

US EPA ARCHIVE DOCUMENT

Date Out: 1/ /94

Chemical Code: 059101
DP Barcode(s):
D195492

ENVIRONMENTAL FATE AND GROUND WATER BRANCH

Review Action

To: Dennis Edwards, PM #19
Registration Division (7505C)

From: Elizabeth Behl, Section Head
Ground Water Technology Section
Environmental Fate & Ground Water Branch/EFED (7507C)

Thru: Henry Jacoby, Chief
Environmental Fate & Ground Water Branch/EFED (7507C)

Attached, please find the EFGWB review of...

Common Name:	chlorpyrifos	Trade name:	Dursban TC; Equity TC
Company Name:	DowElanco		
ID #:	062719-00047		
Purpose:	6(a)2 action - respond to reports of chlorpyrifos residues in wells and a cistern.		

Type Product:	Action Code:	EFGWB #(s):	Review Time:
Insecticide (termiteicide)	405 6(a)2		7 days

STATUS OF STUDIES IN THIS PACKAGE:

**STATUS OF DATA REQUIREMENTS
ADDRESSED IN THIS PACKAGE**

Guideline #	MRID	Status ¹
none		N

Guideline #	Status ²
	N

¹Study Status Codes: A=Acceptable U=Upgradeable C=Ancillary I=Invalid.
²Data Requirement Status Codes: S=Satisfied P=Partially satisfied N=Not satisfied R=Reserved W=Waived.

DP BARCODE: D195492

1/24/94

CASE: 015420
SUBMISSION: S449342

DATA PACKAGE RECORD
BEAN SHEET

DATE: 01/21/94
Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REGISTRATION ACTION: 405 6(A)(2) ADVERSE DATA
RANKING : 20 POINTS (B)
CHEMICALS: 059101 Chlorpyrifos (ANSI) 42.8000%

ID#: 062719-00047 DOW DURSBAN TC TERMITICIDE CONCENTRATE
COMPANY: 062719 DOWELANCO
PRODUCT MANAGER: 19 DENNIS EDWARDS, JR. 703-305-6386 ROOM: CM2 207
PM TEAM REVIEWER: CARL ANDREASEN 703-305-5417 ROOM: CM2 201
RECEIVED DATE: 09/22/93 DUE OUT DATE: 12/01/93

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 195492 EXPEDITE: N DATE SENT: 10/01/93 DATE RET.: / /
CHEMICAL: 059101 Chlorpyrifos (ANSI)
DP TYPE: 001 Submission Related Data Package

CSF: N LABEL: N
ASSIGNED TO DATE IN DATE OUT ADMIN DUE DATE: 10/26/93
DIV : EFED 11/02/93 / / NEGOT DATE: / /
BRAN: EFGB 11/02/93 1/24/94 PROJ DATE: 01/20/94
SECT: GTS 11/03/93 01/21/94
REVR : JJORDAN 12/01/93 01/21/94
CONTR: EFG94-0059 / / / /

* * * DATA REVIEW INSTRUCTIONS * * *

Contamination of wells (see similar Data Package D193490, Submission S444657, MRID No. 428393-01) with chlorpyrifos following termiticide treatment, January 1, 1993 to March 31, 1993. MRID No. 429361-01. Please review 6(a)(2) material.

* * * DATA PACKAGE EVALUATION * * *

No evaluation is written for this data package

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC BRANCH/SECTION DATE OUT DUE BACK INS CSF LABEL

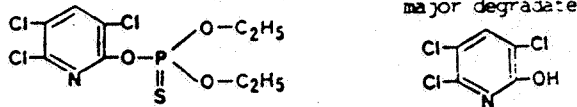
1. CHEMICAL:

Chemical name: O,O-diethyl O-(3,5,6-trichloro-2pyridinyl) phosphorothioate

Common name: chlorpyrifos

Trade name: Dursban TC, Equity Termiticide Concentrate

Structure:



2. TEST MATERIAL:

not applicable

3. STUDY/ACTION TYPE: 6(a)2 action - Reports of chlorpyrifos detections in wells, and a cistern, received by DowElanco and forwarded to the Agency.

