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OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: **Temephos. List A Reregistration Case 0006. PC Code 059001. Product and Residue Chemistry Chapters for the Reregistration Eligibility Decision [RED]. DP Barcodes: 240191, 240438, & 243454.**

FROM: K. Dockter, Chemist
Reregistration Branch 2 *KD 7-7-98*
Health Effects Division [7509C]

THRU: *Alan Nielsen*
Alan Nielsen, Branch Senior Scientist
Reregistration Branch 2
Health Effects Division [7509C]

TO: Kathy Monk / Larry Schnaubelt PMT 52
Special Review and Reregistration Division [7508W]

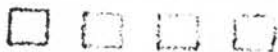
Attached are the RED product and residue chemistry chapters for the non-food use mosquito larvicide temephos. The chapters were assembled by Dynamac Corporation under supervision of RRB2, HED. The data assessment has undergone secondary review in the Branch and has been revised to reflect Agency policies. Most product chemistry data requirements remain outstanding.

Attachment: Reregistration Eligibility Decision: Product and Residue Chemistry Considerations

cc [with Attachment]: RF, Reg. Std. File, SF, Dockter, Paquette, Larry Schnaubelt; SRRD.

RD/I RRB2 Temephos RED Team: N. Paquette [the TL], J. Becker, D. Liem, K. Dockter.

7509C:RRB2:CM2:Rm812A:57886:KD/kd:7/6/98
TEMEPHOS.RED [820]



TEMEPHOS

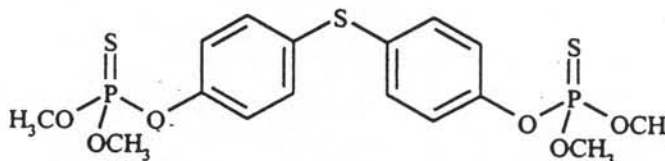
REREGISTRATION ELIGIBILITY DECISION:

PRODUCT CHEMISTRY CONSIDERATIONS

PC Code 059001; Case No. 0006

DESCRIPTION OF CHEMICAL

Temephos (O,O,O',O'-tetramethyl O,O'-(thiodi-4,1-phenylene)phosphorothioate is an organophosphate insecticide primarily used as a mosquito larvicide for application to aquatic non-crop sites.



Empirical Formula:	C ₁₆ H ₂₀ O ₆ P ₂ S ₃
Molecular Weight:	466.4
CAS Registry No.:	3383-96-8
PC Code:	059001

IDENTIFICATION OF ACTIVE INGREDIENT

Pure temephos is a white crystalline solid with a melting point of 30 C; technical temephos is a brown viscous liquid which decomposes at 120-125 C, and has a specific gravity of 1.3, an octanol/water partition coefficient of 80,900 and vapor pressure of 7.17 x 10⁻⁸ mm Hg at 25 C. Technical temephos is essentially insoluble in water (0.03 ppm), and is insoluble in hexane and methyl cyclohexane. Temephos is soluble at 100g/100 mL in acetone, acetonitrile, dichloromethane, and toluene at 20 C. It is also soluble in carbon tetrachloride, chloroform, diethyl ether, ethylene dichloride, and lower molecular weight alkyl ketones.

MANUFACTURING-USE PRODUCTS

A search of the Reference Files System (REFS) conducted 6/24/98 identified a single temephos manufacturing-use product (MP) registered under PC Code 059001: the Clarke Mosquito Control Products Inc. 90% technical (T; EPA Reg. No. 8329-56). The Clarke Mosquito Control Products 90% T was transferred from American Cyanamid Company (EPA Reg. No. 241-220)

on 9/9/97. Only the Clarke Mosquito Control Products 90% T is subject to a reregistration eligibility decision.

REGULATORY BACKGROUND

The Temephos Reregistration Standard dated 7/24/81 required additional generic and product-specific product chemistry data concerning OPPTS 830.1600, 830.1620, 830.1670, 830.1700, 830.1750, 830.1800, 830.6303, 830.7220, 830.7330, 830.7840, 830.7950, and 830.7550, 830.7000, and 830.6313-.6320; in response the registrant has submitted data pertaining to OPPTS 830.1600-.1620. In 1992 the registrant requested a low volume/minor use waiver for product chemistry data requirements, which was denied by the Greybeard Committee.

The current status of the product chemistry data requirements for the Clarke Mosquito Control Products temephos technical product is presented in the attached data summary table.

CONCLUSIONS

Most product chemistry data requirements remain outstanding for the Clarke Mosquito Control Products 90% T. Provided that the registrant submits the data required in the attached data summary table for the 90% T, and either certifies that the suppliers of beginning materials and the manufacturing process for the temephos technical product/MP have not changed since the last comprehensive product chemistry review or submits a complete updated product chemistry data package, HED has no objections to the reregistration of temephos with respect to product chemistry data requirements.

