



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, DC 20460

6-29-89

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29 JUN 1989

30 JUN 1989

OFFICE OF
PESTICIDES AND
TOXIC SUBSTANCESMEMORANDUM

SUBJECT: EXPOSURE ASSESSMENT FOR EMPIRE 20, A MICROENCAPSULATED
FORMULATION OF CHLORPYRIFOS FOR TERMITICIDE USE

TO: Dennis Edwards
Product Manager 12
Registration Division

FROM: David Jaquith
Review Section 1
Non-Dietary Exposure Branch
Health Effects Division (H7509C)

David Jaquith

THRU: Michael Firestone, Section Head
Review Section 1
Non-Dietary Exposure Branch
Health Effects Division (H7509C)

Michael Firestone

THRU: Charles L. Trichilo, Ph.D., Chief
Non-Dietary Exposure Branch
Health Effects Division (H7509C)

Charles L. Trichilo

Please find below the NDEB review of

HED Project #: 9-1458

Reg. File/Rec #: 245217

Registration #:

Caswell #: 219A

Company Name: Dow Chemical Company

Date Received: 5/12/89

Action Code: 315

Date Completed: 6/15/89

Reviewing Time: 2 Days

Deferral to : _____

Biological Analysis Branch/BEAD

Science Analysis and Coordination Branch

TB - Insecticide/Rodenticide Branch

TB - Herbicide/Fungicide Branch

INTRODUCTION

Dow Chemical Company has requested registration of a new formulation of chlorpyrifos for use as a termiticide. The product, marketed under the trade name Empire 20, is a microencapsulated formulation containing 20 percent chlorpyrifos as the active ingredient. Empire 20 is currently registered as a general indoor pest control insecticide for commercial applicator use only. The material is applied as a 0.2-0.5 percent finished spray when used for general pest control. The current submission requests the additional use of this product for subterranean termite control. Termiticide application is performed by low pressure spray, by rodding, or trenching. The maximum application concentration proposed for this product is 2.0 percent although a 1.0 percent spray is recommended for routine use.

ESTIMATION OF EXPOSURE OF RESIDENTS

The registrant has previously submitted an indoor air monitoring study for their termiticide formulation of chlorpyrifos, Dursban TC. The study included measurements over an extended period of time in plenum, crawlspace, slab, and basement homes. These data were reviewed by NDEB/EAB in a report dated 28 June 1988 (Attached). Empire 20 is to be applied in the same manner as Dursban TC and at comparable application rates. It is NDEB's belief that the data from the previous study can be used as a surrogate for the microencapsulated formulation since formulation effect on the spray mixture composition is expected to be minimal and the concentrations to be used are similar. Empire is to be used at concentrations of 1-2 percent. The currently registered product, Dursban TC label has similar application rates (0.5-1 percent). Since the same active ingredient is used in both formulations the total amounts of material should also be comparable. Air concentrations of chlorpyrifos in homes treated with the newer microencapsulated formulation are unlikely to exceed those resulting from application of the emulsifiable concentrate, Dursban TC.

Attachment

cc: Chlorpyrifos file
Correspondence file
Circulation file
SACB
TB-IRS

ATTACHMENT

Shaughnessy No: 059101

Date Out of EAB: JUN 28 1988

To: Dennis Edwards
Product Manager #12
Registration Division (TS-767C)

From: Michael Firestone, Chief
Special Review Section
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

Michael P. Firestone

Thru: Paul F. Schuda, Chief
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

Paul F. Schuda

Attached, please find the EAB review of:

Reg./File # : 464-562

Chemical Name : Chlorpyrifos

Type Product : Termiticide

Product Name : DURSRAN TC

Company Name : Dow Chemical Company

Purpose : Amended Registration for Plenum Housing

Date Received : 3/31/88 Action Code: 305

Date Completed: 6/24/88 EAB #(s): 60271, 80628

Monitoring study requested: X Total Reviewing Time: 20 days

Monitoring study voluntarily:

Deferrals to: Ecological Effects Branch

 Residue Chemistry Branch

 Toxicology Branch

1.0 INTRODUCTION

Dow Chemical has requested an amended registration for their product DURSBAN TC for treatment of plenum construction homes for subterranean termite control. The product is currently registered for slab, crawlspace, and basement construction structures. Dursban TC is an emulsifiable concentrate containing 42 percent chlorpyrifos (4 pounds per gallon) as the active ingredient. Two gallons of the formulated product are mixed with 98 gallons of water to form a 1 percent emulsion. Postconstruction treatment with this emulsion is by subsoil injection (rodding), injection through holes drilled in the slab, filling the voids of hollow block foundations, or application by coarse spray to a shallow trench dug around the perimeter of the home (trenching). The application rate for the rodding of slab on ground, basement, or crawlspace construction homes is 4 gallons of emulsion per 10 linear feet. For deep foundation, the rate is 4 gallons per 10 linear feet per foot of depth. Voids are filled at a rate of 2 gallons per 10 linear feet. If the trenching method is used, the application rate is also 4 gallons per 10 linear feet. The label also allows the treatment of homes by brushing the material on wood surfaces and by coarse spray application but these methods are not used for subterranean termite control.

In February 1984, the Agency issued a Data Call In Notice (DCI) for data measuring the indoor air concentrations of chlorpyrifos in homes treated for subterranean termite control. Dow Chemical Company responded with a protocol for a study in homes treated with DURSBAN TC. The protocol was approved by EAB in February 1985. Plenum construction homes were included among the various construction types used in the study. The study began in the spring of that year. The purpose of this study was to determine the indoor air concentrations of chlorpyrifos after proper application of the pesticide. Misapplication, while potentially a problem, was not addressed in this study. An interim report of this study, covering the first 90 days after treatment, has been reviewed by EAB (1). The study was completed in 1986 and a final report was received by the Agency in February 1987 (2). Although that report was not part of the current submission, an evaluation of those data are included in this review. The study did not address the treatment of homes prior to construction. The registrant has also submitted a laboratory study measuring the effectiveness of different ground cover barriers in improving the air quality in treated plenum homes. A brochure describing a Plenum-Wood System of construction was also included in this submission. The latter two documents, which had previously been submitted by the registrant (Id. No. 464-562, EAB No.60271), were not reviewed since actual monitoring data, measuring air levels in properly treated homes are available.

2.0 DESCRIPTION OF AIR MONITORING STUDY

2.1 Treatment Description

Thirty two homes, 8 each of plenum, crawlspace, slab, and basement construction, were treated at several different locations throughout the country. Applications were made by licensed professional applicators using conventional equipment and following the label instructions. The treatment parameters are presented in Appendix A. Air in the kitchen, one bedroom, and the basements of basement construction homes was monitored before treatment and at various intervals after application. The sampling intervals are presented in Table 1.

Table 1. Intervals for Sampling of Airborne Chlorpyrifos in Homes Treated with DURSBN TC for Subterranean Termite Control.

Pre Treatment
During Treatment
2 Hours After Application
2 Hours After Application
2 Hours After Application
2 Hours After Application
7 Days After Application
30 Days After Application
90 Days After Application
1 Year After Application

Airborne chlorpyrifos was determined by drawing air, at a known rate, through sampling tubes containing Chromosorb 102 as the trapping agent. Calibrated personal sampling pumps were used throughout the study. In ten percent of the cases, additional samples were collected and submitted to the Agency's analytical laboratory in Beltsville, Maryland.

2.2 RESULTS

The measured concentrations of chlorpyrifos in the indoor air of treated homes are presented in Appendices B-E. Most of the homes exhibited measurable levels of the compound prior to the treatment. There was considerable variation in the observed concentration, both between homes and in a given home over time. The concentrations observed in basements tended to be higher than those found in the first floor rooms. The mean concentrations found in the various rooms of basement homes are presented in Figure 1. Airborne concentrations in basements declined over time, nearing background levels within about 90 days. There was little variation in the levels found in the first floor rooms of a home at a given sampling interval. Figure 2 shows that the concentrations in the first floor rooms

of basement, slab, and crawlspace construction homes were very similar. Plenum homes exhibited somewhat higher concentration soon after treatment but had declined to background levels within 90 days. In general, for all construction types, chlorpyrifos levels rose to a maximum 4-24 hours after treatment. This increase was followed by a decline to pre-application concentrations within 90 days after treatment.