4. STUDY IDENTIFICATION:

DP Barcode: D195492
Case: 015420
Submission: S449342
Date sent to EFGWB: 11/02/93

5. REVIEWED BY:

John Jordan, Ph.D.
Microbiologist
OPPTS/EFED/EFGWB/GW Technology Section

Signature: John Jordan
Date: 1/6/94

6. APPROVED BY:

Elizabeth Behl, Head
OPPTS/EFED/EFGWB/GW Technology Section

Signature: E. Behl
Date: 1/21/94

7. CONCLUSIONS:

Treatment of some structures with Dursban TC and Equity Termiticide Concentrate resulted in contamination of a well and a cistern. Parent residue of 309 ppb was found in the cistern and 101 ppb were detected in the well during January 1 through March, 1993. Residues above the adult 70-kg HAL of 20 ppb may result in unreasonable adverse effects.

8. RECOMMENDATIONS:

Information requested in the attached "Environmental Fate Data Extraction Sheet Ground-Water Incident Study Identification Form" is required by the Agency. The purpose of the 6(a)2 program is to prevent and to mitigate contamination. Reporting of contaminated wells, cisterns, ponds and ground water without documentation of specific well locations, and their identification, does not fulfill the purpose of the 6(a)2 program.

To meet requirements of the 6(a)2 program, future 6(a)2 reports must contain specific information requested on the enclosed form.

Because the parent LC 50 is 0.035 ppb for the marine invertebrate mysid shrimp, the MDL will have to be lowered in order to monitor for the low levels that affect some of the aquatic organisms.

Detections in 15 states range from 150% to over 4000% of the lifetime HAL of 20 ppb. The remediation program is, reportedly, very effective in cleaning up contamination from chlorpyrifos application, but because of the high rate of ground-water contamination, the registrant should proposed label (use) or application rate changes, or both.

9. BACKGROUND:

Fifty-seven suspect wells were reported to DowElanco from January 1 to December 31, 1992. Twenty-five of the 57 wells had no detectable level of parent. Eleven of the wells contained less parent than the 10 day HAL for children (30 ppb). Twenty-one wells in 12 states were contaminated with 30 to 916 ppb parent; the parent levels were up to over 4000% above the adult lifetime HAL of 20 ppb. Seven ponds in 6 states contained parent residues of 37 to 362 ppb. Table 1, page 6 (attached), presents analytical results from 21 wells that contained parent residues > HAL of 20 ppb.

10. DISCUSSION:

The data in this action were submitted under Section 6(a)2 of FIFRA. The report of detections contained levels of chlorpyrifos above the 10-kg child (30 ppb) HAL and the 70-kg adult (20 ppb) HAL which may result in unreasonable adverse effects.

DowElanco reported chlorpyrifos detections above the HAL of 30 ppb in 1 well and 1 cistern during January 1 through March 31, 1993. The detections resulted from the treatment of structures for termites. Using the remediation procedure, outlined in the paragraph below, clean-up of the wells was continued until chlorpyrifos residues were not detectable. The contaminated cistern was treated, and emptied and refilled three times with clean water. Th registrant indicated that the remediaion process can take from 7 to 160 days.

The remediation procedure consists of superchlorination (with sodium or calcium hypochlorite), purging of the wells, and installation of charcoal filters. The remediation system uses an in-line charcoal filter that reduces (adsorbs) chlorpyrifos in water from 1 ppm to <1 ppb at flow rates as high as 6 gpm. It is DowElanco's policy to initiate remedial measures on all suspect wells. The clean-up and analytical service is free of charge if a well is suspected of being contaminated. The olfactory (odor) threshold of chlorpyrifos is 10 ppb.

Page 6 is not included in this copy.

Pages _____ through _____ are not included.