AGENCY MEMORANDA CITED IN THIS DOCUMENT

CBRS No(s): None
Subject: American Cyanamid Response to the Temephos Registration Standard.
From: R. Kent
To: W. Miller
Dated: 12/2/82
MRID(s): GS00006-002

PRODUCT CHEMISTRY CITATIONS

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

References (cited):

GS0006-001 - No MRID reference available.

GS0006-002 - No MRID reference available.

00001216 American Cyanamid Company (1974) Description of Processing Procedure: [Temephos]. (Unpublished study received Mar 6, 1974 under 241-234; CDL:026901-D)

00001278 American Cyanamid Company (1975?) The Specification for Raw Materials used in the Manufacture of Abate. (Unpublished study received Nov 19, 1975 under 241-246; CDL:224604-C)

00001379 American Cyanamid Company (1972?) [Chemical and Physical Properties of Abate Manufacturing Concentrate Insecticide and Formulations]. (Unpublished study received Jan 12, 1972 under 2270-554; CDL:025308-A)

00003268 American Cyanamid Company (19??) Chemical and Physical Properties of Biothion Insecticide. (Unpublished study received Apr 7, 1971 under 1F1156; CDL:093476-E)

05000638 Pasarela, N.R.; Orloski, E.J. (1973) Abate insecticide. Pages 119-146, In Analytical Methods for Pesticides and Plant Growth Regulators. Edited by G. Zweig. Vol. VII. Thin-layer and Liquid Chromatography. Pesticides of International Importance. Edited by J. Sherma and G. Zweig. New York: Academic Press.

Case No. 0006
Chemical No. 059001

Case Name: Temephos
Registrant: American Cyanamid Company
Product: 90% T (EPA Reg. No. 241-220)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? ¹	MRID Number ²
830.1550	Product identity and composition	N ³	00001216, 00003268
830.1600	Description of materials used to produce the product	Y	GS0006-001, 00001278, GS0006-002
830.1620	Description of the production process	Y	GS0006-001, 00001278, GS0006-002
830.1670	Discussion of formation of impurities	N	
830.1700	Preliminary analysis	N	
830.1750	Certified limits	N	
830.1800	Enforcement analytical method	N	05000638
830.6302	Color	Y	00001379
830.6303	Physical state	Y	product jacket
830.6304	Odor	N	
830.6313	Stability to normal and elevated temperatures, metals, and metal ions	Y	00001379
830.6314	Oxidation/reduction: chemical incompatibility	N	
830.6315	Flammability	Y	product jacket
830.6316	Explosibility	N	
830.6317	Storage stability	N	
830.6319	Miscibility	Y	product jacket
830.6320	Corrosion characteristics	N	
830.7000	pH	N	
830.7050	UV/visible absorption	N ⁴	
830.7100	Viscosity	N	
830.7200	Melting point/melting range	Y	00001379
830.7220	Boiling point/boiling range	N	
830.7300	Density/relative density/bulk density	Y	00001379
830.7370	Dissociation constants in water	N	
830.7550	Partition coefficient (n-octanol/water), shake flask method	N	
830.7840	Water solubility: column elution method; shake flask method	N ⁵	00001379
830.7950	Vapor pressure	N	

¹ Y = Yes; N = No; N/A = Not Applicable. The Clarke Mosquito Control Products 90% T was transferred from American Cyanamid Company (EPA Reg. No. 241-220). Outstanding product chemistry requirements are based on data submitted in support of the American Cyanamid product; the registrant must confirm that the manufacturing site

and process have not changed since the product transfer, otherwise additional product chemistry data may be required.

² The **bolded** reference was reviewed in an Agency memorandum dated 12/2/82 by R. Kent; remaining references were reviewed in the Temephos Reregistration Standard dated 7/24/81.

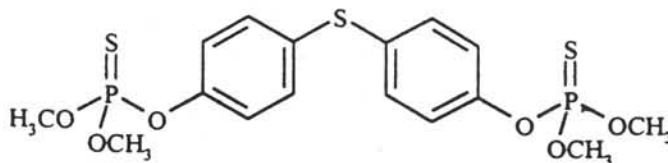
³ The impurities exceeding 0.1% of the product weight must be identified.

⁴ The OPPTS Series 830, Product Properties Test Guidelines require data pertaining to UV/visible absorption for the PAI.

⁵ Quantitative data for the solubility of the TGAI in organic solvents are required.