3.0 CALCULATION OF EXPOSURES

3.1 Assumptions

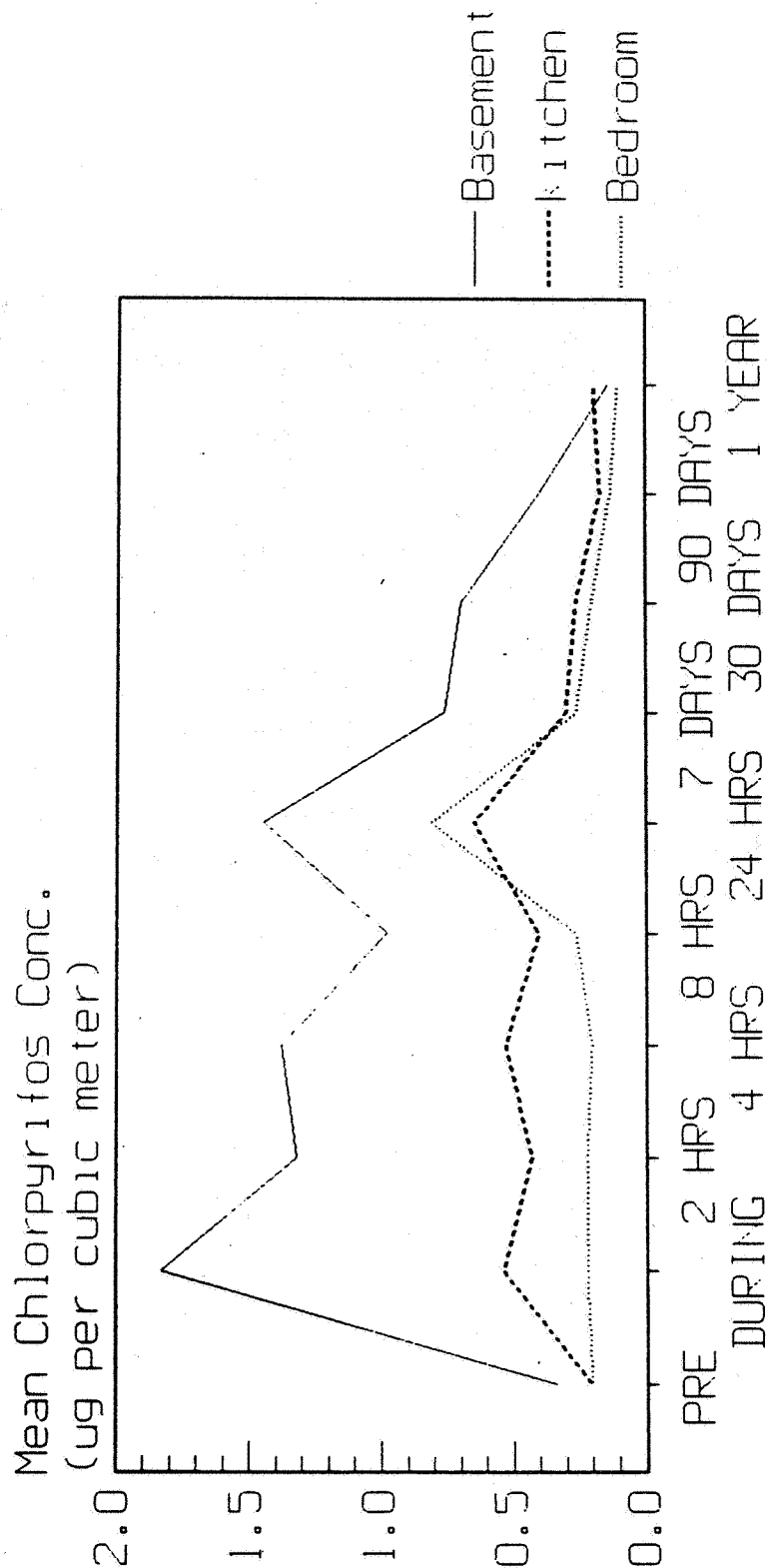
In order to estimate the potential respiratory exposures of residents of homes treated with chlorpyrifos for subterranean termite control a number of assumptions were required.

- 1) An average resident weighs 70 kg and has respiratory volumes of 0.44 m³ per hour and 1.7 m³ per hour at rest and while performing light tasks, respectively.
- 2) A resident is in the home for 15 hours per day, 365 days per year. Ten of these hours are spent at rest and the remaining five performing light tasks. The daily volume of household air is therefore 12.9 m³ per day.
- 3) EAB has taken a conservative approach and has used the maximum concentrations of chlorpyrifos found in each home at a given sampling interval to estimate exposures. These concentrations are presented in Tables 2-5.
- 4) The airborne concentration of chlorpyrifos remains constant at the level measured after one year.

