

# **San Francisco Bay Area Pesticide Retail Store Survey**



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## **PREFACE**

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## SAN FRANCISCO BAY AREA PESTICIDE RETAIL STORE SURVEY

### SUMMARY

This report documents the results of a survey of San Francisco Bay Area pesticide retail stores. The survey was conducted to provide current pesticide sales information to San Francisco Bay Area water quality agencies and U.S. EPA Region 9.

Data from previous surveys show that at least half of residential pesticide sales in the San Francisco Bay Area probably occur at two stores—Home Depot and Orchard Supply Hardware. These two major San Francisco Bay area pesticide retailers and a similar store new to the Bay Area (Lowe's) were visited in September 2003. At each store, product brand name, insecticide active ingredient, formulation type, U.S. EPA registration number, and application locations were obtained for insecticide, herbicides, molluscicides, and fungicides. Other stores in each chain were visited to confirm that pesticide stocks are similar to those in the three surveyed stores. In addition, to identify the most popular active ingredients in new products (there is a time delay moving products through distributors), major retail insecticide product lines were reviewed using information available on the Internet.

The results of this survey reflect widely anticipated changes in the insecticide market away from organophosphorous pesticides and to pyrethroids. This trend—and resulting domination of the market by pyrethroids—is likely to pose a threat to future urban surface water quality.<sup>1</sup> This survey included herbicides, molluscicides, and fungicides for the first time, providing a baseline for future surveys of these pesticide products.

### 1.0 INTRODUCTION

Since the mid-1990s, San Francisco Bay area water quality agencies have implemented programs intended to reduce insecticide-related toxicity in urban surface waters. The agencies working on these programs include urban storm water runoff management programs, municipal wastewater treatment plants, and the San Francisco Bay Regional Water Quality Control Board. Because a substantial fraction of urban insecticide use involves residential application of products purchased at retail stores, these water quality agencies have conducted public outreach designed to modify residential insect control methods. Evaluating the effectiveness of residential education efforts has proven challenging—residential surveys are expensive and provide little specific information about active ingredient use. Although attempts have been made to evaluate insecticide sales data, retailers and manufacturers consider retail sales data confidential—and statewide sales data from the California Department of Pesticide Regulation do not provide regional breakdowns.<sup>2</sup>

Residential pesticide purchasing data from telephone surveys indicates that most of the applied insecticides are purchased at a relatively small number of retail outlets—these are large volume retailers like Orchard Supply Hardware and Home Depot.<sup>3</sup> Interviews

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<sup>1</sup> TDC Environmental, *Insecticide Market Trends and Potential Water Quality Implications*, prepared for the San Francisco Estuary Project and the San Francisco Bay Regional Water Quality Control Board, April 2003.

<sup>2</sup> *Ibid.*, page 44.

<sup>3</sup> TDC Environmental, *Diazinon & Chlorpyrifos Products: Screening for Water Quality Implications*, prepared for the California Department of Pesticide Regulation, May 15, 2001; Wilen, C., University of California Statewide IPM Project, *Survey of Residential Pesticide Use and Sales in the San Diego Creek Watershed of Orange County, California*, prepared for the California Department of Pesticide Regulation, October 16, 2001; and Wilen, C., University of California Statewide IPM Project, *Survey of Residential Pesticide Use in*

with retailers and thorough shelf surveys conducted by the City of Palo Alto in 1995 and Alameda County in 1997 verified this finding.<sup>4</sup> These surveys found that 44 to 78% of residential pesticide sales occur at Home Depot and Orchard Supply Hardware (results vary, apparently depending on the presence or absence of these two specific chains in the survey area). On the basis of this finding, limited shelf surveys have been used in recent years to provide program planning and evaluation information for Bay Area water quality agencies.<sup>5</sup>

This report presents the results of a shelf survey of the insecticides and herbicides available for sale at three major San Francisco Bay area pesticide retailers (Home Depot, Lowe's, and Orchard Supply Hardware). The survey is intended to provide 2003 data to support pesticide-related program planning and evaluation by San Francisco Bay Area water quality agencies and U.S. EPA Region 9.

## 2.0 SAN FRANCISCO BAY AREA PESTICIDE RETAILERS SURVEYED

All three surveyed stores are large chains with a major presence in California.

- Orchard Supply Hardware (OSH) is a California-based hardware chain that appears to focus on product selection and customer service. Unlike the other two stores, OSH is not a "warehouse" store. There are about 30 OSH stores in the San Francisco Bay area. All 82 stores in the OSH chain are in California.
- Home Depot is a large home improvement retailer with more than 1,500 stores in North America, primarily in the U.S. Home Depot has about 25 Bay Area locations. A "warehouse" store, Home Depot appears to focus on low prices.
- Lowe's is a nationwide chain with about 875 stores in the U.S. Lowe's has 49 California stores, four of which are in the San Francisco Bay area. While it is a warehouse store, Lowe's offers some customer service and a physical setting intermediate between Home Depot's concrete-floored warehouse and the more conventional retail design of OSH stores.

Both Home Depot and OSH have previously been identified as the major pesticide retailers—in terms of volume of active ingredient—in the San Francisco Bay area. Lowe's, which recently entered the Bay Area market, is a competitor to Home Depot and thus is likely to be a major pesticide retailer in the future, so it was added to the survey this year. On the basis of previous survey data, it is probable that at least half of residential pesticide sales in the San Francisco Bay Area occur at these three stores.

## 3.0 STORE SHELF SURVEY PROCEDURE

The 2003 survey was conducted using the methods used in the March 2002 survey.<sup>6</sup> On September 4, 5, and 8, one store from each of the three selected pesticide retailers in the San Francisco Bay Area (Orchard Supply Hardware in Foster City, Home Depot in San Mateo, and Lowe's in San Bruno) was visited to review insecticide and herbicide products available for sale. The survey did not include disinfectants and cleaning

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*the Chollas Creek Area of San Diego County and Delhi Channel of Orange County, California*, September 2, 2002.

<sup>4</sup> Cooper, A., *Diazinon in Urban Areas*, prepared for the City of Palo Alto, 1996 and Scanlin, J. and A. Cooper, *Outdoor Use of Diazinon and Other Insecticides in Alameda County*, prepared for the Alameda County Flood Control and Water Conservation District, September 1997.

<sup>5</sup> Moran, K., "Shelf Surveys at Orchard Supply Hardware and Home Depot," Memorandum to Bill Johnson, San Francisco Bay Regional Water Quality Control Board, March 15, 2002 and Appendix D.2. of TDC Environmental, *Diazinon & Chlorpyrifos Products: Screening for Water Quality Implications*, prepared for the California Department of Pesticide Regulation, May 15, 2001;

<sup>6</sup> *Ibid.* Product registration numbers were also recorded in this survey.

products, pool products, drain clearing products, or rodent control products. Product brand name, active ingredient, formulation type, U.S. EPA registration number, and application locations were obtained for insecticide, herbicides, molluscicides, and fungicides. Non-chemical insect controls, enclosed baits, soaps, petroleum oils, and unregistered “safer substitutes,” were not included in the survey.