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6/2/81

TEMEPHOS



REREGISTRATION ELIGIBILITY DECISION

RESIDUE CHEMISTRY CONSIDERATIONS

PC Code 059001: Case 0006

INTRODUCTION

Temephos [O,O,O',O'-tetramethyl O,O'-(thiodi-4,1-phenylene)phosphorothioate] is an insecticide used as a mosquito larvicide for application to aquatic non-crop sites. Temephos is manufactured in the U.S. by Clarke Mosquito Control Products, Inc. under the trade name Abate.[®] Active use sites listed in REFS include the following aquatic sites: aquatic areas (all or unspecified); lakes, ponds, and impounded water (with human or wildlife use); streams and rivers; swamps, marshes, bogs, and standing water (permanent); industrial/community lakes, ponds, and reservoirs with no human, wildlife, or ornamental use; polluted water; intermittently flooded areas; and salt water sites. There are no registered uses of temephos on agricultural crops.

REGULATORY BACKGROUND

Temephos is a List A reregistration chemical and was the subject of a Reregistration Standard issued 7/24/81. This document summarized the status of residue chemistry data requirements with respect to the reregistration of temephos. The Reregistration Standard specified several label amendments for end-use products intended to prevent the occurrence of residues in potable water, fish, irrigated crops, and livestock resulting from the aquatic uses of temephos.

Uses of temephos on orange and tangerine trees in AZ and CA, which were registered when the Temephos Reregistration Standard was issued, were subsequently canceled by American Cyanamid Company. In a 1991 Data Call-In registrants were required to modify all end-use labels to make temephos a non-food-use chemical. In 1997, responsibility for the reregistration of temephos was transferred from American Cyanamid to Clarke Mosquito Control Products, Inc.

A tolerance of 0.1 ppm was established for the combined negligible residues of temephos and its metabolite O,O,O',O'-tetramethyl O,O'-(sulfinyl-di-4,1-phenylene)phosphorothioate in/on the raw agricultural commodity citrus fruits [40 CFR §180.170]. However, this tolerance was recently revoked [63 FR 5907, 2/5/98]. No tolerances have been established for any other commodities.

SUMMARY OF SCIENCE FINDINGS

No residue chemistry data have been submitted and no residue data are required in support of the reregistration of temephos, provided the required label amendments for aquatic uses are made.

A REFS search, conducted 6/25/98, identified seven temephos end-use products (EPs) registered under FIFRA Section 3 to Clarke Mosquito Control Products for aquatic uses. These EPs, including the associated Special Local Need (SLN) registrations under FIFRA Section 24 (c), are listed in Table A1.

A comprehensive summary of temephos aquatic use patterns, based on the product labels registered to Clarke Mosquito Control Products, is presented in Table A2. Although the labels for Clarke Mosquito Control Products bear restrictions against use on crops used for food, forage, or pasture and contamination of food, feed, or water, the following label amendment, which was required in the Reregistration Standard for each EP for which aquatic uses are registered, has not been made:

This product is to be applied only to areas wholly within the control of the applicator. Do not apply to the following aquatic sites: 1) potable water, 2) water used for irrigating crops, 3) water used for watering livestock, and 4) water containing edible fish. Do not drain treated water into a flowing stream that is a potential source of water for one or more of the above uses.

Unless EP labels are amended to include the above statement, residue chemistry data pertaining to aquatic food use will be required for temephos.

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2/26/11

Table A1. Temephos EPs with Aquatic Uses Registered to Clarke Mosquito Control Products.

EPA Reg. No.	Label Acceptance Date	Formulation	Product Name
8329-15	1/21/97	5% G	5% Skeeter Abate®
8329-16	1/28/97	2% G	2% Skeeter Abate®
8329-17	1/21/97	1% G ¹	1% Skeeter Abate®
8329-57 ²	7/2/86	4 lb/gal EC	Abate® 4E Insecticide
8329-58 ³	12/1/88	5% G	Abate® 5-CG Insecticide
8329-59 ⁴	8/15/96	2% G	Abate® 2-CG Insecticide
8329-60 ⁵	7/2/86	1% G	Abate® 1-SG Insecticide

¹ This product is identified in REFS as an emulsifiable concentrate. However, an examination of the product label indicates that the product is actually a granular formulation.

² Transferred from 241-174 on 9/9/97.

³ Transferred from 241-151 on 9/9/97.

⁴ Transferred from 241-150 on 9/9/97. Includes SLN No. NJ940005.

⁵ Transferred from 241-132 on 9/9/97. Includes SLN No. NJ940004.

When EP DCIs are developed (e.g., at issuance of the RED), RD should require that all EP labels (e.g., multiple active ingredient (MAI) labels, SLNs, and products subject to the generic data exemption) be amended such that they are consistent with the basic producer labels.