The material not included contains the following type of information:

- Identity of product inert ingredients.
 - Identity of product impurities.
 - Description of the product manufacturing process.
 - Description of quality control procedures.
 - Identity of the source of product ingredients.
 - Sales or other commercial/financial information.
 - A draft product label.
 - The product confidential statement of formula.
 - Information about a pending registration action.
 - FIFRA registration data.
 - The document is a duplicate of page(s) _____.
 - The document is not responsive to the request.
-

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

Environmental Fate & Effects Division
 PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
CHLORPYRIFOS (DOW ELANCO)

Last Update on January 6, 1994

[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

LOGOUT	Reviewer:	Section Head:	Date:
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Common Name: CHLORPYRIFOS (DOW ELANCO)

Smiles Code: Cl-c(nc(c1Cl)OP(=S)(OCC)OCC)c(Cl)c1

PC Code # : 59101

CAS #: 2921-88-2

Caswell #:

Chem. Name : O,O-DIETHYL-O-(3,5,6-TRICHLORO-2-PYRIDYL) PHOSPHOROTHIOATE

Action Type: Insecticide

Trade Names: BRODAN; DURSEBAN; LORSBAN; EQUITY

(Formul'tn): 4E; 15G; DUSTS; WP; BAITS;

Physical State: COLORLESS CRYSTALS

Use : 57% OF CHLORPYRIFOS MFD. IN U.S. IS USED ON CORN, 22% USED
 Patterns : FOR PEST CONTROL AND LAWN AND GARDEN SERVICES
 (% Usage) : Reg'd on terr. food/nonfood; grnhse food/nonfood; aq. non/fd
 : domestic outdoor; indoor

Empirical Form: C₉H₁₁Cl₃NO₃PS

Molecular Wgt.: 350.58

Vapor Pressure: 1.87E -5 Torr

Melting Point : 41.5-43.5 °C

Boiling Point: NA °C

Log Kow : 4.70

pKa: @ °C

Henry's : 4.21E -6 Atm. M3/Mol (Measured)

4.31E -6 (calc'd)

Solubility in ...

Comments

Water	2.00E	ppm	@20.0 °C	
Acetone	E	ppm	@ °C	Readily soluble in organic solvents
Acetonitrile	E	ppm	@ °C	
Benzene	E	ppm	@ °C	
Chloroform	E	ppm	@ °C	
Ethanol	E	ppm	@ °C	
Methanol	E	ppm	@ °C	
Toluene	E	ppm	@ °C	
Xylene	E	ppm	@ °C	
	E	ppm	@ °C	
	E	ppm	@ °C	

Hydrolysis (161-1)

[V] pH 5.0: 72 DAYS

Data acceptable for reregistration.

[V] pH 7.0: 72 DAYS

(MRID 00155577)

[V] pH 9.0: 16 DAYS

[] pH :

[] pH :

[] pH :

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Photolysis (161-2, -3, -4)

[V] Water: 29.6 days in pH 7, buffered soln. in natural sunlight. 3/91.

[] : Data acceptable for reregistration. (MRID 41747206)

[] :

[] :

[S] Soil : 30 h (natural light - CA) (MRID 42495403)

[S] Air : 2.6 DAYS

Aerobic Soil Metabolism (162-1)

[U] 30 days (Wauchope)

[V] 11 - 141 days in soils ranging in texture from loamy sand to clay

[] (less persistent in soils with higher pH) MRID 00025619

[]

[]

[]

[]

Anaerobic Soil Metabolism (162-2)

[V] 15 days in loam soil; 58 days in clay (MRID 00025619)

[]

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Anaerobic Aquatic Metabolism (162-3)

[V] 39 days in loam soil; 51 days in clay (MRID 00025619)

[]

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[]

Aerobic Aquatic Metabolism (162-4)

[]

[]

[]

[]

[]

[]

[]

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Soil Partition Coefficient (Kd) (163-1)

