SECTION II
CURRENT HAZARDOUS WASTE MANAGEMENT:
ISSUES AND ANALYSIS

Chapter 3
CURRENT HAZARDOUS WASTE GENERATION PATTERNS IN ALAMEDA COUNTY

A. INTRODUCTION

The purpose of this chapter is to describe current patterns of hazardous waste generation in Alameda County. In order to develop a set of policies for effective future management of hazardous wastes in Alameda County, an understanding of the composition of hazardous waste and the patterns of hazardous waste generation is essential. This chapter provides an assessment of available data, an analysis of Alameda County's current waste stream, and a profile of the county's hazardous waste generators.[1]

B. DATA SOURCES AND LIMITATIONS

This analysis of Alameda County's patterns of hazardous waste generation is based on currently available data. The extent to which these data accurately and precisely describe the waste stream limits the accuracy of this analysis. Unfortunately, detailed reliable data are not readily available. While this analysis has extended beyond the information provided by the Department of Health Services (DHS), many gaps and uncertainties still remain. It will be essential to update and build upon these data in the future to produce a more accurate description of current hazardous waste generation in the county.

The analysis contained in this Plan does provide a qualitative description of the overall hazardous waste stream, and presents many quantifiable estimates for consideration by decisionmakers. The analysis provides a model for further investigations, and identifies possible areas of emphasis in Alameda County's future hazardous waste management planning effort. Principal data gaps and technical restrictions that limit this analysis are identified and discussed in the following paragraphs.

This plan uses 1986 manifest summaries from the DHS Hazardous Waste Information System. These manifest data cover those hazardous wastes which generators shipped offsite, accompanied by a DHS manifest form. These summaries are the most complete and reliable data source currently available for purposes of this study. However, this information clearly does not describe Alameda County's <u>total</u> hazardous waste stream.

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[1] The data are based on incomplete material obtained from the State manifest system and local generators. The Plan implementation program calls for early review and update of the Plan where these deficiencies will be corrected. Comments from State DHS on the data portion of the Plan were received too late to include in the final Plan.

By definition the manifests only contain information concerning wastes shipped offsite. No information is included for those hazardous wastes managed onsite. The manifests contain information about only a portion of the wastes shipped offsite. If a generator fills out a manifest partially, or illegibly, these partial data are entered into a suspense file. DHS estimate that approximately 20 percent of the manifests are in the suspense file. It is not known what waste types or volumes this represents. Beyond the suspense file data, the "unknown" manifest summaries were not received. The DHS summaries contain errors. For example data from other counties were included. The tables in the Plan have been corrected.

Although data theoretically describe all county wastes shipped offsite, in reality many Alameda County generators do not fill out DHS manifests. Many small generators may be unaware that they produce hazardous wastes, or that they are required to submit information to the state and others are unwilling to incur the high costs of full compliance.

DHS has developed a series of formulas (based on an EPA survey of small quantity generators) to estimate the number of unidentified small quantity generators (SQGs) and the hazardous wastes they produce. This "No Survey Method" is described in the DHS Guidelines for Preparation of Hazardous Waste Management Plans: Technical Reference Manual (TRM). This method provides calculations to estimate the waste streams produced by 22 industry groups. The TRM lists several Standard Industrial Classification (SIC) codes of businesses in each industry group.

Calculations were made for each industry group using only businesses whose SIC codes were included in the TRM. There may be businesses which were not included in calculations, yet are potential generators; therefore the list of generators may not be complete. Numbers of businesses in Alameda County came from the Bureau of Census, 1985 County Business Patterns. This is currently the most reliable source for information regarding county business profiles; however, it too may contain errors such as listings of local business offices for out-of-county generators. The conversion factors in the TRM for the amounts of waste generated by an industry group are single numbers applied to all businesses within that industry group, regardless of their size. This could lead to inaccuracies because large businesses typically generate more wastes than do small ones. An effort was made to calibrate the conversion factors to business size using DHS manifest data, but without success.

Estimations of waste oil generation outside the manifest system were made separately, using conversion factors provided by DHS for industry groups and County Business Patterns data and checked. These estimates seem reasonable according to conversations with several California waste oil recyclers. However, it has been difficult to justify the estimates in terms of known local waste oil sources.

One limitation affects all estimates included in this report: quantifying hazardous waste streams is a relatively recent undertaking. Thus, benefits of long term experience and practice that can add refinement to a process are lacking. This is evident in the problems identified with the No Survey Method. Many of the studies available to help estimate household hazardous waste streams, have limitations which are discussed later in this chapter. Inspection programs in Alameda County are

not completely developed. Much of the data available from the Department of Environmental Health (DEH) about the businesses it has inspected to date were not complete enough for this analysis, or is in the process of being coded. Some city fire departments have extensive data on hazardous materials storage, but not on hazardous waste generation. In 1991, no commonly accepted system existed to estimate hazardous wastes from leaking underground tanks. For these reasons, the data presented in this analysis should be viewed as preliminary and subject to change as data collection and analysis efforts continue and improve. A program of ongoing data collection and analysis will be essential to monitor the changing hazardous waste stream in the county.