(a)

Table A2. Aquatic Use Patterns Subject to Reregistration for Temephos (Case 0006).

Site	Application Equipment	Formulation [EPA Reg. No.]	Maximum Single Application Rate (lb ai/A)	Use Limitations
Standing water, moist areas, woodland pools, shallow ponds, around the edges of lakes, swamps, marshes, tidal waters, and catch basins	Ground/aerial equipment	4 lb/gal EC [8329-60] [NJ940004]	0.05	Applications may be repeated as necessary. Aerial applications may be made as ultra-low volume or low volume sprays; application by fixed-wing aircraft to targets sites less than 10 contiguous acres is prohibited (NJ940004 only). Consultation with the appropriate State Fish and Game Agency is required before application to waters or wetlands. The following are prohibited: (i) use on crops used for food, forage, or pasture; (ii) contamination of food or feed products; (iii) contamination of water by cleaning of equipment or disposing of waste; and (iv) contamination of water, food, or feed by storage or disposal.
Standing water, shallow ponds, lakes, woodland pools, and catch basins	Ground/aerial equipment	5% G [8329-15] [8329-59] [NJ940005] 2% G [8329-16] [8329-58] 1% G [8329-17] [8329-57]	0.1	Applications may be repeated as necessary. The 5% and 1% G formulations may be applied as spot treatments to catch basins and similar areas where mosquitoes breed. Application by fixed-wing aircraft to target sites less than 10 contiguous acres is prohibited (NJ940005 only). Consultation with the appropriate State Fish and Game Agency is required before application to waters or wetlands. Use on crops used for food, forage, or pasture or contamination of water by cleaning of equipment or disposing of waste is prohibited. The following are prohibited (8329-57, 8329-58, and 8329-60 only): (i) contamination of food or feed products; and (ii) contamination of water, food, or feed by storage or disposal.
Tidal waters, marshes, swamps, and water high in organic content	Ground/aerial equipment	5% G [8329-15] [8329-59] [NJ940005] 2% G [8329-16] [8329-58]	0.2	Applications may be repeated as necessary. The 5% and 1% G formulations may be applied as spot treatments to catch basins and similar areas where mosquitoes breed. Application by fixed-wing aircraft to target sites less than 10 contiguous acres is prohibited (NJ940005 only). Consultation with the appropriate State Fish and Game Agency is required before application to waters or wetlands. Use on crops used for food, forage, or pasture or contamination of water by cleaning of equipment or disposing of waste is prohibited. The following are prohibited (8329-57, 8329-58, and 8329-60 only): (i) contamination of food or feed products; and (ii) contamination of water, food, or feed by storage or disposal.
Highly polluted waters	Ground/aerial equipment	5% G [8329-15] [8329-59] [NJ940005] 2% G [8329-16] [8329-58]	0.5	Applications may be repeated as necessary. The 5% and 1% G formulations may be applied as spot treatments to catch basins and similar areas where mosquitoes breed. Application by fixed-wing aircraft to target sites less than 10 contiguous acres is prohibited (NJ940005 only). Consultation with the appropriate State Fish and Game Agency is required before application to waters or wetlands. Use on crops used for food, forage, or pasture or contamination of water by cleaning of equipment or disposing of waste is prohibited. The following are prohibited (8329-57, 8329-58, and 8329-60 only): (i) contamination of food or feed products; and (ii) contamination of water, food, or feed by storage or disposal.
Marshlands, margins of streams, intertidal zones of sandy beaches	Ground/aerial equipment	2% G [8329-16] [8329-58]	0.2	Applications may be repeated as necessary. The 5% and 1% G formulations may be applied as spot treatments to catch basins and similar areas where mosquitoes breed. Application by fixed-wing aircraft to target sites less than 10 contiguous acres is prohibited (NJ940005 only). Consultation with the appropriate State Fish and Game Agency is required before application to waters or wetlands. Use on crops used for food, forage, or pasture or contamination of water by cleaning of equipment or disposing of waste is prohibited. The following are prohibited (8329-57, 8329-58, and 8329-60 only): (i) contamination of food or feed products; and (ii) contamination of water, food, or feed by storage or disposal.

TOLERANCE REASSESSMENT SUMMARY

The only established tolerance for residues of temephos in/on citrus fruits (40 CFR §180.170) was recently revoked [63 FR 5907, 2/5/98]. Because there are no longer any registered or proposed uses of temephos on any food or feed use sites, no tolerances for residues of temephos are required.

CODEX HARMONIZATION

Codex MRLs are not established for temephos; therefore, issues of compatibility with U.S. tolerances do not exist.