- [V] Relatively immobile in column leaching studies (MRIDs 00155636, 00155637, and 40050401)
- []
- [S] Kd's 50-260; Koc's 3680-31000 (MRID 40050401, 41892801)
- []
- [V] TCP very mobile in soil (Kd's 0.53-1.69) (MRID 42493901)
- [V] Mobile in column leaching studies (MRIDs 00155637 and 40050401)

Soil Rf Factors (163-1)

- []
- []
- []
- []
- []
- []

Laboratory Volatility (163-2)

- [V] Concn's 41-131.6 ug/m3 from sand; 1.6-9.5 ug/m3 from clay
- [] Fluxes 2.0×10^{-4} - 1.63×10^{-2} ug/cm2/hr (MRID 41829006)

Field Volatility (163-3)

- []
- []

Terrestrial Field Dissipation (164-1)

- [V] 33-56 days in soils in CA, IL, and MI planted to corn (40385201)
- [V] <32 days in citrus soils in FL (no leaching observed) (40059001)
- []
- []
- []
- []
- []
- []
- []
- []

Aquatic Dissipation (164-2)

- []
- []
- []
- []
- []
- []

Forestry Dissipation (164-3)

- []
- []

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Long-Term Soil Dissipation (164-5)

[]
[]

Accumulation in Rotational Crops, Confined (165-1)

[S] RESIDUES ACCUMULATE IN LETTUCE, SPINACH, WHEAT, SOYBEANS, BEETS,
[] AND TURNIPS (MRID 00149415). TCP major deg. found.

Accumulation in Rotational Crops, Field (165-2)

[]
[]

Accumulation in Irrigated Crops (165-3)

[]
[]

Bioaccumulation in Fish (165-4)

[V] Max. BCFs in rainbow trout treated for 30 d at 0.3 ppb: 1280x in
[] edible tissue; 3903x in non-ed.; 2727x in whole fish. (40056401)

Bioaccumulation in Non-Target Organisms (165-5)

[V] Max. BCFs in eastern oysters treated for 28 d @ 0.7 ppb: 1900x in
[] whole, 2500x tissues, 87x liquor; deperates rapidly (42495406)

Ground Water Monitoring, Prospective (166-1)

[]
[]
[]
[]

Ground Water Monitoring, Small Scale Retrospective (166-2)

[]
[]
[]
[]

Ground Water Monitoring, Large Scale Retrospective (166-3)

[]
[]
[]
[]

Ground Water Monitoring, Miscellaneous Data (158.75)

[S] RESIDUES NOT DETD AT ANY TIME UP TO 295 DAYS AFTER 3RD APPLN
[] (4 LB/GAL EC) 2 WELLS IN AN ORANGE GROVE IN HIGHLANDS CO., FL
[S] DETD at < MLC IN APPROX. 30 WELLS OUT OF >3000 WELLS TESTED

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Field Runoff (167-1)

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[]
[]

Surface Water Monitoring (167-2)

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[]
[]
[]

Spray Drift, Droplet Spectrum (201-1)

[]
[]
[]
[]

Spray Drift, Field Evaluation (202-1)

[]
[]
[]
[]

Degradation Products

HYDROLYSIS: 3,5,6-trichloro-2-pyridinol (TCP) [major deg] - T1/2 approx. 25 days, yielding 3,5,6-trichloro-2-methoxypyridine
After 1 year incubation most of ring-labelled chlorpyrifos is evolved as CO₂.

2-methoxy-3,5,6-trichloropyridine (minor degradate in soil photolysis).