#### **4.0 SURVEY RESULTS**

A total of 100 to 151 products meeting the survey criteria were on sale at each store, some in multiple container sizes. The products contained 36 individual insecticide active ingredients (two of which are simply stereoisomers of other insecticides, for a total of 34 different substances), 32 individual herbicide active ingredients, 12 other types of active ingredients, and two synergists. Almost all ready-to-use liquids were in volumes of 24 fluid ounces or more; many also were available in a 128 fluid ounce size. Concentrates were most commonly observed in 16 and 24 fluid ounce containers, but some—particularly herbicides—are sold in volumes as large as 128 fluid ounces. Dusts and granules were generally in 1-pound shaker cans and in 5 to 25 pound boxes and bags.

The attached tables (Tables 1 through 3) summarize the observed active ingredients, formulations, and sites of use that are most important for water quality purposes. Since aerosols comprise a large fraction of the containers but a very small fraction of the active ingredient, in this survey (as in previous surveys), site of use are not summarized for aerosol products. Below, the major findings from each store are summarized.

#### **4.1 Orchard Supply Hardware Results**

OSH consistently stocks the largest number of pesticide products of any surveyed pesticide retailer. The survey cataloged 151 different products containing 77 registered pesticide active ingredients (see Table 1). The surveyed products included 85 insecticides, 46 herbicides, 12 molluscicides (one of which is also an insecticide), and 14 fungicides (5 of which are also insecticides). The following formulations were observed: concentrates (52), ready-to-use liquids (34), granules (30), aerosols (22), dusts (5), foggers (4), fertilizers (3), and one solid.

A single container of one diazinon product was found. Since the product was on the shelf with the non-diazinon product of the same brand and product name (but different registration number), it appeared to be a final container of an old product.

#### **4.2 Home Depot**

The survey identified 100 different products, the smallest product selection in the 3 surveyed stores (see Table 2). The surveyed products included 61 insecticides, 29 herbicides, 6 molluscicides (one of which is also an insecticide), 9 fungicides (5 of which are also insecticides) and one growth regulator. The following formulations were observed: concentrates (36), ready-to-use liquids (20), granules (11), aerosols (18), dusts (6), fertilizers (6), and foggers (3).

No diazinon products were observed. A staff member said that Home Depot policy was to stop ordering any pesticide when a sales phase-out is announced, rather than waiting for the sales end date.

#### **4.3 Lowe's**

The survey cataloged 128 products at Lowe's (see Table 3). The surveyed products included 80 insecticides, 35 herbicides, 8 molluscicides (2 of which are also insecticides), and 12 fungicides (6 of which are also insecticides). The following formulations were observed: concentrates (45), ready-to-use liquids (26), aerosols (21), granules (16), fertilizers (11), dusts (6), and foggers (3).

The surveyed Lowe's store had three diazinon products: a ready-to-use liquid, an aerosol, and a fertilizer with insecticide granules. While only a few containers of the ready-to-use liquid were apparent (and these were displayed mixed in with the manufacturer's substitute product of the same product name), a pallet of the granules and a full case of the aerosol were observed (however, it should be noted that the other Lowe's store visited [see Section 5.5] did not have any diazinon products).

## **5.0 SURVEY PROCEDURE VALIDATION**

Previous surveys have been designed on the basis of the assumption that stocks are essentially the same at stores of the same chain in the Bay Area. This year, several steps were taken to check this assumption. First, two qualitative checks were conducted—distributors and store staff were interviewed to learn about each chain's stock management practices. Second, store visits were used to provide qualitative (visual display similarity) and quantitative comparisons of the stocks in various stores throughout the Bay Area.

### **5.1 Store Practices**

As explained below, both distributors and store staff described similar policies for managing pesticide stocks in each chain. It is apparent that the three chains intend product selection to be identical among Bay Area stores.

Distributor contacts said that stores in the surveyed chains stock the same products. The contractor working with distributors on the "Our Water, Our World" program checked with distributors to learn about stocking procedures.<sup>7</sup> Distributors said that all Home Depot and Lowe's should have the same mix of pesticides in their Bay Area stores. While these national chains carry different products in other regions of the U.S., they have one set of products that they distribute to all their California stores. According to distributors, all OSH stores are supposed to stock the same pesticides.

Store staff interviewed said that stores in the surveyed chains sell the same products—and usually display them according to a regional or chain-wide shelf plan. During the initial survey and validation visits to stores in the three surveyed chains, when store staff members were present in the pesticide section, they were interviewed to obtain information about company pesticide stocking practices. At Home Depot, three staff members were interviewed; all said that stocks were very similar among Bay Area stores in the chain. One Home Depot staffer had a stock display diagram that he said was provided by the company to ensure displays are similar at each store. At OSH, staff interviewed in three stores described the pesticide stocking process similarly—the chain specifies the items to be carried by each store, the layout of the shelves, and the shelf space allotted to each pesticide product. At Lowe's one staff member was interviewed; she said that like the other chain stores, Lowe's specifies products to be purchased and how products are to be organized and displayed on the shelves.

### **5.2. Store Visits**

Other stores from the three surveyed chains were visited on September 13 and 15, 2003 (within 2 weeks of the original surveys). To keep travel time reasonable, comparison stores were not selected randomly, but instead were visited in two loop trips to maximize the number of stores that could be visited in a reasonable time period. At each comparison store, a qualitative and a quantitative survey were performed:

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<sup>7</sup> Joseph, A., technical consultant, Pesticide Distributor Project, electronic communications, September 2003.

- Qualitative Review. The pesticide stock was visually reviewed to compare it with the visual appearance of the stock at the surveyed store.
- Quantitative Comparison. A random number generator<sup>8</sup> was used to identify 20 products from each surveyed store to use as a sample to compare stocks among stores of the same chain. The presence or absence of each of the 20 products was noted.

Comparisons among stores showed that displays are very similar and stock is qualitatively similar. Stocking practices appear to lead to minor product differences between stores. The primary reason for stock differences appears to be low stock on the day of the visit. A second reason for differences is change from one product to another similar product—typically this is evidenced by a few “leftover” containers of a product in a disorganized display. Stocking levels were an issue at both Home Depot and Lowe’s, indicating that it might be desirable to avoid surveying stores with low stocks and to cross check future surveys at one or two additional stores. Results for individual chains are presented below.

### **5.3 Orchard Supply Hardware Comparison**

Five OSH stores were visited. The comparison stores were in the cities of Dublin, Concord, Mountain View, and Milpitas. Of the three chains, OSH had the most consistent product list and product display pattern. The four stores all had extremely similar pesticide displays, with products organized in the same fashion in each store. There is an overflow area (often an end cap) where products that are being phased out are displayed until they are sold out; this small area was slightly different among the stores, as would be expected.