C. OVERALL TYPES AND VOLUMES OF HAZARDOUS WASTES

The 1986 annual waste stream for Alameda County is summarized in Table 3-1 and shown graphically in Figure 3-1. It includes manifested wastes, estimates of wastes from small quantity generators, an estimate of wastes from leaking underground tank remediation, and an estimate of annual household hazardous waste generation. The total is just over 100,000 tons per year (200 million pounds).

Manifested wastes account for half of the estimated total county waste stream, and wastes from recycling operations account for fully another 15 percent of the total. These facts suggest that significant progress has been made in managing hazardous wastes in Alameda County. In many counties, 80 to 90 percent of all hazardous wastes appear to fall outside the formal manifest system. Recycling is desirable as a waste management technique; few counties in California can count wastes headed for recycling as up to one-quarter of their total manifested wastes.

Examination of manifest data reveals errors in the basic manifest listings, and shows that some listings--such as those for recycled products--can be misleading. The original total for 1986 manifest wastes in Alameda County was 66,694 tons, as shown on Table 3-2. Corrections and adjustments, as shown, isolate those hazardous wastes--50,267 tons--that comprise Alameda County's regular annual waste stream. The 15,834 tons of recycled wastes were isolated from other categories of the manifested wastes The adjusted figure of 50,300 tons/year has been used in Table 3-1 for manifested hazardous wastes, plus another 15,800 tons/year of wastes designated for recycling.

Table 3-1 also shows the impact of small quantity generators in Alameda County; fully 32 percent of the estimated hazardous waste stream comes from several thousand small firms, outside the DHS manifest system. By comparison to the smaller generators, household hazardous wastes (1,900 tons) and contaminated soils from cleanup of leaking tanks (900 tons) are very small.

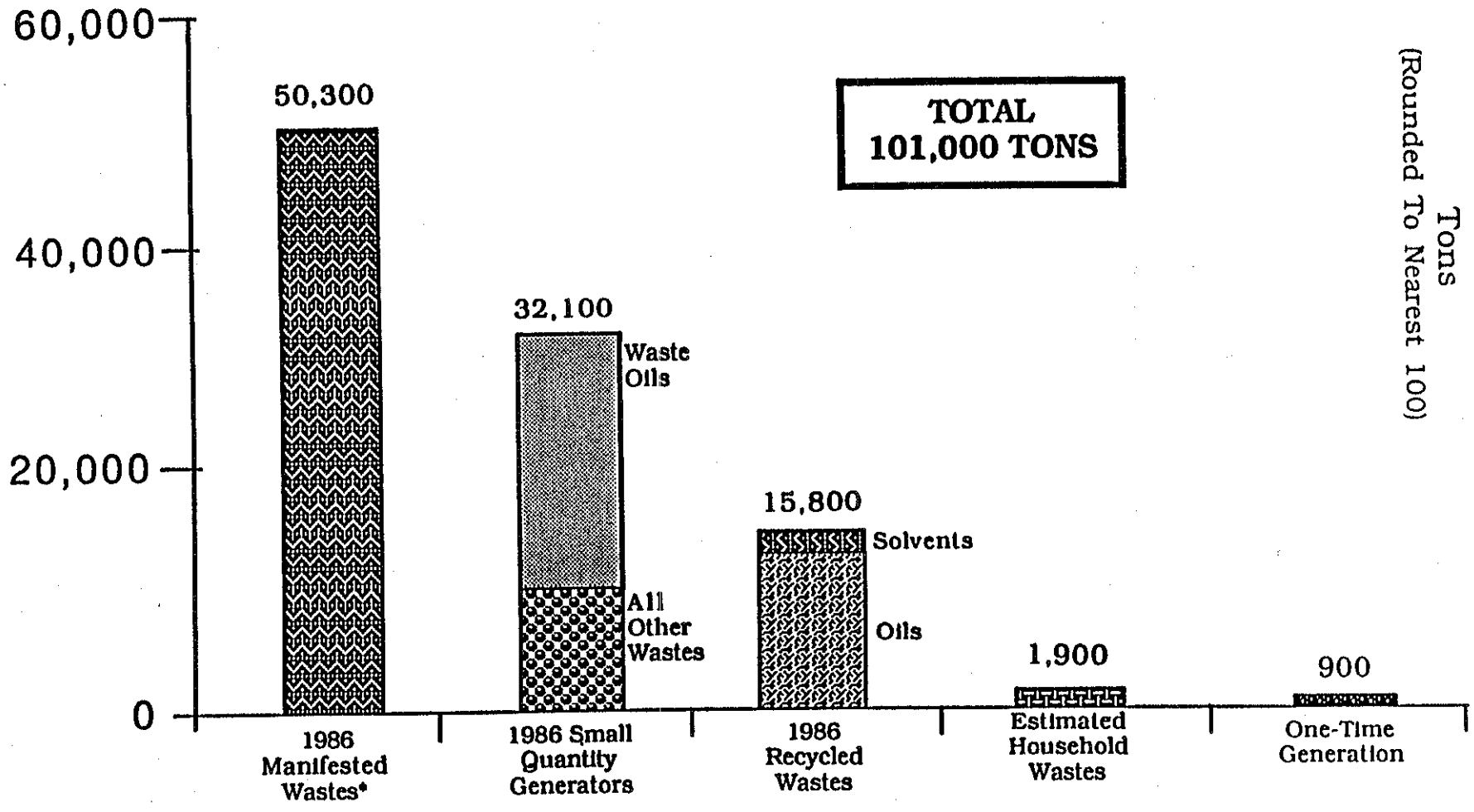
Table 3-1
Hazardous Waste Summary
1986[a]