O-ethyl-O-(3,5,6-trichloro-2-pyridyl)-phosphorothioate

TCP accumulates in rainbow trout; also TCP-glucuronide conjugates

TCP does NOT accumulate in oysters - O,O-diethyl-O-(3,5-dichloro-6-methylthio-2-pyridyl)-phosphorothioate is major degradate

TCP does NOT accumulate in mosquitofish

Photodegradation is probably not major route of dissipation in soil

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Comments

Breakdown in soil is mostly by microbial metabolism.
Acute toxicity to trout and bluegill ranged from 3 to 14 ppb; also very highly toxic to freshwater aquatic invertebrates.
In leaching experiments, most of the chlorpyrifos will remain in the upper 2" of soil having org. carbon content above 1%.
Chlorpyrifos residues volatilized from the surface of corn leaves with T_{1/2} of <12 hours.
Soil Koc = 6070 (U)
After 16 days depuration, residues in rainbow trout decreased from: max of 385 ppb in edible tissue to 5 ppb; 1174 ppb in inedible to 16 ppb; 822 ppb in whole fish to 8 ppb)
The mysid shrimp LC50 is 0.035 ppb- MDL has to be lowered to <1ppb to monitor sensitive aquatic organisms. Detections of 30 to 916 ppb in 15 states are from 150% to 4000% of the lifetime 20 ppb HAL.

References: File, Second Round Review (1989), EFGWB reviews
Writer : SKS, JHJ, 1/6/94 - last para.

ENVIRONMENTAL FATE DATA EXTRACTION SHEET
GROUND WATER INCIDENT - STUDY IDENTIFICATION FORM

INSTRUCTIONS: Complete one Study Identification Form for each ground water study.

STUDY TITLE: [REDACTED]

CONTACT PERSON: [REDACTED]

STUDY SPONSOR: [REDACTED]

LOCATION: COUNTY: [REDACTED] STATE: [REDACTED]

METHOD OF ANALYSIS: [REDACTED]
[REDACTED]

COMMENTS: [REDACTED]
[REDACTED]

ENVIRONMENTAL FATE DATA EXTRACTION SHEET
GROUND WATER INCIDENT - SOIL PROPERTIES FORM

INSTRUCTIONS: Provide the following information for any soil analyses performed at this site.

SOIL SERIES			
SAMPLE DEPTH			
MINEROLOGY			
USDA TEXTURE			
TEXTURE (%)	SAND:		
	SILT:		
	CLAY:		
HYDRAULIC CONDUCTIVITY			
HYDROLOGIC GROUP			
		pH	
		CEC (meq/100g)	
		PCT ORGANIC MATTER	
		PCT ORGANIC CARBON	
		PCT MOISTURE @15BAR	
		PCT MOISTURE @.3BAR	
		BULK DENSITY	
		PORE VOLUME (%)	

SOIL SERIES			
SAMPLE DEPTH			
MINEROLOGY			
USDA TEXTURE			
TEXTURE (%)	SAND:		
	SILT:		
	CLAY:		
HYDRAULIC CONDUCTIVITY			
HYDROLOGIC GROUP			
		pH	
		CEC (meq/100g)	
		PCT ORGANIC MATTER	
		PCT ORGANIC CARBON	
		PCT MOISTURE @15BAR	
		PCT MOISTURE @.3BAR	
		BULK DENSITY	
		PORE VOLUME (%)	

SOIL SERIES			
SAMPLE DEPTH			
MINEROLOGY			
USDA TEXTURE			
TEXTURE (%)	SAND:		
	SILT:		
	CLAY:		
HYDRAULIC CONDUCTIVITY			
HYDROLOGIC GROUP			
		pH	
		CEC (meq/100g)	
		PCT ORGANIC MATTER	
		PCT ORGANIC CARBON	
		PCT MOISTURE @15BAR	
		PCT MOISTURE @.3BAR	
		BULK DENSITY	
		PORE VOLUME (%)	

SOIL SERIES			
SAMPLE DEPTH			
MINEROLOGY			
USDA TEXTURE			
TEXTURE (%)	SAND:		
	SILT:		
	CLAY:		
HYDRAULIC CONDUCTIVITY			
HYDROLOGIC GROUP			
		pH	
		CEC (meq/100g)	
		PCT ORGANIC MATTER	
		PCT ORGANIC CARBON	
		PCT MOISTURE @15BAR	
		PCT MOISTURE @.3BAR	
		BULK DENSITY	
		PORE VOLUME (%)	

**ENVIRONMENTAL FATE DATA EXTRACTION SHEET
GROUND WATER INCIDENT - WELL IDENTIFICATION FORM**

INSTRUCTIONS: Complete all information for each well. Information for more than 5 wells must be submitted electronically. All electronic submissions must be accompanied by a data dictionary. County and State information can be provided as names or FIPS codes.

