines.

60. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Residue data from peaches harvested 14 days after the last of several foliar high volume ground applications of a WP and an EC formulation in separate tests, at 1 lb ai/100 gal. [Since we expect the maximum gal/A rate to achieve runoff in peach orchard is 500, 5 lb ai/A should be applied.] These tests must be conducted in CA and SC. The registrant must also propose a maximum number of permissible seasonal applications to apricots, peaches and nectarines; this number must be supported by the data requested above.

61. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data depicting residues in or on plums harvested 14 days after the last of several high-volume ground foliar applications of a WP and, in separate tests, and EC formulation at 1 lb ai/100 gal. [Since we expect no more than 500 gal/A will be needed to achieve runoff, 5 lb ai/A must be applied.] Tests must be conducted in CA, OR, WA, and ID. The registrant must propose a label restriction limiting the number of permissible applications per season for foliar use on plums and cherries; the data required above must reflect that number.

62. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Residues must be determined in prunes processed from plums bearing measurable weathered residues. If residues are found to concentrate in prunes, an appropriate food additive tolerance must be proposed.

63. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data depicting residues in or on gooseberries collected 15 days after multiple ULV aerial and, in separate tests, ground applications at seven day intervals of an EC at 0.5 lb ai/A. Tests must be conducted in MI, CA, and WA. The registrant must propose a label restriction limiting the number of foliar applications to gooseberries; the data requested above must reflect the proposed maximum number of applications.

TABLE A. (Continued).

64. The following actions must be taken: (i) The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate, supported by appropriate residue data; and (ii) The registrant(s) must propose a higher tolerance for grapes. Alternatively, the registrant(s) may amend the product label to reduce the application rate and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data.

65. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Depiction of methyl parathion residues of concern in or on strawberries sampled 14 days after, in separate tests, the last of multiple foliar applications of an EC formulation and a WP formulation at 0.79 lb ai/A. Separate tests must also be conducted with ground and ULV aerial applications of these formulations. The registrant must also propose a label restriction limiting the number of foliar applications permitted per season; the requested data must reflect this label restriction.

66. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data depicting methyl parathion residues in or on almonds and almond hulls sampled after a full-season application regimen (through hull-split) at 6.0 lb ai/A applied at 7-day intervals by ground and aerial equipment in separate trials. Data from at least three locations (San Joaquin Valley, Sacramento Valley and central coast areas) in CA are requested. The registrant(s) must also propose label restrictions limiting the number of foliar applications permitted per season, which must be supported by the requested residue data. The registrant(s) must also indicate the minimum PHI resultant from trying the Codex MRL final application to the hull-split growth stage.

67. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data depicting methyl parathion residues of concern in or on pecans treated with the 3 lb/gal EC (MAI) at the maximum labeled rate in a full-season application regimen (through shuck-split) applied at 7-day intervals by ground and aerial equipment in separate trials. Data are requested from trials conducted in AL or GA, NM and OK or TX. The registrant(s) must also propose label restrictions limiting the number of foliar applications permitted per season; express the maximum application rate in lb ai/A or restrict the maximum spray volume if the rates are expressed in lb ai/100 gal; and indicate the minimum resultant PHI if the final application is tied to the shuck-split growth stage. We recommend that the current label restriction against feeding treated shucks to livestock be deleted because pecan shucks are not fed to livestock.

68. The data requested for wheat will be translated to assess the established tolerance for methyl parathion residues in or on barley.

TABLE A. (Continued).

69. Residue data from the requested wheat milling study will be translated to assess the need for food and feed additive tolerances for residues of methyl parathion in the milled products of barley.

70. The following actions must be taken: The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on field corn grain; the available data would support the proposal of a 1 ppm tolerance for field corn grain. In addition, the registrant(s) must propose label restrictions limiting the number of applications per growing season, which must be supported by the residue data. The available data support six applications of the EC formulation per season and five applications of the Mcap formulation per season at 1 lb ai/A/application.