Three of the four comparison stores had all 20 products on the comparison checklist; the fourth had 19 products; the 20<sup>th</sup> product appeared to be out of stock, as the shelf tag for that product was evident and the shelf above it was bare.

### **5.4 Home Depot Comparison**

A total of 8 of the 25 Bay Area Home Depot stores were visited; the 7 comparison stores were in the cities of San Ramon, Concord, Milpitas, San Carlos, East Palo Alto, Santa Clara, and Union City. All stores had relatively similar pesticide product displays, although displays were not as similar as they were among stores in the other chains. The primary visual difference was that the surveyed store had the fullest shelves of all the visited stores. Each store appeared to have a garden products overstock area that sometimes contained a few pesticide products, often products that were on sale (apparently to sell out remaining stock). Promotional displays were different among the stores. At some stores, there was little pesticide product promotional display; however, at one store pesticides were prominently displayed near checkout registers.

Only one store had all 20 products on the comparison checklist; three had 19 products, one had 18, one 17, and one store had only 15 of the comparison products. One product was only available at the originally surveyed store and at one comparison store (where it was on sale). A staff member at a store that did not have this product explained that the product was being phased out in favor of a substitute product from a different brand. Several stores were out of stock of one or more comparison products, particularly the store with only 15 of the 20 comparison products. Obvious stock gaps and the one unusual product accounted for the entire stock difference between the original store and 5 of the 7 comparison stores.

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<sup>8</sup> [www.Random.org](http://www.Random.org)

## 5.5 Lowe's Comparison

Two of the four Bay Area stores were visited. The comparison store was in Union City. The comparison store had very similar pesticide displays and pest product organization, although different products were displayed in aisle center merchandising displays.

The one comparison store had 16 of the 20 products on the comparison list; however, the shelves contained large bare areas where products had apparently sold out and had not been replaced. A staff member in the area said that the stocks were unusually low because the pesticide section of the store had been short of staff in recent days.

## 6.0 RETAIL PESTICIDE PRODUCT LINE REVIEW

Using information available on the Internet, the major retail insecticide product lines were reviewed. The purpose of the review was to identify the most popular active ingredients in new products (as there is a time delay moving products through distributors) and to obtain an inventory of the active ingredients in popular products (even if they may not have been on the shelf at the surveyed stores).

Of the dozens of pesticide brands, only a few had a significant number of products displayed at the surveyed stores. Most brands specialize in one type of product (e.g., snail control, aerosols) or simply have limited market share. Excluding the retailers' own brands, shelf survey data from the three stores revealed only three product lines with more than 10 products available at one or more of the stores: Ortho, Spectracide, and Bayer. Scotts, which has the largest line of lawn care products, was also reviewed to ensure that the product line review adequately covered lawn care products, which were not fully represented in the shelf survey due to its timing in the fall.

### 6.1 Ortho Product Line

Ortho is the most common product line in all of the surveyed stores—20 to 30% of observed products were Ortho products. The most common active ingredients in Ortho products are:

- Insecticides—Bifenthrin, permethrin, esfenvalerate, acephate
- Herbicides—2,4-D, mecoprop, dicamba, triclopyr

Another common active ingredient—tetramethrin—only appears in aerosol products. Other active ingredients in Ortho products are: calcium acid methanearsonate, carbaryl, chlorothalonil, diazinon, d-limonene, fenbutatin-oxide, ferrous sulfate monohydrate, fluazifop-p-butyl, gamma-lactone, glyphosate, imazapyr, malathion, metaldehyde, n-octylbicycloheptene dicarboximide, oxyfluorfen, peach aldehyde, phenothrin, prallethrin, propiconazole, pyrethrins, resmethrin, spinosad, sumithrin, and triforine.<sup>9</sup>

### 6.2 Spectracide Product Line

Spectracide has significantly increased its retail presence in Northern California in the last few years; at two of the surveyed stores, about 20% of the observed products were Spectracide products. Spectracide is currently heavily promoting its new "Triazicide," a brand name for lambda cyhalothrin. The most common active ingredients in Spectracide products are:

- Insecticides—permethrin, tralomethrin, lambda cyhalothrin
- Herbicides—2,4-D, mecoprop, dicamba

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<sup>9</sup> Lists in this section exclude active ingredients in products that would not be used in Northern California, e.g., products designed for St. Augustine grass.



Other active ingredients in the product line include: d-trans allethrin, pyrethrins, piperonyl butoxide (PBO), diazinon, pyriproxyfen, resmethrin, myclobutanil, malathion, metaldehyde, prometon, dithiopyr, dichlorprop, diquat dibromide, and fluazifop-p-butyl.

### 6.3 Bayer Product Line

Bayer has 3 related lines of residential products “Advanced Home,” “Advanced Garden,” and “Advanced Lawn.” The most common active ingredients in Bayer products are:

- Insecticides—cyfluthrin, imidacloprid
- Herbicides—2,4-D, mecoprop-p, dicamba

Other active ingredients in the product line include: disulfoton, triclopyr, glyphosate, glufosinate-ammonium, trichlorfon, monosodium acid methanearsonate (MSMA), triadimefon, and proflumicarb.

### 6.4 Scotts Product Line

Scotts (which owns Ortho) has a wide array of specialized lawn care products. The products are specialized for certain regions of the country and for applications at certain times of year. Excluding the products for St. Augustine grass (which would not normally be found in Northern California), most Scotts products use the following active ingredients:

- Insecticides—Bifenthrin
- Herbicides—2,4-D, mecoprop, dicamba, pendamethalin

Other active ingredients in Scotts products include: diclorprop, halofenozide, thiophanate-methyl, siduron, and ferrous sulfate.

### 6.5 Comparison to Products Observed in Stores

The vast majority of products from the above product lines was observed in the stores. The primary exceptions were products not designed for pests or plants found in Northern California (e.g., products for St. Augustine grass or for fire ants); products more likely to be applied at another time of year (e.g., lawn care products, most of which are intended to be applied in the spring and summer); and products with the same functions as other products that were observed in the shelf survey, but that contained more toxic active ingredients (e.g., diazinon, carbaryl).

Quite a few of the products observed in the store shelf survey (Section 4) are not part of the current product lines. Many have been replaced with newer products (often just a newer brand name); these changes were almost always noted on the manufacturer Internet sites. This finding correlates with information obtained informally from distributors and store personnel who note that it may take a while (months to years) for an old product to move out of the supply chain and be replaced by the new product.