3.2 Calculation of Exposures

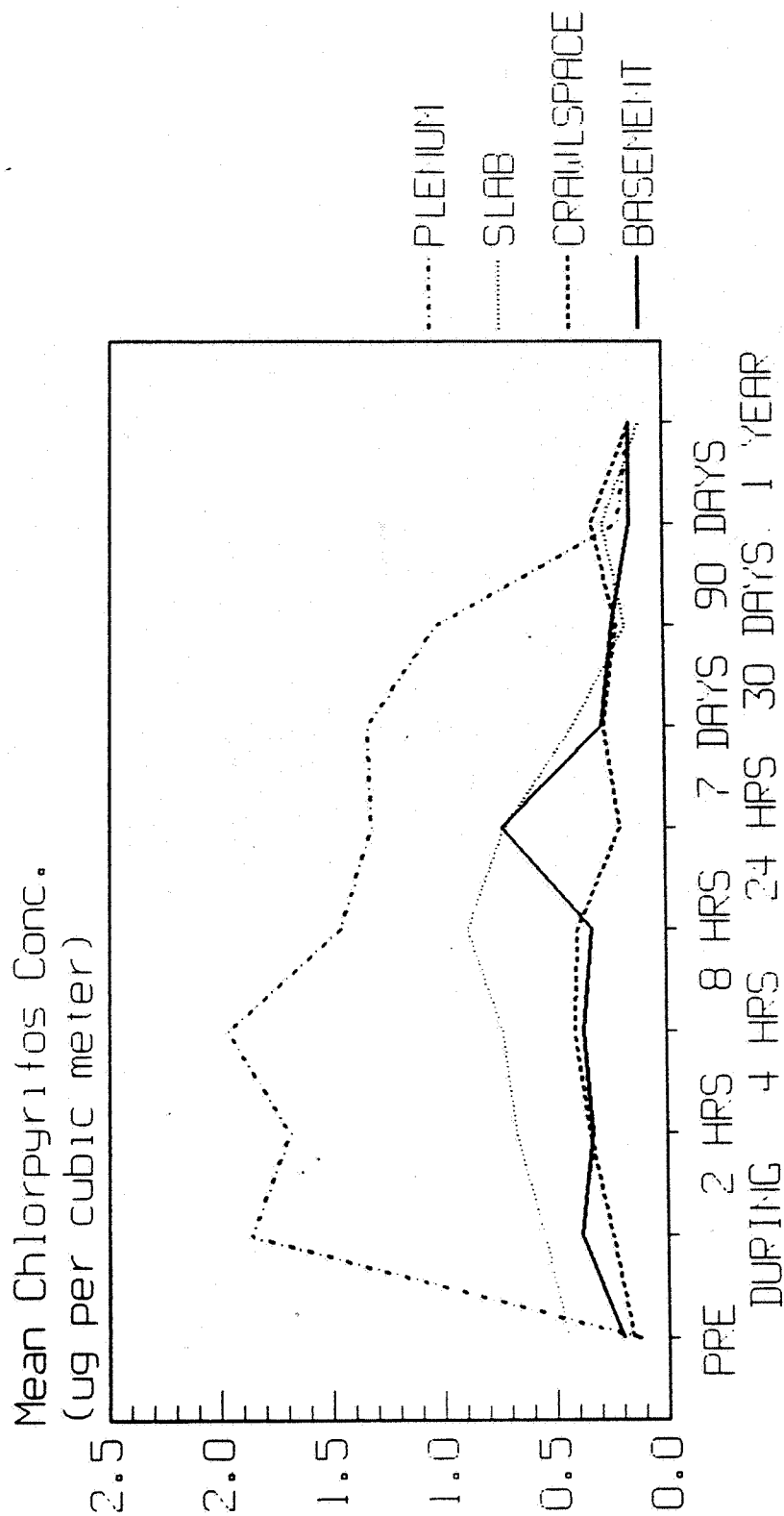
Several sampling intervals were included within the first 24 hours after treatment. In order to properly determine exposures on the day of treatment it was necessary to calculate a time weighted average which would represent the concentration of chlorpyrifos to which a resident would be exposed. The concentration observed at a given sampling period was multiplied by the appropriate interval and the result summed with those from other intervals. The sum was then divided by the total elapsed time, 24 hours. For example, the time weighted average

Figure 1. Mean Air Concentrations of Chlorpyrifos in Rooms of Basement Homes Treated with DURSBAN TC.