71. The following actions must be taken: The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on sweet corn (K+CWHR); the available data would support proposal of a 1 ppm tolerance for sweet corn (K+CWHR). Additionally, the registrant(s) must propose a label amendment specifying the maximum number of foliar applications per growing season and/or the maximum seasonal rate. The available data will support a maximum of six foliar applications per season; and (ii)

72. The data requested for wheat will be translated to assess the established tolerance for methyl parathion residues in or on oats.

73. Residue data from the requested wheat milling study will be translated to assess the need for food and feed additive tolerances for residues of methyl parathion in the milled products of oats.

74. The following actions must be taken: (i) The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate and submit the supporting data; and (ii) The registrant(s) must propose a higher tolerance for rice grain; the available data would support a proposal of a 5 ppm tolerance for rice grain. Alternatively, the registrant(s) may amend product label(s) to reduce the application rate and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data.

75. Following the submission of adequate field residue and storage stability data, a feed additive tolerance must be proposed for the combined residues of methyl parathion and methyl paraoxon in rice hulls at 5x.

TABLE A. (Continued).

76. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: The available data are inadequate to support the interim tolerance for residues of methyl parathion in or on rye. However, the residue data requested for wheat is translatable to rye. The registrant(s) should propose an appropriate permanent tolerance for residues of methyl parathion in or on rye grain and, if warranted by the milling data, appropriate food and feed additive tolerances for residues in the milled products or rye. Further, we recommend that the current interim tolerance for residues of methyl parathion in or on rye be deleted from 40 CFR 180.319 when the permanent tolerance is established.

77. Cheminova, the data submitter, does not currently hold registrations for the use of methyl parathion on sorghum grain (milo) or sweet sorghum. If Cheminova wishes to support the use of methyl parathion on sorghum, grain (milo) or sweet, then the following additional data are required: (i) Label amendments specifying use directions for methyl parathion on sorghum, grain (milo) and /or sweet sorghum, supported by appropriate residue data. The submitted data do not support the established tolerance since tolerance-exceeding residues were reported; therefore, if the registrant wishes to rely on the submitted data, a higher tolerance must also be proposed; and (ii) Data depicting residues of methyl parathion and methyl paraoxon in or on seeds of sweet sorghum (sorgo) harvested 21 days following the proposed maximum number of foliar applications of the EC formulation at 1 lb ai/A/application. Tests must be conducted in AR(24%) and TN(43%) since these states accounted for ca. 70% of the 1982 U.S. production of sorghum for syrup (1982 Census of Agriculture, Vol. 1, Part 51, p. 383). Alternatively, data for sweet sorghum and its processed commodity may be exempted if the registrant(s) submit an appropriate label restriction excluding methyl parathion use on sweet sorghum.

78. Cheminova, the data submitter, does not currently hold registrations for the use of methyl parathion on sorghum grain (milo) or sweet sorghum. If Cheminova wishes to support the use of methyl parathion on sorghum, grain (milo) or sweet, then the following additional data are required: (i) A processing study depicting the potential for concentration of residues of methyl parathion and methyl paraoxon in milled products (flour and starch) and grain dust from the processing of sorghum grain (milo) bearing measurable, weathered residues. If residues concentrate in any product, appropriate food/feed additive tolerances must be proposed; and (ii) A processing study depicting the potential for concentration of residues of methyl parathion and methyl paraoxon in syrup processed from sweet sorghum bearing measurable, weathered residues. If residues concentrate in any product, appropriate food/feed additive tolerances must be proposed. Alternatively, data for sweet sorghum and its processed commodity may be exempted if the registrant(s) submit an appropriate label restriction excluding methyl parathion use on sweet sorghum.

TABLE A. (Continued).

79. The following action pertaining to the Mcap formulation must be taken: The registrant(s) must revise product labels to specify a maximum number of foliar applications per growing season and/or a maximum seasonal rate. The available data support a maximum of two applications of the Mcap formulation at 0.75 lb ai/A/application.

