Knizner
9-15-94

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

SEP 15 1994

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

September 14, 1994

**MEMORANDUM**

SUBJECT: **Chlorpyrifos.** Product Chemistry Chapter and Residue Chemistry Chapter for the Reregistration Eligibility Document. Reregistration Case No. 0100 Chemical No. 059101 No MRID # DP Barcodes D198040 and D203769 CBRS #13024 and 13809

FROM: Steven A. Knizner, Chemist
Special Review Section I
Chemistry Branch II - Reregistration Support
Health Effects Division (7509C)

THRU: Edward Zager, Chief
Chemistry Branch II - Reregistration Support
Health Effects Division (7509C)

TO: Dennis McNeilly, PM Team 73
Accelerated Reregistration Branch
Special Review and Reregistration Division (7508W)

and

Karen Whitby/John Redden
Chemical Coordination Branch
Health Effects Division (7509C)

Attached are the Product Chemistry Chapter and the Residue Chemistry Chapter for the Chlorpyrifos Reregistration Eligibility Document (RED). The chapters were prepared by Dynamac Corporation under supervision of CBRS, HED. The assessment has undergone secondary review in the Branch and has been revised to reflect Branch policies.

Concerning product chemistry, all TGAI data requirements concerning the DowElanco 99% T (EPA Reg. No. 62719-44) and the 97% T (EPA Reg. No. 62719-15) are satisfied. Guideline 63-14 data requirements remain outstanding for the DowElanco 99% T. Data

remain outstanding for the other chlorpyrifos MPs; for many MPs no product chemistry data have been submitted. Provided that the registrants submit the data required in the attached summary tables for the chlorpyrifos MPs, and either certify that the suppliers of starting materials and the manufacturing processes for the chlorpyrifos technicals and manufacturing-use products have not changed since the last comprehensive product chemistry review or submit complete updated product chemistry data packages, CBRS has no objections to the reregistration of chlorpyrifos with respect to product chemistry data requirements.

Because of revisions to Table II (June 1994) of the Subdivision O Guidelines, livestock feeding restrictions previously allowed on some product labels will no longer be accepted by the Agency. Label revisions or additional residue data are required. Additional residue chemistry data, and/or label revisions, and/or English translations of labels are required for: beans, peppers, tomatoes, cherries, tree nuts, carrots (grown for seed), corn, cotton, clover (grown for seed), grass (grown for seed), peanuts, peppermint, and spearmint. Additional data are required for sorghum, soybean, and wheat aspirated grain fractions before a tolerance for aspirated grain fractions can be established.

TOX Branch has determined that TCP is not of toxicological concern and concluded that TCP can be excluded from the tolerance expression (PP3F2884 and 3F2947 and FAP3H5396 and 3H5411/R1191, Final Rule, D.Barolo, 4/1/93). The conclusions specified in the "Tolerance Reassessment Summary" section of this document reflect the TOX Branch decision and recommendation to consider only chlorpyrifos *per se* as the residue of concern.

Anticipated residues for chlorpyrifos have been previously generated for wheat (M.Flood, undated memorandum to DRES, received in DRES on 8/11/92) and tomatoes (N.Dodd, 9/27/93, CBTS #10804, PP#4F03008) in conjunction with a recent Chlorpyrifos Dietary Exposure Analysis (J.Bauzin, 2/19/93) and should continue to be used for DRES analysis.

Attachments.

cc: S.F., circ., R.F., Reg. Stnd. File, S.Knizner
RDI: A.Rathman, 9/12/94 M.Metzger, 9/13/94
7509C:CBRS:CM#2:305-6903:SAK:sak:chlorpyr.red:8/31/94

DYNAMAC CORPORATION
Environmental Services

Final Report

# CHLORPYRIFOS
# Shaughnessy No. 059101
# Case No. 0100
# (CBRS No. 13024, DP Barcode D198040)

# TASK 2A
## Reregistration Eligibility Document: Product Chemistry Considerations

September 14, 1994

**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

# CHLORPYRIFOS

## REREGISTRATION ELIGIBILITY DOCUMENT:

## PRODUCT CHEMISTRY CONSIDERATIONS

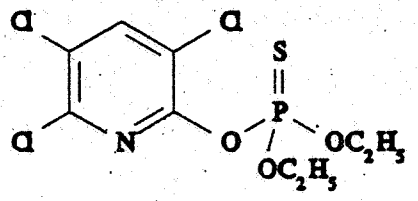
Shaughnessy No. 059101; Case No. 0100

(CBRS No. 13024; DP Barcode D198040)

TASK 2A

## DESCRIPTION OF CHEMICAL

Chlorpyrifos [O,O-diethyl O-(3,5,6-trichloro-2-pyridinyl)phosphorothioate] is an organophosphorus insecticide used on food and feed crops, animals and buildings (including food handling establishments), ornamentals, lawns and turf, and terrestrial structures. In addition, chlorpyrifos may be used in both residential and aquatic areas as a mosquito adulticide and larvicide.



| | |
|---|---|
| Empirical Formula: | $C_9H_{11}Cl_3NO_3PS$ |
| Molecular Weight: | 350.6 |
| CAS Registry No.: | 2921-88-2 |
| Shaughnessy No.: | 059101 |

## IDENTIFICATION OF ACTIVE INGREDIENT

Technical chlorpyrifos is a white crystalline solid with a melting point of 41.5-43.5 C. Chlorpyrifos is stable in neutral and acidic aqueous solutions; however, stability decreases with increasing pH. Chlorpyrifos is practically insoluble in water, but is soluble in most organic solvents (i.e., acetone, xylene and methylene chloride).

## MANUFACTURING-USE PRODUCTS

A search of the Reference Files System (REFS) conducted 1/5/94 identified 40 chlorpyrifos manufacturing-use products (MPs) registered under Shaughnessy No. 059101; these MPs are listed in Table 1. The products listed below are the only MPs subject to reregistration eligibility decisions.

Table 1. Registered MPs of chlorpyrifos.

| EPA Reg. No. | Formulation | Registrant | Reg. Date | Transferred from: Registrant EPA Reg. No. (date) |
|---|---|---|---|---|
| 279-3134 | 62.5% FI | FMC | 10/93 | |
| 432-570 | 16% FI | Roussel UCLAF, Corp. * | 06/81 | |
| 432-571 | 16% FI | | 06/81 | |
| 432-615 | 25% FI | | 11/81 | |
| 432-625 | 25% FI | | 09/81 | |
| 432-648 | 16% FI | | 04/82 | |
| 432-649 | 16% FI | | 04/82 | |
| 432-661 | 25% FI | | 09/82 | |
| 432-662 | 25% FI | | 09/82 | |
| 432-674 | 15% FI | | 12/82 | |
| 432-682 | 15% FI | | 10/82 | |
| 432-692 | 16% FI | | 11/82 | |
| 769-690 | 44.8% FI | Sureco, Inc. | 03/73 | Southern Mill Creek Products 6720-195 (12/28/92) |
| 1021-1215 | 20% FI | McLaughlin Gormley King Company | 04/90 | |
| 1021-1220 | 20% FI | | 10/72 | |
| 1021-1434 | 20% FI | | 08/81 | |
| 1021-1438 | 8.363% FI | | 1/81 | |
| 1021-1442 | 8.363% FI | | 04/81 | |
| 1021-1444 | 8.363% FI | | 04/81 | |
| 1021-1458 | 28.331% FI | | 10/81 | |
| 1021-1506 | 14.286% FI | | 03/82 | |

| EPA Reg. No. | Formulation | Registrant | Reg. Date | Transferred from: Registrant EPA Reg. No. (date) |
|---|---|---|---|---|
| 4816-448 | 0.714% FI | Roussel UCLAF, Corp. [b] | 05/73 | |
| 4816-480 | 2.5% FI | | 08/75 | |
| 4816-622 | 5% FI | | 03/81 | |
| 4816-634 | 10% FI | | 12/81 | |
| 4816-638 | 5% FI | | 02/82 | |
| 4816-657 | 25% FI | | 08/82 | |
| 10350-10 | 20% FI | 3M/Animal Care Products | 11/85 | |
| 11678-45 | 94% FI | Makhteshim Chemical Works Ltd. | 01/90 | |
| 45600-6 | 41% FI | Insecta Sales Inc. | 03/83 | |
| 62719-10 | 61.5% FI | DowElanco | 12/89 | Dow 464-358 (12/4/89) |
| 62719-15 | 97% T [c] | | 12/89 | Dow 464-404 (12/4/89) |
| 62719-44 | 99% T [c] | | 12/89 | Dow 464-558 (12/4/89) |
| 62719-45 | 30% FI | | 12/89 | Dow 464-559 (12/4/89) |
| 62719-49 | 52.4% FI | | 12/89 | Dow 464-564 (12/4/89) |
| 62719-51 | 62.4% FI | | 12/89 | Dow 464-567 (12/4/89) |
| 62719-66 | 62.5% FI | | 12/89 | Dow 464-588 (12/4/89) |
| 62719-76 | 62.5% FI | | 12/89 | Dow 464-608 (12/4/89) |
| 62719-78 | 50% FI | | 12/89 | Dow 464-610 (12/4/89) |
| 62719-225 | 22.8% FI | | 08/92 | |

[a] The registrant has changed from Penick to Roussel without change in company number (432).

[b] The registrant has changed from Fairfield to Roussel without change in company number (4816).

[c] REFS lists these products as formulation intermediates (FIs); however, because they contain no intentionally added inert ingredients, these products have been identified as Ts in previous reviews and will be identified as Ts in this document.

## REGULATORY BACKGROUND

The regulatory background for chlorpyrifos products in terms of comprehensive product chemistry reviews is presented below in Table 2. Only products for which data have been submitted are included in the table; no data have been submitted for any of the remaining products listed in Table 1. In summary, the Chlorpyrifos Guidance Document dated 9/28/84 required that data pertaining to all product chemistry requirements be submitted in support of the reregistration of chlorpyrifos; the Chlorpyrifos SRR dated 11/18/88 reviewed and or re-evaluated all product chemistry data submitted in response to the Guidance Document.

Table 2. Regulatory background for chlorpyrifos MPs for which data have been submitted.

| Products (EPA Reg. No.) | September 1984 Guidance Document | | November 1988 SRR | |
|---|---|---|---|---|
| | Data Required | Data submitted in response | Data required | Data submitted in response |
| 99% T (62719-44) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -5, -7, -8, -9, -11, -13, -17, -20 | 61-3<br><br>63-7, -11, -14, -15, -16, -17, -20 | 61-3<br><br>63-7, -11, -16, -17, -20 |
| 97% T (62719-15) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -5, -7, -8, -9, -11, -13, -16, -17, -20 | 61-2, -3<br>62-1<br>63-7, -11, -14, -15 | 61-2, -3<br>62-1<br>63-7, -11, -14 |
| 62.5% FI (62719-66) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7, -15, -17, -18, -20 | 61-3<br><br>63-12, -14, -16, -17, -19, -20 | none |
| 62.4% FI (62719-51) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7, -15, -17, -18, -20 | 61-3<br><br>63-12, -14, -16, -17, -19, -20 | none |
| 61.5% FI (62719-10) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7, -15, -17, -18, -20 | 61-3<br><br>63-12, -14, -16, -19 | none |

| Products (EPA Reg. No.) | September 1984 Guidance Document | | November 1988 SRR | |
|---|---|---|---|---|
| | Data Required | Data submitted in response | Data required | Data submitted in response |
| 52.4% FI (62719-49) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7, -15, -16, -17, -18, -20 | 61-2, -3<br><br>63-12, -14, -15, -17, -19, -20 | none |
| 30% FI (62719-45) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7, -12, -15, -17, -18, -19, -20 | 61-1, -3<br><br>63-7, -14, -16, -17, -20 | none |
| 41% FI (45600-6) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7, -15, -16, -18, -19, -20 | 61-1, -2<br><br>63-7, -12, -14, -17, -20 | none |
| 25% FI (432-625 and 432-662) | 61-1, -2, -3<br>62-1, -2, -3<br>63-2 through -20 | 61-1, -2, -3<br>62-1, -2, -3<br>63-2, -3, -4, -7, -12, -14, -15, -16, -17, -18, -19, -20 | 61-1<br><br>63-14, -16, -17, -20 | none |

The Chlorpyrifos SRR required preliminary analysis of one product, the DowElanco 97% T (EPA Reg. No. 62719-15), for dipyridine analogues of chlorinated dibenzo-p-dioxins. The requested study indicated that no dioxin analogues were detected at levels of toxicological significance. On review of the data, the Agency concluded (CBRS No. 11403, D188256, 6/16/93, S. Funk) that no further analysis for dioxin analogues was required for technical chlorpyrifos.

The current status of the product chemistry data requirements for the MPs listed in Table 1 is presented in the attached data summary tables. Refer to these tables for a listing of the outstanding product chemistry data requirements.

## CONCLUSIONS

All TGAI data requirements concerning the DowElanco 99% T (EPA Reg. No. 62719-44) and the 97% T (EPA Reg. No. 62719-15) are satisfied. Guideline 63-14 data requirements remain outstanding for the DowElanco 99% T. Data remain outstanding for the other chlorpyrifos MPs; for many MPs no product chemistry data have been submitted. Provided that the registrants submit the data required in the attached summary tables for the chlorpyrifos MPs, and either certify that the suppliers of starting materials and the manufacturing processes for the chlorpyrifos technicals and manufacturing-use products have not changed since the last comprehensive product chemistry review or submit complete updated product chemistry data packages, CBRS has no objections to the reregistration of chlorpyrifos with respect to product chemistry data requirements.

## AGENCY MEMORANDA CITED IN THIS DOCUMENT

| | |
|---|---|
| CBRS No(s).: | 952 |
| Subject: | Chlorpyrifos. Response to Data Gaps in Product Chemistry. |
| From: | G. Makhijani |
| To: | A. Rispin and J. Ellenberger |
| Dated: | 7/30/85 |
| MRID(s): | 00146506 |
| | |
| CBRS No(s).: | 745 and 765 |
| Subject: | EPA Registration Nos. 432-625 and 432-662. Chlorpyrifos (Ultratec®). Product Chemistry Data Follow-up in Response to the Chlorpyrifos Registration Standard. |
| From: | S. Malak |
| To: | A. Rispin and J. Ellenberger |
| Dated: | 9/11/85 |
| MRID(s): | 00146823 and 00149498 |
| | |
| CBRS No(s).: | 931 |
| Subject: | EPA Registration No. 464-588. Chlorpyrifos (Dursban HF Insecticide Concentrate®). Product Chemistry Follow-ups in Response to the Chlorpyrifos Registration Standard Data Gaps. |
| From: | S. Malak |
| To: | A. Rispin and J. Ellenberger |
| Dated: | 9/11/85 |
| MRID(s): | 00146513 |

CBRS No(s).: 932
Subject: EPA Registration No. 464-564. Chlorpyrifos (Dursban MCR Insecticidal Concentrate®). Product Chemistry Follow-Ups in Response to the Chlorpyrifos Registration Standard Data Gaps.
From: S. Malak
To: A. Rispin and J. Ellenberger
Dated: 9/11/85
MRID(s): 00146511

CBRS No(s).: 946
Subject: EPA Registration No. 464-358. Chlorpyrifos (Dursban 6 Insecticidal Concentrate®). Product Chemistry Data Gaps in Response to the Chlorpyrifos Registration Standard.
From: S. Malak
To: A. Rispin and J. Ellenberger
Dated: 9/11/85
MRID(s): 00146515

CBRS No(s).: 947
Subject: EPA Registration No. 464-558. Chlorpyrifos (Dursban R Insecticidal Chemical®). Product Chemistry Data Gaps in Response to the Chlorpyrifos Registration Standard Data Gaps.
From: S. Malak
To: A. Rispin and J. Ellenberger
Dated: 9/11/85
MRID(s): 00146508

CBRS No(s).: 940
Subject: EPA Registration No. 464-559. Chlorpyrifos (Dursban 30 SEC Insecticidal Concentrate®). Product Chemistry Follow-ups in Response to the Chlorpyrifos Registration Standard Data Gaps.
From: S. Malak
To: A. Rispin and J. Ellenberger
Dated: 9/25/85
MRID(s): 00146512

CBRS No(s).: 935
Subject: EPA Registration No. 464-567. Chlorpyrifos (Dursban 6R Insecticidal Concentrate®). Product Chemistry Follow-ups in Response to the Chlorpyrifos Registration Standard Data Gaps.
From: S. Malak
To: A. Rispin and J. Ellenberger
Dated: 9/25/85
MRID(s): 00146510

CBRS No(s).: 869 through 876
Subject: Chlorpyrifos; Response to Data Gaps in Product Chemistry.
From: G. Makhijani and K. Arne
To: A. Rispin and J. Ellenberger
Dated: 9/27/85
MRID(s): 00146503

CBRS No(s).: 7368
DP Barcode(s): D158705
Subject: Chlorpyrifos: DowElanco Response to the Reregistration Standard: Product and Residue Chemistry Data.
From: C. Olinger
To: L. Rossi
Dated: 1/24/92
MRID(s): 41653503

CBRS No(s).: 10813
DP Barcode(s): D184265
Subject: Chlorpyrifos Reregistration: a List A Chemical (Chemical No. 059101; Case No. 0100). DowElanco: Response to the Chlorpyrifos Product Chemistry DCI (dated, 9/18/91) Regarding the Storage Stability and Corrosion Characteristics (Guideline #63-17 and 63-20) Data Requirements.
From: F. Toghrol
To: L. Rossi/L. Propst
Dated: 2/1/93
MRID(s): 42527201

CBRS No(s).: 11403
DP Barcode(s): D188256
Subject: Chlorpyrifos: List A; Chemical 059101; Case 0100. Dow Chemical Co. Response to the Registration Standard Data Requirements for Determination of a Dioxin Analogue (GLN 62-1).
From: S. Funk
To: L. Rossi/L. Propst
Dated: 6/16/93
MRID(s): 42544901

CBRS No(s).: 11373
DP Barcode(s): D188150
Subject: Chlorpyrifos Reregistration: DowElanco's 2/2/93 Response [61-3, 63-7, and 63-11 data for: 97 and 99% technical products; 62719-15 and -44] to "Rejection No. 218".
From: K. Dockter
To: J. Edwards
Dated: 8/3/93
MRID(s): 42495401-02 and 42652601

CBRS No(s).: 14125 and 14126
DP Barcode(s): D206232 and D206236
Subject: Product Chemistry: Guidelines 61-2(a), 62-1, and 63-14 through 63-19.
From: S. Knizner
To: D. McNeilly
Dated: 8/12/94
MRID(s): 43046601, 43046602, 41747204, and 41747205

PRODUCT CHEMISTRY CITATIONS

Bibliographic citations include only MRIDs containing data which fulfill data requirements.

References (cited):

00146503 Hamel, J. (1985) Product Chemistry: Insecta 105: Insecticidal Concentrates 101 through 108 Formulating Anti-Insect Paint: Project No. 850307-1. Unpublished study prepared by Insecta Paint Inc. 192 p.

00146506 Dow Chemical U.S.A. (1985) Product Chemistry: Dursban F Insecticidal Chemical. Unpublished compilation. 63 p.

00146508 Dow Chemical U.S.A. (1985) Product Chemistry: Dursban R Insecticidal Chemical. Unpublished compilation. 34 p.

00146510 Dow Chemical U.S.A. (1985) Product Chemistry: Dursban 6R Insecticidal Concentrate. Unpublished compilation. 26 p.

00146511 Dow Chemical U.S.A. (1985) Product Chemistry: Dursban MCR Insecticidal Concentrate. Unpublished compilation. 27 p.

00146512 Dow Chemical U.S.A. (1985) Product Chemistry: Dursban 30 SEC Insecticidal Concentrate. Unpublished compilation. 27 p.

00146513 Dow Chemical U.S.A. (1985) Product Chemistry: Dursban HF Insecticide Concentrate. Unpublished compilation. 26 p.

00146515 Dow Chemical U.S.A. (1985) Product Chemistry: Dursban 6 Insecticidal Concentrate. Unpublished compilation. 26 p.

00146823 Penick Corporation (1985) Product Chemistry Data - Ultra TEC Insecticide with Chlorpyrifos Transparent Emulsion Concentrate 25%. Unpublished study. 32 p.

00149498 Penick Corp. (1984) Product Chemistry Data for Ultra Tec Insecticide with Chlorpyrifos Transparent Emulsion Concentrate 25%, EPA Registration No. 432-625. Unpublished study. 30 p.

40105301 Dow Chemical Co. (1987) Dursban F Insecticidal Chemical: Product Identity and Composition. Unpublished compilation. 29 p.

40144101 Dow Chemical U.S.A. (1987) Dursban F Insecticidal Chemical: Analysis and Certification of Product Ingredients. Unpublished compilation. 74 p.

40411301 Dow Chemical Co. (1987) Dursban R Insecticidal Chemical: Product Identity and Composition. Unpublished study. 17 p.

41653503 Hamburg, F. (1990) Determination of the Compatibility Characteristics of Dursban R: Lab Project Number: 90014: GH-C2369. Unpublished study prepared by DowElanco. 11 p.

41747204 Dow Chemical Co. Storage Stability of Dursban R (EPA Reg.No 62719-44).

41747205 Dow Chemical Co. Oxidizing of Reducing Action of Dursban F Technical (EPA Reg.No 62719-15)

42495401 Jones-Jefferson, T.; Bischoff, R. (1992) Response to EPA Chlorpyrifos Generic Data Call-in dated September 18, 1991: [Product Chemistry]: Lab Project Number: RFB-92. Unpublished study prepared by DowElanco. 6 p.

42495402 Jones-Jefferson, T. (1992) Density of Dursban Technical: Lab Project Number: FOR92037. Unpublished study prepared by DowElanco. 11 p.

42527201 Krause, R. (1988) Laboratory Immersion Compatibility Test Procedure for Testing with Metals, Rubbers, and Plastics: Lab Project Number: REK51688. Unpublished study prepared by DowElanco. 10 p.

42544901 Hermann, E. (1992) Batch Analysis of Dursban FM Insecticide for the Presence of 2,3,7,8-Tetrachloro-1,4-Dioxino-2,3B-5,6B Dipyridine: Lab Project Number: DECO ML-AL 92-030221. Unpublished study prepared by The Dow Chemical Company. 15 p.

42652601 Macdonald, I. (1985) The Determination of Physico-Chemical Parameters of Chlorpyrifos: Lab Project Number: DWC 432/85579. Unpublished study prepared by Huntington Research Centre Ltd. 28 p.

43046601 DowElanco. (1993) Response to letter written by Linda S. Propst (September 30, 1993) Subject: Chlorpyrifos Reregistration. Product Chemistry Deficiencies for Guidelines 61-2(a), 62-1, and 63-14 through 63-19".