Sampling Interval

Figure 2. Mean Air Concentrations of
Chlorpyrifos in First Floor Rooms of
Homes Treated with DURSBAN TC



chlorpyrifos concentration in crawlspace homes on the day of treatment was:

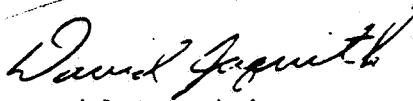
$$\begin{aligned}\text{Time Weighted Average (ug/m}^3\text{)} &= [2 \text{ hrs x (value at 2 hrs)} \\ &\quad + 2 \text{ hrs x (value at 4 hrs)} \\ &\quad + 4 \text{ hrs x (value at 8 hrs)} \\ &\quad + 16 \text{ hrs x (value at 16 hrs)}] / 24 \text{ hrs} \\ &= [2 \text{ hrs x (0.38 ug/m}^3\text{)} \\ &\quad + 2 \text{ hrs x (0.47 ug/m}^3\text{)} \\ &\quad + 4 \text{ hrs x (0.46 ug/m}^3\text{)} \\ &\quad + 16 \text{ hrs x (0.25 ug/m}^3\text{)}] / 24 \text{ hrs} \\ &= 0.31 \text{ ug/m}^3\end{aligned}$$

Time weighted average calculations were not necessary for days following application. The time weighted average concentrations and the resulting exposures are presented in Table 6.

4.0 CONCLUSIONS

Treatment of homes with DURSBAN TC for subterranean termite control appears to result in a slightly increased exposure over background levels soon after treatment. Exposures return to background levels within a few days after the application for slab, crawlspace, and the first floor rooms of basement homes. Basement showed higher concentrations of the chemical than first floor rooms. The concentrations in basements declined slowly over time, reaching first floor levels within one year after application. Treatment of plenum structures, the subject of the current submission, appears to result in airborne concentrations in first floor rooms that are slightly higher than those observed in other construction types. These increased levels return to background within a few months after application.

[higher]?



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Table 5. Maximum Concentrations of Chlorpyrifos in Plenum Homes Treated with DURSBRAN TC for Subterranean Termite Control. All values are in ug per m³.

HOUSE ID. NO.	PRE- TREAT.	DURING TREAT.	POST APPLICATION									
			2 HRS	4 HRS	8 HRS	24 HRS	7 DAYS	30 DAYS	90 DAYS	1 YEAR		
P1	0.06	0.42	1.80	2.00	1.90	1.80	1.38	0.74	0.21	0.08		
P2	0.05	0.28	0.28	0.40	1.81	0.96	0.36	0.07	0.13	0.20		
P3	0.07	0.80	0.12	0.21	0.11	0.14	0.12	0.24	0.17	0.23		
P4	0.07	0.10	0.77	0.63	0.65	0.45	0.08	0.08	0.08	--		
P5	0.08	3.20	0.20	0.45	0.25	0.29	0.51	0.36	0.57	--		
P6	0.40	3.20	3.70	5.80	1.50	1.70	0.40	1.30	--	--		
P7	0.08	10.40	6.70	6.30	6.20	4.70	8.10	6.80	--	--		
P8	--	--	--	--	--	--	--	--	--	--		
MEAN	0.12	2.63	1.94	2.26	1.77	1.43	1.56	1.37	0.23	0.17		
STANDARD DEV.	0.12	3.41	2.28	2.46	1.93	1.47	2.70	2.25	0.17	0.06		
MAXIMUM	0.40	10.40	6.70	6.30	6.20	4.70	8.10	6.80	0.57	0.23		
NO. REPLICATES	7	7	7	7	7	7	7	7	5	3		

Table 6. Indoor Air Concentrations ($\mu\text{g}/\text{m}^3$) and Exposures of Residents to Chlorpyrifos After Treatment of Homes with DURSBN TC.

Construction Type	Interval	Chlorpyrifos ($\mu\text{g}/\text{cu m}$)	Respiratory Exposure ($\mu\text{g}/\text{day}$) ($\mu\text{g}/\text{kg}/\text{day}$)	
Slab	Day 1	0.87 ^a	11.22	0.16
	Days 2-7	0.46	5.93	0.08
	Days 8-30	0.18	2.32	0.03
	Days 31-90	0.32	4.13	0.06
	After 90	0.11	1.42	0.02
Crawlspace	Day 1	0.31 ^a	4.00	0.06
	Days 2-7	0.33	4.26	0.06
	Days 8-30	0.26	3.35	0.05
	Days 31-90	0.34	4.39	0.06
	After 90	0.15	1.94	0.03
Basement	Day 1	1.36 ^a	17.54	0.25
	Days 2-7	0.77	9.93	0.14
	Days 8-30	0.70	9.03	0.13
	Days 31-90	0.41	5.29	0.08
	After 90	0.29	3.74	0.05
Plenum	Day 1	1.60 ^a	20.64	0.29
	Days 2-7	1.56	20.12	0.29
	Days 8-30	1.37	17.67	0.25
	Days 31-90	0.23	2.97	0.04
	After 90	0.17	2.19	0.03

^a Time weighted average on the day of treatment.