		Tons per Year
Manifested Hazardous Wastes[b]		50,300
Waste Oils	(16,500)	
All Other Wastes	(33,800)	
Small Quantity Generator[c] Hazardous Wastes[d]		32,100
Waste Oils[e]	(22,600)	
All Other Wastes	(9,500)	
Waste from Cleanup of Leaky Underground Tanks		900[f]
Household Wastes[g]		1,900
Subtotal		85,200
Recycled Wastes		15,800
Oils	(13,300)	
Solvents	(2,500)	
TOTAL		101,000

[a]All waste streams are rounded to the nearest 100 tons per year. For actual value, see appropriate table.
[b]See Table 3-2 for correction method from formal DHS manifests.
[c]Equivalent to a yearly waste stream of less than 13.2 tons (1,000 kg per month)
[d]Data generated from the No Survey Method outlines in the Technical Reference Manual developed by DHS.
[e]Adjusted to account for the amount of oil manifested in the county in 1986.
[f]Mean of range, 700 to 1,100 tons/year.
[g]Based on estimate of 3.44 kilograms per year (7.56 pounds per year) from recent survey in Marin County. There are 492,271 households in Alameda County according to the Department of Finance (January 1, 1988).

FIGURE 3-1

Hazardous Waste Summary 1986



*Excludes One-Time And Recycled Wastes

Table 3-2
Hazardous Waste Manifest Data
1986

	Number	Tons
Regular Manifestors[a]	627	63,873
One-Time Manifestors	149	2,821
Subtotal	776	66,694
Corrections:		
Wastes Incorrectly Manifested in Alameda County[b]		(593)
Subtotal		66,101
Recycled Wastes[c]		
Waste Oil Products		(13,340)
Solvent Products		(2,494)
Subtotal Corrections[d]		(15,834)
Total Corrected Manifested Hazardous Wastes		50,267

[a]Each manifestor has an EPA ID number, but one company can have multiple ID numbers. A company may be included more than once.

[b]These wastes were generated in other counties but mistakenly included in the Alameda county manifest list supplies by DHS.

[c]Wastes manifested by recyclers in Alameda County do not correlate with other kinds of hazardous wastes. Recyclers are allowed to pick up wastes from their customers without filling out a detailed manifest form. They complete a daily form showing the volume of wastes they have collected which is entered in the manifest system as if it were generated at the location of the recycler, when in reality these wastes are being "imported" to that location. Moreover, these recyclers pick up wastes from customers outside Alameda County, yet their manifests are keyed to their location within Alameda County. These wastes are so different that they deserve separate analysis.

[d]Wastes such as contaminated soils, asbestos and PCBs, which result from one-time occurrences, were not subtracted from the manifest total because in a large county such as Alameda, with its sizeable industrial profile, such nontypical, one-time occurrences are an expected waste stream element. Wastes from companies which have gone out of business were included in the manifest total.

D. WASTE OILS

In Table 3-1, waste oils represent more than twice the amount of all other wastes estimated for small quantity generators. The total of waste oils from small generators, combined with those from generators and recyclers covered on the DHS manifests, accounts for 36 percent of Alameda County's estimated total hazardous waste stream.