## 7.0 ANALYSIS OF SURVEY RESULTS

In general, the results of this survey reflect widely anticipated changes in the insecticide market away from organophosphorous pesticides and to pyrethroids. This trend—and resulting domination of the market by pyrethroids—is likely to pose a threat to future urban surface water quality.<sup>10</sup> The formulation mix and product instructions were similar to those observed in recent surveys. This survey included herbicides, molluscicides,

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<sup>10</sup> TDC Environmental, *Insecticide Market Trends and Potential Water Quality Implications*, prepared for the San Francisco Estuary Project and the San Francisco Bay Regional Water Quality Control Board, April 2003.

and fungicides for the first time, providing a baseline for future surveys of these pesticide products.

## 7.1 Conclusions

- Pyrethroids are now dominating the insecticide marketplace. For example, at OSH, 65 of the 84 insecticides contained a pyrethroid pesticide. Among products with uses most important for water quality (outdoor structural pest control uses),<sup>11</sup> permethrin is the most common insecticide, followed by cyfluthrin, bifenthrin, and esfenvalerate. Many of these pyrethroid products have the same brand and product names as previous products (with different registration numbers) formulated with diazinon or chlorpyrifos. Lambda cyhalothrin is now being sold for urban uses under a major pesticide brand name. Displays generally highlight pyrethroid insecticides; in contrast, malathion, carbaryl and other possible diazinon substitutes were not observed in promotional displays. Imidacloprid appears to have lost the urban market inroads it had previously appeared to be making.
- Diazinon and chlorpyrifos phase out is evident. All chlorpyrifos products were gone as were almost all diazinon products. The few observed diazinon products appeared to be remainders based on the low number of containers, absence in other stores of the same chain, and shelf placement in irregular locations. Several pyrethroid products were accompanied by shelf talkers saying “Looking for Diazinon?”.
- Brand mix has changed slightly. Bayer appears to be losing market share, replaced by Spectracide, which has significantly increased its retail presence in Northern California in the last few years. Store brands (e.g., Real-Kill, OSH Easy Gone) have increased their shelf space.
- Participation in the “Our Water, Our World” program may correlate with stocking less-toxic alternative pest control products. Although safer substitutes were not included in the survey, it was qualitatively observed that Orchard Supply Hardware (and to a lesser extent, Home Depot) has a relatively broad selection of safer substitutes—and a much greater selection than observed in the surveys in the late 1990s, when the “Our Water, Our World” program was initiated. The fewest safer substitutes were observed at Lowe’s, which is not currently participating in the “Our Water, Our World” program.

## 7.2 Recommendations for Future Surveys

- Surveys should ideally be conducted in the late spring or early summer. Some products—particularly lawn care products—have instructions for application at a particular time in the growing season, most commonly spring or summer. Although the survey was conducted a bit late in the peak pesticide sales season, the selection of lawn care products was relatively larger than observed during last year’s wintertime surveys. Retail promotional displays were smaller at the time of this survey than earlier in the summer; however, pesticides were still prominently displayed on end caps and near garden checkout areas in two of the three stores. (In contrast, few promotional displays were observed during the wintertime survey).
- Surveys should ideally be conducted when shelves are most well stocked. Store staff indicated that most pesticide sales occur on the weekend and therefore that stores have the most complete stock at the end of the week. Stores not capable of

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<sup>11</sup> TDC Environmental, *Diazinon & Chlorpyrifos Products: Screening for Water Quality Implications*, prepared for the California Department of Pesticide Regulation, May 15, 2001.

keeping up with stocking during busy weekend days may have low stock early in the week.

- Minor modifications can enhance the value of future shelf surveys. Given apparently less vigorous shelf stocking practices and more frequent changes in product lines, the best procedure for future surveys would involve checking more than one Home Depot and Lowe's to ensure complete and representative survey. Future surveys should consider attempting to differentiate "regular" and "old stock" products, if possible.

## **ATTACHMENTS**

Attachment 1: Memorandum documenting the March 2002 survey

Attachment 2: Excerpts from *Diazinon & Chlorpyrifos Products: Screening for Water Quality Implications*<sup>12</sup> documenting the December 2000 survey

Because the detailed survey worksheets documenting product brand names and registration numbers contain details that could be used by competitors to the disadvantage of the stores that allowed their shelves to be surveyed in detail, they are not attached. The survey worksheets will be provided to U.S. EPA. Other agencies may obtain copies from TDC Environmental upon request and with certification that the worksheets will be kept confidential and will not be used for competitive purposes.

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<sup>12</sup> Excerpts from Appendix D of TDC Environmental, *Diazinon & Chlorpyrifos Products: Screening for Water Quality Implications*, prepared for the California Department of Pesticide Regulation, May 15, 2001.

**Table 1: Ingredient Analysis: OSH Survey, September 2003**

Active ingredient	Total # Products	Sites of Use <sup>a</sup> (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc.	Fogger	RTU Liquid <sup>b</sup>	Other
<i>Pyrethroids</i>											
Allethrin	4		1			3				1	
Beta-cyfluthrin	1	1						1			
Bifenthrin	5	2	3	1			1	1		2	Fertilizer
Cyfluthrin	7	5	6	1			2	2		3	
Cypermethrin	2					1			1		
Deltamethrin	1	1		1							Dust
d-trans allethrin	3					3					
Esbiothrin	1		1								Solid
Esfenvalerate	5	4	4			1		2		2	
Imiprothrin	1					1					
Lambda-Cyhalothrin	1	1		1						1	
Permethrin	27	15	9	3	Pets	8	4	8	2	3	Dust (2)
Phenothrin	3					3					
Prallethrin	2					2					
Resmethrin	3					3					
Tetramethrin	8					7			1		
Tralomethrin	3					3					
<i>Carbamates</i>											
Carbaryl	6	2	6		Pets		3	1		1	Dust

<sup>a</sup> All uses allowed by the label are recorded. Product labels often allow more than one of these sites of use (e.g., both structure-outdoors and indoor uses).

<sup>b</sup> RTU = Ready to Use

**Table 1: Ingredient Analysis: OSH Survey, September 2003 (Continued)**

Active ingredient Insecticides, continued	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc.	Fogger	RTU Liquid	Other
<i>Organophosphorous Pesticides</i>											
Acephate	5		3			2	1	2			
Diazinon	1	1	1					1			
Disulfoton	1		1				1				
Malathion	1	1	1					1			
<i>Other</i>											
DEET	2				Person	1					1
Disodium octaborate tetrahydrate	2	2						1			1
d-Limonene	1			1							1
gamma-lactone	1			1							1
Hydramethylnon	1	1	1				1				
Imidacloprid	3		3					2			1
peach aldehyde	1			1							1
p-menthane-3,8-diol	1				Person						1
Potassium salts of fatty acids	2		1			1					1
Pyrethrins	8		3	2		3			2		3
S-Methoprene	2					1			1		