43046602 DowElanco. (1992) Explodability of Dursban Insecticide AGR Sample 220406 by Drop Weight Tester.

Case No. 0100
Chemical No. 059101

Case Name: Chlorpyrifos
Registrant: DowElanco
Product(s): 99% T (EPA Reg. No. 62719-44)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | Y | **00146508** |
| 61-2 | Starting Materials and Manufacturing Process | Y | **00146508** 40105301 |
| 61-3 | Discussion of Formation of Impurities | Y | **00146508** 40411301 42495401 [c] |
| 62-1 | Preliminary Analysis | Y | **00146508** |
| 62-2 | Certification of Ingredient Limits | Y | **00146508** |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | **00146508** |
| 63-2 | Color | Y | **00146508** |
| 63-3 | Physical State | Y | **00146508** |
| 63-4 | Odor | Y | **00146508** |
| 63-5 | Melting Point | Y | **00146508** |
| 63-6 | Boiling Point | N/A [d] | |
| 63-7 | Density, Bulk Density or Specific Gravity | Y | **00146508** 42495402 [e] |
| 63-8 | Solubility | Y | **00146508** |
| 63-9 | Vapor Pressure | Y | **00146508** |
| 63-10 | Dissociation Constant | N/A [e] | |
| 63-11 | Octanol/Water Partition Coefficient | Y | **00146508** 42652601 [e] |
| 63-12 | pH | N/A [f] | |
| 63-13 | Stability | Y | **00146508** |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | N/A [g] | |
| 63-16 | Explodability | Y | 403046602[g] |
| 63-17 | Storage Stability | Y | **00146508**, 41742704[g] |
| 63-18 | Viscosity | N/A [d] | |
| 63-19 | Miscibility | N/A [g] | |
| 63-20 | Corrosion Characteristics | Y | **00146508** 41653503 [h] 42527201 [i] |

[a] Y = Yes; N = No; N/A = Not Applicable.

[b] **Bolded** references were reviewed under CBRS No. 947, dated 9/11/85, by S. Malak and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88; underlined references were reviewed in the Chlorpyrifos SRR dated 11/18/88; all other references were reviewed as noted.

[c] CBRS No. 11373, D188150, dated 8/3/93, by K. Dockter.

[d] Data are not required because the TGAI/MP is a solid.

[e] Data pertaining to dissociation constant are not required because the TGAI/PAI does not dissociate.

[f] Data pertaining to pH are not required because the TGAI/MP is not dispersible in water.

[g] CBRS No. 14125 and 14126, D206232 and D206236, dated 8/12/94, by S. Knizner.

[h] CBRS No. 7368, D158705, dated 1/24/92, by C. Olinger.

[i] CBRS No. 10813, D184265, dated 2/1/93, by F. Toghrol.

Case No. 0100
Chemical No. 059101

Case Name: Chlorpyrifos
Registrant: DowElanco
Product(s): 97% T (EPA Reg. No. 62719-15)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | Y | **00146506** |
| 61-2 | Starting Materials and Manufacturing Process | Y | **00146506** 40411301, 40105301 |
| 61-3 | Discussion of Formation of Impurities | Y | **00146506** 40105301 42495401 [c] |
| 62-1 | Preliminary Analysis | Y | **00146506** 40144101 42544901 [d] |
| 62-2 | Certification of Ingredient Limits | Y | **00146506** 40105301 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | **00146506** 40144101 |
| 63-2 | Color | Y | **00146506** |
| 63-3 | Physical State | Y | **00146506** |
| 63-4 | Odor | Y | **00146506** |
| 63-5 | Melting Point | Y | **00146506** |
| 63-6 | Boiling Point | N/A [e] | |
| 63-7 | Density, Bulk Density or Specific Gravity | Y | **00146506** 42495402 [c] |
| 63-8 | Solubility | Y | **00146506** |
| 63-9 | Vapor Pressure | Y | **00146506** |
| 63-10 | Dissociation Constant | N/A [f] | |
| 63-11 | Octanol/Water Partition Coefficient | Y | **00146506** 42652601 [c] |
| 63-12 | pH | N/A [g] | |
| 63-13 | Stability | Y | **00146506** |
| 63-14 | Oxidizing or Reducing Action | Y | 41742705[h] |
| 63-15 | Flammability | N/A [e] | |
| 63-16 | Explodability | Y | **00146506** |
| 63-17 | Storage Stability | Y | **00146506** |
| 63-18 | Viscosity | N/A [e] | |
| 63-19 | Miscibility | N/A [e] | |
| 63-20 | Corrosion Characteristics | Y | **00146506** |

[a] Y = Yes; N = No; N/A = Not Applicable.

[b] **Bolded** references were reviewed under CBRS No. 952, dated 7/30/85, by G. Makhijani and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88; underlined references were reviewed in the Chlorpyrifos SRR dated 11/18/88; all other references were reviewed as noted.

[c] CBRS No. 11373, D188150, dated 8/3/93, by K. Dockter.

[d] CBRS No. 11403, D188256, 6/16/93, S. Funk.

[e] Data are not required because the TGAI/MP is a solid.

[f] Data pertaining to dissociation constant are not required because the TGAI/PAI does not dissociate.

[g] Data pertaining to pH are not required because the TGAI/MP is not dispersible in water.

[h] CBRS No. 14125 and 14126, D206232 and D206236, dated 8/12/94, by S. Knizner.

Case No. 0100
Chemical No. 059101

Case Name: Chlorpyrifos
Registrant: DowElanco
Product(s): 62.5% FI (EPA Reg. No. 62719-66)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | Y | 00146513 |
| 61-2 | Starting Materials and Manufacturing Process | Y | 00146513 |
| 61-3 | Discussion of Formation of Impurities | N [c] | 00146513 |
| 62-1 | Preliminary Analysis | N/A [d] | 00146513 |
| 62-2 | Certification of Ingredient Limits | Y | 00146513 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | 00146513 |
| 63-2 | Color | Y | 00146513 |
| 63-3 | Physical State | Y | 00146513 |
| 63-4 | Odor | Y | 00146513 |
| 63-5 | Melting Point | N/A [d] | |
| 63-6 | Boiling Point | N/A [d] | |
| 63-7 | Density, Bulk Density or Specific Gravity | Y | 00146513 |
| 63-8 | Solubility | N/A [d] | |
| 63-9 | Vapor Pressure | N/A [d] | |
| 63-10 | Dissociation Constant | N/A [d] | |
| 63-11 | Octanol/Water Partition Coefficient | N/A [d] | |
| 63-12 | pH | N [e] | |
| 63-13 | Stability | N/A [d] | |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | Y | 00146513 |
| 63-16 | Explodability | N | |
| 63-17 | Storage Stability | N [f] | 00146513 |
| 63-18 | Viscosity | Y | 00146513 |
| 63-19 | Miscibility | N [g] | |
| 63-20 | Corrosion Characteristics | N [f] | 00146513 |

[a] Y = Yes; N = No; N/A = Not Applicable.

[b] All references were reviewed under CBRS No. 931, dated 9/11/85, by S. Malak and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88.

[c] These data do not fully satisfy the requirements of 40 CFR §158.167 (Guideline Reference No. 61-3) regarding discussion of formation of impurities because a discussion of possible post-production reactions between any of the product's active ingredients and any other

component of the product or its packaging, and possible contamination from packaging materials or production equipment is required.

[d] Data are not required; this requirement will be fulfilled by the technical source product.

[e] Data pertaining to pH are required if the MP is dispersible in water.

[f] New data must be submitted for this requirement.

[g] Data pertaining to miscibility are required if the MP is an emulsifiable liquid which is to be diluted with petroleum solvents.

Case No. 0100
Chemical No. 059101

Case Name: Chlorpyrifos
Registrant: DowElanco
Product(s): 62.4% FI (EPA Reg. No. 62719-51)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | Y | 00146510 |
| 61-2 | Starting Materials and Manufacturing Process | Y | 00146510 |
| 61-3 | Discussion of Formation of Impurities | N [c] | 00146510 |
| 62-1 | Preliminary Analysis | N/A [d] | 00146510 |
| 62-2 | Certification of Ingredient Limits | Y | 00146510 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | 00146510 |
| 63-2 | Color | Y | 00146510 |
| 63-3 | Physical State | Y | 00146510 |
| 63-4 | Odor | Y | 00146510 |
| 63-5 | Melting Point | N/A [d] | |
| 63-6 | Boiling Point | N/A [d] | |
| 63-7 | Density, Bulk Density or Specific Gravity | Y | 00146510 |
| 63-8 | Solubility | N/A [d] | |
| 63-9 | Vapor Pressure | N/A [d] | |
| 63-10 | Dissociation Constant | N/A [d] | |
| 63-11 | Octanol/Water Partition Coefficient | N/A [d] | |
| 63-12 | pH | N [e] | |
| 63-13 | Stability | N/A [d] | |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | Y | 00146510 |
| 63-16 | Explodability | N | |
| 63-17 | Storage Stability | N [f] | 00146510 |
| 63-18 | Viscosity | Y | 00146510 |
| 63-19 | Miscibility | N [g] | |
| 63-20 | Corrosion Characteristics | N [h] | 00146510 |

[a] Y = Yes; N = No; N/A = Not Applicable.

[b] All references were reviewed under CBRS No. 935, dated 9/25/85, by S. Malak and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88.

[c] These data do not fully satisfy the requirements of 40 CFR §158.167 (Guideline Reference No. 61-3) regarding discussion of formation of impurities because a discussion of possible post-production reactions between any of the product's active ingredients and any other

component of the product or its packaging, and possible contamination from packaging materials or production equipment is required.

[d] Data are not required; this requirement will be fulfilled by the technical source product.

[e] Data pertaining to pH are required if the MP is dispersible in water.

[f] New data must be submitted for this requirement.

[g] Data pertaining to miscibility are required if the MP is an emulsifiable liquid which is to be diluted with petroleum solvents.

[h] A description of the method used to determine corrosion characteristics is required.

Case No. 0100
Chemical No. 059101

Case Name: Chlorpyrifos
Registrant: DowElanco
Product(s): 61.5% FI (EPA Reg. No. 62719-10)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | Y | 00146515 |
| 61-2 | Starting Materials and Manufacturing Process | Y | 00146515 |
| 61-3 | Discussion of Formation of Impurities | N [c] | 00146515 |
| 62-1 | Preliminary Analysis | N/A [d] | 00146515 |
| 62-2 | Certification of Ingredient Limits | Y | 00146515 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | 00146515 |
| 63-2 | Color | Y | 00146515 |
| 63-3 | Physical State | Y | 00146515 |
| 63-4 | Odor | Y | 00146515 |
| 63-5 | Melting Point | N/A [d] | |
| 63-6 | Boiling Point | N/A [d] | |
| 63-7 | Density, Bulk Density or Specific Gravity | Y | 00146515 |
| 63-8 | Solubility | N/A [d] | |
| 63-9 | Vapor Pressure | N/A [d] | |
| 63-10 | Dissociation Constant | N/A [d] | |
| 63-11 | Octanol/Water Partition Coefficient | N/A [d] | |
| 63-12 | pH | N [e] | |
| 63-13 | Stability | N/A [d] | |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | Y | 00146515 |
| 63-16 | Explodability | N | |
| 63-17 | Storage Stability | Y | 00146515 |
| 63-18 | Viscosity | Y | 00146515 |
| 63-19 | Miscibility | N [f] | |
| 63-20 | Corrosion Characteristics | Y | 00146515 |

[a] Y = Yes; N = No; N/A = Not Applicable.

[b] All references were reviewed under CBRS No. 946, dated 9/11/85, by S. Malak and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88.

[c] These data do not fully satisfy the requirements of 40 CFR §158.167 (Guideline Reference No. 61-3) regarding discussion of formation of impurities because a discussion of possible post-production reactions between any of the product's active ingredients and any other

component of the product or its packaging, and possible contamination from packaging materials or production equipment is required.

[d] Data are not required; this requirement will be fulfilled by the technical source product.

[e] Data pertaining to pH are required if the MP is dispersible in water.

[f] Data pertaining to miscibility are required if the MP is an emulsifiable liquid which is to be diluted with petroleum solvents.

Case No. 0100
Chemical No. 059101

Case Name: Chlorpyrifos
Registrant: DowElanco
Product(s): 52.4% FI (EPA Reg. No. 62719-49)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | Y | 00146511 |
| 61-2 | Starting Materials and Manufacturing Process | N [c] | 00146511 |
| 61-3 | Discussion of Formation of Impurities | N [d] | 00146511 |
| 62-1 | Preliminary Analysis | N/A [e] | 00146511 |
| 62-2 | Certification of Ingredient Limits | Y | 00146511 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | 00146511 |
| 63-2 | Color | Y | 00146511 |
| 63-3 | Physical State | Y | 00146511 |
| 63-4 | Odor | Y | 00146511 |
| 63-5 | Melting Point | N/A [e] | |
| 63-6 | Boiling Point | N/A [e] | |
| 63-7 | Density, Bulk Density or Specific Gravity | Y | 00146511 |
| 63-8 | Solubility | N/A [e] | |
| 63-9 | Vapor Pressure | N/A [e] | |
| 63-10 | Dissociation Constant | N/A [e] | |
| 63-11 | Octanol/Water Partition Coefficient | N/A [e] | |
| 63-12 | pH | N [f] | |
| 63-13 | Stability | N/A [e] | |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | N [g] | 00146511 |
| 63-16 | Explodability | Y | 00146511 |
| 63-17 | Storage Stability | N [g] | 00146511 |
| 63-18 | Viscosity | Y | 00146511 |
| 63-19 | Miscibility | N [h] | |
| 63-20 | Corrosion Characteristics | N [i] | 00146511 |

[a] Y = Yes; N = No; N/A = Not Applicable.

[b] All references were reviewed under CBRS No. 932, dated 9/11/85, by S. Malak and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88.

[c] These data do not fully satisfy the requirements of 40 CFR §158.160-165 (Guideline Reference No. 61-2) regarding starting materials and the manufacturing process because the reported starting materials must be revised to correspond with the statement of formula.

[d] These data do not fully satisfy the requirements of 40 CFR §158.167 (Guideline Reference No. 61-3) regarding discussion of formation of impurities because a discussion of possible post-production reactions between any of the product's active ingredients and any other component of the product or its packaging, and possible contamination from packaging materials or production equipment is required.

[e] Data are not required; this requirement will be fulfilled by the technical source product.

[f] Data pertaining to pH are required if the MP is dispersible in water.

[g] New data must be submitted for this requirement.

[h] Data pertaining to miscibility are required if the MP is an emulsifiable liquid which is to be diluted with petroleum solvents.

[i] A description of the method used to determine corrosion characteristics is required.

Case No. 0100
Chemical No. 059101

Case Name: Chlorpyrifos
Registrant: DowElanco
Product(s): 30% FI (EPA Reg. No. 62719-45)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | N [c] | 00146512 |
| 61-2 | Starting Materials and Manufacturing Process | Y | 00146512 |
| 61-3 | Discussion of Formation of Impurities | N [d] | 00146512 |
| 62-1 | Preliminary Analysis | N/A [e] | 00146512 |
| 62-2 | Certification of Ingredient Limits | Y | 00146512 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | 00146512 |
| 63-2 | Color | Y | 00146512 |
| 63-3 | Physical State | Y | 00146512 |
| 63-4 | Odor | Y | 00146512 |
| 63-5 | Melting Point | N/A [e] | |
| 63-6 | Boiling Point | N/A [e] | |
| 63-7 | Density, Bulk Density or Specific Gravity | N [f] | 00146512 |
| 63-8 | Solubility | N/A [e] | |
| 63-9 | Vapor Pressure | N/A [e] | |
| 63-10 | Dissociation Constant | N/A [e] | |
| 63-11 | Octanol/Water Partition Coefficient | N/A [e] | |
| 63-12 | pH | Y | 00146512 |
| 63-13 | Stability | N/A [e] | |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | Y | 00146512 |
| 63-16 | Explodability | N | |
| 63-17 | Storage Stability | N [g] | 00146512 |
| 63-18 | Viscosity | Y | 00146512 |
| 63-19 | Miscibility | Y | 00146512 |
| 63-20 | Corrosion Characteristics | N [h] | 00146512 |

[a] Y = Yes; N = No; N/A = Not Applicable.

[b] All references were reviewed under CBRS No. 940, dated 9/25/85, by S. Malak and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88.

[c] These data do not fully satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product identity because the CA-approved chemical name of each inert ingredient in the product, its CAS registry number, and nominal concentration are required.

[d] These data do not fully satisfy the requirements of 40 CFR §158.167 (Guideline Reference No. 61-3) regarding discussion of formation of impurities because a discussion of possible post-production reactions between any of the product's active ingredients and any other component of the product or its packaging, and possible contamination from packaging materials or production equipment is required.

[e] Data are not required; this requirement will be fulfilled by the technical source product.

[f] The temperature for the density determination is required.

[g] New data must be submitted for this requirement.

[h] A description of the method used to determine corrosion characteristics is required.

Case No. 0100
Chemical No. 059101

Case Name: Chlorpyrifos
Registrant: Insecta Sales Inc.
Product(s): 41% FI (EPA Reg. No. 45600-6)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | N [c] | 00146503 |
| 61-2 | Starting Materials and Manufacturing Process | N [d] | 00146503 |
| 61-3 | Discussion of Formation of Impurities | Y | 00146503 |
| 62-1 | Preliminary Analysis | N/A [e] | 00145603 |
| 62-2 | Certification of Ingredient Limits | Y | 00146503 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | 00146503 |
| 63-2 | Color | Y | 00146503 |
| 63-3 | Physical State | Y | 00146503 |
| 63-4 | Odor | Y | 00146503 |
| 63-5 | Melting Point | N/A [e] | |
| 63-6 | Boiling Point | N/A [e] | |
| 63-7 | Density, Bulk Density or Specific Gravity | N [f] | 00146503 |
| 63-8 | Solubility | N/A [e] | |
| 63-9 | Vapor Pressure | N/A [e] | |
| 63-10 | Dissociation Constant | N/A [e] | |
| 63-11 | Octanol/Water Partition Coefficient | N/A [e] | |
| 63-12 | pH | N [g] | |
| 63-13 | Stability | N/A [e] | |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | Y | 00146503 |
| 63-16 | Explodability | Y | 00146503 |
| 63-17 | Storage Stability | N | |
| 63-18 | Viscosity | Y | 00146503 |
| 63-19 | Miscibility | Y | 00146503 |
| 63-20 | Corrosion Characteristics | N [h] | 00146503 |

[a] Y = Yes; N = No; N/A = Not Applicable.

[b] All references were reviewed under CBRS Nos. 869 through 876, dated 9/27/85, by G. Makhijani and K. Arne, and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88.

[c] These data do not fully satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product identity because the CA-approved chemical name of each inert ingredient in the product, its CAS registry number, and nominal concentration are required.

[d] These data do not fully satisfy the requirements of 40 CFR §158.160-165 (Guideline Reference No. 61-2) regarding starting materials and the manufacturing process because the brand name, trade name, or other commercial designation and information concerning the composition of each inert ingredient and its purpose are required.

[e] Data are not required; this requirement will be fulfilled by the technical source product.

[f] The method and temperature are required for the density determination.

[g] Data pertaining to pH are required if the MP is dispersible in water.

[h] A description of the method used to determine corrosion characteristics is required.

Case No. 0100
Chemical No. 059101

Case Name: Chlorpyrifos
Registrant: Roussel UCLAF, Corp.
Product(s): 25% FIs (EPA Reg. Nos. 432-625 and 432-662)

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number [b] |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | N [c] | 00146823 00149498 |
| 61-2 | Starting Materials and Manufacturing Process | Y | 00146823 00149498 |
| 61-3 | Discussion of Formation of Impurities | Y | 00146823 00149498 |
| 62-1 | Preliminary Analysis | N/A [d] | 00146823 00149498 |
| 62-2 | Certification of Ingredient Limits | Y | 00146823 00149498 |
| 62-3 | Analytical Methods to Verify the Certified Limits | Y | 00146823 00149498 |
| 63-2 | Color | Y | 00146823 00149498 |
| 63-3 | Physical State | Y | 00146823 00149498 |
| 63-4 | Odor | Y | 00146823 00149498 |
| 63-5 | Melting Point | N/A [d] | |
| 63-6 | Boiling Point | N/A [d] | |
| 63-7 | Density, Bulk Density or Specific Gravity | Y | 00146823 00149498 |
| 63-8 | Solubility | N/A [d] | |
| 63-9 | Vapor Pressure | N/A [d] | |
| 63-10 | Dissociation Constant | N/A [d] | |
| 63-11 | Octanol/Water Partition Coefficient | N/A [d] | |
| 63-12 | pH | Y | 00146823 00149498 |
| 63-13 | Stability | N/A [d] | |
| 63-14 | Oxidizing or Reducing Action | N [e] | 00146823 00149498 |
| 63-15 | Flammability | Y | 00146823 00149498 |
| 63-16 | Explodability | N [e] | 00146823 00149498 |
| 63-17 | Storage Stability | N [e] | 00146823 00149498 |
| 63-18 | Viscosity | Y | 00146823 00149498 |
| 63-19 | Miscibility | Y | 00146823 00149498 |
| 63-20 | Corrosion Characteristics | N [e] | 00146823 00149498 |

[a] Y = Yes; N = No; N/A = Not Applicable.

[b] All references were reviewed under CBRS Nos. 745 and 765, dated 9/11/85, by S. Malak and were re-evaluated in the Chlorpyrifos SRR dated 11/18/88. As noted in CBRS Nos. 746 and 765, the composition of these products is identical.

[c] These data do not fully satisfy the requirements of 40 CFR §158.155 (Guideline Reference No. 61-1) regarding product identity because the CA-approved chemical name of each inert ingredient in the product, its CAS registry number, and nominal concentration are required.

[d] Data are not required; this requirement will be fulfilled by the technical source product.

[e] New data must be submitted for this requirement.

Case No. 0100
Chemical No. 059101
Case Name: Chlorpyrifos

**Registrant/Product(s):** **FMC** 62.5% FI (EPA Reg. No. 279-3134); **Roussel UCLAF** 25% FIs (EPA Reg. Nos. 432-615 and 432-661), 16% FIs (EPA Reg. Nos. 432-570, 432-571, 432-648, 432-649, and 432-692), 15% FIs (EPA Reg. Nos. 432-674 and 432-682); **Sureco Inc.** 44.8% FI (EPA Reg. No. 769-690); **McLaughlin Gormley King Co.** 28.331% FI (EPA Reg. No. 1021-1458), 20% FIs (EPA Reg. Nos. 1021-1215, 1021-1220, and 1021-1434), 14.286% FI (EPA Reg. No. 1021-1506), and 8.363% FIs (EPA Reg. Nos. 1021-1438, 1021-1442, and 1021-1444); **Roussel UCLAF** 25% FI (EPA Reg. No. 4816-657), 10% FI (EPA Reg. No. 4816-634), 5% FIs (EPA Reg. Nos. 4816-622 and 4816-638), 2.5% FI (EPA Reg. No. 4816-480), and 0.714% FI (EPA Reg. No. 4816-448); **3M/Animal Care Products** 20% FI (EPA Reg. No. 10350-10); **Makhteshim Chemical Works** 94% FI (EPA Reg. No. 11678-45); and **DowElanco** 62.5% FI (EPA Reg. No. 62719-76), 50% FI (EPA Reg. No. 62719-78), and 22.8% FI (EPA Reg. No. 62719-225).

## PRODUCT CHEMISTRY DATA SUMMARY

| Guideline Number | Requirement | Are Data Requirements Fulfilled? [a] | MRID Number |
|---|---|---|---|
| 61-1 | Product Identity and Disclosure of Ingredients | N | |
| 61-2 | Starting Materials and Manufacturing Process | N | |
| 61-3 | Discussion of Formation of Impurities | N | |
| 62-1 | Preliminary Analysis | N | |
| 62-2 | Certification of Ingredient Limits | N | |
| 62-3 | Analytical Methods to Verify the Certified Limits | N | |
| 63-2 | Color | N | |
| 63-3 | Physical State | N | |
| 63-4 | Odor | N | |
| 63-5 | Melting Point | N | |
| 63-6 | Boiling Point | N | |
| 63-7 | Density, Bulk Density or Specific Gravity | N | |
| 63-8 | Solubility | N | |
| 63-9 | Vapor Pressure | N | |
| 63-10 | Dissociation Constant | N | |
| 63-11 | Octanol/Water Partition Coefficient | N | |
| 63-12 | pH | N | |
| 63-13 | Stability | N | |
| 63-14 | Oxidizing or Reducing Action | N | |
| 63-15 | Flammability | N | |
| 63-16 | Explodability | N | |
| 63-17 | Storage Stability | N | |
| 63-18 | Viscosity | N | |
| 63-19 | Miscibility | N | |
| 63-20 | Corrosion Characteristics | N | |

[a] Y = Yes; N = No; N/A = Not Applicable.