Table 3-3 focuses on the six recyclers in Oakland, Pleasanton, and Newark in operation in 1986. Together they manifested 24 percent (15,834 tons) of all 1986 manifested county wastes. The three recyclers in Oakland and the one in Pleasanton transfer hazardous wastes to their facilities in these cities, but are not the actual "generators" of these wastes. DHS grants variances for oil and solvent recyclers, allowing them to minimize the paperwork of filling out a manifest for each collection made during the day by submitting only a summary manifest to report the total amount of waste collected which shows only the address of the recycling facility, not the locations of the original generators. Alameda County's recyclers collect from many counties, yet their daily manifests show only these Alameda recycling facility addresses, even though some were generated in other counties.

All American Oil Company in Pleasanton and Waste Oil Recovery Systems in Oakland together account for over 90 percent of total waste recycling shown on 1986 manifests for Alameda County. Artesian Oil Recovery in Oakland is much smaller. Waste Oil Recovery Systems shows 5 tons of oily sludges sent for disposal, as well as the 5,275 tons of oils collected for recycling. All American Oil shows only the 6,149 tons of oil for recycling, with no oily sludges for disposal.

Safety Kleen Corporation in Oakland operates a recycling system for waste solvents, particularly from dry cleaners. This firm in 1986 showed 2,289 tons of solvents (over 97 percent nonhalogenated) headed for recycling in Oakland. Baron-Blakeslee recycled 196 tons of halogenated solvents in 1986. In Newark, RCA Oil Recovery is a waste oil hauler, not a recycler. This hauler's wastes are collected from firms in several counties and then deposited at a Santa Clara County transfer station each day. They are neither stored nor recycled at Newark; only the hauler's business office is there. The wastes are not necessarily generated in-county; and in-county efforts to reduce hazardous waste generation are not likely to significantly affect these totals.[2]

E. MANIFESTED HAZARDOUS WASTES

Table 3-4 lists Alameda County's cities in decreasing order of their contribution to the 1986 manifested hazardous waste stream. Geographical distribution of hazardous wastes shifts when

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[2]Evergreen Oil Inc., started an oil recycling plant in Newark in 1986, producing no hazardous waste byproducts. Approximately 21,000 tons of waste oil were recycled in 1987. Of this amount it is estimated that 2,700 came from Alameda County. Capacity of the plant is 35,000-42,000 tons per year. This plant significantly increases the County's waste oil recycling capacity.

Table 3-3
Waste Oil and Solvent Recycling Facilities in Alameda County
(By City and Waste Category Manifested)
1986

	Waste Oil for Recycling	Halogenated Solvents for Recycling	Nonhalogenated Solvents for Recycling	Oily Sludge from Recycling	Total	Percent of Total City Waste
Newark						
RCA Oil Recovery	1,035				1,035	
Baron-Blakeslee, Inc.		196			196	
Total	1,035	196			1,231	24
Oakland						
Artesian Waste Oil Recovery	876				876	
Safety Kleen Corporation		64	2,225		2,289	
Waste Oil Recovery Systems	5,275			5	5,280	
Total	6,151	64	2,225	5	8,445	49
Pleasanton						
All American Oil Company	6,149	9			6,158	82
Overall Total	13,335	269	2,225	5	15,834	

Percent of total manifested wastes in Alameda County: 24 percent.

Table 3-4
Waste Stream Generation by City
1986 Manifest Data

City	No. of Manifests	Manifested Wastes (Corrected)		All Manifested Wastes	
		TPY	Percent	TPY	Percent
Oakland	201	8,707	17	17,152	26
Emeryville	36	7,379	15	7,380	11
Hayward*	115	7,305	15	7,305	11
Fremont	118	5,637	11	5,637	9
Newark	29	3,901	8	5,132	8
Alameda	31	3,759	7	3,757	6
Livermore	25	3,352	7	3,351	5
Berkeley	70	3,267	6	3,266	5
Union City	20	3,032	6	3,032	5
San Leandro	78	2,173	4	2,174	3
Pleasanton	20	1,378	3	7,537	11
Piedmont		91	<1	91	<1
Albany		46	<1	46	<1
Dublin	24	33	<1	33	<1
Unincorporated		206	<1	206	<1
TOTALS	776	50,266	100	66,101	101

*The City of Hayward Fire Department reports that Davis Walker installed a dryer in October 1987 to process metal containing sludge which reduces waste form 604 to 135 tons per year, a 78 percent reduction. In July 1988, Davis Walker installed an acid recovery system eliminating disposal of 4,120 tons of metal containing liquid. Total reduction of waste is from 4,724 to 135 tons per year, a 97 percent total reduction. This significantly reduces the portion of the County waste stream composed of metal containing liquids generated in the City of Hayward. As a result, total waste generated in the City of Hayward has dropped from 7,305 tons in 1986 to 3,716 tons in 1988.

recyclers are considered separately. Pleasanton manifests more than any other city except Oakland because it is the location of All American Oil Company. When recyclers' manifests are excluded, however, Pleasanton drops.