WELL ID NUMBER:	████████████████████	WELL USE:	████████████████████
<u>DEPTH INFORMATION</u>		<u>LOCATION INFORMATION</u>	
WELL DEPTH	██████████	LATITUDE	██████████
SCREEN TOP	██████████	LONGITUDE	██████████
SCREEN BOTTOM	██████████	CITY	████████████████████
WATER TABLE	██████████	COUNTY	████████████████████
ALTITUDE	██████████	STATE	██████████

WELL ID NUMBER:	████████████████████	WELL USE:	████████████████████
<u>DEPTH INFORMATION</u>		<u>LOCATION INFORMATION</u>	
WELL DEPTH	██████████	LATITUDE	██████████
SCREEN TOP	██████████	LONGITUDE	██████████
SCREEN BOTTOM	██████████	CITY	████████████████████
WATER TABLE	██████████	COUNTY	████████████████████
ALTITUDE	██████████	STATE	██████████

WELL ID NUMBER:	████████████████████	WELL USE:	████████████████████
<u>DEPTH INFORMATION</u>		<u>LOCATION INFORMATION</u>	
WELL DEPTH	██████████	LATITUDE	██████████
SCREEN TOP	██████████	LONGITUDE	██████████
SCREEN BOTTOM	██████████	CITY	████████████████████
WATER TABLE	██████████	COUNTY	████████████████████
ALTITUDE	██████████	STATE	██████████

WELL ID NUMBER:	████████████████████	WELL USE:	████████████████████
<u>DEPTH INFORMATION</u>		<u>LOCATION INFORMATION</u>	
WELL DEPTH	██████████	LATITUDE	██████████
SCREEN TOP	██████████	LONGITUDE	██████████
SCREEN BOTTOM	██████████	CITY	████████████████████
WATER TABLE	██████████	COUNTY	████████████████████
ALTITUDE	██████████	STATE	██████████

WELL ID NUMBER:	████████████████████	WELL USE:	████████████████████
<u>DEPTH INFORMATION</u>		<u>LOCATION INFORMATION</u>	
WELL DEPTH	██████████	LATITUDE	██████████
SCREEN TOP	██████████	LONGITUDE	██████████
SCREEN BOTTOM	██████████	CITY	████████████████████
WATER TABLE	██████████	COUNTY	████████████████████
ALTITUDE	██████████	STATE	██████████

TRANSMITTAL DOCUMENT

NAME AND ADDRESS OF SUBMITTER

Dow Elanco
9002 Purdue Rd.
Indianapolis, IN 46268-1189

REGULATORY ACTION IN SUPPORT OF WHICH THIS PACKAGE IS SUBMITTED

FIFRA 6(a)(2)

DATE RECEIVED BY EPA

9/22/93

LIST OF SUBMITTED STUDIES:

Letter to Office of Pesticide Programs dated 9/14/93
from Ron McCormick and Michael Melichar regarding
several suspected water contaminations following
application of Dursban TC and Equity.

429361/01

FOR ISB USE

Date to ISB: 9/22/93	Company No.: 62719	Reg. No. (s):
Date to Index: 9/23/93	Guideline: -	Dursban TC Termitic Concentrate 62719
Date frm Indx:	Page Count: 43	Equity Termiticide Concentrate 62719
Addressee: D. Edwards	Groundwater? State(s): not given	
Notify: J. Edwards	Chem. Name(s) & Code(s):	
Category: 1) 6a2 2) adv. flag		Chlorpyrifos 059101