**Table 1: Ingredient Analysis: OSH Survey, September 2003 (Continued)**

Active ingredient	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc.	Fogger	RTU Liquid	Other
2-(2,4-DP), dimethylamine salt	2		2				1	1			
2,4-D	4		4				3				Fertilizer
2,4-D, dimethylamine salt	9		9				1	5		3	
Benefin	1		1				1				
Calcium acid methanearsonate	2	2						1		1	
Dicamba	4		4				3	1			
Dicamba, dimethylamine salt	7		7					4		3	
Diquat dibromide	3		3					2		1	
Dithiopyr	1		1				1				
Fluazifop-p-butyl	3		3					1		2	
Glyphosate	4		4					3		1	
Glyphosate, isopropylamine salt	3		3					2		1	
Imazapyr	1		1					1			
MCPA, dimethylamine salt	1		1							1	
MCPA, isooctyl ester	1		1					1			
MCPP	2		2				2				
MCPP, dimethylamine salt	8		8				1	4		3	

**Table 1: Ingredient Analysis: OSH Survey, September 2003 (Continued)**

Active ingredient	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc.	Fogger	RTU Liquid	Other
<b>Herbicides, continued</b>											
MCPP-p, dimethylamine salt	2		2					1		1	
Magnesium chloride	1	1						1			
Mecoprop-p	2		2				1				Fertilizer
MSMA	3		3					2		1	
Oryzalin	4		4				1	3			
Pendamethalin	2		2				1				Fertilizer
Prometon	1		1					1			
Sethoxydim	2		2					2			
Trichlopyr triethylamine salt	3		3					2		1	
Triclopyr	1		1					1			
Triclopyr, butoxyethyl ester	1		1					1			
Trifluralin	1		1				1				
Zinc	1	1						1			
<b>Synergists</b>	<b>Total # Products</b>	<b>Structure- Outdoors</b>	<b>Lawn &amp; Garden</b>	<b>Indoor</b>	<b>Other</b>	<b>Aerosol</b>	<b>Granule</b>	<b>Conc.</b>	<b>Fogger</b>	<b>RTU Liquid</b>	<b>Other</b>
PBO	4		2	2		1			1	2	
n-octylbicycloheptene dicarboximide	5					3			2		

**Table 1: Ingredient Analysis: OSH Survey, September 2003 (Continued)**

Active ingredient Other (Molluscicides, Fungicides)	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc.	Fogger	RTU Liquid	Other
Basic copper sulfate	1		1								Dust
Chlorothalonil	1		1					1			
Copper, metallic	2		2					2			
Fenbutatin-oxide	2	2						2			
Iron Phosphate	1		1				1				
Metaldehyde	11		11				8	1		2	
Myclobutanil	2		1			1		1			
Neem Oil	3		3	2				1		2	
Thiophanate-methyl	2		2				2				
Triadimefon	2		2				1	1			
Triforine	3		1			2		1			



**Table 2: Ingredient Analysis: Home Depot Survey, September 2003**

Active ingredient	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc.	Fogger	RTU Liquid	Other
<i>Pyrethroids</i>											
Allethrin	2					2					
Bifenthrin	4	2	2	2				1		2	Fertilizer
Cyfluthrin	3	2	2	1				1		2	
Cypermethrin	3	1	1	2		1		1	1		
Deltamethrin	1	1									Dust
d-trans allethrin	4					4					
Esfenvalerate	3	3	3					2		1	
Imiprothrin	2					2					
Lambda-Cyhalothrin	2	1	2				1	1			
Permethrin	16	8	5		Pets	5	3	5	2		Dust
Phenothrin	3					3					
Prallethrin	1					1					
Resmethrin	3					3					
Tetramethrin	5					4			1		
Tralomethrin	5					5					
<i>Carbamates</i>											
Carbaryl	3	1	3		Pets		1			1	Dust
<i>Organophosphorous Pesticides</i>											
Acephate	4		2			2		2			
Disulfoton	1		1				1				
Malathion	2	1	2					2			

**Table 2: Ingredient Analysis: Home Depot Survey, September 2003 (Continued)**

Active ingredient Insecticides, continued	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc.	Fogger	RTU Liquid	Other
<i>Other</i>											
Disodium octaborate tetrahydrate	1	1									Dust
Imidacloprid	2		2					1		1	
Orthoboric acid	1			1							Dust
Pyrethrins	5		3	1	Pets	1				4	

**Table 2: Ingredient Analysis: Home Depot Survey, September 2003 (Continued)**

Active ingredient	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc.	Fogger	RTU Liquid	Other
2-(2,4-DP), dimethylamine salt	2		2					1		1	
2,4-D	2		2								Fertilizer
2,4-D, dimethylamine salt	5		5					4		1	
Calcium acid methanearsonate	1		1					1			
Dicamba	2		2								Fertilizer
Dicamba, dimethylamine salt	4		4					3		1	
Diquat dibromide	3		3					1		3	
Dithiopyr	1		1								Fertilizer
Fluazifop-p-butyl	4		4					1		3	
Glyphosate	4		4					3		1	
Glyphosate, isopropylamine salt	2		2					1		1	
MCPP	2		2								Fertilizer
MCPP, dimethylamine salt	6		6					4		2	
MSMA	1		1					1			
Pendamethalin	1		1								Fertilizer
Prometon	1		1					1			
Trichlopyr triethylamine salt	2		2					1		1	
Trifluralin	3		3						1		Fertilizer
Zinc	1	1								1	

**Table 2: Ingredient Analysis: Home Depot Survey, September 2003 (Continued)**

Active ingredient	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc .	Fogger	RTU Liquid	Other
<b>Synergists</b>											
PBO	5		2	1	Pets	2				3	
n-octylbicycloheptene dicarboximide	2				Pets	1				1	
<b>Other (Molluscicides, Fungicides)</b>		<b>Structure- Outdoors</b>	<b>Lawn &amp; Garden</b>	<b>Indoor</b>	<b>Other</b>	<b>Aerosol</b>	<b>Granule</b>	<b>Conc .</b>	<b>Fogger</b>	<b>RTU Liquid</b>	<b>Other</b>
Chlorothalonil	1		1					1			
Ethephon	1		1					1			
Fenbutatin-oxide	2		2					2			
Iron Phosphate	1		1				1				
Metaldehyde	5		5				4			1	
Myclobutanil	3		2			1		2			
Neem Oil	1		1	1						1	
Triforine	4		2			2		2			