Figure 3-2 shows this situation graphically. From the corrected data without recycling, Oakland, Emeryville, and Hayward account for 46 percent of the county's total. Although Emeryville contributed substantially to the manifested waste stream, only 36 generators, as compared with 201 in Oakland and 115 in Hayward, produced this waste. While two of these sources in Emeryville were large cleanups, the percentage of mid- and large-sized manifested generators in Emeryville is greater than in other Alameda County cities.

Inspection of the data shown in Table 3-5 reveals the types of manifested hazardous wastes generated by each city in the County. These data include all manifested wastes, the recycled ones among them (wastes from small generators are not included here).

Waste oils are manifested primarily in Oakland, Pleasanton, and Newark, locations of the three oil recyclers and one hauler. These wastes were not necessarily generated in these cities. Hayward generates a significant volume (506 tons) of waste oils. The Naval Air Station in Alameda also manifests a substantial amount (496 tons) of waste oil (672 tons in the city as a whole).

Miscellaneous waste is the second largest manifested waste category in Alameda County: 9,320 tons. Asbestos, inorganic solids, pharmaceuticals, aged organics, empty containers, photo and lab wastes, and household wastes are all included. These wastes represent a significant portion of almost every city's total manifested waste stream, but are particularly large in Oakland (2,238 tons), Emeryville (1,568 tons), and Berkeley(1,320 tons).

Metal-containing liquids compose the next largest portion of the waste stream: 6,922 tons. In Hayward, where 65 percent of the county's metal-containing liquids were generated in 1986, the Davis Walker Corporation produced 92 percent (4,120 tons) of these wastes. This company performs galvanizing processes which generate lead, zinc, and iron-containing liquids.[3] The 703 tons in Fremont come from several companies, many of which are in the semiconductor industry. Lawrence Livermore National Laboratory generates 98 percent (852 tons) of the metal-containing liquids in Livermore (total of 872 tons).

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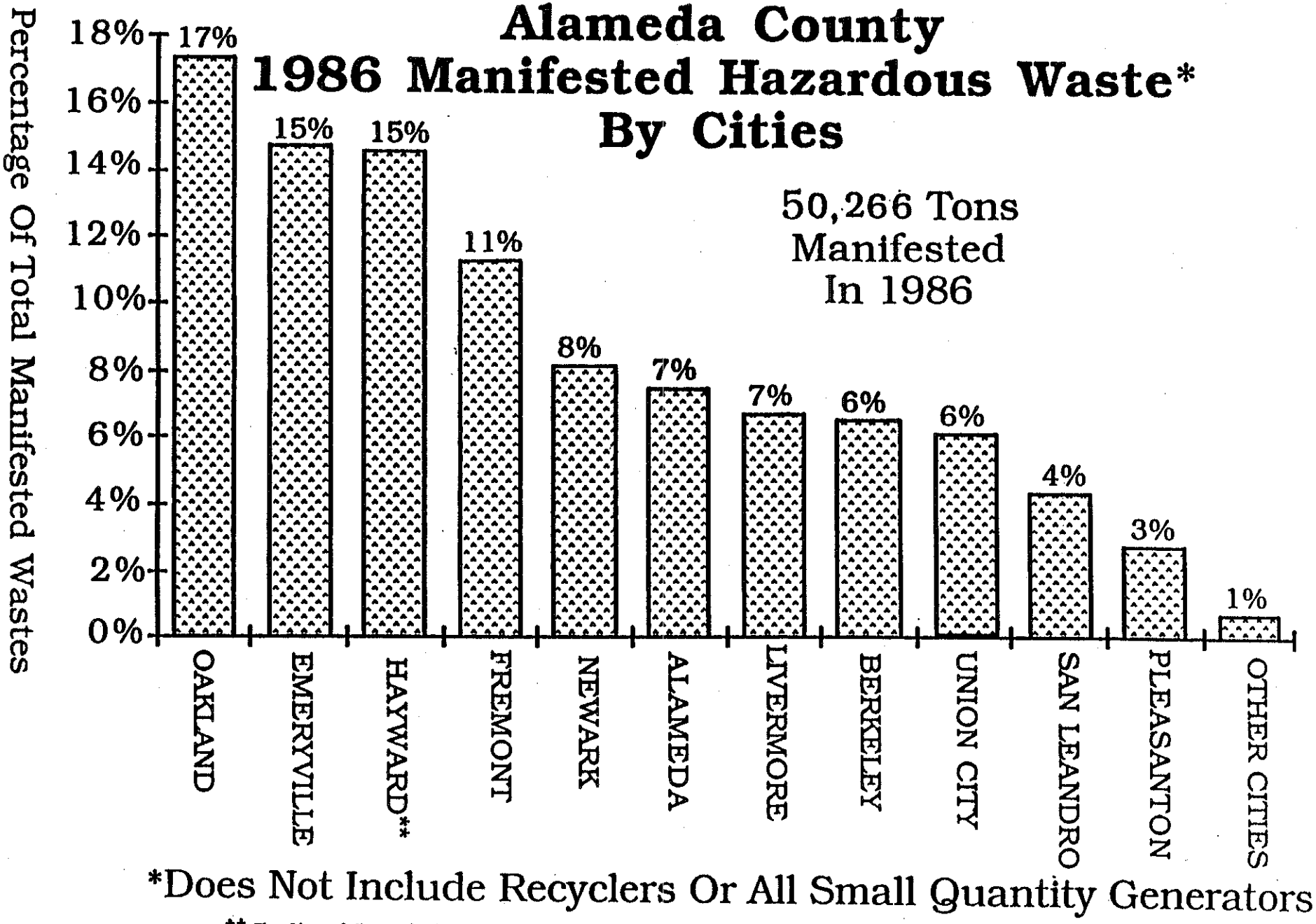
[3]The City of Hayward Fire Department reports that Davis Walker installed a dryer in October 1987 to process metal containing sludge which reduces waste from 604 to 135 tons per year, a 78 percent reduction. In July 1988, Davis Walker installed an acid recovery system eliminating disposal of 4,120 tons of metal containing liquid. Total reduction of waste is from 4,724 to 135 tons per year, a 97 percent total reduction. This significantly reduces the portion of the County waste stream composed of metal containing liquids generated in the City of Hayward. As a result, total waste generated in the City of Hayward has dropped from 7,305 tons in 1986 to 3,716 tons in 1988.