80. The following actions pertaining to the EC formulation must be taken: The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate. The available data (MRID 41596209) indicate that six applications of the EC formulation at 1x will result in tolerance-exceeding residues in or on wheat grain harvested 14 days posttreatment. The registrant(s) must propose a higher tolerance for wheat grain; the available data would support the proposal of a 6 ppm tolerance for wheat grain. Alternatively, the registrant(s) may amend the product label for the EC formulation to reduce the application rate, and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data.

81. The following additional data are required: (i) A processing study depicting the potential for concentration of residues of methyl parathion and methyl paraoxon in grain dust processed from wheat grain bearing measurable, weathered residues. If residues concentrate in this item, an appropriate feed additive tolerance must be proposed; and (ii) When an appropriate tolerance for residues in or on wheat grain is determined and following the submission of adequate storage stability data, food/feed additive tolerances must be proposed for the combined residues of methyl parathion and methyl paraoxon in wheat bran at 2x and wheat shorts at 3x.

82. If the registrant wishes to establish tolerances for residues in or on these commodities, residue data will be translated from the data required for wheat forage and straw.

83. The following additional data are required: (i) The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate, supported by appropriate residue data. Data depicting residues of methyl parathion and methyl paraoxon in or on field and sweet corn forage harvested 12 days following the last of the proposed number of foliar applications of the Mcap formulation at 1 lb ai/A/application. Tests must reflect the use of ground and low volume aerial equipment. Tests must be conducted in CA(5%), CO(3%), IA(6%) [representing NE(4%)], MI(4%) [representing OH(3%)], NY(8%) [representing PA(7%)], SD(3%), VA(3%), and WI(13%) [representing MN(7%)] since these states accounted for ca. 70% of the 1988 U.S. production of corn silage; and (ii) The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on field

corn fodder, which must be supported by adequate field residue data. The available data will support the proposal of a 21 ppm tolerance for field corn fodder.

84. The submitted data alone are inadequate to propose a tolerance for residues of methyl parathion in or on rice straw since no data are available reflecting application using ground equipment. However, residue data pertaining to wheat straw (ground applications) may be translated to support a tolerance proposal for rice straw. The following actions must be taken: (i) The registrant(s) must amend product labels to specify a maximum number of applications per season or a maximum seasonal rate, which must be supported by residue data. The available data support a maximum of six applications per season; and (ii) The registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on rice straw. The available data would support proposal of a 9 ppm tolerance for rice straw.

85. Cheminova, the data submitted, does not currently hold registrations for the use of methyl parathion on sorghum. If Cheminova wishes to support the use of methyl parathion on sorghum forage, fodder, and hay, the following actions must be taken: (i) The registrant must propose label restrictions limiting the number of foliar applications per growing season on sorghum (milo) forage, fodder, and hay and must propose a pregrazing interval for forage, which must be supported by the requested residue data; and (ii) A tolerance must be proposed for the combined residues of methyl parathion and methyl paraoxon in or on sorghum (milo) hay, which must be supported by appropriate residue data.

86. The following additional data are required: The registrant(s) must amend product labels to specify a maximum number of foliar applications per growing season or a maximum seasonal rate. Data depicting residues of methyl parathion, methyl paraoxon, and p-nitrophenol in or on wheat forage and straw harvested 15 days following the last of the proposed number of applications of the Mcap formulation at 0.75 lb ai/A/applications. Tests must be conducted in IL(4%), KS(18%) [representing CO(4%), MO(4%), NE(4%), and OK(10%)], ND(6%), TX(5%), and WA(7%) [representing ID(4%)] since these states accounted for ca. 70% of the 1988 U.S. production of wheat (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989). Upon submission of adequate residue data, the registrant(s) must propose tolerances for the combined residues of methyl parathion and methyl paraoxon in or on wheat forage and straw. Alternatively, the registrant may propose a restriction against the feeding of wheat forage and submit data and a tolerance proposal for wheat straw only.