DYNAMAC
CORPORATION
*Environmental Services*

Final Report

# CHLORPYRIFOS
# Shaughnessy No. 059101
# Case No. 0100
# (CBRS No. 13024, DP Barcode D198040)

# TASK 2B
# Reregistration Eligibility Document:
# Residue Chemistry Considerations

September 14, 1994

**Contract No. 68-D2-0053**

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

**Submitted by:**
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# CHLORPYRIFOS

## REREGISTRATION ELIGIBILITY DOCUMENT

## RESIDUE CHEMISTRY CONSIDERATIONS

Shaughnessy No. 059101; Case 0100

(CBRS No. 13024; DP Barcode D198040)

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TASK 2B

## INTRODUCTION

Chlorpyrifos [O,O-diethyl O-(3,5,6-trichloro-2-pyridinyl)-phosphorothioate] is an insecticide registered to control foliage- and soil-borne insect pests on a variety of food and feed crops. This chemical is also registered for ear tag treatment of cattle (beef and lactating and non-lactating dairy) and for direct treatments to livestock premises, mushroom houses, and food-handling establishments. Comprehensive lists of chlorpyrifos end-use products (EPs) and of use patterns with food/feed uses which are subject to reregistration appear in Tables A and B, respectively.

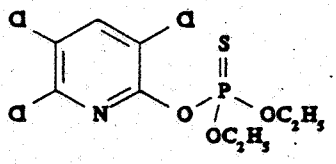
The formulations registered for use on food and feed crops include the granular (G), wettable powder (WP), impregnated material (Impr), dry flowable (DF), and emulsifiable concentrate (EC). These formulations may be applied as foliar, bark, seed, and soil-incorporated band or broadcast treatments using ground, sprinkler irrigation, or aerial equipment. The different crop growth stages or timings as to when chlorpyrifos formulations may be applied are dormant, delayed dormant, preplant, at-planting, transplanting, postplant, post-transplant, preemergence, postemergence, and postharvest. The impregnated material formulation is registered for ear tag use on cattle. The formulations registered for animal premise treatments include the wettable powder and dry flowable. The chlorpyrifos formulations registered for food-handling establishments include the microencapsulated (Mcap), emulsifiable concentrate, and liquid ready-to-use (RTU) *[Source: REFS search, 1/5/94]*.

## REGULATORY BACKGROUND

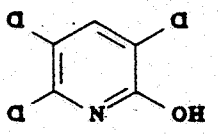
Chlorpyrifos was the subject of a Reregistration Standard Guidance Document dated 9/28/84; the Residue Chemistry Science Chapter of the Guidance Document was dated 1/25/84. The Chlorpyrifos Second Round Review (SRR) was issued 11/18/88; an addendum to the SRR was issued 1/13/89. Several residue chemistry studies have been submitted since issuance of these documents, and practically all have been evaluated by CBRS.

The established tolerances in/on raw agricultural, animal, and processed food/feed commodities are expressed either in terms of the combined residues of chlorpyrifos and its metabolite 3,5,6-trichloro-2-pyridinol (TCP) *[40 CFR §180.342 (a) and (b), 185.1000 (a), and 186.1000 (a)]* or as chlorpyrifos *per se [40 CFR §180.342 (c) and (d) and 185.1000 (c) and (d)]*. The ranges of these established tolerances are 0.01-13 ppm for crop commodities, 0.01-0.25 ppm for eggs, milk, and animal tissues, and 0.5-25 ppm for processed food/feeds. Adequate residue analytical methods are available for the enforcement of established chlorpyrifos tolerances. The chemical structures of chlorpyrifos and its metabolite, TCP, are depicted below in Figure A.

Figure A: Chemical structures of chlorpyrifos and its metabolite, TCP.




Chlorpyrifos




TCP

TOX Branch has determined that TCP is not of toxicological concern and concluded that TCP can be excluded from the tolerance expression (PP3F2884 and 3F2947 and FAP3H5396 and 3H5411/R1191, Final Rule, D.Barolo, 4/1/93). The conclusions specified in the "Tolerance Reassessment Summary" section of this document reflect the TOX Branch decision and recommendation to consider only chlorpyrifos *per se* as the residue of concern.

The information contained in this document summarizes the status of the residue chemistry data requirements, in accordance with Subdivision O's Pesticide Assessment Guidelines, with respect to the reregistration of chlorpyrifos.

## SUMMARY OF SCIENCE FINDINGS

### GLN 171-3: Directions for Use

A REFS search conducted 1/5/94 identified 27 chlorpyrifos end-use products (EPs) with food/feed uses registered to DowElanco and Y-TEX Corporation. These EPs are presented in Table A.

Table A. Chlorpyrifos end-use products with food/feed uses registered to DowElanco and Y-TEX Corp.

| Registrant<br>EPA Reg. No. | Acceptance Date | Formulation Class | Product Name |
|---|---|---|---|
| **Y-TEX Corporation** | | | |
| 39039-2 | 1/15/90 [a] | 5% Impr | Max-Con Insecticide Ear Tags |
| **DowElanco** | | | |
| 62719-14 | 9/1/92 | 0.5% G | Dursban 1/2 G Granular Insecticide |
| 62719-210 | 9/1/92 | 1% G | Dursban 1G Insecticide |
| 62719-85 | 1/15/90 [a] | 7.5% G | Lorsban 7.5G Granular Insecticide |
| 62719-34 [b] | 5/27/93 | 15% G | Lorsban 15G Granular Insecticide |
| 62719-38 [c] | 1/15/90 [a] | 50% WP | Lorsban 50-SL Wettable Powder Insecticide |
| 62719-39 [d] | 5/27/93 | 50% WP | Lorsban 50W Wettable Powder Insecticide |
| 62719-68 | 1/15/90 [a] | 50% WP | Dursban 50W Insecticide |
| 62719-72 | 8/23/93 | 50% WP | Dursban 50W in Water Soluble Packets |
| 62719-221 [e] | 5/27/93 | 50% WP | Lorsban 50W in Water Soluble Packets |
| 62719-74 | 3/17/92 | 1 lb/gal Mcap | Dursban ME Insecticide |
| 62719-88 | 11/18/93 | 1.7 lb/gal Mcap | Dursban ME20 Microencapsulated Insecticide |
| 62719-29 | 4/30/93 | 1% Impr | Polyethylene D |
| 62719-163 | 1/5/93 | 50% DF | Dursban 50DF Insecticide |
| 62719-56 | 12/9/93 | 1 lb/gal EC | Dursban 1-12 Insecticide |
| 62719-7 | 1/15/90 [a] | 2 lb/gal EC | Dursban 2EC Insecticide |
| 62719-65 | 12/9/93 | 2 lb/gal EC | Dursban 2EC Insecticide |
| 62719-79 | 8/19/92 | 2 lb/gal EC | Lock-On Insecticide |
| 62719-166 | 6/12/91 | 2 lb/gal EC | XRM-5184 L.O. Insecticide |
| 62719-200 | 4/20/84 | 2 lb/gal EC | B&G Dursban 2E Insecticide |
| 62719-11 [f] | 9/29/92 | 4 lb/gal EC | Dursban 4E Insecticide |
| 62719-41 | 1/15/90 [a] | 4 lb/gal EC | Dursban 4 Plus Insecticide |
| 62719-55 | 9/27/93 | 4 lb/gal EC | Dursban LO |
| 62719-23 [g] | 5/27/93 | 4 lb/gal EC | Lorsban 4E Insecticide |
| 62719-220 | 11/29/93 | 4 lb/gal EC | Lorsban 4E-HF |
| 62719-245 | 11/29/93 | 4 lb/gal EC | Lorsban 4E-SG |
| 62719-197 | 4/3/92 | 0.5% RTU | Dursban WB05 III |

[a] Copy of label was obtained from a Product Label DCI dated 1/15/90.

[b] Includes SLN No. MO890008.

[c] Includes SLN No. TX880002.

[d] Includes SLN Nos. AZ870006, CA860066, FL920007, GA930003, HI930010, IN880012, MI880010, and OH880006.

[e] Includes SLN Nos. FL920009, FL920010, GA930004, and HI930011.

[f] Includes SLN No. MS930012.

[g] Includes SLN Nos. AL850003, AZ900006, CA790238, CA810031, CA820055, CA860049, CA880026, CA890018, CA890048, CA900007, CA910016, DE840003, FL780046, GA790019, GA860001, GA870006, ID820018, ID830005, ID830021, ID830028, MD840004, MI840002, MI850006, MO870004, MS830025, MS840004, OR820001, OR830007, OR830017, OR830018, OR840021, OR850031, OR850032, OR850034, PA840008, SD870006, TN880002, TX900006, WA810036, WA830009, WA830033, and WA850025.

A comprehensive summary of the registered food/feed use patterns of chlorpyrifos, based on these product labels, is presented in Table B. A tabular summary of the residue chemistry science assessments for reregistration of chlorpyrifos is presented in Table C. The conclusions listed in Table C regarding the reregistration eligibility of chlorpyrifos food/feed uses are based on the use patterns registered by the basic producers, DowElanco and Y-TEX (ear tag uses only). When end-use product DCIs are developed (e.g., at issuance of the RED), RD should require that all end-use product labels (e.g., MAI labels, SLNs, and products subject to the generic data exemption) be amended such that they are consistent with the basic producer labels.

GLN 171-4 (a): Plant Metabolism

The qualitative nature of the residue in plants is adequately understood based on acceptable metabolism studies with a cereal grain (corn) and a root and tuber vegetable (sugar beets). The terminal residue of concern in/on plants is chlorpyrifos *per se*. The requirements for a third crop (legume vegetable) metabolism study is waived because: (i) the corn and sugar beet studies adequately identified the majority of the total radioactive residues (TRR) using GC or HPLC in conjunction with mass spectral confirmation; and (ii) the TRR in both corn grain and foliage, and in sugar beet foliage were sufficiently characterized and identified. Earlier metabolism studies with apples, dry beans, and soybeans, although not completely acceptable, provide supplemental data to elucidate the metabolism of chlorpyrifos in plants.

In the corn metabolism study, the corn plants received a soil and a mid-season foliar application of ring-labeled [$^{14}$C]chlorpyrifos. Forage and fodder were harvested 79 and 92 days, respectively, after the foliar application; grain was harvested at maturity. HPLC analyses of extracts, following exhaustive residue extraction procedures, indicated that chlorpyrifos accounted for 3% of the total radioactivity in forage and 0.7% in fodder. TCP accounted for 30 and 17% of the total residues in forage and fodder, respectively. Polar materials comprised 56-67% of the $^{14}$C-activity in forage and fodder. Trichloromethoxypyridine, a known soil metabolite, accounted for 3% of the radioactive residue in fodder. Of the radioactivity in grain, 98.4% was associated with natural plant constituents. Additional minor metabolites, hydrolyzable to TCP, were also identified.

In the sugar beet metabolism study, sugar beet plants were exposed to ring-labeled [$^{14}$C]chlorpyrifos in a soil application at-planting and in a mid-season foliar application. Samples of foliage were collected 38 days after soil application; sugar beet roots and tops were harvested 107 days after soil application. TCP was the major terminal residue, accounting for 59% of the total radioactivity in young foliage, 30% in tops, and 25.6% in roots. Chlorpyrifos accounted for 1.5% of the $^{14}$C-activity in young foliage, and 0.3% in roots. Trichloromethoxypyridine comprised 8.9% of the radioactivity in roots. Additional minor metabolites, hydrolyzable to TCP, were also identified.

GLN 171-4 (b): Animal Metabolism

The qualitative nature of the residue in animals is adequately understood based on acceptable poultry and ruminant metabolism studies. The residue of concern in animals is chlorpyrifos *per se*. There are presently no direct application uses of chlorpyrifos on meat- and milk-producing animals, except for ear tag treatment of cattle (beef and lactating and non-lactating dairy).

In a poultry metabolism study, laying hens were dosed with ring-labeled [$^{14}$C]chlorpyrifos for ten days at levels equivalent to 20 ppm in the diet. Of the total radioactivity administered, ca. 90-95% was detected in the excreta. The total radioactive residues in egg yolks reached a maximum (0.141-0.153 ppm chlorpyrifos equivalents) on days 9-10 of the dosing period. The maximum residue level in egg whites occurred in samples collected on days 3-6 at 0.021-0.029 ppm. The animals were sacrificed 12 hours after administration of the last dose. $^{14}$C-Residues (expressed as chlorpyrifos equivalents) were 0.198 ppm in fat, 0.154 ppm in kidney, 0.126 ppm in skin, 0.068 ppm in heart, 0.054 ppm in liver, 0.024 ppm in gizzard, 0.015 ppm in thigh muscle, and 0.01 ppm in breast muscle. Chlorpyrifos accounted for $<1\%$ of the total $^{14}$C-activity in kidney and liver, 62% in skin, 87% in fat, and 30% in egg yolk. TCP accounted for $<1\%$ of the total radioactivity in fat, 17% in skin, 45% in egg yolk, and 72% in kidney. In liver, 62% of the $^{14}$C-activity was hydrolyzable to TCP.

The nature of the residue in milk has been adequately delineated. In a ruminant metabolism study, lactating goats were dosed with ring-labeled [$^{14}$C]chlorpyrifos for ten days at levels equivalent to 16-21 ppm in the diet. Approximately 0.14% of the administered $^{14}$C-activity was recovered in milk (0.046 ppm). HPLC analysis revealed that 66-74% of the $^{14}$C-activity was accounted for by chlorpyrifos and 13-20% was TCP. TCP accounted for $>90\%$ of the radioactivity in hydrolyzed samples. In another study, goats were fed [$^{14}$C]chlorpyrifos labeled in the ethyl moiety for five days at a level equivalent to 5-10 ppm in the diet. TLC analysis of milk extracts indicated that 18% of the radioactivity was in chlorpyrifos, 28% in monoethyl phosphate, 36% in diethyl thiophosphate, and 17% in diethyl phosphate.

Another study was conducted in which two goats each received a single dermal application of [$^{14}$C]chlorpyrifos at 1 g ai/100 lb of body weight. Urine, feces, and blood were collected at 4-hour intervals, and the animals were sacrificed 16 hours after treatment. The total radioactive residues in blood reached a maximum of 0.824-0.866 ppm (chlorpyrifos equivalents) 12 hours postdose, and decreased slightly thereafter. Feces and urine contained up to 0.428 and 6.48 ppm of $^{14}$C-residues, respectively. The total radioactive residues in tissues were 0.361-0.604 ppm in liver, 0.442-0.733 ppm in kidney, 0.252-0.478 ppm in heart, 0.402-0.834 ppm in fat, and 0.046-0.09 ppm in muscle. HPLC analysis indicated that TCP accounted for 54.1% of the total residues in liver, 59.7% in kidney, 21.5% in heart, 9.2% in fat and 32.4% in muscle. Chlorpyrifos comprised 8.7% of the $^{14}$C-residues in kidney, 52.6% in heart, 78.4% in fat, and 22.1% in muscle; none was detected in liver. Unidentified HPLC peaks accounted for 2.57-18.6% of the total radioactivity in these tissues.

Hydrolyzed muscle extract contained [$^{14}$C]TCP as the only radioactive compound (63% of the total radioactivity in muscle).

GLN 171-4 (c) and (d): Residue Analytical Methods - Plants and Animals

The requirements for residue analytical methods are fulfilled for purposes of reregistration. In consideration of the Agency's decision to regulate only the parent chlorpyrifos, acceptable methods are available for enforcement and data collection purposes. The behavior of chlorpyrifos using FDA's multiresidue protocols has also been investigated and reported.

For the enforcement of tolerances in plant commodities, the Pesticide Analytical Manual (PAM Vol. II) lists three GLC methods (designated as Methods I, II, and VI) with phosphorus-specific flame photometric detection (FPD) and a detection limit of 0.01 ppm, as available for the determination of chlorpyrifos *per se*. Three confirmatory procedures (p-values, hydrolysis of chlorpyrifos to TCP followed by GLC determination, and mass spectrometry) are listed as Method A. PAM Vol. II Method VII hydrolyzes chlorpyrifos to TCP to quantify TCP plus chlorpyrifos; TCP residues are then determined by difference.

For the enforcement of tolerances in animal commodities, PAM Vol. II lists a GLC method (designated as Method IV) with electron capture detection (ECD) and a detection limit of 0.01 ppm, as available for determination of chlorpyrifos *per se*. PAM Vol. II Method V determines free TCP in meat. Residue data used for tolerance establishment and/or reassessment were collected using the enforcement methods (or modifications of the enforcement methods). In the majority of the situations, these data were supported by acceptable concurrent method recoveries.

The FDA PESTDATA database dated 8/93 (PAM Vol. I, Appendix II) indicates that chlorpyrifos is completely recovered (>80%) using FDA multiresidue method protocols D (Section 232.4) and E (Section 212.1/232.1, nonfatty matrices) and partially (50-80%) recovered using multiresidue method protocol E (Section 211.1/232.1, fatty matrices). Also, the oxygen analog of chlorpyrifos is completely recovered by method protocol D and not recovered by protocol method E (nonfatty matrices).

GLN 171-4 (e): Storage Stability

The requirements for storage stability data are fulfilled for purposes of reregistration. Acceptable storage stability studies have been conducted on representative oil seeds, non-oily grains, root crops, fruits and fruiting vegetables, and low moisture content forage and hay. Additional studies have also been conducted to investigate the frozen stability of chlorpyrifos in selected processed food/feed commodities and in animal tissues and milk. The storage conditions and intervals of commodity samples used for tolerance establishment and reassessment are supported by adequate storage stability data.

**Oil seeds:** Residues of chlorpyrifos and TCP are stable in/on almonds and almond hulls stored at -18 C for 9 months and in/on walnuts stored at -18 C for 4 years.

**Non-oily grains:** Residues of chlorpyrifos and TCP are stable in/on corn grain, forage, and fodder stored at -18 C for 27 months, in/on sweet corn fodder stored at -18 C for almost 3 years, and in/on sorghum grain, forage, and fodder stored at -18 C for 3 months.

**Root and bulb crops:** Residues of chlorpyrifos and TCP are stable in/on sweet potatoes stored at -18 C for 4 months, in/on sugar beet roots stored at -18 C for almost 4 years, and in/on onions stored at -23 C for 15 months.

**Fruits and fruiting vegetables:** Residues of chlorpyrifos and TCP are stable in/on apples, apricots, cherries, peaches, pears, and plums stored at -18 C for 9 months, in/on whole bananas and banana pulp and peel stored under frozen storage conditions (temperature unspecified) for 3 months, in/on tomatoes stored at -18 C up to 29 months, and in/on cherries stored at -23 C for 15.6 months, and in/on whole oranges stored at -18 C for 6 months.

**Low moisture content forage/hay:** Residues of chlorpyrifos and TCP are stable in/on fresh and spent mint hay stored under frozen storage conditions (temperature unspecified) for 10 months and in/on alfalfa forage and hay stored at -18 C for 12 months.

**Processed commodities:** Residues of chlorpyrifos and TCP are stable in orange peel and pulp stored at -18 C for 5-6 months and in mint oil stored under frozen storage conditions (temperature unspecified) for 10 months.

**Animal commodities:** Residues of chlorpyrifos *per se* are stable in cattle tissues stored at -18 C for up to 41 months and in milk stored at -18 C for 49 months.

GLN 171-4 (k): Magnitude of the Residue in Plants

The reregistration requirements for magnitude of the residue in plants are fulfilled for the following crops: alfalfa; apples; bananas; beans; blueberry; Brassica leafy vegetables (broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage); caneberries (*Rubus* spp.); cherimoya; citrus fruits; corn (field and sweet); cotton; cranberries; cucumbers; feijoa; figs; grapes; kiwifruits; mint, hay; leeks; mushrooms; nectarines; peaches; peanuts; pears; peas; plums; pumpkins; radish; rutabagas; sapote; soybeans; sorghum; strawberries; sugar beet; sugarcane; sunflowers; sweet potatoes; tobacco; turnip; and wheat. Adequate field trials, depicting residues of chlorpyrifos *per se* (or combined residues of chlorpyrifos and the TCP metabolite) following treatment according to the maximum registered use patterns have been submitted for these crops.

The following data requirements and/or label revisions for magnitude of the residue in plants remain outstanding or are now required:

- For asparagus, no additional residue data are required. However, a label revision is needed. The maximum equivalent rate of 1.9 lb ai/A specified by a homeowner-use label (EPA Reg. No. 62719-56) should be adjusted to reflect the maximum registered rate of 1.0 lb ai/A for which adequate residue data are available.

- For beans, a label revision is needed because feeding restrictions for bean hay are no longer considered practical and will not be accepted [see "Table II (June 1994) of the Pesticide Assessment Guidelines, Subdivision O, Residues Chemistry", E.Saito and E.Zager, 6/7/94, feeding restrictions will only be accepted for safflower forage, buckwheat forage, lentil forage, and sunflower forage]. Sufficient data are available to support the bean hay tolerance of 0.1 ppm with the slurry seed/preplant treatment using the 50% WP formulation at 1 oz/cwt. Additional data must be submitted in support of SLN TX88002 (slurry seed/stored seed treatment at 3 oz/cwt). Alternatively, this SLN use may be canceled.

- For cherries (sour), the use patterns of the 50% WP and 1 lb/gal EC formulations (EPA Reg. Nos. 62719-39, 62719-221, and 62719-56), involving a 14-day PHI and 8 foliar spray applications at 1.5 lb ai/A/application or 1.6 lb ai/100 gal/application, are not supported by residue data. To satisfy the reregistration requirements, additional data reflecting these formulations and use patterns are required. Alternatively, the registrant may elect to revise its labels such that the use patterns for sour cherries are made identical with those for sweet cherries which are supported by adequate residue data.

- For corn, label restrictions prohibiting feeding of silage, forage, or fodder to meat or dairy animals are not practical [see Table II (June 1994)] and must be removed from SLN DE930004, FL780046, GA790019, MD840004, and PA840008 labels. Additional data must be submitted to determine if established tolerances on corn forage and fodder are adequate for these uses. Alternatively, these SLN uses may be canceled.

- For cotton, feeding restrictions for gin trash (gin by-products) are not practical [see Table II (June 1994)] and must be removed from product labels. Appropriate tolerances for cotton gin by-products must be proposed. The proposal must be supported by adequate residue data conducted according to the maximum use patterns.

- For crops grown solely for seed (carrots, clover, and grasses), tolerance proposals and adequate field residue data are required to support SLN (Section 24-c) uses.

  For carrots grown for seed, an appropriate tolerance for residues of chlorpyrifos *per se* in/on carrots must be proposed. The proposal must be supported by residue data conducted according to the maximum use patterns specified by WA850025. Alternatively, this SLN use may be canceled.

  The Oregon Clover Association has indicated that it will support chlorpyrifos SLN (OR850032) use on clover grown for seed. The requirements specified in the Addendum to the Chlorpyrifos SRR remain outstanding.

  For grasses grown for seed, appropriate tolerances for residues of chlorpyrifos *per se* in/on grass forage and hay must be proposed. The proposal must be supported by adequate residue data conducted according to the maximum use patterns specified by CA900007, ID830005, OR830007, SD870006, and WA830009. Alternatively, these SLN uses may be canceled.