Figure 3-2



** The City of Hayward Fire Department reports that Davis Walker installed a dryer in October 1987 to process metal containing sludge which reduces waste from 604 to 135 tons per year, a 78% reduction. In July, 1988 Davis Walker installed an acid recovery system eliminating disposal of 4,120 tons of metal containing liquid. Total reduction of waste is from 4,724 to 135 tons per year, a 97% total reduction. This significantly reduces the portion of the County waste stream composed of metal containing liquids generaced in the City of Hayward. As a result, total waste generated in the City of Hayward has dropped from 7,305 tons in 1986 to 3,716 tons in 1988.

Table 3-5
Waste Stream by Geographic Location[a]
1986 Manifest Data
Alameda County

Waste Category[b]	Oakland	Pleasanton	Emeryville	Hayward[d]	Fremont	Newark	Alameda	Livermore	Berkeley
1. Waste Oil	6,974	6,195	166	506	132	1,267	672	201	89
2. Halogenated Solvents	370	12	14	59	21	132	24	190	4
3. Nonhalogenated Solvents	2,600	9	542	668	950	252	107	156	577
4. Organic Liquids	154	0	45	66	24	1,035	157	116	105
5. Pesticides	4	0	0	2	0	0	0	0	0
6. Dioxins and PCBs	2,372	6	3,001	51	48	0	266	202	11
7. Oily Sludges	457	2	333	794	344	127	174	78	5
8. Halogenated Organics Sludges & Solids	3	0	3	9	10	1	0	0	0
9. Nonhalogenated Organic Sludges & Solids	287	15	199	48	151	458	41	2	181
10. Dye & Paint Sludges and Resins	98	715	266	146	601	325	279	9	68
11. Metal-Containing Liquids	157	7	44	4,470	703	154	147	872	203
12. Metal-Containing Sludges	723	0	1	18	747	37	1	0	0
13. Metal-Containing Liquids (700 Series)	0	0	0	0	0	0	0	0	0
14. Cyanide & Metal Liquids	1	0	0	1	3	0	0	0	6
15. Nonmetallic Inorganic Liquids	232	408	356	84	445	100	267	724	18
16. Nonmetallic Inorganic Sludges	10	0	0	0	99	61	477	0	0
17. Contaminated Soil	472	1	852	245	225	150	427	299	679
18. Miscellaneous Waste	2,238	167	1,568	138	1,134	1,033	718	502	1,320
TOTAL	17,152	7,537	7,380	7,305	5,637	5,132	3,757	3,351	3,266
Percentage of Total	25.95%	11.40%	11.16%	11.05%	8.53%	7.76%	5.69%	5.07%	4.94%