87. The following additional data are required: (i) The registrant(s) must revise Mcap product labels to specify a maximum number of foliar applications per season and/or a maximum seasonal application rate. Data depicting residues of methyl parathion and methyl paraoxon in or on Bermudagrass, bluegrass, and bromegrass

or fescue hay harvested 15 days following the last of the proposed number of foliar applications of a representative Mcap formulation at 0.75 lb ai/A. Tests must be conducted at locations representative of Bermudagrass (southern-southeastern U.S.), bluegrass (northeastern-midwestern U.S), and bromegrass (upper midwestern-western U.S) production regions; (ii) The registrant(s) must revise EC product labels to specify a maximum number of foliar applications per season and/or a maximum seasonal application rate, which must be supported by residue data; and (iii) Following the submission of adequate field residue data, storage stability data and product label amendments, the registrant(s) must propose a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on grass hay, which must be supported by residue data.

88. The following additional data are required: (i) The registrant(s) must propose a label amendment limiting the maximum number of foliar applications to two per growing season; or, alternatively submit data depicting residues of methyl parathion and methyl paraoxon in or on alfalfa forage and hay following the proposed number of applications according to the maximum use patterns of representative EC formulations. The registrant(s) must also establish pregrazing intervals for alfalfa forage and hay equal to the PHIs; and (ii) Data depicting residues of methyl parathion and methyl paraoxon in or on alfalfa seed harvested 15 and 20 days following the last of the proposed number of foliar applications of the EC formulation at 1 and 1.25 lb ai/A/application, respectively. Tests must reflect the use of ground and aerial equipment. Tests must be conducted in CA(18%), ID(9%), MT(7%), and SD(35%) since these states accounted for ca. 70% of the 1987 U.S. acreage of alfalfa seeds (1987 Census of Agriculture, Vol. 1 Part 51, p. 340).

89. The following additional data are required: (i) The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate. Data depicting residues of methyl parathion and methyl paraoxon in or on clover hay harvested 15 and 20 days following the last of the proposed number of foliar applications of the EC formulation at 1 and 1.25 lb ai/A/application, respectively. Tests must reflect the use of ground and aerial equipment. These tests must be conducted in areas representing the major regions of U.S. hay production; and (ii) The registrant(s) must propose a higher tolerance for the combined residues of methyl parathion and methyl paraoxon in or on clover forage. Alternatively, the registrant(s) may amend the product label to reduce the application rate and/or lengthen the PHI. Label amendments and proposed tolerances must be supported by field residue data.

90. Data requested for alfalfa forage and hay will be used to evaluate the established tolerance for residues in or on vetch and should be used by the registrant to propose separate tolerances for residues in or on vetch forage and vetch hay. The registrant must also propose label directions limiting the number of foliar applications per season and pregrazing intervals for forage.

TABLE A. (Continued).

91. The following additional data are required: The registrant(s) must revise product labels to specify a maximum number of applications per season or a maximum seasonal application rate. Data depicting residues of methyl parathion and methyl paraoxon in or on artichokes harvested following the last of the proposed maximum number of foliar applications of the EC formulation (using aerial equipment) and the Mcap formulation (using ground equipment) at 1 lb ai/A/application. These tests must be conducted in the state of CA which accounted for ca. 100% of the 1982 U.S. artichoke acreage (1982 Census of Agriculture, Vol. 1, Part 51, p. 335). Tolerance-exceeding residues were reported for artichokes harvested 7 days following four foliar applications of the EC formulation; the registrant(s) must amend product labels to reflect a reduction in the maximum single application rate and/or a longer PHI. Alternatively, the registrant may propose a higher tolerance for the combined residues of methyl parathion and methyl paraoxon in or on artichokes. Product label or tolerance amendments must be accompanied by adequate supporting data.