- For mint, Table II (June 1994) requires data for peppermint and spearmint tops (leaves and stems). Mint hay is no longer considered a rac. Additional data are required for peppermint and spearmint tops (leaves and stems).

- For peanuts, feeding restrictions for peanut hay are not practical [see Table II (June 1994)] and must be removed from product labels. Appropriate tolerances for peanut hay must be proposed. The proposal must be supported by adequate residue data conducted according to the maximum use patterns.

- For peppers, the requirements specified by the Addendum to the Chlorpyrifos SRR to submit English translations of labels for all products that permit use of chlorpyrifos on peppers imported to the U.S. have not been fulfilled. Since issuance of the SRR, SLN (FL920007, FL920009, GA930003, and GA930004) uses of chlorpyrifos on peppers have been approved.

- For sorghum, data are required for aspirated grain fractions.

- For soybeans, the label restriction prohibiting feeding of treated soybean forage, hay, and straw is not practical and must be removed from product labels. Appropriate tolerances must be proposed for soybean forage and aspirated grain fractions. The proposal must be supported by adequate residue data conducted according to the maximum use patterns.

- For tomatoes, the requirements specified by the Addendum to the Chlorpyrifos SRR to submit English translations of labels for all products that permit use of

chlorpyrifos on tomatoes imported to the U.S. have not been fulfilled. These data requirements remain outstanding. Since issuance of the SRR, SLN (FL920010, GA930003, and GA930004) uses of chlorpyrifos on tomatoes have been approved.

- For the tree nuts group (almonds, filberts, pecans, and walnuts), the Addendum to the Chlorpyrifos SRR did not require additional data to support the established crop group tolerance. However, an examination of the recently amended labels for the 4 lb/gal EC formulation (EPA Reg. Nos. 62719-23 and 62719-220) indicated that a maximum seasonal rate of 10 lb ai/A was inadvertently approved for pecans. The available residue data, reflecting combined residues of chlorpyrifos and TCP in/on pecans and other representative members of this crop group, only support a maximum seasonal rate of 5 lb ai/A. If the registrant wishes to support a seasonal rate of 10 lb ai/A, then additional data are required. Alternatively, the labels for pecans may be revised to reflect a maximum seasonal rate of 5 lb ai/A.

- For wheat, data are required for aspirated grain fractions.

[Note: The field trial data submitted for asparagus, apples, sugar beets, and tree nuts depict combined residues of chlorpyrifos and TCP. In the absence of adequate data depicting chlorpyrifos *per se* on the commodities of these crops, the established tolerances, for tolerance reassessment purposes, should remain at the existing levels. It is the registrant's prerogative to petition the Agency and submit additional field residue data depicting chlorpyrifos *per se* in/on these crops if tolerance-level reductions or lower anticipated residue calculations are desired.]

GLN 171-4 (l): Magnitude of the Residue in Processed Food/Feed

The reregistration requirements for magnitude of the residue in processed food/feed commodities are fulfilled except for a sorghum processing study. According to the memo entitled "Table II (June 1994) of the Pesticide Assessment Guidelines, Subdivision O, Residues Chemistry", E.Saito and E.Zager, 6/7/94, residue data for sorghum flour are not needed at this time because it is used exclusively as a component of drywall, and not as a food or animal feed item, in the US. However, because 50% of the worldwide sorghum production is used for human consumption, data may be needed at a later time.

Acceptable processing studies have been submitted and evaluated for apples, citrus, corn, cottonseed, figs, grapes, mint, peanuts, plums, soybeans, sugar beets, sugarcane, sunflowers, tomatoes, and wheat. The requirements for processing data on alfalfa meal are waived because residue data indicate that levels of chlorpyrifos *per se* are not likely to exceed the established tolerance in alfalfa hay following tests conducted according to registered uses. In

addition, no bean cannery residue and sweet corn processing data are required since adequate bean and corn forage data are available.

[Note: The available processing data for apples and sugar beets depict combined residues of chlorpyrifos and TCP. In the absence of adequate data depicting chlorpyrifos *per se* on the processed commodities of these crops, the established feed additive tolerances, for tolerance reassessment purposes, should remain at the existing levels. It is the registrant's prerogative to petition the Agency and submit additional processing data depicting chlorpyrifos *per se* in/on these commodities if tolerance-level reductions or lower anticipated residue calculations are desired.]

GLN 171-4 (j): Magnitude of the Residue in Meat, Milk, Poultry, and Eggs

The reregistration requirements for magnitude of the residue in animals are fulfilled. There are presently no registered direct application uses of chlorpyrifos on livestock animals except for ear tag treatment of cattle (beef and lactating and non-lactating dairy). An acceptable residue transfer study of chlorpyrifos to milk and cream from dairy cows wearing chlorpyrifos-impregnated tags has been submitted; data from this study indicate that residues in whole milk and fat resulting from eartag use should not be a significant fraction of the residues resulting from intake of animal feeds containing chlorpyrifos. Cattle and poultry feeding studies have been evaluated and found adequate to satisfy feeding study requirements.

GLN 171-4 (f): Magnitude of the Residue in Drinking and Irrigation Water

No maximum contaminant level (MCL) for chlorpyrifos residues in potable water has been established. Since registered uses of chlorpyrifos are not directly applied to streams, lakes, or ponds, the Agency regards these as non-food/feed uses.

GLN 171-4 (i): Magnitude of the Residue in Food-Handling Establishments

The reregistration requirements for magnitude of the residue in food-handling establishments are fulfilled. Sufficient data exist to determine that when registered formulations are used according to label directions, no detectable residues ($<0.01$-$<0.025$ ppm) are likely to occur in food items. Bait and insecticidal strip uses would not result in residues greater than those resulting from spray applications.

The prescribed conditions for use of chlorpyrifos formulations in food-handling establishments, as outlined in §185.1000(b), are adequate. In addition, the tolerances established in §185.1000(c) for residues in food items (other than those already covered by a higher tolerance as a result of use on growing crops), in food-service establishments where food and food products are prepared and served, resulting from the application of microencapsulated formulation are adequate.

GLNs 165-1 and 165-2: Confined/Field Rotational Crops

Provided that DowElanco modifies all labels for its chlorpyrifos containing products to limit application to 5 lb ai/A/season on those crops where rotation to another crop could occur (as was stated in their letter to the Agency dated 8/12/94), CBRS will not require field rotational crop studies. Furthermore, a 30 day plant back interval for rotational crops would then be appropriate.

Table B. Food/Feed Use Patterns Subject to Reregistration for Chlorpyrifos (Case 0100).

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Crop Uses** | | | | | | |
| **Alfalfa** | | | | | | |
| Soil in-furrow treatment<br>At planting<br>Ground equipment | 15% G | 1 lb/A | 1 | Not Applicable (NA) | -- | Use limited to MO. A 21-day PHI/PGI has been established. |
| Broadcast application<br>Foliar or postemergence<br>Ground, sprinkler irrigation, or aerial equipment | 4 lb/gal EC | 1 lb/A | 1 (per cutting)<br>4 (per season) | -- | 24 [a] | A 7-day PHI (rates ≤0.25 lb ai/A), a 14-day PHI (rates ≤0.5 lb ai/A), and a 21-day PHI (rates >0.5 lb ai/A) have been established. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 2 lb/gal EC | 0.5 lb/A | 1 (per cutting)<br>4 (per season) | -- | -- | Use limited to AZ and CA. A 4-day PHI/PGI (rates 0.375-0.5 lb ai/A) has been established. |
| **Almond** | | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground or aerial equipment | 50% WP | 2 lb/A<br>or<br>2 lb/100 gal | 1 | NA | 24 [a] | |
| Spray application<br>Dormant/delayed dormant<br>Ground or aerial equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A] | 1 | NA | 24 [a] | Application may be made alone or as a tank mix with petroleum spray oil. Grazing of meat or dairy animals in treated orchards is prohibited. |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Almond (continued)** | | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 50% WP<br>50% DF<br>1 lb/gal EC<br>4 lb/gal EC | 2 lb/A<br>or<br>2 lb/100 gal | 3 | -- | 24 [a] | A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited. |
| Trunk spray (bark) application<br>Ground equipment | 4 lb/gal EC | 3 lb/100 gal<br>[0.5-1.5 gal finished spray per tree trunk] | 2 | (60) | 24 | Use limited to CA.<br>A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited. |
| Soil broadcast application<br>Orchard floor<br>Ground equipment | 4 lb/gal EC | 4 lb/A | (2) | -- | 24 [a] | A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited. |
| **Apples** | | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground or aerial equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal<br>[200-600 gal finished spray/A] | 1 | NA | 24 [a] | Application may be made alone or as a tank mix with petroleum spray oil. Grazing of meat or dairy animals in treated orchards is prohibited. |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Apples (continued)** | | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 50% WP<br>50% DF<br>1 lb/gal EC | 1.5 lb/A<br>or<br>1.5 lb/100 gal | 8 | 21 (between final two applications) | 24 * | Application may be made alone or as a tank mix with other pesticides in certain states. A 28-day PHI has been established. Grazing of livestock in treated orchards is prohibited. |
| **Asparagus** | | | | | | |
| Broadcast foliar application<br>Preharvest<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 1 | NA | 24 * | Use limited to AZ, CA, the midwest, and Pacific Northwest. A 1-day PHI has been established. |
| Broadcast application<br>Postharvest (fern stage)<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 2 | -- | 24 * | Use limited to AZ, CA, the midwest, and Pacific Northwest. |
| **Bananas** | | | | | | |
| Fruit bag (shroud) application | 1% Impr | -- | -- | -- | -- | Shrouds are installed on the stem after all fruit bunches have formed and are removed at harvest. |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Bean (field, green, kidney, lima, navy, snap, string and wax)** | | | | | | |
| Slurry seed treatment<br>Preplant | 50% WP | 1 oz/cwt | (1) | -- | NA | Grazing/feeding of livestock on bean hay grown from treated seed is prohibited.[b] Treated seeds may not be used for food, feed, or oil purposes. |
| Slurry seed treatment<br>Stored seed | 50% WP | 19.3 oz/23.5 gal [3 fl.oz/cwt] | (1) | -- | NA | Use limited to TX. Treated seeds may not be used for food, feed, or oil purposes. |
| **Broccoli** | | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | 24 | Maximum seasonal application rates of 2.25 lb ai/A (0.5-15% G and 4 lb/gal EC) and 2.6 lb ai/A (1 lb/gal EC) are in effect. A 30-day PHI has been established for the EC formulations. |
| Soil band treatment<br>At planting<br>Ground equipment | 4 lb/gal EC | 1.4 oz/1,000 ft. of row | 2 | -- | -- | Use limited to CA. Maximum seasonal application rate of 2.25 lb ai/A is in effect. Application may be repeated at thinning time as a directed spray. A 30-day PHI has been established. |
| **Broccoli (continued)** | | | | | | |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| Soil injected sidedress application | 4 lb/gal EC | 1.3 oz/1,000 ft. of row | 1 | NA | 24 * | A 30-day PHI has been established. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 * | A 21-day PHI has been established. Application may be made alone or as a tank mix with other pesticides. |
| **Broccoli Raab (rapini)** | | | | | | |
| Soil application<br>At planting<br>Ground equipment | 4 lb/gal EC | 2.25 lb/A | 1 | NA | 24 * | Use limited to CA. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 * | See "Broccoli." |
| **Brussels sprouts** | | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | 24 * | See "Broccoli." |
| Soil band treatment<br>At planting<br>Ground equipment | 4 lb/gal EC | 1.4 oz/1,000 ft. of row | 2 | -- | 24 * | See "Broccoli." |
| **Brussels sprouts (continued)** | | | | | | |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 1 lb/A | 6 | 7 | 24 * | A 21-day PHI has been established. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 * | See "Broccoli." |
| **Cabbage** | | | | | | |
| Soil band treatment<br>At planting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | 24 * | See "Broccoli." |
| Soil band treatment<br>At planting<br>Ground equipment | 4 lb/gal EC | 1.4 oz/1,000 ft. of row | 2 | -- | 24 * | See "Broccoli." |
| Soil injected sidedress application | 4 lb/gal EC | 1.3 oz/1,000 ft. of row | 1 | NA | 24 * | See "Broccoli." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 * | See "Broccoli." |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Carrot (grown for seed)** | | | | | | |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 1 lb/A | -- | -- | -- | Use limited to WA. Feeding of treated carrot cuttings or seed screenings to livestock or grazing of livestock in treated areas is prohibited.[b] |
| **Cauliflower** | | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment | 0.5% G<br>1% G<br>15% G | 1.4 oz/1,000 ft. of row | 1 | NA | -- | See "Broccoli." |
| Soil band treatment<br>At planting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 1.2 oz/1,000 ft. of row | 1 | NA | 24 [a] | Maximum seasonal application rate of 2 lb ai/A is in effect. A 30-day PHI has been established. |
| Soil band treatment<br>At planting<br>Ground equipment | 4 lb/gal EC | 1.2 oz/1,000 ft. of row | 2 | -- | -- | Use limited to CA. Maximum seasonal application rate of 2 lb ai/A is in effect. A 30-day PHI has been established. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 [a] | See "Broccoli." |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Cherries** | | | | | | |
| Trunk spray (bark) application<br>Foliar and postharvest and/or dormant/delayed dormant<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 3 lb/100 gal | 3 | 14 | 24 * | Use limited to sweet cherries. One of the three permitted applications per season may be applied as a dormant spray tank mixed with petroleum spray oil at 0.5 lb ai/100 gal. A 6-day PHI has been established. Grazing of meat or dairy animals in treated orchards is prohibited. |
| Spray application<br>Foliar<br>Ground or aerial equipment | 50% WP<br>1 lb/gal EC | 1.5 lb/A<br>or<br>1.5 lb/100 gal | 8 | -- | 24 * | Use limited to sour cherries. A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited. |
| **Chinese broccoli (gai lon)** | | | | | | |
| Soil application<br>At planting<br>Ground equipment | 4 lb/gal EC | 2.25 lb/A | 1 | NA | 24 * | See "Broccoli raab." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/gal | 6 | -- | 24 * | See "Broccoli." |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Chinese cabbage (bok choy, napa)** | | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | 24 * | See "Broccoli." |
| Soil application<br>At planting<br>Ground equipment | 4 lb/gal EC | 2.25 lb/A | 1 | NA | 24 * | See "Broccoli raab." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 * | See "Broccoli." |
| **Chinese mustard (gai choy)** | | | | | | |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 * | See "Broccoli." |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Citrus** | | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 6 lb/A | 2 | 30 | 48 | Use limited to AZ and CA. Maximum seasonal application rate of 7.5 lb ai/A is in effect. A 21-day PHI (rates ≤ 3.5 lb ai/A) and a 35-day PHI (rates > 3.5 lb ai/A) have been established. Grazing of livestock in treated areas is prohibited. Application may be made alone or as a tank mix with other pesticides. |
| Spray application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 3.5 lb/A | 2 | 30 | 48 | Use limited to FL and TX. Maximum seasonal application rate of 7.5 lb ai/A is in effect. A 21-day PHI (rates ≤ 3.5 lb ai/A) and a 35-day PHI (rates > 3.5 lb ai/A) have been established. Grazing of livestock in treated areas is prohibited. Application may be made alone or as a tank mix with other pesticides. |
| Spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 0.5 lb/100 gal | 2 | 30 | -- | Use limited to residential citrus. A 21-day PHI has been established. |
| **Citrus (continued)** | | | | | | |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| Spray application<br>Foliar<br>Ground or aerial equipment | 1 lb/gal EC | 0.4 lb/100 gal | 2 | 30 | -- | Maximum seasonal application rate of 2 lb ai/A is in effect. A 21-day PHI has been established. |
| Trunk spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 0.625 lb/A | 4 | -- | 48 | Use limited to CA. A 28-day PHI has been established. |
| Fiberglass band application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 2.5 lb/A | 4 | -- | 48 | |
| Soil broadcast application<br>Postplant (grove floor)<br>Ground or sprinkler irrigation equipment | 15% G<br>4 lb/gal EC | 1 lb/A | (10) | -- | 24 * | Maximum seasonal application rate of 10 lb ai/A is in effect. A 28-day PHI has been established. Grazing of livestock in treated areas is prohibited. For use in FL, a maximum seasonal rate of 3 lb ai/A (EC) is in effect. |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Clover (grown for seed)** | | | | | | |
| Soil broadcast application<br>Preplant<br>Ground equipment<br>or<br>Broadcast application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 2 lb/A | -- | -- | -- | Use limited to OR. Grazing or feeding of treated clover cuttings or seed screenings or using of hay for livestock is prohibited.[b] |
| **Collards** | | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | 24 | See "Broccoli." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 | See "Broccoli." |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Corn: field or sweet or pop or grown for seed** | | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 15% G | 2 lb/A | (1) | NA | -- | Maximum seasonal application rate of 2 lb ai/A is in effect. A 35-day PHI (corn grain), a 14-day PGI (corn silage), and a 35-day PFI (corn fodder) have been established. |
| Soil band treatment<br>At planting<br>Ground equipment | 0.5% G<br>1% G<br>7.5% G<br>15% G | 2.4 oz/1,000 ft. of row | (1) | NA | -- | |
| Soil band treatment or broadcast application<br>Postplant<br>Ground or aerial equipment | 15% G | 1.2 oz/1,000 ft. of row | (1) | NA | -- | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 3 lb/A | (1) | NA | 24 [a] | Maximum seasonal application rate of 7.5 lb ai/A is in effect. A 35-day PHI (corn grain), a 14-day PGI (corn silage), and a 35-day PFI (corn fodder) have been established. Application may be made alone or as a tank mix with other pesticides. |
| Soil broadcast application<br>Preplant, at planting, or preemergence<br>Ground equipment | 4 lb/gal EC | 1 lb/A | (1) | NA | 24 [a] | |
| Broadcast application<br>Postemergence/foliar<br>Ground, aerial, or sprinkler irrigation equipment | 4 lb/gal EC | 1.5 lb/A | (2) | 10 | 24 [a] | |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Corn: field or sweet** | | | | | | |
| Broadcast application<br>Foliar<br>Ground, aerial, or sprinkler irrigation equipment | 4 lb/gal EC | 1 lb/A | 11 | -- | 24 [a] | Use limited to FL and GA. Maximum seasonal application rate of 11 lb ai/A is in effect. A 21-day PHI (corn ears), PGI, and PFI (corn silage, fodder, or grain) have been established. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 0.5 lb/A | 13 | -- | -- | Use limited to DE, FL, GA, MD, and PA. A 7-day PHI has been established. Grazing of livestock in treated areas and feeding treated corn silage, forage, or fodder to meat or dairy animals is prohibited.[b] |
| Slurry seed treatment<br>Preplant | 50% WP | 1 oz/cwt | (1) | -- | NA | Treated seeds may not be used for food, feed, or oil purposes. |
| Slurry seed treatment<br>Stored seed | 50% WP | 19.3 oz/23.5 gal [3 fl.oz/cwt] | (1) | -- | NA | See "Bean." |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Cotton** | | | | | | |
| Soil incorporated treatment<br>Preplant or at planting<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 1 | NA | -- | Use limited to MS. |
| Broadcast application<br>Foliar<br>Ground, sprinkler irrigation, aerial equipment | 4 lb/gal EC | 1 lb/A | 6 | -- | 24 [a] | A 14-day PHI has been established. Grazing of livestock in treated areas and feeding of gin trash or treated forage to livestock is prohibited.[b] |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 2 lb/gal EC | 0.5 lb/A | -- | -- | -- | Use limited to AZ and CA. A 40-day PHI has been established. Grazing of livestock in treated areas and feeding of gin trash or treated forage to livestock is prohibited. Applications may be made undiluted at the same rate.[b] |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Cotton (continued)** | | | | | | |
| Broadcast application<br>Foliar<br>Aerial equipment | 4 lb/gal EC | 0.5 lb/A | -- | -- | -- | Use limited to AL and MS. Application may be made alone or as a tank mix with other insecticides. The longest PHI for any of the products in the tank mix has been established as the PHI. Grazing of livestock in treated areas and feeding of gin trash or treated forage to livestock is prohibited.[b] |
| Slurry seed treatment<br>Stored seed | 50% WP | 19.3 oz/23.5 gal [3 fl.oz/cwt] | (1) | -- | NA | See "Bean." |
| Gin trash treatment<br>Ground equipment | 4 lb/gal EC | 1 lb per 20 tons of gin trash | -- | -- | -- | Use limited to MS. |
| **Cranberry** | | | | | | |
| Broadcast application<br>Foliar<br>Ground, aerial, or sprinkler irrigation equipment | 4 lb/gal EC | 1.5 lb/A | 2 | -- | 24 [a] | A 60-day PHI has been established. Application may not be made when bogs are flooded. |
| **Cucumbers** | | | | | | |
| Slurry seed treatment<br>Preplant | 50% WP | 1 oz/cwt | (1) | -- | NA | Treated seeds may not be used for food, feed, or oil purposes. |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Figs** | | | | | | |
| Soil incorporated treatment<br>Dormant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | NA | 24 * | Use limited to CA. A 210-day PHI has been established. |
| **Filberts** | | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 50% WP<br>1 lb/gal EC<br>4 lb/gal EC | 2 lb/A<br>or<br>2 lb/100 gal | 3 | -- | 24 * | A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited. |
| **Grapefruit** | | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 6 lb/A | 2 | 30 | 48 | See "Citrus." |
| Spray application<br>Foliar or transplant<br>Ground or aerial equipment | 4 lb/gal EC | 3.5 lb/A | 2 | 30 | 48 | See "Citrus." |
| Spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 0.5 lb/100 gal | 2 | 30 | -- | See "Citrus." |
| Spray application<br>Foliar<br>Ground or aerial equipment | 1 lb/gal EC | 0.4 lb/100 gal | 2 | 30 | -- | See "Citrus." |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Grapes** | | | | | | |
| Directed spray soil application<br>Foliar<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 2.25 lb/100 gal [2 qt finished spray/15 sq. ft.] | 1 | NA | 24 [a] | Use limited to states east of the Rocky Mountains. A 35-day PHI has been established. |
| Directed spray soil application<br>Foliar and postharvest<br>Ground equipment | 4 lb/gal EC | 1.125 lb/100 gal [2 qt finished spray per 15 sq. ft.] | 2 | -- | -- | Use limited to GA and TN. A 35-day PHI has been established. |
| Spray/drench application<br>Prebloom<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 1 | NA | -- | Use limited to MI and MO. |
| Broadcast foliar application<br>Nonbearing<br>Ground or aerial equipment | 4 lb/gal EC | 1 lb/A | -- | -- | -- | Use limited to ID, OR, and WA. |
| **Grass (grown for seed)** | | | | | | |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 1 lb/A | 3 | -- | 24 | Use limited to CA, ID, OR, SD, and WA. Aerial application use limited to CA and SD. Grazing of livestock in treated areas or feeding treated grass, straw, or seed screenings to livestock or using hay for livestock bedding is prohibited.[b] |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Kale** | | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | 24 * | See "Broccoli." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 * | See "Broccoli." |
| **Kohlrabi** | | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | 24 * | See "Broccoli." |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 * | See "Broccoli." |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Lemon** | | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 6 lb/A | 2 | 30 | 48 | See "Citrus." |
| Spray application<br>Foliar or transplant<br>Ground or aerial equipment | 4 lb/gal EC | 3.5 lb/A | 2 | 30 | 48 | See "Citrus." |
| Spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 0.5 lb/100 gal | 2 | 30 | -- | See "Citrus." |
| Spray application<br>Foliar<br>Ground or aerial equipment | 1 lb/gal EC | 0.4 lb/100 gal | 2 | 30 | -- | See "Citrus." |
| **Macadamia Nuts** | | | | | | |
| Trunk spray (bark) application<br>Foliar<br>Ground equipment | 50% WP | 1 lb/A | (8) | 30 | -- | Use limited to HI. Maximum seasonal application rate of 8 lb ai/A is in effect. A 14-day PHI has been established. Grazing of livestock in treated areas is prohibited. |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Mint** | | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | NA | -- | Use limited to OR. |
| Broadcast foliar application<br>Preharvest and postharvest<br>Ground or sprinkler irrigation equipment | 1 lb/gal EC<br>4 lb/gal EC | 2 lb/A | 1 | NA | 24 * | A 90-day PHI has been established. |
| **Mushrooms** | | | | | | |
| Incorporation into compost<br>Prior to spawning<br>Ground equipment | 50% WP | 60 ppm | 1 | NA | -- | |
| **Mustard greens** | | | | | | |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 * | See "Broccoli." |
| **Nectarines** | | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground or aerial equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A] | 1 | NA | 24 * | See "Almonds." |
| Trunk spray (bark) application<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 3 lb/100 gal | 1 | NA | 24 * | A 14-day PHI has been established. Grazing of meat or dairy animals in treated orchards is prohibited. |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Onions, bulb** | | | | | | |
| Soil application<br>At seeding<br>Ground equipment | 0.5% G<br>1% G<br>15% G | 0.035 lb/1,000 ft. of row | 1 | NA | -- | Maximum seasonal application rate of 1 lb ai/A is in effect for the 15% G formulation. |
| Soil drench application<br>At seeding<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.04 lb/1,000 ft. of row (1 lb/gal EC)<br><br>0.03 lb/1,000 ft. of row (4 lb/gal EC) | 1 | NA | 24 * | |
| **Oranges** | | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 4 lb/gal EC | 6 lb/A | 2 | 30 | 48 | See "Citrus." |
| Spray application<br>Foliar or transplant<br>Ground or aerial equipment | 4 lb/gal EC | 3.5 lb/A | 2 | 30 | 48 | See "Citrus." |
| Spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 0.5 lb/100 gal | 2 | 30 | -- | See "Citrus." |
| Spray application<br>Foliar<br>Ground or aerial equipment | 1 lb/gal EC | 0.4 lb/100 gal | 2 | 30 | -- | See "Citrus." |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Peaches** | | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground or aerial equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A] | 1 | NA | 24 [a] | See "Almonds." |
| Trunk spray (bark) application<br>Ground equipment | 4 lb/gal EC | 3 lb/100 gal | 1 | NA | 24 [a] | See "Nectarines." |
| Dip application<br>Preplant (nonbearing) | 4 lb/gal EC | 3 lb/100 gal | 1 | NA | NA | |
| **Peanuts** | | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | NA | 24 [a] | A combined maximum seasonal application rate of 4 lb ai/A is in effect for preplant and postplant use. A 21-day PHI has been established. Feeding peanut forage or hay to meat or dairy animals is prohibited.[b] |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Peanuts (continued)** | | | | | | |
| Soil band application<br>At planting, postplant, or early pegging<br>Ground equipment | 0.5% G<br>1% G<br>15% G | 2.25 oz/1,000 ft. of row | (2) | NA | -- | A maximum seasonal application rate of 4.5 oz ai/1,000 ft. of row or 4 lb ai/A for the 15% G formulation is in effect. A maximum seasonal rate of 2.25 oz ai/1,000 ft. of row is in effect for the 0.5% and 1% G formulations. A 21-day PHI has been established. Feeding peanut forage or hay to meat or dairy animals is prohibited.[b] |
| Broadcast application<br>Prior to or at pegging<br>Aerial equipment | 15% G | 1.95 lb/A | -- | -- | -- | A maximum seasonal application rate of 4 lb ai/A is in effect. A 21-day PHI has been established. Feeding peanut forage or hay to meat or dairy animals is prohibited.[b] |
| Directed spray application<br>Foliar<br>Ground equipment | 1 lb/gal EC | 2 lb/A | 1 | NA | -- | A 21-day PHI has been established. A maximum seasonal application rate of 2 lb ai/A is in effect. |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Pears** | | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground or aerial equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A] | 1 | NA | 24 * | See "Apples." |
| **Peas (black-eyed, field, and garden)** | | | | | | |
| Slurry seed treatment<br>Preplant | 50% WP | 1 oz/cwt | (1) | -- | NA | See "Bean." |
| Slurry seed treatment<br>Stored seed | 50% WP | 19.3 oz/23.5 gal [3 fl.oz/cwt] | (1) | -- | NA | See "Bean." |
| **Pecans** | | | | | | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 50% WP<br>50% DF<br>1 lb/gal EC<br>4 lb/gal EC | 1 lb/100 gal<br>or<br>1 lb/A (50% WP, 50% DF, and 1 lb/gal EC)<br><br>2 lb/A (4 lb/gal EC) | 5 | -- | 24 * | A maximum seasonal application rate of 10 lb ai/A is in effect for the 4 lb/gal EC formulation. Application may be made alone or as a tank mix with other pesticides. A 28-day PHI has been established. The grazing of livestock in treated orchards is prohibited. |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Pecans (continued)** | | | | | | |
| Soil broadcast application<br>Orchard floor<br>Ground equipment | 50% WP<br>1 lb/gal EC<br>4 lb/gal EC | 1 lb/100 gal<br>or<br>1 lb/A (50% WP and 1 lb/gal EC)<br><br>2 lb/A (4 lb/gal EC) | 5 | -- | 24 * | |
| **Peppers** | | | | | | |
| Broadcast application<br>Foliar<br>Ground equipment | 50% WP | 1 lb/A | 8 | -- | -- | Use limited to FL and GA. A 7-day PHI has been established. |
| **Plum** | | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground or aerial equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A] | 1 | NA | 24 * | See "Apples." |
| **Prune** | | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground or aerial equipment | 1 lb/gal EC<br>4 lb/gal EC | 0.5 lb/100 gal [200-600 gal finished spray/A] | 1 | NA | 24 * | See "Apples." |
| **Pumpkin** | | | | | | |
| Slurry seed treatment<br>Preplant | 50% WP | 1 oz/cwt | (1) | -- | NA | See "Bean." |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Radish** | | | | | | |
| Soil in-furrow treatment<br>At planting<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 0.5 oz/1,000 ft. of row | 1 | NA | 24 [a] | A maximum seasonal application rate of 2.75 lb ai/A is in effect for the 0.5-15% G and 4 lb/gal EC formulations. A maximum seasonal application rate of 2.72 lb ai/A is in effect for the 1 lb/gal EC formulation. |
| **Radish (grown for seed)** | | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | (1) | NA | -- | Use limited to OR. Grazing of livestock in treated areas or the feeding of radish cuttings or seed screenings to livestock is prohibited.[b] |
| **Rape** | | | | | | |
| Broadcast application<br>Foliar<br>Ground or aerial equipment | 50% WP | 1 lb/A | 6 | -- | 24 [a] | See "Broccoli." |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Rutabagas** | | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment | 0.5% G<br>1% G<br>15% G | 1.4 oz/1,000 ft. of row | 1 | NA | -- | Maximum seasonal application rate of 2.25 lb ai/A is in effect. The use of rutabaga tops for food/feed purposes is prohibited. |
| | 4 lb/gal EC | 1.6 oz/1,000 ft. of row | 1 | NA | 24 [a] | |
| Soil band treatment<br>At planting<br>Ground equipment | 1 lb/gal EC | 1.3 oz/1,000 ft. of row | 1 | NA | -- | Maximum seasonal application rate of 1.9 lb ai/A is in effect. The use of rutabaga tops for food/feed purposes is prohibited. |
| **Sorghum** | | | | | | |
| Soil band incorporated treatment<br>At planting<br>Ground equipment | 15% G | 1.8 oz/1,000 ft. of row | 1 | NA | -- | |
| Broadcast application<br>Foliar<br>Ground, sprinkler irrigation, or aerial equipment<br>or<br>Directed spray application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 1 lb/A | -- | -- | 24 [a] | Maximum seasonal application rate of 1.5 lb ai/A is in effect. A 30-day PHI/PGI/PFI for rates 0.5 lb ai/A and a 60-day PHI/PGI/PFI for rates >0.5 lb ai/A have been established. Use on sweet sorghum is prohibited. |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Sorghum (continued)** | | | | | | |
| Slurry seed treatment<br>Stored seed | 50% WP | 19.3 oz/23.5 gal [3 fl.oz/cwt] | (1) | NA | -- | See "Bean." |
| **Soybean** | | | | | | |
| Soil incorporated treatment<br>At planting or postemergence<br>Ground equipment | 15% G | 1.2 oz/1,000 ft. of row | 1 | NA | -- | |
| Soil band application<br>At planting<br>Ground equipment<br>or<br>Directed soil band application,<br>Postemergence<br>Ground equipment<br>or<br>Broadcast spray application<br>Foliar<br>Ground, sprinkler irrigation, or aerial equipment | 4 lb/gal EC | 1 lb/A | -- | 14 (between final two applications) | 24 [a] | Maximum seasonal application rate of 3 lb ai/A is in effect. A 28-day PHI has been established. Grazing of livestock in treated areas or the feeding of treated soybean forage, hay, and straw to meat or dairy animals is prohibited.[b] |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Soybean (continued)** | | | | | | |
| Broadcast spray application<br>Foliar<br>Ground equipment | 50% WP | 0.5 lb/A | -- | 14 (between final two applications) | -- | Use limited to IN, MI, and OH. Maximum seasonal application rate of 3 lb ai/A is in effect. A 28-day PHI has been established. Grazing of livestock in treated areas or the feeding of treated soybean forage, hay, and straw to meat or dairy animals is prohibited.[b] |
| **Strawberry** | | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | (1) | NA | -- | Use limited to ID, OR, and WA. |
| Broadcast foliar application<br>Prebloom<br>Ground equipment | 1 lb/gal EC<br>4 lb/gal EC | 1 lb/A | 2 | 10 | 24 [a] | A 21-day PHI has been established. |
| Directed spray application<br>Postharvest<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 2 | 14 | -- | Use limited to OR. |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Sugar beet** | | | | | | |
| Soil band application<br>At planting or postemergence (two- to four-leaf stage)<br>Ground equipment | 15% G | 1.35 oz/1,000 ft. of row<br>or<br>2 lb/A (based on a 22-inch row spacing) | 1 | NA | -- | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment<br>or<br>Soil band application<br>At planting<br>Ground equipment | 4 lb/gal EC | 0.5 lb/A | (1) | NA | 24 * | Maximum seasonal application rate of 4 lb ai/A is in effect. A 30-day PHI/PGI have been established. Application may be made alone or as a tank mix with other pesticides. |
| Broadcast application<br>Foliar<br>Ground or aerial equipment<br>or<br>Soil band application<br>Foliar<br>Ground equipment | 4 lb/gal EC | 1 lb/A | 4 | -- | 24 * | Maximum seasonal application rate of 4 lb ai/A is in effect. A 30-day PHI/PGI have been established. |
| **Sugar beet (grown for seed)** | | | | | | |
| Soil broadcast application<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | (1) | NA | -- | Use limited to ID and OR. |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Sunflower** | | | | | | |
| Soil band application<br>At planting<br>Ground equipment | 0.5% G<br>1% G<br>15% G | 1.25 oz/1,000 ft. of row | 1 | NA | -- | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | (1) | NA | 24 * | Maximum seasonal application rate of 4.5 lb ai/A is in effect. A 42-day PHI has been established. Grazing of livestock in treated areas is prohibited. |
| Broadcast foliar application<br>Postemergence<br>Ground or aerial equipment | 4 lb/gal EC | 1.5 lb/A | -- | 7 | 24 * | |
| **Sweet Potato** | | | | | | |
| Soil incorporated treatment<br>Preplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 2 lb/A | 1 | NA | 24 * | A 125-day PHI has been established. |
| **Tobacco** | | | | | | |
| Soil incorporated treatment<br>Pre-transplant<br>Ground equipment | 15% G<br>4 lb/gal EC | 3 lb/A | 1 | NA | 24 * | |
| Soil incorporated treatment<br>Pre-transplant<br>Ground equipment | 4 lb/gal EC | 5 lb/A | 1 | NA | 24 * | Use limited to NC, SC, and VA. |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Tobacco (continued)** | | | | | | |
| Soil incorporated treatment<br>Pre-transplant<br>Ground equipment | 4 lb/gal EC | 2 lb/A | 1 | NA | 24 * | Tank mix use in all tobacco growing regions. |
| **Tomato** | | | | | | |
| Broadcast application<br>Foliar<br>Ground equipment | 50% WP | 1 lb/A | 8 | -- | -- | Use limited to FL and GA. A 14-day PHI has been established. Application to cherry tomatoes is prohibited. |
| **Turnip** | | | | | | |
| Soil band treatment<br>At planting/transplanting<br>Ground equipment<br>or<br>Directed spray application<br>Post-transplant<br>Ground equipment | 0.5% G<br>1% G<br>15% G<br>1 lb/gal EC<br>4 lb/gal EC | 1.4 oz/1,000 ft. of row | 1 | NA | 24 * | See "Broccoli." |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Walnuts** | | | | | | |
| Spray application<br>Dormant/delayed dormant<br>Ground or aerial equipment | 50% WP | 2 lb/A<br>or<br>2 lb/100 gal | 1 | NA | 24 [a] | |
| Spray application<br>Foliar<br>Ground or aerial equipment | 50% WP<br>50% DF<br>1 lb/gal EC<br>4 lb/gal EC | 2 lb/A<br>or<br>2 lb/100 gal | 2 | -- | 24 [a] | A 14-day PHI has been established. Grazing of livestock in treated orchards is prohibited. |
| **Wheat** | | | | | | |
| Broadcast application<br>Foliar<br>Ground, sprinkler irrigation, or aerial equipment | 4 lb/gal EC | 0.5 lb/A | 2 | -- | 24 | Use limited to AZ, CA, CO, ID, KS, MT, NE, NM, NV, OK, OR, SD, TX, UT, WA, and WY. A 28-day PHI, a 14-day PGI/PFI (forage), and a 28-day PFI (straw) have been established. |