[a]Greater than 1,000 tons/year each in 1986.
[b]Of the 776 manifested generators in Alameda County in 1986, 12 generators (greater than 1,000 TPY waste) created 52.4 percent of the waste stream.
[c]Exluding recycles, out of business manifestors and nontypical one-time wastes, 5 generators (greater than 1,000 TPY waste) created 20.1 percent of waste stream.
[d]The City of Hayward Fire Department reports that Davis Walker installed a dryer in October 1987 to process metal containing sludge which reduces waste form 604 to 135 tons per year, a 78 percent reduction. In July 1988 Davis Walker installed an acid recovery system eliminating disposal of 4,120 tons of metal containing liquid. Total reduction of waste is from 4,724 to 135 tons per year, a 97 percent total reduction. This significantly reduces the portion of the County waste stream composed of metal containing liquids generated in the City of Hayward. As a result, total waste generated in the City of Hayward has dropped from 7,305 tons in 1986 to 3,716 tons in 1988.

Table 3-5 (cont.)
Waste Stream by Geographic Location[a]
1986 Manifest Data
Alameda County

Waste Category[b]	Union City	San Leandro	Castro Valley[c]	Piedmont	`Albany	Dublin	Sunol[c]	Total	% of Total County Waste
1. Waste Oil	57	269	0	0	4	0	3	16,535	25
2. Halogenated Solvents	175	9	0	0	0	3	0	1,013	2
3. Nonhalogenated Solvents	59	574	166	0	3	8	0	6,671	10
4. Organic Liquids	3	27	1	0	0	0	0	1,733	3
5. Pesticides	0	0	0	0	0	0	0	7	<1
6. Dioxins and PCBs	18	0	0	0	0	0	0	5,975	9
7. Oily Sludges	852	48	6	0	1	1	0	3,222	5
8. Halogenated Organics Sludges & Solids	0	7	0	0	0	0	0	34	<1
9. Nonhalogenated Organic Sludges & Solids	936	70	1	90	0	0	0	2,479	4
10. Dye & Paint Sludges and Resins	63	175	0	0	0	12	0	2,757	4
11. Metal-Containing Liquids	153	15	0	0	0	1	0	6,928	10
12. Metal-Containing Sludges	0	3	0	0	0	0	0	1,530	2
13. Metal Containing Liquids (700 Series)	0	0	0	0	0	0	0	1	<1
14. Cyanide & Metal Liquids	26	0	0	0	0	0	0	37	<1
15. Nonmetallic Inorganic Liquids	276	6	0	0	0	0	0	2,905	4
16. Nonmetallic Inorganic Sludges	13	1	0	0	0	0	0	661	1
17. Contaminated Soil	42	901	0	0	0	0	0	4,292	7
18. Miscellaneous Waste	359	69	0	1	38	8	29	9,320	14
TOTAL	3,032	2,174	174	91	46	33	32	66,101	100
Percentage of Total	4.59%	3.29%	0.26%	0.14%	0.07%	0.05%	0.05%	100%	

[a]Figures rounded to the nearest ton.
[b]Waste categories defined in TRM.
[c]Unincorporated Area

Another 10 percent (6,671 tons) of manifested county hazardous wastes are nonhalogenated solvents. Oakland manifests the major portion; here the Safety Kleen Corporation recycles (but does not necessarily "generate") 86 percent of these. The New United Motors assembly plant in Fremont is the other large nonhalogenated solvent manifestor. Painting newly assembled cars accounts for most of this waste. Other cities with relatively large contributions to the total include: Hayward (668 tons), Berkeley (577 tons), San Leandro (574 tons), and Emeryville (542 tons).

"Dioxins and PCBs," often associated with one-time cleanups, represent the fifth largest waste category manifested in Alameda County in 1986. Oakland's Schnitzer Steel Company and Pacific Gas and Electric, in Emeryville, each had one-time cleanups in 1986 that involved large amounts of PCBs. These cleanups account for the major portion of wastes manifested in this category.

Another waste generated primarily in one-time spill or leakage events is contaminated soil. It accounted for 6.5 percent of Alameda County's 1986 manifested waste stream: 4,296 tons. The County will probably continue to have a variable amount of contaminated oil in its waste stream due to leaking underground tanks and unforeseen industrial spills.

These six waste categories constitute 75 percent of Alameda County's 1986 manifested waste stream.

Table 3-6 lists the 12 manifestors in Alameda County who generated more than 1,000 tons each of waste in 1986: of the County's largest generators, three are recyclers: the County's largest, 10th, and 12th largest in the DHS manifest data. Two, Judson Steel Corporation (No. 5) and Peterbilt Motors (No. 9), are now out-of-business and will not generate hazardous wastes in the future. Pacific Gas and Electric (No. 8) and Schnitzer Steel (No. 11) reported wastes from one-time cleanup events that will not continue to contribute wastes.

Only five of the largest generators remain from the original list of 12: Davis Walker Corporation;[4] New United Motors Manufacturing; Alameda Naval Air Station, Lawrence Livermore National Laboratories, and De Soto Incorporated.