**Table 3: Ingredient Analysis: Lowe's Survey, September 2003**

Active ingredient	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granul e	Conc .	Fogge r	RTU Liquid	Other
<i>Pyrethroids</i>											
Beta-cyfluthrin	1	1						1			
Bifenthrin	4	2	2	1			1	1		1	Fertilizer
Cyfluthrin	7	6	6	1			1	3		3	
Cypermethrin	1					1					
Deltamethrin	1	1	1	1							Dust
d-trans allethrin	5					5					
Esfenvalerate	2	1	1			1				1	
Imiprothrin	1					1					
Lambda-Cyhalothrin	2	1	2				1	1			
Permethrin	17	6	9	1	Pets	3	2	8	1	1	Dust, Fertilizer
Phenothrin	3			1		2					Dust
Prallethrin	2					2					
Resmethrin	3					3					
Tetramethrin	3					3					
Tralomethrin	9	2	3	3		5			2	3	
<i>Carbamates</i>											
Carbaryl	4	2	4				2	1		1	
<i>Organophosphorous Pesticides</i>											
Acephate	4		2			22		2			
Diazinon	3	1	2			1				1	Fertilizer
Malathion	1	1	1					1			

**Table 3: Ingredient Analysis: Lowe's Survey, September 2003 (Continued)**

Active ingredient Insecticides, continued	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc.	Fogger	RTU Liquid	Other
<i>Other</i>											
DEET	2				Human	1				1	
d-Limonene	1			1						1	
gamma-lactone	1			1						1	
Hydramethylnon	1		1				1				
Imidacloprid	2		2					1		1	
Orthoboric acid	1			1							Dust
peach aldehyde	1			1						1	
p-menthane-3,8-diol	1				Human					1	
Pyrethrins	6			1	Pets	5				1	
S-Methoprene	3		1		Pets			3			
Silicon dioxide	1		1	1							Dust
Sodium tetraborate decahydrate	1	1		1				1			

**Table 3: Ingredient Analysis: Lowe's Survey, September 2003 (Continued)**

Active ingredient	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc.	Fogger	RTU Liquid	Other
2,4-D	6		6				1				Fertilizer
2,4-D, dimethylamine salt	8		8					5		3	
2,4-D, isooctyl ester	1		1					1			
2,4-DP, isooctyl ester	1		1					1			
Calcium acid methanearsonate	1		1					1			
Dicamba	1		1					1			
Dicamba, dimethylamine salt	3		3					2		1	
Diquat dibromide	4		4					2		2	
Dithiopyr	1		1								Fertilizer
Fluazifop-p-butyl	3		3					1		2	
Glyphosate	2		2					1		1	
Glyphosate, isopropylamine salt	6		6					4		2	
Imazapyr	1		1					1			
MCPP	3		3								Fertilizer
MCPP, dimethylamine salt	5		5					3		2	
MCPP-p, dimethylamine salt	3		3					2		1	
Mecoprop-p	3		3				1				Fertilizer
MSMA	4		4					3		1	
Oryzalin	1		1					1			
Pendamethalin	1		1								Fertilizer

**Table 3: Ingredient Analysis: Lowe's Survey, September 2003 (Continued)**

Active ingredient	Total # Products	Sites of Use (Excluding Aerosols & Foggers)				Formulations (All Products)					
		Structure- Outdoors	Lawn & Garden	Indoor	Other	Aerosol	Granule	Conc.	Fogger	RTU Liquid	Other
<b>Herbicides, continued</b>											
Prometon	1		1					1			
Trifluralin	2		2				1				Fertilizer
<b>Synergists</b>											
PBO	5			1	Pets	4				1	
n-octylbicycloheptene dicarboximide	2					2					
<b>Other (Molluscicides, Fungicides)</b>											
Basic copper sulfate	1		1								Dust
Chlorothalonil	2		2					2			
Fenbutatin-oxide	2		2					2			
Iron Phosphate	1		1				1				
Metaldehyde	7		7				5			2	
Myclobutanil	4		3			1		3			
Neem Oil	3	1	3					1		2	
Thiophanate-methyl	1		1				1				
Triforine	4		2			2		2			



**ATTACHMENT 1**



# MEMO

**TO:** Bill Johnson **DATE:** March 15, 2002  
**FROM:** Kelly D. Moran **PROJECT:** 33a  
**SUBJECT:** Shelf Surveys at Orchard Supply Hardware and Home Depot

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On March 7 and 13, I visited two major pesticide retailers in the San Francisco Bay Area (Orchard Supply Hardware in Foster City and Home Depot in San Mateo) to survey insecticide products available for sale. These informal shelf surveys focused on identification of the products coming on the market to replace diazinon and chlorpyrifos. I obtained product brand name, insecticide active ingredient, formulation type, and application location<sup>1</sup> for insecticides. I omitted all non-chemical insect controls, all baits, and all diazinon products from the survey. I also omitted soaps, neem extract, and oils. This was a wintertime survey, so the selection of lawn care products was relatively smaller than previously observed during summer and fall surveys.

In general, the nature of the insecticide product mix has changed substantially since I last surveyed the shelves of these stores a little over a year ago (December 2000<sup>2</sup>). Major findings were:

- Diazinon and chlorpyrifos phase out is evident. All chlorpyrifos products were gone as were most diazinon products. Remaining diazinon products included concentrates, granules and dusts in small and large quantities. The dusts were especially surprising, as these dust products—including the large quantity product in a 5-pound bag—were not previously observed. Some products were accompanied by shelf talkers saying “Looking for Dursban?” and recommending the product as a replacement.
- Brand mix has changed. Ortho had substantially reduced shelf space at both stores. At one store, it was replaced by a new display of least-toxic controls and additional shelf space for the Bayer Advanced brand. At the other store, Real-Kill and Spectracide products were the primary replacements.
- Formulation mix has changed. The most important change was that there were far more dusts and far fewer granules. Foggers have also obtained much more shelf space in the last year. At one store, there were fewer concentrate products and more shelf space was devoted to ready-to use products (both hand pump liquids and aerosol cans); however, this change was not observed at the other store. Some of these observations may be seasonal.
- Application instructions on new products are similar to instructions on diazinon and chlorpyrifos products. Many products had “band around the structure”

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<sup>1</sup> Application location was not obtained for aerosols and foggers.

<sup>2</sup> Described in *Diazinon & Chlorpyrifos Products: Screening for Water Quality Implications*, TDC Environmental, May 15, 2001.

- application instructions. All formulations were also available for applications on lawns and ornamental landscaping. Many products have instructions for indoor applications, also similar to those observed for now phased out chlorpyrifos products. Several liquid and dust products that appear to be intended primarily for other uses also had instructions for applications directly to dogs and cats.
- Use of synergists was much less than anticipated. Only six products at each store contained one of the two observed synergists (PBO and n-octylbicycloheptene dicarboximide). None of these products was labeled for outdoor structural pest control or lawn uses; only two were outdoor use products (for ornamental landscaping). Ten of the 12 products with synergists were foggers or aerosols. One fogger product and one flea shampoo contained both synergists. Four of five products with pyrethrins contained synergists. Other active ingredients in products with synergists were allethrin, permethrin, S-methoprene, prallethrin, esfenvalerate, tetramethrin, and phenothrin.