*(continued; footnotes follow.)*

Table B *(continued).*

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| **Animal uses** | | | | | | |
| **Cattle (beef, calves, and lactating and non-lactating dairy)** | | | | | | |
| Ear tag treatment | 5% Impr | Two ear tags/animal | -- | -- | -- | One tag is attached to each ear when pests first appear in the spring. Tags may be replaced as needed. |
| **Outdoor turkey pens** | | | | | | |
| Soil treatment<br>Before turkeys are transferred to pens<br>Ground equipment | 50% WP<br>50% DF | 4 lb/A | 2 | 28 | -- | Direct application to turkeys is prohibited. A 7-day PSI has been established. Open feed should be covered during spraying and water troughs should be flushed out immediately after spraying operations. |



*(continued; footnotes follow.)*

Table B *(continued)*.

| Site<br>Application Type<br>Application Timing<br>Application Equipment | Form | Max. Single Application Rate (ai) | Max. # Apps. | Min. Retreatment Interval (Days) | Restricted Entry Interval (Hours) | Use Limitations |
|---|---|---|---|---|---|---|
| Food-handling establishment uses | | | | | | |
| **Food-Handling Establishments** | | | | | | |
| Spot and/or crack and crevice treatment<br>Coarse low pressure sprayer or paint brush | 1 lb/gal Mcap<br>1.7 lb/gal Mcap | 0.5% spray | -- | 14 | -- | |
| Spot and/or crack and crevice treatment<br>Coarse low pressure sprayer or paint brush | 2 lb/gal EC<br>4 lb/gal EC<br>0.5% RTU | 0.5% spray | -- | 7 | -- | Applications may be repeated at 7-day intervals in food service establishments and every 14 days in other types of food handling establishments. Emergency application may be made 2 days after the last treatment; limited to one emergency treatment per month. |

[a] Unless protective clothing is worn.

[b] According to the "Updated Livestock Feeds Table for Subdivision O (Residue Chemistry) of the Pesticide Assessment Guidelines" (D.Edwards and E.Zager dated 4/28/94) label restrictions on these commodities are not practical and will no longer be accepted.

Table C. Residue Chemistry Science Assessments for Reregistration of Chlorpyrifos.
NOTE: If additional data are required as indicated below, before starting field trials the registrant should consult the recently issued guidelines entitled "Number and Location of Domestic Crop Field Trials", dated June 1994 (EPA 738-K-94-001).

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| 171-3: Directions for use | | Yes [2] | See Table B. |
| 171-4 (a): Plant Metabolism | | No | **00066724, 00066725, 00072657, 00072660,** 00157541, 00157542, 00157543, 40638801,[3] 40638802,[3] 41829007 [4] |
| 171-4 (b): Animal Metabolism | | No | **00077055,** 00154734,[5] 00161743,[6] 40638802,[3] PP#3F1306 |
| 171-4 (c/d): Residue Analytical Methods | | No | **00034031, 00037455, 00037457, 00037458, 00039642, 00039643, 00051801, 00058089, 00071201, 00084330, 00084331, 00095179, 00095201, 00095216, 00095251, 00095383, 00095387, 00095436, 00134720,** 00141725,[7] 00148881,[8] 00155578, 00155579, 00155580, 00157713, 00158566,[9] 00158567,[9] 00158568,[9] 00158569,[9] 00162109, 00164187,[10] 40131301, 40131302, 40288501 |
| 171-4 (e): Storage Stability | | No | **00033586, 00034031, 00044555, 00051798, 00077120, 00095227, 00095260, 00095374, 00101566, 00116675, 00134720,** 00162109, 41653502 [11] |
| 171-4 (k): Magnitude of the Residue in Plants | | | |
| Root and Tuber Vegetables Group | | | |
| - Radish, fresh | 2 [180.342(c)] | No | **00095259** |



*(continued; footnotes follow.)*

Table C *(continued)*.

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Rutabagas, root | 0.5 [180.342(c)] | No | **00095259** |
| - Sugar beets, root | 1.0 [180.342(a)] | No | **00039641, 00101566** |
| - Sweet potatoes, root | 0.05 [180.342(c)] | No | **00095227** |
| - Turnip, root | 1 [§180.342(c)] | No | **00095259** |
| Leaves of Root and Tuber Vegetables Group | | | |
| - Sugar beets, tops | 8.0 [§180.342(a)] | No | **00039641, 00101566** |
| - Turnip, tops | 0.3 [§180.342(c)] | No | **00095259** |
| Bulb Vegetables Group | | | |
| - Leeks | 0.5 (of which no more than 0.2 ppm is chlorpyrifos) [§180.342(b)] | No [12] | 00157909 [13] |
| - Onions, dry bulb (only) | 0.5 [§180.342(a)] | No | **00154019**, 42649001 [14] |
| Brassica Leafy Vegetables Group | 2.0 (of which no more than 1.0 ppm is chlorpyrifos) [§180.342(a)] | No | **00095273**, 00155580, [15] 00158566 [9] |
| - Broccoli | 1 [§180.342(c)] | No | **00095273**, 00155580, 00158566 [9] |
| - Brussels sprouts | 1 [§180.342(c)] | No | **00095273**, 00158566 [9] |
| - Cabbage | 1 [§180.342(c)] | No | **00095273**, 00155580, 00158566 [9] |
| - Cabbage, Chinese | 1 [§180.342(c)] | No | **00095273** |
| - Cauliflower | 1 [§180.342(c)] | No | **00095273**, 00158566 [9] |
| Legume Vegetables (Succulent or Dried) Group | 0.05 [§180.342(c)] | No | **00095216, 00095264** |
| - Beans, lima | 0.05 [§180.342(a)] | No [16] | |



*(continued; footnotes follow.)*

Table C *(continued)*.

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Beans, snap | 0.05 [§180.342(a)] | No | 42245907 [17] |
| - Soybeans | 0.3 [§180.342(c)] | Yes [18] | **00095270** |
| Foliage of Legume Vegetables Group | | | |
| - Beans, vines | 0.7 [§180.342(c)] | No | **00095264**, 42245907 [17] |
| - Beans, lima, vines | 1.0 [§180.342(a)] | No [19] | |
| - Beans, snap, vines | 1.0 [§180.342(a)] | Yes [19] | 42245907 [17] |
| - Peas, vines | 0.7 [§180.342(c)] | No | **00095264** |
| - Soybeans, forage | 0.7 [§180.342(c)] | No | **00095270** |
| Fruiting Vegetables (except cucurbits) Group | | | |
| - Peppers | 1.0 [§180.342(a)] | Yes [20] | |
| - Tomatoes | 0.5 [§180.342(a)] | Yes [21] | **00095251**, 00131864, PP#03008 |
| Cucurbit Vegetables Group | | | |
| - Cucumbers | 0.05 [§180.342(c)] | No | **00095264** |
| - Pumpkins | 0.05 [§180.342(c)] | No | **00095264** |
| Citrus Fruits Group | 1.0 [§180.342(a)] | No | **00084326, 00095260** |
| Pome Fruits Group | | | |
| - Apples | 1.5 [§180.342(a)] | No | **00044555, 00088978, 00095264** |
| - Pears | 0.01 [§180.342(c)] | No | **00044555** |
| Stone Fruits Group | | | |
| - Cherries | 1 [§180.342(c)] | Yes [22] | **00044555, 00077120** |
| - Nectarines | 0.01 [§180.342(c)] | No [23] | |



*(continued; footnotes follow.)*

Table C *(continued)*.

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Peaches | 0.01 [§180.342(c)] | No | **00044555, 00095179** |
| - Plums (fresh prunes) | 0.01 [§180.342(c)] | No | **00044555** |
| Small Fruits and Berries Group | | | |
| - Blueberry | 2 (of which no more than 1 ppm is chlorpyrifos) [§180.342(a)] | No [24] | 00164187 [10] |
| - Caneberries (*Rubus* spp.) | 1.0 [§180.342(c)] | No [25] | PP#7E3557 |
| - Cranberries | 1.0 [§180.342(a)] | No | **00108813** |
| - Grapes | 0.5 [§180.342(b)] | No | **00085785**, 00126713, 00134499, PP#3F02872/ 3H05393 |
| - Strawberries | 0.2 [§180.342(c)] | No | **00052967, 00095271,** 40131302 |
| Tree Nuts Group | 0.2, tree nuts and 12.0, almond hulls [§180.342(a)] | Yes [26] | **00132786, 00044555, 00116675,** 41424401 [27] |
| Cereal Grains Group | | | |
| - Corn, field, grain | 0.05 [§180.342(c)] | No | **00070509** |
| - Corn, sweet (K + CWHR) | 0.1 [§180.342(a)] | No | **00095216,** 42245904 [17] |
| - Sorghum, grain (milo) | 0.75 [§180.342(a)] | Yes [28] | **00046785, 00095249,** 42245905 [17], 43191402 [29] |
| - Wheat, grain | 0.5 [§180.342(c)] | Yes [30] | PP#3F2947/FAP#3H5411 |
| Forage, Fodder, and Straw of Cereal Grains Group | | | |
| - Corn, fodder | 8 [§180.342(c)] | Yes [31] | **00070509, 00078962** |
| - Corn, forage | 8 [§180.342(c)] | Yes [31] | **00070509, 00078962** |



*(continued; footnotes follow.)*

Table C *(continued)*.