Appendix A. Treatment Parameters for Homes Treated with DURSBAN TC for Subterranean Termite Control.

HOUSE ID. NO.	TYPE OF CONSTRUCTION	LOCATION	DATE OF TREATMENT	TEMP (F)	RH (%)	BUILDING MATERIAL	BARRIER COND.	MIX CONC. (%)	VOL. (GAL)	FAN STATUS
B1	Basement	Kansas City, MO	7/08/85	77	52	STONE	NA	0.9	85	ON
B2	Basement	Kansas City, MO	7/10/85	78	60	FRAME	NA	1.0	65	OFF
B3	Basement	Washington, DC	7/16/85	75	94	FRAME	NA	1	186	OFF
B4	Basement	Washington, DC	7/17/85	79	62	FRAME	NA	1	175	ON
B5	Basement	Atlanta, GA	8/12/85	85	72		NA	1	180	ON
B6	Basement	Atlanta, GA	8/85				NA	0.8	170	
B7	Basement	Westwood, MA	10/30/85	33	60	BRICK	NA	0.8	185	ON
B8	Basement	MA	12/05/85	34	50	BRICK	NA	0.7	170	ON
C1	Crawlspce	Atlanta, GA		77	49			1.2	104	OFF
C2	Crawlspce	Atlanta, GA		81	49			1	105	ON
C3	Crawlspce	Dallas, TX		10	36	FRAME		0.9	203	ON
C4	Crawlspce	Dallas, TX		68	50	BRICK	NONE	1	129	OFF
C5	Crawlspce	Atlanta, GA						1.1	170	
C6	Crawlspce	Atlanta, GA						1.3	130	
C7	Crawlspce	Allen, TX	2/15/85	35	45	FRAME	NONE	0.8	43	ON
C8	Crawlspce	Allen, TX	2/16/85	35	45	BRICK	GOOD	0.8	45	ON
P1	Plenum	Fresno, CA	6/18/85	10	30			0.8	--	
P2	Plenum	Concord, CA	12/12/85	42	92	STUCCO	EX	0.8	200	OFF
P3	Plenum	Fresno, CA	1/08/86	61	58	STUCCO	EX	0.9	35	OFF
P4	Plenum	Fresno, CA	2/11/86	54	80			0.9	--	OFF
P5	Plenum	Fresno, CA	3/35/86	75	52	STUCCO	EX	1	125	ON
P6	Plenum	Fresno, CA	11/11/86	65	42	STUCCO	EX	0.99	100	ON
P7	Plenum	Fresno, CA	12/03/86	63	50	STUCCO	EX	1	60	ON
P8	Plenum	Fresno, CA	2/03/87	53	81	STUCCO	EX	0.8	90	OFF
S1	Slab	Dallas, TX	3/11/85	71	44	BRICK	GOOD	0.6	80	ON
S2	Slab	Dallas, TX	3/11/85	70	48	BRICK	GOOD	0.8	98	OFF
S3	Slab	Dallas, TX	7/29/85	85	47	BRICK	NONE	0.9	95	ON
S4	Slab	Plano, TX	10/29/85	64	70	BRICK	GOOD	0.8	50	OFF
S5	Slab	Plano, TX	10/29/85	62	95	BRICK	GOOD	0.8	50	OFF
S6	Slab	Allen, TX	11/18/85	75	75	BRICK	GOOD	0.9	50	OFF
S7	Slab	Allen, TX	11/18/85	77	91	BRICK	GOOD	0.9	60	OFF
S8	Slab	Allen, TX	11/19/85	75	75	BRICK	GOOD	0.9	75	OFF

Appendix B. Airborne Concentrations of Chlorpyrifos in Basement Homes Treated with DURSBAN TC for Subterranean Termite Control.