92. The following additional data are required: (i) The registrant(s) must propose label restrictions specifying the maximum number of foliar applications per growing season or the maximum seasonal rate and submit the supporting data; (ii) Data depicting residues of methyl parathion and methyl paraoxon in or on cottonseed harvested 1 day following the last of the proposed number of applications of the EC formulation at 1 lb ai/A/application. Tests must reflect the use of ground and aerial equipment. Tests must be conducted in AZ(7%), CA(18%), MS(12%), and TX(34%) since these states accounted for ca. 70% of the 1988 U.S. cotton production (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989); (iii) Data depicting residues of methyl parathion and methyl paraoxon in or on cottonseed harvested 0 days and 7 days following the last of the proposed number of applications of the Mcap formulation at 1 lb ai/A/application using ultra low volume (0-day PHI) and ground (7-day PHI) equipment. Tests must be conducted in AZ(7%), CA(18%), MS(12%), and TX(34%) since these states accounted for ca. 70% of the 1988 U.S. cotton production (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989); (iv) Data depicting residues of methyl parathion and methyl paraoxon in or on cotton forage following the last of the proposed maximum number of foliar applications of the EC and Mcap formulations applied at the maximum registered single application rates for the formulations. Tests must be conducted in AZ(7%), CA(18%), MS(12%), and TX(34%) since these states accounted for ca. 70% of the 1988 U.S. cotton production (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989); and (v) The registrant(s) must propose a tolerance for combined residues of methyl parathion and methyl paraoxon in or on cotton forage, upon submission of adequate residue data. Alternatively, the registrant(s) may alter product labels to impose a feeding restriction for cotton forage.

93. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: (i) Data are required depicting the residues of concern in or on mature fresh hops harvested 15 days after the last of multiple applications of an EC and WP formulation, in separate

TABLE A. (Continued).

tests, at 1 lb ai/A using, in separate tests, aerial and high and low volume ground equipment. These tests must be conducted in WA, OR, or ID; and (ii) The registrant(s) must propose a label restriction limiting the number of applications permitted per season; this number being reflected in above requested data.

94. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Data depicting the residues of concern in dried hops and spent hops processed from hops bearing measurable weathered residues. Should concentration of residues be found in the processed products, appropriate food/feed additive tolerances must be proposed.

95. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: (i) Residue data are required from peanuts (nutmeats), hulls, and hay harvested 15 days after the last of several foliar applications of an EC and D formulation (in separate tests) at 0.375 and 0.5 lb ai/A. These tests must utilize (separately aerial, and high and low volume ground equipment. Vines must be sampled at intervals following the last treatment. Tests must be performed in GA, or AL, NC, and TX; (ii) Tolerances must be proposed for residues in or on peanut vines, hay, and hulls, and a pregrazing interval must be proposed for vines. If feeding and grazing restrictions are proposed, no data or tolerance proposals are required for vines or hay; and (iii) The registrant(s) must propose a label restriction limiting the number of applications permitted per season; this number being reflected in above requested data.

96. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Processing data for peanut meal, crude oil, soapstock, and refined oil to determine the concentration of residues upon processing. These data must be generated from peanuts bearing measurable, weathered residues.

97. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: (i) Residue data are required from rapeseed harvested 15 days after the last of several multiple applications of the 4 lb/gal EC formulation at 0.5 lb ai/A in 3 gal of water per acre. These tests must be conducted in ND by aerial application; and (ii) The registrant must propose a label restriction limiting the number of foliar applications permitted to rape, with above requested data reflecting that number.

98. Data depicting residues in meal and oil processed from rapeseed bearing measurable weathered residues. Should residues be found to concentrate in rapeseed oil or meal, then appropriate food/feed additive

tolerances must be proposed. (Note: Processing data for corn, cottonseed and peanuts may be translated to rapeseed).

99. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: (i) Residue data from safflower seed harvested after multiple foliar applications (up to flowering) with a WP and EC formulation, in separate tests, at 0.5 lb ai/A, utilizing, (in separate tests) aerial and ground (high and low volume) equipment. These tests must be conducted in CA and MT; and (ii) Residue data are required from safflower seeds harvested 60 days after the last of two foliar aerial application a 1.5 lb/gal EC using 5 gal water/A. This test must be conducted in CA.

100. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: Processing data are required for safflower meal and oil utilizing safflower seeds bearing measurable, weathered residues. If residues concentrate upon processing, then appropriate food/feed additive tolerance must be proposed. (Note: Processing data for corn, cottonseed, and peanuts may be translated to safflower seed).

101. The following additional data are required: Data depicting residues of methyl parathion and methyl paraoxon in or on sunflower forage harvested following three foliar applications of an EC formulation at 1 lb ai/A/application, utilizing aerial and high and low volume ground equipment in separate tests. These tests must be conducted in ND since this state accounted for ca. 80% of the 1988 U.S. production of sunflower (Agricultural Statistics Board, NASS, USDA Crop Database, Aug. 1989). Upon submission of adequate residue data, a tolerance for the combined residues of methyl parathion and methyl paraoxon in or on sunflower forage and a pregrazing interval must be proposed. Alternatively, the registrant(s) may place a grazing restriction on the product labels.

102. The following additional data are required: A processing study depicting the potential for concentration of residues of methyl parathion and methyl paraoxon in meal, hulls, crude oil, refined oil processed from sunflower seeds bearing measurable, weathered residues. If residues concentrate in any product, an appropriate food/feed additive tolerance must be proposed.

103. No data have been submitted for this topic. The following data requirements stated in the Guidance Document remain outstanding: (i) Information indicating the formulation actually used to generate the submitted residue data and the mode of application used; (ii) Pyrolysis products derived from methyl parathion treated tobacco must be characterized and the level of residue in smoke must be quantified. [14C-Ring labeled methyl parathion must be used for identification of pyrolysis products.]; (iii) The

TABLE A. (Continued).

registrant(s) must propose a label restriction limiting the number of foliar applications permitted per season; and (iv) Information clarifying if residues were methyl parathion or ethyl parathion.

104. The following additional data are required: (i) A feeding study with ruminants which are fed methyl parathion per se at levels of 1x, 3x, and 10x the maximum expected dietary intake by ruminants. Animals must be dosed for at least four weeks; if residues in milk have not reached a plateau by the end of four weeks, the dosing period should be continued until residues have reached a plateau. Animals must be sacrificed within 24 hours of the final dose. In this study, the milk, fat, meat, and meat byproducts of ruminants must be analyzed for methyl parathion, methyl paraoxon, and free and conjugated forms of p-aminophenol and p-nitrophenol; and (ii) A feeding study with poultry which are fed methyl parathion per se at levels of 1x, 3x, and 10x the maximum expected dietary intake by poultry. Animals must be dosed for at least four weeks; if residues in eggs have not reached a plateau by the end of four weeks, the dosing period should be continued until residues have reached a plateau. Animals must be sacrificed within 24 hours of the final dose. In this study, the eggs, meat, and meat byproducts of poultry must be analyzed for methyl parathion, methyl paraoxon, and free and conjugated forms of p-aminophenol and p-nitrophenol.

105. Reduction of residue information is required for a pesticide when the Agency determines that tolerance level residues would result in exposures at unsafe levels. Data on residues in food as consumed provide a more precise estimate of dietary exposure, therefore such data should be generated for methyl parathion and its metabolite, methyl paraoxon. This may include monitoring, degradation, and processing (cooking, etc.) studies. Reduction of residue data may be required if the required field trial data do not show reduction of the exceedance to less than 100%. The registrant(s) is urged to contact the Agency regarding appropriate protocols for these studies prior to initiating any experiments.