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Sorghum, fodder (milo) | 6.0 [§180.342(a)] | No [28] | **00046785**, 00158569 [9], 43191402[32] |
| - Sorghum, forage (milo) | 1.5 [§180.342(a)] | No [28] | **00046785**, 00158569 [9], 43191402[33] |
| - Wheat, forage | 3 [§180.342(c)] | No | PP#3F2947/FAP#3H5411 |
| - Wheat, straw | 6 [§180.342(c)] | No | PP#3F2947/FAP#3H5411 |
| Non-grass Animal Feeds (forage, fodder, straw, and hay) Group | | | |
| - Alfalfa, forage | 3 [§180.342(c)] | No | **00125686**, 00158567,[9] 00158568,[9] 41739001 [34] |
| - Alfalfa, hay | 13 [§180.342(c)] | No | **00125686**, 00158567,[9] 00158568,[9] 41739001 [35] |
| Herbs and Spices Group | | | |
| - Dill | | No [36] | |
| Miscellaneous Commodities | | | |
| - Asparagus | 5.0 [§180.342(b)] | No [37] | **00094088** |
| - Bananas | 0.1 (bananas), 0.01 (bananas, pulp) §180.342(c)] | No | **00125686** |
| - Cherimoya | 0.05 [§180.342(d)] | No [38] | PP#7E3536 |
| - Cottonseed | 0.2 [§180.342(c)] | Yes [39] | **00095373**, 40131303 |
| - Dates | 0.5 (of which no more than 0.3 ppm is chlorpyrifos) [§180.342(b)] | No [40] | 00162109 |
| - Feijoa (pineapple guava) | 0.05 [§180.342(d)] | No [38] | PP#7E3536 |
| - Figs | 0.01 [§180.342(c)] | No | **00098580** |
| - Kiwifruits | 2.0 [§180.342(a)] | No | **00115260** |



*(continued; footnotes follow.)*

Table C *(continued)*.

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Mint | 0.8 (hay) [§180.342(c)] | Yes [41] | **00034031** |
| - Mushrooms | 0.1 [§180.342(a)] | No | **00129295** |
| - Okra | | No [42] | |
| - Peanuts | 0.2 (peanuts) 2 (peanuts, hulls) [§180.342(c)] | Yes [43] | **00025942, 00083840, 00095263** |
| - Sapote | 0.05 [§180.342(d)] | No [38] | PP#7E3536 |
| - Sugarcane | 0.01 [44] [§180.342(c)] | No | 42645401 [45] |
| - Sunflower | 0.25 (seeds) [§180.342(a)] | No [46] | **00084845**, 42245906 [17], 43181401 [47] |
| - Tobacco | | No | 40265201 |
| Crops Grown Solely for Seed | | | |
| - Carrots | None Established | Yes [48] | |
| - Clover forage, seed, and hay | None Established | Yes [49] | |
| - Grass forage and hay | None Established | Yes [50] | |
| 171-4(l): **Magnitude of the Residues in Processed Food/Feed** | | | |
| - Alfalfa | | No [51] | **00125686**, 00158567,[9] 00158568 [9] |
| - Apples | 12.0 (dried pomace) [§186.1000(a)] | No | **00044555, 00088978, 00095264** |
| - Citrus | 25.0 (oil) [§185.1000(a)], 5.0 (dried pulp) [§186.1000(a)] | No | **00084326** |



*(continued; footnotes follow.)*

Table C *(continued)*.

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Corn, field | 3.0 (oil) [§185.1000(a)], 1.0 (soapstock) [§186.1000(a)] | No [52] | **00084266**, 42649002 [14] |
| - Corn, sweet | | No [53] | 42649002 [14] |
| - Cottonseed | | No [54] | **00037455** |
| - Figs | | No [55] | |
| - Grapes | 2.0 (dried pomace) [§186.1000(a)] | No | **00085785**, 00126713, 00134499, PP#3F02872/30H5393 |
| - Mint | 8 (oil) [§185.1000(d)] | No | **00034031** |
| - Peanuts | 0.4 (oil) [§185.1000(d)] | No | **00025942, 00083840, 00095263** |
| - Plums | | No [54] | **00044555** |
| - Sorghum | 1.5 (milling fractions) [§185.1000(a)] | No [56] | **00046785, 00095249** |
| - Soybeans | | No [54] | **00095270** |
| - Sugar beet | 5.0 (dried pulp) 15.0 (molasses) [§186.1000(a)] | No | **00039641, 00101566** |
| - Sugarcane | | No [57] | 42645401 [45] |
| - Sunflower | 0.5 (hulls) [§186.1000(a)] | No [58] | **00084846**, 42245906 [17], 43181401 [59] |
| - Tomatoes | | No | **00095251** |



*(continued; footnotes follow.)*

Table C *(continued)*.

| GLN: Data Requirements | Current Tolerances, ppm [40 CFR] | Must Additional Data Be Submitted? | References [1] |
|---|---|---|---|
| - Wheat | 1.5 (milling fractions, exc. flour) [§185.1000(d)] | No | PP#3F2947/FAP#3H5411 |
| 171-4 (j): Magnitude of the Residue in Meat, Milk, Poultry, and Eggs | | | |
| - Cattle | 0.3 (fat) [§180.342(c)] | No | **00058087, 00095179, 00095438** |
| - Goats, hogs, and sheep | 0.2 (fat) [§180.342(c)] | No | **00058087, 00095179, 00095438** |
| - Cattle, goats, hogs, and sheep | 0.05 (meat and meat byproducts) [§180.342(c)] | No | **00058087, 00095179, 00095438** |
| - Horses | 0.25 (fat, meat, and meat byproducts) [§180.342(c)] | No | **00058087, 00095179, 00095438** |
| - Poultry | 0.1 (fat, meat, and meat byproducts) [§180.342(c)] | No | **00058087, 00095179, 00095438** |
| - Milk, fat | 0.25 [§180.342(c)] | No | **00095179**, 42542701 [60] |
| - Milk, whole | 0.01 [§180.342(c)] | No | **00095179**, 42542701 [60] |
| - Eggs | 0.01 [§180.342(c)] | No | **00095179** |
| 171-4(f): Nature and Magnitude of the Residue in Drinking and Irrigation Water | | No | |
| 171-4(i): Magnitude of the Residue in Food-Handling Establishments | | No | **00090562, 00090563** |
| 165-1: Rotational Crops (Confined) | | No[61] | 43210801[61] |
| 165-2: Rotational Crops (Field) | | No[61] | |

1. **Bolded** references were reviewed in the Residue Chemistry Science Chapter of the Reregistration Standard dated 2/29/84. Unbolded references were reviewed in the SRR of 11/18/88. Otherwise, references were reviewed as noted.

2. Label revisions are required for some crops and are noted in appropriate crop section.

3. CB No. 3938, 9/23/88, S. Willett.

4. CBRS No. 7907, DP Barcode D163645, 1/7/91, C. Olinger.

5. CBRS No. 501, 3/25/85, R. Loranger.

6. CB No. 1429, 1/21/87, M. Bradley.

7. No CBRS No., 8/16/84, S. Malak.

8. CB No. 992, 7/15/85, N. Dodd.

9. CB Nos. 2933, 2934, and 2939, 3/9/88, S. Willett.

10. CB No. 1562, 4/30/87, W. Chin.

11. CBRS No. 7368, DP Barcode D158705, 1/24/92, C. Olinger.

12. As there are no registered uses of chlorpyrifos on leeks, the established tolerance for leeks should be revoked.

13. CB No. 798, 7/7/86, N. Dodd; and CB No. 1803, 2/2/87, N. Dodd.

14. CBRS No. 11372, DP Barcode D188151, 8/26/93, S. Knizner and CBRS No. 14106, 8/15/94, S. Knizner.

15. CB Nos. 464 and 465, 4/1/86, M. Metzger.

16. Residue data submitted for snap beans satisfy the data requirements for lima beans.

17. CBRS No. 9638, DP Barcode D176281, 5/19/92, L. Cheng.

18. Data are required for soybean aspirated grain fractions (see Guidance Document entitled "Aspirated Grain Fractions (Grain Dust): A Tolerance Perspective", June, 1994).

19. Since a tolerance exists for beans, vines, the tolerances for vines of lima and snap beans should be revoked. For beans, a label revision is needed because feeding restrictions for bean hay are no longer considered practical and will not be accepted [see "Table II (June 1994) of the Pesticide Assessment Guidelines, Subdivision O, Residues Chemistry", E.Saito and E.Zager, 6/7/94]. Sufficient data are available to support the bean hay tolerance of 0.1 ppm with the slurry seed/preplant treatment using the 50% WP formulation at 1 oz/cwt. Additional data must be submitted in support of SLN TX88002 (slurry seed/stored seed treatment at 3 oz/cwt). Alternatively, this SLN use may be canceled.

20. For peppers, the requirements specified by the Addendum to the Chlorpyrifos SRR to submit English translations of labels for all products that permit use of chlorpyrifos on peppers imported to the U.S. have not been fulfilled. Since issuance of the SRR, SLN (FL920007, FL920009, GA930003, and GA930004) uses of chlorpyrifos on peppers have been approved.

Table C *(continued)*.

21. For tomatoes, the requirements specified by the Addendum to the Chlorpyrifos SRR to submit English translations of labels for all products that permit use of chlorpyrifos on tomatoes imported to the U.S. have not been fulfilled. These data requirements remain outstanding. Since issuance of the SRR, SLN (FL920010, GA930003, and GA930004) uses of chlorpyrifos on tomatoes have been approved. The domestic uses of chlorpyrifos on tomatoes are supported by adequate residue data.

22. For sour cherries, the use patterns of the 50% WP and 1 lb/gal EC formulations (EPA Reg. Nos. 62719-39, 62719-221, and 62719-56) involving a 14-day PHI and 8 foliar spray applications at 1.5 lb ai/A/application or 1.6 lb ai/100 gal/application are not supported by residue data. To satisfy the reregistration requirements, additional data reflecting these formulations and use patterns are required. Alternatively, the registrant may elect to revise its labels such that the use patterns for sour cherries are made identical with sweet cherries which are supported by adequate residue data.

23. Residue data submitted for peaches satisfy the data requirements for nectarines.

24. As there are no registered uses of chlorpyrifos on blueberries, the established tolerance for blueberries should be revoked.

25. As there are no registered uses of chlorpyrifos on caneberries (*Rubus* spp.), the established tolerance for caneberries should be revoked.

26. For tree nuts group, the Addendum to the Chlorpyrifos SRR did not require additional data. However, an examination of the recently amended labels for the 4 lb/gal EC formulation (EPA Reg. Nos. 62719-23 and 62719-220) indicates that a maximum seasonal rate of 10 lb ai/A was inadvertently approved for pecans. The available residue data, reflecting combined residues of chlorpyrifos and TCP in/on pecans and other representative members of this crop group, only support a maximum seasonal rate of 5 lb ai/A. If the registrant wishes to support a seasonal rate of 10 lb ai/A, then additional data are required. Alternatively, the labels for pecans may be revised to reflect a maximum seasonal rate of 5 lb ai/A.

27. CBRS No. 6582, 6/19/90, K. Dockter.

28. Data are required for sorghum aspirated grain fractions (see Guidance Document entitled "Aspirated Grain Fractions (Grain Dust): A Tolerance Perspective", June, 1994). The sorghum magnitude of the residue study for sorghum grain, forage, and fodder is fully acceptable (CBRS #13,498, DP Barcode D201562, 5/23/94, S.Knizner). In the Tolerance Reassessment Chapter of the RED, tolerances for residues of chlorpyrifos per se should be revised as follows: sorghum grain 0.5 ppm; sorghum forage 0.5 ppm; and sorghum fodder 2.0 ppm. Although a sorghum processing study, depicting chlorpyrifos residues in sorghum milled fractions was required by the SRR, residue data are no longer required at this time because sorghum flour in the US is used exclusively as a component for drywall, and not as either a human or animal feed item. The Agency reserves the right to require these data if needed at a later date (D.Edwards and E.Zager, "Updated Livestock Feeds Table for Subdivision O (Residue Chemistry) of the Pesticide Assessment Guidelines", dated 4/28/94).

29. CBRS No. 13,498, 5/23/94, S.Knizner.

30. Data are required for wheat aspirated grain fractions (see Guidance Document entitled "Aspirated Grain Fractions (Grain Dust): A Tolerance Perspective", June, 1994). According to Table II June 1994, residue data are also required for wheat hay.

31. Label restrictions prohibiting feeding of silage, forage, or fodder to meat or dairy animals are not practical [see Table II (June 1994)] and must be removed from SLN DE930004, FL780046, GA790019, MD840004, and PA840008 labels. Additional data must be submitted to determine if established tolerances on corn forage and fodder are adequate for these uses. Alternatively, these SLN uses may be deleted.

32. CBRS No. 13,498, 5/23/94, S.Knizner.

33. CBRS No. 13,498, 5/23/94, S.Knizner.

34. CBRS No. 7627, 4/4/91, C. Swartz and CBRS No. 7955, DP Barcode D164122, 5/9/91, C. Swartz.

35. CBRS No. 7627, 4/4/91, C. Swartz and CBRS No. 7955, DP Barcode D164122, 5/9/91, C. Swartz.

36. According to the REFS database, dill is not listed as a use site for chlorpyrifos; hence, the requirement for a magnitude of the residue study for dill is waived (CBRS No. 9235, DP Barcode D173011, 4/15/92, C. Olinger; and CBRS No. 12483, DP Barcode D194679, 9/17/93, S. Knizner).

37. For asparagus, no additional residue data are required. However, a label revision is needed. The maximum equivalent rate of 1.9 lb ai/A specified by a homeowner-use label (EPA Reg. No. 62719-56) should be adjusted to reflect the maximum registered rate of 1.0 lb ai/A for which adequate residue data are available.

38. There are presently no registered uses of chlorpyrifos on cherimoya, feijoa, and sapote. The current regional tolerances on these fruit commodities, originally established to support their uses in CA, should be revoked.

39. Residue data are required for cotton gin byproducts. Feeding restrictions for cotton gin byproducts (gin trash) are no longer considered practical and will not be accepted (see Table II, June 1994).

40. As there are no registered uses of chlorpyrifos on dates, the established tolerance for dates should be revoked.

41. According to Table II June 1994, residue data are required for peppermint and spearmint tops (leaves and stems), not hay.

42. According to the REFS data base, okra is not listed as a use site for chlorpyrifos; hence, the requirement for a magnitude of the residue study for okra is waived (CBRS No. 9235, DP Barcode D173011, 4/15/92, C. Olinger; and CBRS No. 12483, DP Barcode D194679, 9/17/93, S. Knizner).

43. According to Table II June 1994, residue data are required for peanut hay. Feeding restrictions for peanut hay are not considered practical and will not be allowed.

44. A tolerance of 0.01 ppm for residues of chlorpyrifos *per se* in/on sugarcane has recently been established (FR 10287, 3/4/94) in conjunction with PP#3E4192. No tolerance for sugarcane forage is required since the proposed uses include a restriction against the feed use of sugarcane forage.

45. CBTS No. 11397, DP Barcode D188233, 7/6/93, J. Morales; and CBTS No. 12276, DP Barcode D193356, 8/2/93, J. Morales.

46. For sunflower, the data submitted in response to the Addendum to the Chlorpyrifos SRR (CBRS No. 9638, DP Barcode 176281, 5/19/92, L. Cheng) were deemed inadequate because separate residue levels of chlorpyrifos *per se* in/on sunflower seeds and hulls were not provided. Subsequently, separate data were provided for sunflower hulls (MRID #4318401). The sunflower processing study was fully acceptable. In

the Tolerance Reassessment Chapter of the Reregistration Eligibility Document (RED), tolerances for residues of chlorpyrifos per se in/on sunflower seed should be set at 0.1 ppm. Residue levels in hulls concentrate approximately 2X versus the rac. Therefore, in the RED, tolerances for residues of chlorpyrifos per se in/on sunflower hulls should be revised to 0.2 ppm (CBRS #13,498, DP Barcode D201562, 5/23/94, S.Knizner).

47. CBRS #13,498, 5/23/94, S.Knizner.

48. For carrots grown for seed, appropriate tolerance for residues of chlorpyrifos *per se* in/on carrots must be proposed. The proposal must be supported by adequate residue data conducted according to the maximum use patterns specified by WA850025. Alternatively, this SLN use may be canceled.

49. The Oregon Clover Association has indicated (CBRS No. 9235, DP Barcode D173011, 4/15/92, C. Olinger) that it will support chlorpyrifos SLN (OR850032) use on clover grown for seed. The requirements specified in the Addendum to the Chlorpyrifos SRR remain outstanding.

50. For grasses grown for seed, appropriate tolerances for residues of chlorpyrifos *per se* in/on grass forage, hay and seed screenings must be proposed. The proposal must be supported by adequate residue data conducted according to the maximum use patterns specified by CA900007, ID830005, OR830007, SD870006, and WA830009. Alternatively, these SLN uses may be canceled.

51. The requirements for processing data on alfalfa meal is waived because residue data indicate that levels of chlorpyrifos *per se* are not likely to exceed the established tolerance in alfalfa hay following tests conducted according to registered uses (CB Nos. 2933, 2934, and 2939, 3/9/88, S. Willett).

52. The processing data submitted in response to the Addendum to the Chlorpyrifos SRR indicate that food/feed additive tolerances for residues of chlorpyrifos *per se* of 0.1 ppm are required in/on corn grain milled fractions (grits, meal, and flour), based on concentration factors ranging from 1.25x in grits to 2x in flour. A food additive tolerance for residues of chlorpyrifos *per se* in corn oil at 0.25 ppm is required, based on the highest concentration factor of 4.5x.

53. No sweet corn processing data are required since adequate field corn data are available.

54. Residues of chlorpyrifos *per se* are not likely to concentrate in processed fractions of cottonseed, plums, and soybeans.

55. The data requirement depicting residues of chlorpyrifos in dried figs is waived (CB No. 501, 3/25/85, R. Loranger).

56. The established tolerance for sorghum milled fractions should be revoked. According to the memo entitled "Table II (June 1994) of the Pesticide Assessment Guidelines, Subdivision O, Residues Chemistry", E.Saito and E.Zager, 6/7/94, Residue data for sorghum flour are not needed at this time because it is used exclusively as a component of drywall, and not as a food or animal feed item, in the US. However, because 50% of the worldwide sorghum production is used for human consumption, data may be needed at a later time.

57. In an evaluation of a recently submitted petition (PP#3E4192), CBTS concluded that residues of chlorpyrifos are not likely to concentrate (above the established RAC tolerance) in the processed fractions of sugarcane.

58. The sunflower processing study (MRID #413841401) is fully acceptable. Tolerances for residues of chlorpyrifos per se in/on sunflower seed should be set at 0.1 ppm. Residue levels in hulls concentrate approximately 2X versus the rac. Therefore, in the RED, tolerances for residues of chlorpyrifos per se in/on sunflower hulls should be revised to 0.2 ppm.

59. CBRS #13,498, 5/23/94, S.Knizner.

60. CBTS No. 10941, DP Barcode D185093, 1/8/93, M. Flood.

61. S.Knizner, CBRS #13710, DP Barcode D203434, MRID #43210801, 6/22/94. When chlorpyrifos was applied to soil at less than the maximal seasonal application rate (4.8 lb ai/A, 0.8X), at the 30 day plant back interval TRR levels in all the rotational crops examined exceeded 0.010 ppm and chlorpyrifos per se was found at up to 0.009 ppm. Therefore, field rotational crop trials (Guideline 165-2) will be required to support a 30 day plant back interval. When conducting field rotational crop trials, an application rate of 6.0 lb ai/A should be used. Samples should be analyzed for residues of chlorpyrifos per se. DowElanco responded to the S.Knizner review of 6/22/94 in a letter to the Agency dated 8/12/94. DowElanco proposed to limit the maximum application rate on its chlorpyrifos products to 5 lb ai/A/season on those crops where rotation to another crop could occur. **Provided that DowElanco modifies all labels for its chlorpyrifos containing products to limit application to 5 lb ai/A/season on those crops where rotation to another crop could occur, CBRS will not require field rotational crop studies. Furthermore, a 30 day plant back interval for rotational crops would then be appropriate. (S.Knizner, 9/13/94, CBRS #14256, DP Barcode D206739).**

## TOLERANCE REASSESSMENT SUMMARY

The Agency has concluded that the TCP metabolite of chlorpyrifos is not of toxicological concern and no longer needs to be regulated, and therefore, should be excluded from the tolerance expression. The tolerance levels should be amended to reflect residues of chlorpyrifos *per se*. Based on the Agency's decision to change the tolerance expression, the tolerances listed in 40 CFR need to be reorganized as follows.

| Current Tolerance | | Tolerance Reassessment | |
|---|---|---|---|
| 40 CFR | Expression [Restrictions] | 40 CFR | Tolerance Expression [Restrictions] |
| §180.342 (a) | Chlorpyrifos and TCP. | §180.342 (a) | Chlorpyrifos *per se*. |
| §180.342 (b) | Chlorpyrifos and TCP [For regional registrations]. | §180.342 (b) | Chlorpyrifos *per se* [For regional registrations]. |
| §180.342 (c) | Chlorpyrifos *per se*. | | Delete §180.342 (c) and transfer all tolerances under this section to §180.342 (a) at their respective reassessed levels. |
| §180.342 (d) | Chlorpyrifos *per se* [For regional registrations]. | | Delete §180.342 (d) section since all tolerances under this section are to be revoked (no registered uses). |
| §185.1000 (a) | Chlorpyrifos and TCP. | §185.1000 (a) | Chlorpyrifos *per se*. |
| §185.1000 (b) | [Provisions on safe use of chlorpyrifos on food-handling establishments]. | §185.1000(b) | Conditions for safe use of chlorpyrifos on food-handling establishments. |
| §185.1000 (c) | Chlorpyrifos *per se* (tolerances established in food items [other than those already covered by a higher tolerance as a result of use on growing crops] in food-service establishments, as result of the application of Mcap form. | §185.1000 (c) | Chlorpyrifos *per se*.<br><br>Retain §185.1000 (c) section. |
| §185.1000 (d) | Chlorpyrifos *per se*. | | Delete §185.1000 (d) section and transfer all reassessed tolerances to §185.1000(a). |
| §186.1000(a) | Chlorpyrifos and TCP. | §186.1000(a) | Chlorpyrifos *per se*. |

### Tolerances Listed Under 40 CFR §180.342(a)

The current raw agricultural commodity tolerances listed in 40 CFR §180.342(a) are expressed in terms of the combined residues of chlorpyrifos and its metabolite TCP. This tolerance definition should be amended to depict residues of chlorpyrifos *per se*. Refer to Table D for modifications in commodity definitions.

Adequate data are available to assess the established tolerances for: almonds, hulls; apples; beans, lima; beans, lima, forage; beans, snap; beans, snap, forage; beets, sugar, root; beets, sugar, tops; blueberry; citrus fruits; corn, fresh (inc. sweet K-CWHR); cranberries; kiwifruit; mushrooms; onions; seed and pod vegetables; sorghum, grain; sorghum, fodder; sorghum, forage; tomatoes; and vegetables, leafy, *Brassica* (cole).

Adequate data depicting chlorpyrifos *per se* are available for the majority of commodities listed in 40 CFR §180.342(a). However, the field trial data submitted for apples, sugar beets, and tree nuts depict the combined residues of chlorpyrifos and TCP. In the absence of adequate data depicting chlorpyrifos *per se* on the commodities of these crops, the established tolerances, for tolerance reassessment purposes, should remain at the existing levels. It is the registrant's prerogative to petition the Agency and submit additional field residue data depicting chlorpyrifos *per se* in/on these crops if a tolerance-level reduction is desired.