On the basis of the results of the previous related study,<sup>3</sup> the most important products from a water quality perspective are those:

- Sold in containers with larger volumes of active ingredient
- Concentrates (require mixing, more active ingredient per container)
- With application instructions for “band around structure” and lawn applications.

Products of lower water quality concern are:

- Containerized baits
- Aerosols (because they have a small volume of active ingredient)
- Products with limited application locations in landscaping (*e.g.*, products specifically for roses)

A total of about 60 products meeting the survey criteria were on sale at each store, some in multiple container sizes. The products contained 27 individual insecticide active ingredients (two of which are simply selected stereoisomers of other insecticides, for a total of 25 different substances) and two synergists. All ready-to-use liquid were in volumes of 24 ounces or more; most also were available in 128-ounce size. No concentrates were observed in volumes greater than 32 ounces. Dusts and granules were in 1-pound shaker cans and in 5 and 10 pound bags.

Attached tables summarize the active ingredients, formulations, and sites of use most important for water quality purposes. The tables show a relatively large number of active ingredients are replacing diazinon and chlorpyrifos in retail insecticides. Most of these ingredients are from a family of insecticides known as “pyrethroids.” Because these insecticides have similar chemical structures and a common mode of action, it is likely that they will have cumulative effects in the environment.

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<sup>3</sup> *ibid*

## Ingredient Analysis: Home Depot Survey March 13, 2002

Active Ingredient	Structure			Number of Observed Products								
	Outdoors	Lawn	Indoor non-aerosol	Grand Total	Aerosol Only	Dust	Granule	Concentrate	Fogger	RTU Liquid	Fertilizer	Foam
Acephate	2	1		5				3				
Allethrin				8	X							1
Bifenthrin	2	2	2	4				1		2	1	
Carbaryl		1		1				1				
Cyfluthrin	2	2		3			1	1		1		
Cypermethrin				1	X							
Dimethoate (being cancelled)	1			1				1				
Disulfoton				1			1					
Esfenvalerate	1	1		1				1				
Imidacloprid				2				1		1		
Imiprothrin				1	X							
Malathion	2	1		2				2				
Mint Oil				2	X							
Nylar			1	1							1	
Permethrin	6	3	4	16		2	2	3	4	2		
Phenothrin/Sumethrin			1	7		1						
Pyrethrins			2	6					1	3		
Resmethrin				3	X							
S-Methoprene				1	X							
Tetramethrin				5					1			
Tralomethrin	1		3	8					2	1		1
<b>Synergist</b>												
n-octylbicycloheptene dicarboximide			1	4					1	1		
PBO			1	4						2		

## Ingredient Analysis: OSH Survey, March 7, 2002

Active Ingredient	Number of Observed Products					Aerosol Only	Dust	Granule	Concentrate	Fogger	RTU Liquid
	Structure-Outdoors	Lawn	Indoor non-aerosol	Total excluding aerosols	Grand Total						
Acephate	0	1	0	3	4				3		
Allethrin/D-Trans Allethrin	0	0	0	0	8	X					
Bifenthrin	2	2	1	3	3				1		2
Boric Acid	0	0	0	1	1				1		
Carbaryl	1	2	1	3	3		1		1		1
Cedar oil	0	0	0	0	1	X					
Cyfluthrin/Beta Cyfluthrin	6	4	1	8	8			2	2		3
Cypermethrin	0	0	1	1	3					1	
Disulfoton	0	0	0	2	2			2			
Esfenvalerate	2	1	0	2	3				1		1
Hydramethylnon	1	0	0	1	1			1			
Imidacloprid	0	0	0	3	3				2		1
Imiprothrin	0	0	0	0	2	X					
Malathion	1	0	0	1	1				1		
Mint oil	0	0	0	0	1	X					
S-Methoprene	0	0	1	1	1					1	
Permethrin	4	3	7	12	16		2	2	3	3	2
Phenothrin	0	0	0	0	4	X					
Prallethrin	0	0	0	0	1	X					
Pyrethrins	0	0	2	3	4					2	1
Resmethrin	0	0	0	0	2	X					
Tetramethrin	0	0	1	1	3					1	
Tralomethrin	1	0	1	1	3						1
<b>Synergist</b>											
n-octylbicycloheptene dicarboximide	0	0	2	2	4	X					
PBO	0	0	1	2	3						1

**ATTACHMENT 2**

## D.2 LABEL REVIEW: STORE SHELF SURVEY

A product survey and label review was conducted on December 12, 2000. Since the purpose of the review was to obtain information about common products and their uses, the review focused on products available in the 2 stores known to be the major retailers of home use pesticide products in the San Francisco Bay Area (Home Depot and Orchard Supply Hardware).<sup>1</sup>

To ensure that a reasonable range of products was included (including products for urban professional applicator use), the in-store review was supplemented by reviewing a random selection of additional labels obtained from manufacturer and USEPA internet sites. Labels for all diazinon and chlorpyrifos products on store shelves were reviewed (13 diazinon and 6 chlorpyrifos products, most available in multiple sizes). Together with labels obtained from the Internet, a total of about 40 diazinon product labels and 20 chlorpyrifos product labels were reviewed in detail.<sup>2</sup> Many product labels contain similar or identical language (whole labels or individual sections). Table D-1 highlights the typical and notable label instructions identified with regards to application sites that involve direct or indirect, but inevitable discharges to surface waters (products listed in Tables A-4 and B-4).

This method for selecting labels to review is based on three assumptions:

- The products available at the two major retailers surveyed on December 12, 2000 are representative of the range of commonly used diazinon and chlorpyrifos products sold throughout the year and throughout California.
- The products sold at these stores in the San Francisco Bay Area are representative of products sold at retail outlets elsewhere in California. (The assumption regards products themselves; uses are anticipated to vary, but such variation in uses should be accounted for on the label directions.)
- Since label review at retailers is less time consuming than other methods of obtaining and reviewing labels, a larger number of labels could be reviewed, providing greater chance of encountering a reasonable range of product labels than would be offered by less time-efficient methods.

Initial findings were consistent with previous surveys:

- The most common brand was Ortho.
- The most common product types were ready to use liquids, liquid concentrates (primarily emulsifiable concentrates), and granules (diazinon only).
- The most common insecticide active ingredients on shelves were diazinon, chlorpyrifos, malathion, and carbaryl.

While the consistency of this survey with previous findings does not ensure that a representative range of labels was reviewed, it suggests that the approach for obtaining labels was valid.

Tables D-2 and D-3 (at the end of this Appendix) provide a summary of the observed product container sizes, formulations, and active ingredient content. Individual containers with the largest amount of active ingredient were liquid concentrates (both

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<sup>1</sup> Product availability (particularly for chlorpyrifos products) may have been affected by agreements with registrants (chlorpyrifos, announced June 8, 2000; diazinon, announced December 5, 2000).