HOUSE ID. NO.	TYPE OF CONSTRUCTION	ROOM	AIRBORNE CHLORPYRIFOS CONCENTRATION (ug/m ³)											
			PRE- TREAT.	DURING TREAT.	2 HRS	4 HRS	8 HRS	24 HRS	7 DAYS	30 DAYS	90 DAYS	1 YEAR	POST APPLICATION	
B1	Basement	Basement	0.19	0.27	0.70	0.63	0.57	0.55	0.54	1.10	0.45	a		
B1	Basement	Bedroom	0.14	0.12	0.17	0.14	0.17	0.10	0.20	0.10	0.12	a		
B1	Basement	Kitchen	0.16	0.20	0.18	0.20	0.42	0.11	0.16	0.22	0.08	a		
B2	Basement	Basement	1.54	4.33	3.15	4.37	3.07	2.92	2.74	2.73	1.40	a		
B2	Basement	Bedroom	0.43	0.43	0.42	0.47	0.72	0.59	0.47	0.42	0.33	a		
B2	Basement	Kitchen	0.55	0.72	0.68	0.74	0.91	0.83	0.72	0.58	0.44	a		
B3	Basement	Basement	0.09	3.01	0.65	0.43	0.31	0.21	0.05	0.08	0.13	0.09		
B3	Basement	Bedroom	0.09	0.14	0.15	0.12	0.14	0.03	0.08	0.07	0.08	0.08		
B3	Basement	Kitchen	0.09	0.70	0.26	0.20	0.25	0.06	0.03	0.06	0.09	0.09		
B4	Basement	Basement	0.20	3.48	2.64	1.97	0.89	0.40	0.20	0.41	0.14	0.08		
B4	Basement	Bedroom	0.13	0.19	0.26	0.35	0.26	0.08	0.07	0.27	--	0.08		
B4	Basement	Kitchen	0.17	1.35	0.88	0.71	0.32	0.23	0.09	0.29	0.15	0.08		
B5	Basement	Basement	0.50	1.20	1.70	2.10	1.30	5.50	1.15	0.90	0.60	0.52		
B5	Basement	Bedroom	0.50	0.50	0.50	0.30	0.50	5.40	0.85	0.50	0.28	0.39		
B5	Basement	Kitchen	0.50	0.50	0.80	0.80	0.70	3.60	0.73	0.60	0.26	0.47		
B6	Basement	Basement	0.01	0.96	1.31	0.93	1.07	1.56	1.13	0.25	0.37	0.24		
B6	Basement	Bedroom	0.09	0.11	0.13	0.08	0.08	0.11	0.28	0.12	0.08	0.08		
B6	Basement	Kitchen	0.03	0.35	0.39	0.33	0.35	0.24	0.52	0.20	0.16	0.13		
B7	Basement	Basement	0.07	0.72	0.30	0.28	0.19	0.14	0.13	0.08	0.08	--		
B7	Basement	Bedroom	0.13	0.17	0.07	0.08	0.08	0.08	0.07	0.07	0.08	0.09		
B7	Basement	Kitchen	0.11	0.21	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.09		
B8	Basement	Basement	0.10	0.70	0.07	0.31	0.45	0.34	0.15	0.07	0.07	0.17		
B8	Basement	Bedroom	0.08	0.07	0.08	0.08	0.11	0.08	0.07	0.07	0.07	0.08		
B8	Basement	Kitchen	0.01	0.30	0.14	1.20	0.15	0.08	0.09	0.07	0.07	0.70		

a Registrant was not permitted to sample.

Appendix C. Airborne Concentrations of Chlorpyrifos in Crawlspace Homes Treated with DURSBAN TC for Subterranean Termite Control.