Additional field residue data and/or label revisions are required for the following racs before a complete tolerance reassessment can be made: aspirated grain fractions of sorghum, soybeans, and wheat; cotton gin byproducts; peanut hay; peppermint tops; spearmint tops; tree nuts group (almonds, filberts, pecans, and walnuts); and wheat hay. Additional data are required (and tolerance proposals, if needed) for crops grown solely for seed (carrots, clover, and grasses). The following additional recommendations can be made:

> When the requirements for tree nuts group have been fulfilled, the individual tolerances for almonds and walnuts should be revoked since these commodities will be covered by the established crop group tolerance. The established tolerance for almond hulls, however, should be retained.
>
> The individual tolerances for lima beans and snap beans should be revoked since these commodities are covered by the established crop group tolerance for legume vegetables. The individual tolerances for lima bean forage and snap bean forage should be revoked since these commodities are covered by the established tolerance for beans, forage.
>
> The established tolerance for blueberry should be revoked since there are no registered uses of chlorpyrifos on this crop.
>
> The established crop group tolerance for "seed and pod vegetables" should be revoked since uses of chlorpyrifos on dill and okra, for which this obsolete crop group was supposed to cover, have been deleted.

A tolerance of 0.01 ppm for residues of chlorpyrifos *per se* in/on sugarcane has recently been established (FR 10287, 3/4/94) in conjunction with PP#3E4192. No tolerance for sugarcane forage is required because sugarcane forage is no longer considered a rac [Table II (June 1994)]. The following petitions for the establishment of tolerances for residues of

chlorpyrifos *per se* in/on various commodities and applications for amended use patterns, are pending:

**PP#1F2575.** This petition requests approval for using chlorpyrifos WP formulation on citrus. [Note: Data reviewed in the Residue Chemistry Science Chapter of the Chlorpyrifos Reregistration Standard reflect use of the EC formulation only]. Data submitted with this petition indicate that the established tolerance of 1.0 ppm will not be exceeded following application of the WP and EC formulations according to the proposed use patterns; the maximum residue of chlorpyrifos *per se* was 0.64 ppm. In an evaluation (CBTS Nos. 12054 and 12055, DP Barcodes D192286 and D192287, 2/16/94, G. Otakie) of this petition, CBTS concluded that if the proposed labels are revised so that the minimum recommended spray volume for all the proposed uses is 100 gallons per acre, then CBTS would not object to approval of use of the chlorpyrifos WP formulations on citrus.

**PP#04E4288 and PP#04E4289.** This petition proposes that the current 0.01 ppm tolerances for residues of chlorpyrifos *per se* in/on nectarines, peaches, pears, and plums be raised to 0.05 ppm for import tolerances. In an evaluation (CBTS Nos. 12767 and 12768, DP Barcodes D196565 and D196569, 11/18/93, N. Dodd) of this petition, CBTS recommended for the establishment of 0.05 ppm tolerances with an expiration date (for up to 2 years) to cover both domestic and imported produce. For permanent tolerances on imports from Chile, residue data for pears, peaches, and plums will be needed; data on peaches will suffice for nectarines. Since prunes are the processed commodity of plums, residue data for plums and prunes will be needed.

**PP#4F03132.** This petition proposes the establishment of a tolerance for residues of chlorpyrifos *per se* in/on lettuce. In an evaluation (CBTS No. 10797, DP Barcode D183887, 9/27/93, N. Dodd) of this petition, CBTS recommended for the establishment of a 1 ppm tolerance level.

**PP#3F02872/3H05393.** This petition proposes the establishment of tolerances for residues of chlorpyrifos *per se* in/on grapes and its processed commodities. In an evaluation (CBTS No. 10795, D183897, 9/27/93, N. Dodd) of this petition, CBTS recommended for the establishment of a 1 ppm tolerance level for grapes and a 4 ppm feed additive tolerance level for grape pomace (wet or dried).

**PP#4F03008/1H5295.** This petition proposes the establishment of tolerances for residues of chlorpyrifos *per se* in/on tomatoes and its processed commodities in support of domestically grown tomatoes. In an evaluation (CBTS No. 10804, DP Barcode D183901, 9/27/93, N. Dodd) of this petition, CBTS recommended for the establishment of a 1.0 ppm tolerance level for tomatoes and a 65 ppm feed additive tolerance level for tomato pomace.

This petition was revised to propose the establishment of tolerances for residues of chlorpyrifos *per se* in/on bean hay at 0.1 ppm, pea hay at 0.1 ppm, and soybean hay at 0.1 ppm. In an evaluation (CBRS No. 10903, D185266, 1/12/93, L. Cheng) of this petition, CBRS concluded that these proposed tolerances are appropriate. Although sufficient data are available to support the bean hay tolerance of 0.1 ppm with the slurry seed/preplant treatment using the 50% WP formulation at 1 oz/cwt, additional data must be submitted in support of SLN TX88002 (slurry seed/stored seed treatment at 3 oz/cwt). Alternatively, this SLN use may be canceled.

An additional revision to Section F of this petition (dated 6/2/94) added the following proposed chlorpyrifos tolerances to this petition: 0.5 ppm in/on corn grain dust, sorghum grain, and sorghum forage; 0.1 ppm in/on sunflower seed; 2.0 ppm in/on sorghum fodder; 0.1 ppm in/on corn grain milled fractions; 0.2 ppm in/on sunflower hulls; and 0.25 ppm in/on corn grain oil. CBRS recommended for these proposed tolerances (S.Knizner, CBRS #14150 and 14151, 8/15/94). In another response to this petition, it was noted that although a 0.5 ppm tolerance was recommended for corn aspirated grain fractions based on a concentration factor of ~10x in the <420 $\mu$ dust fraction (see CBRS No. 11372, D188151, S. Knizner, 8/26/93). Additional data are required for sorghum, soybean, and wheat aspirated grain fractions before a tolerance for aspirated grain fractions can be established (see "Aspirated Grain Fractions 9Grain Dust): A Tolerance Perspective", E.Saito and E.Zager, 6/7/94.

**PP#3F4188/3H5662.** This petition proposes the establishment of tolerances for residues of chlorpyrifos *per se* in/on barley grain at 0.3 ppm, barley forage at 1.5 ppm, and barley straw at 1.5 ppm. This petition is currently in reject status (CBTS Nos. 11322, 11791, and 12180, DP Barcodes D187788, D190700, and D192629, 7/20/93, R. Lascola).

**PP#4H05702.** This petition, submitted 6/27/94 by General Mills, Inc., proposes the establishment of a time limited food additive regulation for residues of chlorpyrifos at levels of 0.4 ppm in/on certain oat containing ready to eat cereal products produced on or before June 15, 1994. Subsequently, General Mills, Inc., submitted a protocol for determining the magnitude of the residue in/on oat grain that may have been treated with chlorpyrifos. This protocol was reviewed by CBRS (S.Knizner and M.Clifford, 8/3/94, CBRS 14,105)

**PP#0E3910.** This petition proposes the establishment of a tolerance with regional registration for residues of chlorpyrifos *per se* in/on olives at 4.0 ppm. This petition is currently in reject status (CBTS Nos. 11645, DP Barcode D189607, 5/14/93, J. Garbus; and S. Bacchus memo of 3/8/91).

**PP#0E3920.** This petition proposes the establishment of a temporary tolerance for residues of chlorpyrifos *per se* in catfish at 0.5 ppm. This petition is currently in reject status.

Tolerances Listed Under 40 CFR §180.342(b)

The current raw agricultural commodity tolerances with regional registration listed in 40 CFR §180.342(b) are expressed in terms of the combined residues of chlorpyrifos and its metabolite TCP. This tolerance definition should be amended to reflect residues of chlorpyrifos *per se*. Furthermore, this 40 CFR §180.342(b) section should be retained for chlorpyrifos tolerances with regional registration, as defined in §180.1(n).

Label revision is required for asparagus before a complete tolerance reassessment can be made. The field trial data submitted for asparagus depict combined residues of chlorpyrifos and TCP. In the absence of adequate data depicting chlorpyrifos *per se* on asparagus, the established tolerance on this commodity, should remain at the existing levels. It is the registrant's prerogative to petition the Agency and submit additional field residue data depicting chlorpyrifos *per se* in/on asparagus if a tolerance-level reduction is desired.

The established tolerances for dates and leeks should be revoked since there are no registered uses of chlorpyrifos on these crops.

The established tolerance for grapes should be raised from 0.5 ppm to 1.0 ppm, in conjunction with PP#3F02872.

Tolerances Listed Under 40 CFR §180.342(c)

The current raw agricultural commodity tolerances listed in 40 CFR §180.342(c) are expressed in terms of chlorpyrifos *per se*. All tolerances listed in this section should be transferred to §180.342 (a) at their respective reassessed levels and §180.342 (c) should then be deleted. Refer to Table D for modifications in commodity definitions.

Adequate data are available to assess the established tolerances for: alfalfa, forage; alfalfa, hay; bananas, whole; bananas, pulp with peel removed; bean, forage; broccoli; Brussels sprouts; cabbage; cattle, fat; cattle, meat; cattle, meat byproducts; cauliflower; Chinese cabbage; corn, field, grain; corn, forage; corn, fodder; cottonseed; cucumbers; eggs; figs; goats, fat; goats, meat; goats, meat byproducts; hogs, fat; hogs, meat; hogs, meat byproducts; horses, fat; horses, meat; horses, meat byproducts; legume vegetables, succulent or dried (except soybeans); milk, fat; milk, whole; mint, hay; nectarines; peaches; pea forage; peanut hulls; peanuts; pears; plums (fresh prunes); poultry, fat (inc. turkeys); poultry, meat (inc. turkeys); poultry, meat byproducts (inc. turkeys); pumpkins; radishes; rutabagas; sheep, fat; sheep, meat; sheep, meat byproducts; soybean grain; soybean forage; strawberries; sugarcane; sweet potatoes; turnip greens; turnips; wheat, forage; wheat, grain; and wheat, straw.

Additional field residue data and/or label revisions are required for cherries before a complete tolerance reassessment can be made. The following additional recommendations can be made:

The established tolerance for caneberries should be revoked since there are no registered uses of chlorpyrifos on caneberries (*Rubus* spp.)

The individual tolerances for broccoli, Brussels sprouts, cabbage, Chinese cabbage, and cauliflower should be revoked since these commodities are covered by the crop group tolerance for the Brassica (cole) leafy vegetables group.

Tolerances Listed Under 40 CFR §180.342(d).

The current raw agricultural commodity tolerances with regional registration listed in 40 CFR §180.342(d) are expressed in terms of chlorpyrifos *per se*. The tolerances listed in this section were intended for crop commodities [cherimoya, feijoa (pineapple guava), and sapote] grown in CA. There are presently no registered chlorpyrifos uses on these crops. Therefore, these tolerances should be revoked, and the §180.342(d) section should be deleted.

Tolerances Listed Under 40 CFR §185.1000(a)

The current food additive tolerances listed in 40 CFR §185.1000(a) are expressed in terms of the combined residues of chlorpyrifos and its metabolite TCP. This tolerance definition should be amended to depict residues of chlorpyrifos *per se*. Refer to Table D for modifications in commodity definitions.

Adequate data, depicting residues of chlorpyrifos *per se*, are available to assess the established food additive tolerance for citrus oil.

CBRS has recommended that the registrant submit a petition proposing: (i) a tolerance of 0.25 ppm for residues of chlorpyrifos *per se* in corn, oil, refined; and (ii) a tolerance of 0.1 ppm for residues of chlorpyrifos *per se* in corn, milled fractions (grits, meal, and flour) (CBRS No. 11372, D188151, 8/26/93, S. Knizner). The registrant has revised Section F of PP#4F03008/1H5295 to reflect this recommendation, and CBRS has recommended for the tolerance revision (S.Knizner, CBRS #14150 and 14151, 8/15/94).

Tolerances Listed Under 40 CFR §185.1000(b)

No numerical tolerances have been established for residues in food resulting from treatments of food-handling establishments. The available data are sufficient to determine that when registered formulations are used according to label directions, no detectable residues (<0.01-<0.025 ppm) are likely to occur in food items. The prescribed conditions for safe use of chlorpyrifos formulations in food-handling establishments, as outlined in 40 CFR §185.1000(b), are appropriate and should be retained.

Tolerances Listed Under 40 CFR §185.1000(c)

Sufficient data are available to ascertain the adequacy of the 0.1 ppm food additive tolerance for residues of chlorpyrifos *per se* in/on food items (other than those already covered by a higher tolerance as a result of use on growing crops), in food-service establishments where food and food products are prepared and served, as result of the application of the microencapsulated formulation. The prescribed conditions for safe use of the chlorpyrifos microencapsulated formulation in food-handling establishments, as outlined in 40 CFR §185.1000(c), are appropriate and should be retained.

Tolerances Listed Under 40 CFR §185.1000(d)

The food additive tolerances listed in 40 CFR §180.1000(d) are expressed in terms of chlorpyrifos *per se*. All tolerances listed in this section should be transferred to §180.1000(a) at their respective reassessed levels and §180.1000(d) should be deleted. Refer to Table D for modifications in commodity definitions.

Adequate data are available to assess the established tolerances for: wheat, milled fractions; mint, oil; and peanut, oil, refined. Table II (June 1994) has separate entries for peppermint and spearmint oil; mint oil has been deleted.

Tolerances Listed Under 40 CFR §186.1000(a)

The current feed additive tolerances listed in 40 CFR §186.1000(a) are expressed in terms of the combined residues of chlorpyrifos and its metabolite TCP. This tolerance definition should be amended to depict residues of chlorpyrifos *per se*. Refer to Table D for modifications in commodity definitions.

Adequate data are available to assess the established tolerances for: apple, pomace, dried; beet, sugar, molasses; beets, sugar, pulp (dried); citrus pulp (dried); corn soapstock; grape, pomace, dried; and sunflower hulls.

Note that Table II (June 1994) no longer includes dried apple pomace as an animal feed item; only wet apple pomace is included. Therefore, the tolerance for dried apple pomace should be revoked and a tolerance for wet apple pomace should be established. Additionally, Table II, June 1994, no longer requires tolerances for sorghum milling fractions. Sorghum flour is used exclusively in the US as a component of drywall, not as either a human or animal feed. Therefore, the tolerance for sorghum milling fractions should be revoked.

The available processing data for apples and sugar beets depict combined residues of chlorpyrifos and TCP. In the absence of adequate data depicting chlorpyrifos *per se* on the processed commodities of these crops, the established feed additive tolerances, for tolerance reassessment purposes, should remain at the existing levels. It is the registrant's prerogative to petition the Agency and submit additional processing data depicting chlorpyrifos *per se* in/on these commodities if tolerance-level reductions or lower anticipated residue calculations are desired.

Table D. Tolerance Reassessment Summary.

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| **Tolerances Listed Under 40 CFR §180.342(a)** | | | |
| Almonds | 0.2 | Revoke | Covered by tree nuts group. |
| Almonds, hulls | 12.0 | 12.0 | [*Almond, hulls*]. |
| Apples | 1.5 | 1.5 | |
| Beans, lima | 0.05 | Revoke | Covered by legume vegetables group. |
| Beans, lima, forage | 1.0 | Revoke | Covered by beans, forage. |
| Beans, snap | 0.05 | Revoke | Covered by legume vegetables group. |
| Beans, snap, forage | 1.0 | Revoke | Covered by beans, forage. |
| Beets, sugar, root | 1.0 | 1.0 | [*Beet, sugar, root*]. |
| Beets, sugar, tops | 8.0 | 8.0 | [*Beet, sugar, tops*]. |
| Blueberry | 2 (1) [a] | Revoke | No registered uses exist. |
| Citrus fruits | 1.0 | 1.0 | [*Citrus fruits group*]. |
| Corn, fresh (inc. sweet K-CWHR) | 0.1 | 0.05 | [*Corn, sweet (K + CWHR)*]. |
| Cranberries | 1.0 | 1.0 | |
| Kiwifruit | 2.0 | 2.0 | |
| Mushrooms | 0.1 | 0.1 | [*Mushroom*]. |
| Onions (dry bulbs) | 0.5 | 0.5 | [*Onion, bulb)*]. |
| Peppers | 1.0 | 1.0 | Chlorpyrifos labels from foreign countries that import peppers to the U.S. are required. |
| Seed and pod vegetables | 0.1 | Revoke | Uses of chlorpyrifos on dill and okra, for which this obsolete crop group was supposed to cover, have been deleted. |
| Sorghum, fodder | 6.0 | 2.0 | [*Sorghum, grain, fodder*]. Recommended tolerance from PP#4F3008/FAP#1H5295. |
| Sorghum, forage | 1.5 | 0.5 | [*Sorghum, grain, forage*]. |
| Sorghum, grain | 0.75 | 0.5 | |
| Sunflower seeds | 0.25 | 0.1 | [*Sunflower, seed*]. Recommended tolerance from PP#4F3008/FAP#1H5295. |
| Tomatoes | 0.5 | 1.0 | Chlorpyrifos labels from foreign countries that import tomatoes to the U.S. are required. Recommended tolerance from PP#4F3008/FAP#1H5295. |



*(continued; footnotes follow.)*

Table D *(continued)*.

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| Tree nuts | 0.2 | TBD | [*Tree nuts group*]. Additional data and/or label revisions are required. |
| Vegetables, leafy, *Brassica* (cole) | 2.0 (1.0) [a] | 1 | [*Brassica (cole) leafy vegetables group*]. |
| Walnuts | 0.2 | Revoke | Covered by tree nuts group. |
| **Additional Tolerances Required Under 40 CFR §180.342(a)** | | | |
| Bean, hay | None | TBD | Sufficient data are available to support the bean hay tolerance of 0.1 ppm with the slurry seed/preplant treatment using the 50% WP formulation at 1 oz/cwt. Additional data must be submitted in support of SLN TX88002 (slurry seed/stored seed treatment at 3 oz/cwt). Alternatively, this SLN use may be deleted. |
| Aspirated grain fractions | None | TBD | A 0.5 ppm tolerance was recommended for corn aspirated grain fractions based on a concentration factor of ~10x in the <420 $\mu$ dust fraction (see CBRS No. 11372, D188151, S. Knizner, 8/26/93). Additional data are required for sorghum, soybean, and wheat aspirated grain fractions before a tolerance for aspirated grain fractions can be established (see "Aspirated Grain Fractions (Grain Dust): A Tolerance Perspective", E.Saito and E.Zager, 6/7/94. |
| Carrots | None | TBD | |
| Clover, forage | None | TBD | |
| Clover, hay | None | TBD | |
| Cotton, gin byproducts | None | TBD | |
| Grass, forage | None | TBD | |
| Grass, hay | None | TBD | |
| Grass, seed screenings | None | TBD | |
| Lettuce | None | 1 | Recommended tolerance from PP#4F03132. |
| Pea, hay | None | 0.1 | Recommended tolerance from PP#4F3008/FAP#1H5295. |
| Peanut, hay | None | TBD | |
| Peas, straw | None | 0.1 | Recommended tolerance from PP#4F3008/FAP#1H5295. |
| Peppermint, tops | None | TBD | |



*(continued; footnotes follow.)*

Table D *(continued)*.

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| Soybean, hay | None | 0.1 | Recommended tolerance from PP#4F3008/FAP#1H5295. |
| Spearmint, tops | None | TBD | |
| Wheat, hay | None | TBD | |
| **Tolerances Listed Under 40 CFR §180.342(b)** | | | |
| Asparagus | 5.0 | 5.0 | Label revision is required. |
| Dates | 0.5 (0.3) [a] | Revoke | No registered uses exist. |
| Grapes | 0.5 | 1.0 | Recommended tolerance from PP#3F02872 and PP#3H05393. |
| Leeks | 0.5 (0.2) [a] | Revoke | No registered uses exist. |
| **Tolerances Listed Under 40 CFR §180.342(c)** | | | |
| Alfalfa, forage | 3 | 3 | |
| Alfalfa, hay | 13 | 13 | |
| Bananas, whole | 0.1 | 0.1 | |
| Bananas, pulp with peel removed | 0.01 | 0.01 | |
| Bean, forage | 0.7 | 0.7 | |
| Broccoli | 1 | Revoke | Covered by Brassica (cole) leafy vegetables group. |
| Brussels sprouts | 1 | Revoke | Covered by Brassica (cole) leafy vegetables group. |
| Cabbage | 1 | Revoke | Covered by Brassica (cole) leafy vegetables group. |
| Caneberries | 1.0 | Revoke | No registered uses exist. |
| Cattle, fat | 0.3 | 0.3 | |
| Cattle, meat | 0.05 | 0.05 | |
| Cattle, meat byproducts | 0.05 | 0.05 | |
| Cauliflower | 1 | Revoke | Covered by Brassica (cole) leafy vegetables group. |
| Cherries | 1 | TBD | Additional data and/or label revisions are required. |
| Chinese cabbage | 1 | Revoke | Covered by Brassica (cole) leafy vegetables group. |
| Corn, field, grain | 0.05 | 0.05 | |
| Corn, forage | 8 | 8 | |
| Corn, fodder | 8 | 8 | |
| Cottonseed | 0.2 | 0.2 | |



*(continued; footnotes follow.)*

Table D *(continued)*.

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| Cucumbers | 0.05 | 0.05 | |
| Eggs | 0.01 | 0.01 | |
| Figs | 0.01 | 0.01 | |
| Goats, fat | 0.2 | 0.2 | |
| Goats, meat | 0.05 | 0.05 | |
| Goats, meat byproducts | 0.05 | 0.05 | |
| Hogs, fat | 0.2 | 0.2 | |
| Hogs, meat | 0.05 | 0.05 | |
| Hogs, meat byproducts | 0.05 | 0.05 | |
| Horses, fat | 0.25 | 0.25 | |
| Horses, meat | 0.25 | 0.25 | |
| Horses, meat byproducts | 0.25 | 0.25 | |
| Legume vegetables, succulent or dried (except soybeans) | 0.05 | 0.05 | [*Legume vegetables (succulent or dried) group (except soybeans)*]. |
| Milk, fat | 0.25 | 0.25 | [*Milk fat (reflecting 0.01 ppm in whole milk)*]/ Recommended tolerance from PP#3F2884. |
| Milk, whole | 0.01 | Revoke | Covered by tolerance from milk fat (reflecting 0.01 ppm in whole milk). |
| Mint, hay | 0.8 | Revoke | Separate tolerances for peppermint tops and spearmint tops need to be established. According to Table II (June 1994) mint hay is no longer a rac. |
| Nectarines | 0.01 | 0.05 | Raise tolerance levels to cover both domestic and imported produce (see PP#04E4288/PP#04E4289). |
| Peaches | 0.01 | 0.05 | |
| Pea forage | 0.7 | 0.7 | [*Peas, vines*]. |
| Peanut hulls | 2 | 2 | [*Peanuts, hulls*]. |
| Peanuts | 0.2 | 0.2 | [*Peanuts, nutmeat*]. |
| Pears | 0.01 | 0.05 | Raise tolerance level to cover both domestic and imported produce (see PP#04E4288/PP#04E4289). |
| Plums (fresh prunes) | 0.01 | 0.05 | [*Plums*]/Raise tolerance level to cover both domestic and imported produce (see PP#04E4288/PP#04E4289). |
| Poultry, fat (inc. turkeys) | 0.1 | 0.1 | |



*(continued; footnotes follow.)*

Table D *(continued)*.