<sup>2</sup> Chlorpyrifos products have become increasingly difficult to find, which limited the label review to some extent.

diazinon and chlorpyrifos), bags of granules (diazinon) and paint (chlorpyrifos). The concentrates are notable because of their relatively small size, low viscosity, and large amount of active ingredient—spills of such containers in the wrong location (e.g., a gutter) could easily release the entire amount of active ingredient to surface water. Also notable was the presence of a liquid concentrate product (47.5% diazinon) that was labeled for use by professional pest control operators, but was available on an open shelf for retail sale.



**Table D-1. Label Instructions for Diazinon and Chlorpyrifos Applications To Urban Sites Where Discharge To Surface Water Is Likely**

Site of Use	Typical or Notable Application Instructions
Drainage systems (65013)	<p>Most products registered for this use (diazinon products only) have instructions identical to or similar to the following:</p> <p>“Ditch Banks, Roadsides, Wasteland, Noncrop Areas, Barrier Strips:  “Grasshoppers: Spray 31/44-1 pt. Per acre in water (minimum of 1 gal. Of water per acre) for aerial applications or a minimum of 5 gals. Of water per acre for ground applications or in oil (a minimum of 1 gal. Of oil per acre) when insects first appear, preferably in the nymphal stage. Thorough coverage of the foliage is essential.”</p>
Bathroom premises (lavatories, restrooms, etc.) (88003)	<p>For bathrooms, the label for diazinon-containing Terand Roach &amp; Ant Killer says to “direct spray into moist places, and around sinks, bath tubs, drains, laundry tubs, pipes through walls and floors.” The D.Z.N. product label has similar instructions. The chlorpyrifos products contain no specifics with regards to bathroom applications—the user is simply directed to spray the products on surfaces.</p>
Carpets (hospital, commercial, household) (87010)	<p>On the D.Z.N. Diazinon 4E label, the user is directed to apply a 0.5% spray in spot applications along baseboards and edges of carpeting, under carpeting, rugs, and furniture, but is cautioned to avoid excessive wetting of carpets, floor coverings, or unfinished materials because they may be damaged. The Terand Roach &amp; Ant Killer label directs the user to spray the underside of the carpet. One chlorpyrifos product (Dursban ME 20) calls for covering the carpet with the pesticide:</p> <p>“Brown dog ticks: Thoroughly apply the spray to infested areas such as cracks and crevices and along baseboards, windows and door frames and other areas of floor and floor coverings where these pests may be present. Non-carpeted flooring should only be treated with spot applications as necessary. Spots are defined as areas not to exceed two square feet.”</p> <p>“Carpet beetles: Thoroughly apply the spray to rugs and carpets, along baseboards and edges of carpeting, under carpeting, rugs, and furniture, in closets and on shelving, and wherever else these insects are seen or suspected.”</p> <p>“Fleas: Thoroughly apply a fine-particle broadcast spray to infested areas, such as rugs and carpets.”</p> <p>Some chlorpyrifos products registered for carpet treatment have label language limiting treatment to carpet edges, underneath carpets and under furniture.</p>
Sewage systems (septic tanks, sewers, etc.) (65026), sewage disposal areas (municipal and other) (67008)	<p>Two types of sewer-related uses were noted for chlorpyrifos products: (1) applications into drains (apparently inside premises being treated, called “floor drains” on some labels) and (2) application in sewer manholes. For building drain uses, labels did not provide specific instructions other than to apply (usually by spraying) the pesticide directly into the drain. The instructions on the Insecta label are typical for sewer manhole uses—it directs users as follows:</p> <p>“Treatment of sewer manholes: (For control of roaches). Apply product on manhole walls. Product may be applied via coarse spray using conventional airless spray equipment or by applying with suitable brush or roller.....Do not discharge spray or unused material directly into sewer system. Do not apply product within 36 hours of predicted heavy rainfall.”</p> <p>Super IQ APT and Super IQ LC have instructions nearly identical to the above, with the addition of instructions to “[a]pply product on underside of manhole lids and manhole walls” and to “[a]pply no more than 48 ounces (3 pints) of product to each manhole. The Dursban ME 20 label directs users to avoid application directly to drainage water. Killmaster II directs uses to apply:</p> <p>“a coarse low pressure (20 PSI or less) spray in 8” to 10” bands at the sewer base, midway, and upper rim flange and to the entire underside of the manhole cover. The maximum amount of Killmaster II that can be applied to each manhole shall not exceed 16 ounces (one pint). As in all other situations, the applications should be effective for a minimum of 12 months.”</p>

**Table D-2. Amount of Active Ingredient in Typical Containers of Common Diazinon Products**

<b>Formulation</b>	<b>Diazinon Concentration (%)</b>	<b>Container Size</b>	<b>Specific Gravity (g/ml, for liquids)*</b>	<b>Amount of Active Ingredient in Container (grams)</b>
Granules	2	1 pound	n/a	9.1
	5	20 pound	n/a	454.0
Liquids	22.4	16 fluid ounce	1.053	111.7
	25	32 fluid ounce	0.94	222.6
	25	128 fluid ounce	0.94	890.4
	47.5	32 fluid ounce	0.93	418.4
Ready-to-use liquids	0.075	24 fluid ounce	1.003	0.5
	0.5	128 fluid ounce	1	18.9
Dusts	5	1 pound	n/a	22.7
Aerosols	0.5	15 fluid ounce	0.954	2.1
Paint Additive	87	5 fluid ounce	1.117	143.8

\*Sources for specific gravity: MSDSs for products with the same concentration (used the MSDS for the product observed on shelf where possible). For paint additive, assumed density same as 100% diazinon.

n/a – Not applicable

Source: Product labels and TDC Environmental calculations.

**Table D-3. Amount of Active Ingredient in Typical Containers of Common Chlorpyrifos Products**

<b>Formulation</b>	<b>Chlorpyrifos Concentration (%)</b>	<b>Container Size</b>	<b>Specific Gravity (g/ml, for liquids)*</b>	<b>Amount of Active Ingredient in Container (grams)</b>
Granules	1	10 pound	n/a	45.4
Liquids	4.38	32 fluid ounce	8.46 lb/gal	42.1
	12.6	32 fluid ounce	7.4 lb/gal	105.8
Ready-to-use liquids	0.5	24 fluid ounce	1.017	3.6
	0.5	128 fluid ounce	1.017	19.3
Dusts	1	1 pound	n/a	4.5
Aerosols	0.25	17 fluid ounce	0.865	1.1
Paint (clear coating)	0.9	640 fluid ounce	1	170.5

\*Sources for specific gravity: MSDSs for products with the same concentration (used the MSDS for the product observed on shelf where possible). For paint, assumed density of water (latex paint). For chlorpyrifos aerosol, used density of a different but similar aerosol product (could not obtain density of the product seen).

Source: Product labels and TDC Environmental calculations.