HOUSE ID. NO.	TYPE OF CONSTRUCTION	ROOM	AIRBORNE CHLORPYRIFOS CONCENTRATION (ug/m ³)										
			PRE- DURING		POST APPLICATION								
			TREAT.	TREAT.	2 HR	4 HRS	8 HRS	24 HRS	7 DAYS	30 DAYS	90 DAYS	1 YEAR	
C1	Crawlspace	Bedroom	0.57	0.40	1.00	0.98	0.77	0.39	0.56	0.45	0.77	0.20	
C1	Crawlspace	Kitchen	0.61	0.50	0.95	0.87	0.97	0.67	0.56	0.61	0.70	0.12	
C2	Crawlspace	Bedroom	0.07	0.07	0.07	0.08	0.08	0.07	0.08	0.07	0.08	0.05	
C2	Crawlspace	Kitchen	0.07	0.07	0.07	0.07	0.07	0.06	0.08	0.07	0.08	0.08	
C3	Crawlspace	Bedroom	0.03	0.03	0.23	--	0.03	0.08	0.12	0.73	0.30	0.08	
C3	Crawlspace	Kitchen	0.02	0.35	0.44	0.60	0.34	0.28	0.18	0.08	0.36	0.08	
C4	Crawlspace	Bedroom	0.08	0.10	0.08	0.08	0.12	0.08	0.09	0.08	0.65	0.08	
C4	Crawlspace	Kitchen	0.08	0.10	0.08	0.08	0.08	0.08	0.08	0.08	0.77	0.08	
C5	Crawlspace	Bedroom	0.10	0.15	0.24	1.02	1.15	0.25	0.87	0.35	0.17	0.25	
C5	Crawlspace	Kitchen	0.01	0.20	0.32	0.70	0.89	0.17	0.57	0.34	0.27	0.25	
C6	Crawlspace	Bedroom	0.08	0.36	0.58	0.40	0.32	0.11	0.08	0.10	0.23	0.33	
C6	Crawlspace	Kitchen	0.08	0.72	0.82	0.76	0.69	0.08	0.52	0.07	0.25	0.33	
C7	Crawlspace	Bedroom	0.10	0.20	0.10	0.09	0.14	0.09	0.06	0.07	0.09	0.06	
C7	Crawlspace	Kitchen	0.20	0.20	0.08	0.10	0.14	0.10	0.16	0.08	0.08	0.06	
C8	Crawlspace	Bedroom	0.13	0.25	0.18	0.17	0.19	0.13	0.17	0.08	0.09	0.09	
C8	Crawlspace	Kitchen	0.12	0.12	0.19	0.13	0.23	0.45	0.17	0.08	0.09	0.08	

Appendix E. Airborne Concentrations of Chlorpyrifos in Slab Homes Treated with DURSBAN TC for Subterranean Termite Control.

HOUSE ID. NO.	TYPE OF CONSTRUCTION	ROOM	AIRBORNE CHLORPYRIFOS CONCENTRATION (ug/m ³)											
			PRE- DURING		POST APPLICATION									
			TREAT.	TREAT.	2 HRS	4 HRS	8 HRS	24 HRS	7 DAYS	30 DAYS	90 DAYS	1 YEAR		
S1	Slab	Bedroom	0.10	0.18	0.33	0.15	0.19	0.05	0.10	0.12	0.39	0.09		
S1	Slab	Kitchen	0.07	0.22	0.12	0.15	0.17	0.10	0.12	0.08	0.37	0.08		
S2	Slab	Bedroom	0.09	0.29	0.14	0.08	0.07	0.17	0.13	0.08	0.32	0.09		
S2	Slab	Kitchen	0.09	0.27	0.08	0.08	0.13	0.19	0.13	0.08	0.32	0.17		
S3	Slab	Bedroom	0.08	--	0.12	0.07	0.09	0.10	0.09	0.09	0.20	0.08		
S3	Slab	Kitchen	0.08	0.37	0.41	0.47	0.30	0.25	0.21	0.20	0.45	0.07		
S4	Slab	Bedroom	0.08	0.22	0.27	0.48	0.39	0.22	0.35	0.06	0.09	0.09		
S4	Slab	Kitchen	0.08	0.23	0.18	0.20	0.15	0.11	0.30	0.07	0.14	0.08		
S5	Slab	Bedroom	0.20	0.34	0.12	0.07	0.08	0.08	0.20	0.08	0.12	0.08		
S5	Slab	Kitchen	0.18	0.25	0.08	0.08	0.08	0.09	0.08	0.07	0.10	0.07		
S6	Slab	Bedroom	2.20	1.90	2.60	2.50	3.90	3.40	0.80	0.30	0.70	0.17		
S6	Slab	Kitchen	2.40	1.30	3.30	3.90	5.20	4.60	1.00	0.30	0.40	0.14		
S7	Slab	Bedroom	0.52	1.00	1.00	1.30	1.50	0.70	0.80	0.40	0.20	0.08		
S7	Slab	Kitchen	0.35	1.00	1.40	1.60	1.60	1.20	0.70	0.40	0.20	0.11		
S8	Slab	Bedroom	0.21	0.35	0.25	0.17	0.17	0.15	0.89	0.17	0.09	0.07		
S8	Slab	Kitchen	0.25	0.31	0.30	0.31	0.21	0.08	0.63	0.12	0.20	0.07		

REFERENCES

- 1) Memorandum from J. Reinert (EAB) to M. McDavit (RD), dated 20 May 1986.
- 2) Vaccaro, J., R. Bohl, B. Skowronski, and P. Moribito (1987) Airborne Chlorpyrifos Concentrations Measured During and Following Applications of DURSBN TC Insecticide to Residential Dwellings. Dow Chemical Report GH-P 1310.