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| Poultry, meat (inc. turkeys) | 0.1 | 0.1 | |
| Poultry, meat byproducts (inc. turkeys) | 0.1 | 0.1 | |
| Pumpkins | 0.05 | 0.05 | [*Pumpkin*]. |
| Radishes | 2 | 2 | [*Radish*]. |
| Rutabagas | 0.5 | 0.5 | [*Rutabagas, root*]. |
| Sheep, fat | 0.2 | 0.2 | |
| Sheep, meat | 0.05 | 0.05 | |
| Sheep, meat byproducts | 0.05 | 0.05 | |
| Soybean grain | 0.3 | 0.3 | [*Soybean, seed*]. |
| Soybean forage | 0.7 | 0.7 | [*Soybean, forage*]. |
| Strawberries | 0.2 | 0.2 | [*Strawberry*]. |
| Sugarcane | 0.01 | 0.01 | |
| Sweet potatoes | 0.05 | 0.05 | [*Sweet potato, root*]. |
| Turnip greens | 0.3 | 0.3 | [*Turnip, tops*]. |
| Turnips | 1 | 1 | [*Turnip, root*]. |
| Wheat, forage | 3 | 3 | |
| Wheat, grain | 0.5 | 0.5 | |
| Wheat, straw | 6 | 6 | |
| **Tolerances Listed Under 40 CFR §180.342(d)** | | | |
| Cherimoya | 0.05 | Revoke | No registered uses exist. |
| Feijoa (pineapple guava) | 0.05 | Revoke | No registered uses exist. |
| Sapote | 0.05 | Revoke | No registered uses exist. |
| **Tolerances Listed Under 40 CFR §185.1000(a)** | | | |
| Citrus oil | 25.0 | 25 | *Citrus, oil, refined* |
| Corn oil | 3.0 | 0.25 | [*Corn, oil, refined*]/ Recommended tolerance based on a concentration factor of up to 4.5x (see CBRS No. 11372, D188151, S. Knizner, 8/26/93). |



*(continued; footnotes follow.)*

Table D *(continued)*.

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| **Additional Tolerance Required Under 40 CFR §185.1000(a)** | | | |
| Corn, milled fractions (grits, meal, and flour) | None | 0.1 | Recommended tolerance based on a concentration factors of up to 2x (see CBRS No. 11372, D188151, S. Knizner, 8/26/93). |
| **Tolerances Listed Under 40 CFR §185.1000(d)** | | | |
| Milling fractions (except flour) of wheat | 1.5 | 1.5 | [*Wheat, milled fractions*]. |
| Peanut oil | 0.4 | 0.4 | [*Peanut, oil, refined*]. |
| Mint oil | 8 | Revoke | Tolerances should be established for peppermint and spearmint oil. |
| **Additional Tolerance Required Under 40 CFR §186.1000(d)** | | | |
| Peppermint, oil | None | 8 | |
| Spearmint, oil | None | 8 | |
| **Tolerances Listed Under 40 CFR §186.1000(a)** | | | |
| Apple pomace, dried | 12.0 | Revoke | Revoke. According to Table II (June 1994) dried apple pomace is no longer an animal feed, establish tolerance for wet apple pomace instead (see below). |
| Beets, sugar, molasses | 15.0 | 15.0 | [*Sugar beet, molasses*]. |
| Beets, sugar, pulp (dried) | 5.0 | 5.0 | [*Sugar beet, pulp, dehydrated*]. |
| Citrus pulp, dried | 5.0 | 5.0 | [*Citrus, dried, pulp*]. |
| Corn soapstock | 1.0 | 0.5 | |
| Grape, pomace, dried | 2.0 | 4 | [*Grapes, pomace, dry*]./ Recommended tolerance from PP#3F02872 and PP#3H05393. |
| Sorghum milling fractions | 1.5 | Revoke | Revoke. According to Table II (June 1994), sorghum flour is used exclusively in the US as a component for drywall, not as either a human or animal feed item. |
| Sunflower seed hulls | 0.5 | 0.2 | [*Sunflower, hulls*]. |
| **Additional Tolerance Required Under 40 CFR §186.1000(a)** | | | |



*(continued; footnotes follow.)*

| Commodity | Current Tolerance (ppm) | Tolerance Reassessment (ppm) | [*Correct Commodity Definition*]/ Comments |
|---|---|---|---|
| Apple, pomace, wet | None | 2.0 | Tolerance calculated from reassessed tolerance for dried apple pomace at 8 ppm (with 90% dry matter) extrapolated to 21% dry matter in wet apple pomace. |
| Tomato, pomace, dry | None | 65 | Recommended tolerance from PP#4F03008/1H5295. |

[a] The maximum amount of chlorpyrifos *per se* allowed in this commodity is in parentheses.

[b] TBD = To be determined. Reassessment of tolerance(s) cannot be made at this time because either additional data or label revisions are required.

## CODEX HARMONIZATION

Residue data used to establish US tolerances were examined to determine if US tolerance levels could be adjusted to harmonize with Codex MRLs. Whenever possible, tolerance levels were changed to achieve harmonization.

Several maximum residue limits (MRLs) for chlorpyrifos have been established by Codex in various commodities; see Table E. The Codex MRLs (expressed in terms of chlorpyrifos *per se*) and the U.S. tolerance expression will be compatible when TCP is deleted from the U.S. tolerance expressions.

Compatibility between the U.S. tolerances and Codex MRLs exists for cabbage, Chinese; grapes, pomace, wet or dried; kale [Brassica (cole) leafy vegetables group]; kiwifruits; milks; poultry meat; and tomatoes. Further harmonization of U.S. tolerances and Codex MRLs on other commodities are not feasible at this time.

Table E. Codex MRLs and Applicable U.S. Tolerances.

| Commodity | MRL (mg/kg) [a] | U.S. Tolerance (ppm) [b] | Recommendation/ Comments |
|---|---|---|---|
| Apple | 1 | 1.5 | – |
| Cabbages, head | 0.05 [c] | 1 | – |
| Carrot | 0.5 | None | – |
| Cattle meat | 2 (fat) | 0.05 | – |
| Cauliflower | 0.05 [c] | 1 | – |
| Celery | 0.05 [c] | None | – |
| Chicken meat | 0.1 (fat) | 0.1 | Compatibility exists. |
| Chinese cabbage, type "Pe-tsai" | 1 | 1 | Compatibility exists. |

Table E (*continued*).

| Commodity | MRL (mg/kg) [a] | U.S. Tolerance (ppm) [b] | Recommendation/ Comments |
|---|---|---|---|
| Citrus fruits | 0.3 | 1.0 | -- |
| Common bean (pods and/or immature seeds) | 0.2 | 0.05 (Legume vegetables group, except soybeans) | -- |
| Cottonseed | 0.05 [c] | 0.2 | -- |
| Cotton seed oil, crude | 0.05 [c] | None | -- |
| Dried grapes | 2 | 2.0 | Compatibility exists. |
| Egg plant | 0.2 | None | -- |
| Eggs | 0.05 [c] | 0.01 | -- |
| Grapes | 1 | 0.5 | -- |
| Kale | 1 | 1 (Brassica (cole) leafy vegetables group) | Compatibility exists. |
| Kiwifruit | 2 | 2.0 | Compatibility exists. |
| Lettuce, head | 0.1 | 1 (proposed) | -- |
| Milks | 0.01 [c] | 0.01 | Compatibility exists. |
| Mushrooms | 0.05 [c] | 0.1 | -- |
| Onion, bulb | 0.05 [c] | 0.5 | -- |
| Pear | 0.5 | 0.01 | -- |
| Peppers | 0.5 | 1.0 | -- |
| Potato | 0.05 [c] | None | -- |
| Raspberries, red, black | 0.2 | 1.0 (caneberries) | -- |
| Rice | 0.1 | None | -- |
| Sheep meat | 0.2 (fat) | 0.05 | -- |
| Sugar beet | 0.05 [c] | 1.0 | -- |
| Tomato | 0.5 | 1.0 | -- |
| Turkey meat | 0.2 (fat) | 0.1 (poultry meat, including turkeys) | -- |

[a] All chlorpyrifos MRLs are final (CXL).
[b] Based on chlorpyrifos *per se*.
[c] At or about the limit of detection.

AGENCY MEMORANDA CITED IN THIS DOCUMENT

| | |
|---|---|
| CB No.: | None |
| DP Barcode: | None |
| Subject: | EPA Reg. No. 464-448. Amended Registration of Chlorpyrifos (Lorsban 4E) on Citrus. Accession No. 253677 |
| From: | S. Malak, RCB, HED |
| To: | J. Ellenberger, RD |
| Dated: | 08/16/84 |
| MRID(s): | 00141725 |

| | |
|---|---|
| CB No.: | 501 |
| DP Barcode: | None |
| Subject: | Chlorpyrifos Registration Standard. Dow's Response to Residue Chemistry Data Gaps. Accession Number 256045. |
| From: | R. Loranger, RCB, HED |
| To: | J. Ellenberger, RD/A. Rispin, HED |
| Dated: | 03/25/85 |
| MRID(s): | 00154734 |

| | |
|---|---|
| CB No.: | 992 |
| DP Barcode: | None |
| Subject: | EPA Registration No. 464-523. Chlorpyrifos Registration Standard. Dow's Response of April 18, 1985 to Residue Chemistry Data Gaps. Accession No. 257864. |
| From: | N. Dodd, RCB, HED |
| To: | J. Ellenberger, RD/A. Rispin, HED |
| Dated: | 07/15/85 |
| MRID(s): | 00148881 |

| | |
|---|---|
| CBRS No(s).: | 464 and 465 |
| DP Barcode: | None |
| Subject: | Chlorpyrifos (Lorsban®). Amended Registration for Foliar Application to Brassica (Cole) Crop Group Vegetables (Accession No. 261115). |
| From: | M. Metzger, RCB, HED |
| To: | J. Ellenberger, RD |
| Dated: | 04/01/86 |
| MRID(s): | 00155580 |

CB No.: 798
DP Barcode: None
Subject: Residues of Chlorpyrifos in Leeks
From: N. Dodd
Dated: 07/07/86
MRID(s): 00157909

CB No.: 1429
DP Barcode: None
Subject: Chlorpyrifos Reregistration Standard Follow-Up. Dow's Response to July 1986 With Hen Metabolism Study. Accession No. 264029.
From: M. Bradley, RCB, HED
To: D. Edwards, RD and Toxicology Branch, HED
Dated: 01/21/87
MRID(s): 00161743

CBRS No.: 1803
DP Barcode: None
Subject: Residues of Chlorpyrifos in Leeks.
From: N. Dodd
Dated: 02/02/87
MRID(s): 00157909

CB No.: 1562
DP Barcode: None
Subject: Residues of Chlorpyrifos in Blueberries.
From: W. Chin
Dated: 04/30/87
MRID(s): 00164187

CB No(s).: 2933, 2934, and 2939
DP Barcode: None
Subject: PP#3F2884 and Chlorpyrifos Registration Standard. Dow's Response to Residue Chemistry Data Gaps. Accession Nos. 158566 through 158569, 262241 through -43, and 263124.
From: S. Willett, RCB, HED
To: D. Edwards/A. Rispin, HED and Toxicology Branch, HED
Dated: 03/09/88
MRID(s): None

| | |
|---|---|
| CB No.: | 3938 |
| DP Barcode: | None |
| Subject: | PP#3F2884 and Chlorpyrifos Registration Standard. Dow's Response to DEB Review of March 9, 1988. |
| From: | S. Willett, DEB, HED |
| To: | D. Edwards, RD and Toxicology Branch, HED |
| Dated: | 09/23/88 |
| MRID(s): | 40638801 through 03 |
| | |
| CBRS No.: | 6582 |
| DP Barcode: | None |
| Subject: | Chlorpyrifos (Lorsban™ 4E; EPA Reg. No. 62719-23). Add Third Foliar Application on Walnuts. |
| From: | K. Dockter, DEB, HED |
| To: | D. Edwards, RD |
| Dated: | 06/19/90 |
| MRID(s): | 41424400 and -01 |
| | |
| CB No.: | 7907 |
| DP Barcode: | D163645 |
| Subject: | Chlorpyrifos: DowElanco Response to the Reregistration Standard: Residue Chemistry Data. Chemical No. 59101. |
| From: | C. Olinger, CB II, HED |
| To: | D. Edwards, RD |
| Dated: | 01/07/91 |
| MRID(s): | 41829007 |
| | |
| CBRS No.: | 7627 |
| DP Barcode: | None |
| Subject: | Chlorpyrifos. Amended Label for Lock-On* to Include Alfalfa in Arizona and California. EPA Reg. No. 62719-79. |
| From: | C. Swartz, CB II, HED |
| To: | D. Edwards, RD |
| Dated: | 04/04/91 |
| MRID(s): | 41739001 |

| | |
|---|---|
| CBRS No.: | 7955 |
| DP Barcode: | D164122 |
| Subject: | Chlorpyrifos. Resubmitted Data in Support of an Amended Label for Lock-On* to Include Alfalfa in Arizona and California. EPA Reg. No. 62719-79. |
| From: | C. Swartz, CB II, HED |
| To: | D. Edwards, RD |
| Dated: | 05/09/91 |
| MRID(s): | 41739001 |

| | |
|---|---|
| CBRS No.: | 7368 |
| DP Barcode: | D158705 |
| Subject: | Chlorpyrifos: DowElanco Response to the Reregistration Standard: Product and Residue Chemistry Data. Chemical No. 59101. |
| From: | C. Olinger, CB II, HED |
| To: | L. Rossi, SRRD |
| Dated: | 01/24/92 |
| MRID(s): | 41653501 through -03 |

| | |
|---|---|
| CBTS No.: | 9112 |
| DP Barcode: | D172491 |
| Subject: | PP#3F2884. Chlorpyrifos in Livestock Commodities. |
| From: | M. Flood, CB I, HED |
| To: | C. Andreasen/D. Edwards, RD |
| Dated: | 02/03/92 |
| MRID(s): | None |

| | |
|---|---|
| CBRS No.: | 9235 |
| DP Barcode: | D173011 |
| Subject: | Reregistration of Chlorpyrifos. Waiver Request; Chemical No. 59101. |
| From: | C. Olinger |
| To: | J. Edwards/L. Schnaubelt, SRRD |
| Dated: | 04/15/92 |
| MRID(s): | 41747202 |

| | |
|---|---|
| CBRS No.: | 9638 |
| DP Barcode: | D176281 |
| Subject: | Chlorpyrifos. Case # 0100. ID # 59101. Residue Data in Response to Notice of 9/18/91. |
| From: | L. Cheng, CB II, HED |
| To: | J. Edwards, SRRD |
| Dated: | 05/19/92 |
| MRID(s): | 42254904, -05, -06, and -07 |
| | |
| CBTS No.: | 10941 |
| DP Barcode: | D185093 |
| Subject: | PP#3F2884. Chlorpyrifos in Livestock Commodities. Petition to Separate the Metabolite Trichloropyridinol (TCP) From the Tolerance Expression. Amendment Dated 11/03/92. |
| From: | M. Flood, CB I, HED |
| To: | D. Edwards, RD |
| Dated: | 01/08/93 |
| MRID(s): | 42542701 |
| | |
| CBTS No.: | 11397 |
| DP Barcode: | D188233 |
| Subject: | PP#3E4192. Chlorpyrifos in/on Sugarcane. Evaluation of Residue Data and Analytical Methodology. |
| From: | J. Morales, CB I, HED |
| To: | H. Jamerson, RD |
| Dated: | 07/06/93 |
| MRID(s): | 42645400 and -01 |
| | |
| CBTS No.: | 12276 |
| DP Barcode: | D193356 |
| Subject: | PP#3E4192. Chlorpyrifos in/on Sugarcane. Amendment in Response to Review of 6/30/93. |
| From: | J. Morales, CB I, HED |
| To: | H. Jamerson, RD/A. Kocialski, HED |
| Dated: | 08/02/93 |
| MRID(s): | None |

CBRS No.: 11372
DP Barcode: D188151
Subject: Chlorpyrifos. Magnitude of the Residue in Onions and Corn Processed Commodities. Reregistration Case No. 0100. Chemical No. 059101.
From: S. Knizner, CB II, HED
To: J. Edwards, SRRD
Dated: 08/26/93
MRID(s): 42649001 and -02

CBRS No.: 12483
DP Barcode: D194679
Subject: Chlorpyrifos. Waiver for Magnitude of the Residue in Dill and Okra. Reregistration Case No. 0100. Chemical No. 059101.
From: S. Knizner, CB II, HED
To: J. Edwards, SRRD
Dated: 09/17/93
MRID(s): None

CBTS No.: 10804
DP Barcode: D183901
Subject: PP#4F03008. Chlorpyrifos on Tomatoes. Anticipated Residues.
From: N. Dodd, CB I, HED
To: D. Edwards, RD/A. Kocialski, HED
Dated: 09/27/93
MRID(s): None

CBRS No.: 13398
DP Barcode: D201562
Subject: Sunflower Seed Processing Study and Sorghum Grain Magnitude of the Residue Study.
From: S.Knizner, CBII, HED
To: D. McNeilly, SRRD
Dated: 05/23/94
MRID(s): 43181401 and 43191402

CBRS No.: 13710
DP Barcode: D203434
Subject: Confined Rotational Crop Study.
From: S.Knizner, CBII, HED
To: D. McNeilly, SRRD
Dated: 06/22/94
MRID(s): 43210801

| | |
|---|---|
| CBRS No.: | 14105 |
| DP Barcode: | D205987 |
| Subject: | P#4H5702 Chlorpyrifos in/on Oats. Review of ABC Protocol No. FS-41978.SG. |
| From: | S.Knizner, CB II, HED |
| To: | D. Edwards, RD/A. |
| Dated: | 08/3/94 |
| MRID(s): | None |

| | |
|---|---|
| CBRS No.: | 14150 and 14151 |
| DP Barcode: | D206055 and 206053 |
| Subject: | PP#4F03008/1H05295. Revised Section F. |
| From: | S.Knizner, CB II, HED |
| To: | C. Andreasen, RD/A. |
| Dated: | 08/15/94 |
| MRID(s): | None |

| | |
|---|---|
| CBRS No.: | 14106 |
| DP Barcode: | D205979 |
| Subject: | DowElanco Letter to D. McNeilly dated 6/22/94 |
| From: | S.Knizner, CB II, HED |
| To: | D. McNeilly, SRRD. |
| Dated: | 08/15/94 |
| MRID(s): | None |

| | |
|---|---|
| CBRS No.: | 14152 and 14153 |
| DP Barcode: | D206049 and D206047 |
| Subject: | PP#4F03008/1H05295. Revised Section F. |
| From: | S.Knizner, CB II, HED |
| To: | C. Andreasen, RD/A. |
| Dated: | 08/25/94 |
| MRID(s): | None |

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|---|---|
| CBRS No.: | 14256 |
| DP Barcode: | D206739 |
| Subject: | DowElanco Response to Review of Confined Rotational Crop Study |
| From: | S.Knizner, CB II, HED |
| To: | D. McNeilly, SRRD |
| Dated: | 09/14/94 |
| MRID(s): | None |

MASTER RECORD IDENTIFICATION NUMBERS

References used to support established tolerances:

00025942 Miller, P.W. (1980) Residues of Chlorpyrifos and 3,5,6-Trichloro-2-pyridinol in Peanut Oil Fractions. (Unpublished study received Jan 15, 1980 under 464-448; submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:099201-D)

00033586 Davis, A.C.; Kuhr, R.J.; Helfman, G.; et al. (1980) Summary. Includes undated method entitled: 3,5,6-Trichloro-2-pyridinol on onions. (Unpublished study received Jul 8, 1980 under 0E2387; prepared in cooperation with Cornell Univ., New York State Agricultural Experiment Station, Dept. of Entomology and others, submitted by Dow Chemical U.S.A.; Midland, Mich.; CDL:099507-A)

00034031 Kiigemagi, U.; Inman, R.D.; Deinzer, M.L.; et al. (1979) Summary of Residue Trials. (Unpublished study received Jun 10, 1980 under 0E2372; prepared in cooperation with Oregon State Univ., Depts. of Agricultural Chemistry and Entomology and others, submitted by Interregional Research Project No. 4, New Brunswick, N.J.; CDL:099448-A)

00037455 McKellar, R.L.; Dishburger, H.J. (1975) Determination of Residues of Chlorpyrifos and 3,5,6-Trichloro-2-pyridinol in Cottonseed, Gin Trash and Process Fractions following Multiple Treatments of Cotton Plants with Lorsban Insecticide. (Unpublished study received Feb 13, 1975 under 5G1595; submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:094724-L)

00037457 McKellar, R.L. (1974) Determination of Residues of 0,0-Diethyl 0-(3,5,6-trichloro-2-pyridyl) phosphorothioate in Cottonseed and Cotton Gin Trash by Gas Chromatography. Method ACR 74.4T dated May 13, 1974. (Unpublished study received Feb 13, 1975 under 5G1595; submitted by Dow Chemical U.S.A., Midland, Mich.; CDL: 094724-N)

00037458 McKellar, R.L. (1973) Determination of Residues of 3,5,6-Trichloro-2-pyridinol in Lima and Snapbean Forage and Beans by Gas Chromatography. Method ACR 71.19R dated Sep 27, 1973. (Unpublished study received Feb 13, 1975 under 5G1595; submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:094724-O)

00039641 Wetters, J.H.; Dishburger, H.J. (1974) Residues of Chlorpyrifos and 3,5,6-Trichloro-2-pyridinol in Sugar Beets and Process Fractions Treated with Lorsban Insecticide: GH-C 729. Summary of studies 095171-M through 095171-O. (Unpublished study received Feb 11,1976 under 6F1745; submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:095171-L)

00039642 Wetters, J.H. (1973) Determination of Residues of 0,0-Diethyl 0-(3,5,6-trichloro-2-pyridyl)phosphorothioate in Sugar Beets and Solid Process Fractions by Gas Chromatography. Method ACR 73.5 dated Dec 6, 1973. (Unpublished study received Feb 11, 1976 under 6F1745; submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:095171-M)

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00051798 Dow Chemical U.S.A. (19??) Proposed Analytical Methods for Regulatory Control: Determination of Chlorpyrifos and Its Pyridinol Moiety in or on Bananas. Summary of studies 093656-M through 093656-P. (Unpublished study received Mar 13, 1973 under 3F1370; CDL:093656-L)

00051801 Herman, J.L. (1972) Determination of Residues of 0,0-Diethyl 0-(3,5,6-trichloro-2-pyridyl)phosphorothioate in Bananas by Gas Chromatography with Flame Photometric Detection. Method ACR 72.14 dated Nov 21, 1972. (Unpublished study received Mar 13, 1973 under 3F1370; submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:093656-O)

00052697 Spittler, T.D.; Helfman, G.; Gibbs, S.; et al. (1980) [Determination of Residues in Strawberries]. (Unpublished study received Sep 18, 1980 under 0E2283; prepared by Univ. of Florida, Agricultural Research Center at Bradenton, submitted by Inter-regional Research Project No. 4, New Brunswick, N.J.; CDL:243281-B)

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00058089 McKellar, R.L.; Dishburger, H.J. (1973) Determination of Residues of 3,5,6-Trichloro-2-pyridinol in Bovine Tissues by Gas Chromatography: ACR 70.19R. Method dated Aug 2, 1973. (Unpublished study received Aug 12, 1977 under unknown date; submitted by Dow Chemical U.S.A., Midland, Mich.; CDL:231282-G)

00066724 Smith, G.N.; Watson, B.S.; Fischer, F.S. (1967) Investigations of Dursban insecticide. Uptake and translocation of [^36 C1]~O~,~O~,-Diethyl~O~-3,5,6-trichloro-2-pyridyl phosphorothioate and [^14 C]~O~,~O~-Diethyl~O~-3,5,6-trichloro-2-pyridyl phosphorothioate by beans and corn. Journal of Agricultural and Food Chemistry 15(1):127-131. (Also unpublished submission received Aug 28, 1972 under 3F1306; submitted by Dow Chemical

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