In 1986, the 12 manifestors (0.5 percent of all manifestors) listed in Table 3-6 generated 52 percent of the county manifested waste stream. The adjusted total in Table 3-6 illustrates that when large-quantity recyclers, out-of-business manifestors, and generators of one-time cleanup wastes were eliminated, the adjusted total from large generators was 13,257 tons. In this light, 0.01 percent of all manifestors created 20.05 percent of the waste stream, with the other 99.99 percent of the manifestors creating 79 percent of the wastes. It is evident that a few large generators have a large impact on Alameda County's hazardous waste stream.

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[4]See footnote 3.

Table 3-6
Largest Hazardous Waste Generators in Alameda County[a]

Generator	Waste Category																	Total	Adjusted Total	Comments
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18			
1. All American Oil, Pleasanton	6,149	9																	6,158		Recycler.
2. Davis Walker Corp., Hayward							604				4,120								4,724	4,724	
3. Desoto Inc., Berkeley			397	49						54							478	126	1,104	1,104	
4. GM New United Motors, Fremont*	92	2	721	23		40	295			420		538			1	57	114	948	3,251	3,251	
5. Judson Steel, Emeryville																		1,424	1,435		Out of business.
6. Lawrence Livermore Nat'l Lab, Livermore	95	58	37	80		194	67				852				21		299	345	2,048	2,048	
7. Alameda Naval Air Station, Alameda	496	16	85	86		95	107		18	55	66	1			248	394		463	2,130	2,130	
8. PG&E, Emeryville	2					2,981	3			1	1				152			5	3,145		Nontypical one-time waste.
9. Peterbilt Motors, Newark	4	2	40	1,019			97			133	1				8	61		114	1,479		Out of business.
10. Safety Kleen Corp., Oakland		64	2,226																2,290		Recycler.
11. Schnitzer Steel Co., Oakland						1,849													1,849		Nontypical one-time waste.
12. Waste Oil Recovery Systems, Inc., Oakland	5,275						5												5,280		Recycler.
Totals	12,113	151	3,506	1,257	0	5,170	1,178	0	18	663	5,040	539	0	0	430	512	891	3,425	34,893	13,257	
Percent of Total County	73.4	14.9	52.5	72.5	0	86.5	36.5	0	0.8	24.1	72.5	35.1	0	0	14.8	77.3	20.4	36.7	52.4[b]	20.1[c]	
*New United Motors Manufacturing has provided the following corrected 1986 data for wastes shipped offsite.	62	5	690			5	349		374	389							115	1,007	2,996		

[a]Greater than 1,000 tons/year each in 1986.
[b]Of the 776 manifested generators in Alameda County in 1986, 12 generators (greater than 1,000 TPY waste) created 52.4 percent of the waste stream.
[c]Excluding recyclers, out of business manifestors and nontypical one-time wastes, five generators (greater than 1,000 TPY waste) created 20.1 percent of the waste stream.

Waste Categories:

1. Waste Oil
2. Halogenated Solvents
3. Nonhalogenated Solvents
4. Organic Liquids
5. Pesticides
6. Dioxins and PCBs
7. Oily Sludges
8. Halogenated Organic Sludges & Solids
9. Nonhalogenated Organic Sludges & Solids
10. Dye & Paint Sludges & Resins
11. Metal-Containing Liquids
12. Metal-Containing Sludges
13. Metal-Containing Liquids (700 series)
14. Cyanide & Metal Liquids
15. Nonmetallic Inorganic Liquids
16. Nonmetallic Inorganic Sludges
17. Soil
18. Miscellaneous Wastes

Table 3-7 provides data from the DHS manifests regarding the export and import of hazardous wastes from Alameda County.

The vast majority (almost 90 percent) of all manifested wastes were exported. The largest known recipient category (13,130 tons) is "unknown." Contra Costa County is second, at 12,013 tons. These wastes presumably went to the large IT Corporation complex in Martinez: Vine Hill/ Baker. (Note: most operations at this facility ceased in December 1987, when IT placed this facility--and others--up for sale). Kings County contains Chemical Waste Management, Inc.'s Kettleman Hills facility, and ranks next at 7,719 tons. Los Angeles County is the recipient for 6,623 tons. San Mateo is host to the Romic Solvent recycling facility and transfer station; it received a designated 5,317 tons. Solano County was next, at 4,912 tons; presumably these went to IT's Panoche landfill, closed in December 1986. Another 3,363 tons were shipped with DHS manifests to Santa Barbara County, location of the Casmalia Resources landfill. And, of the other flows over 1,000 tons, 1,979 tons were shipped to Santa Clara County, presumably most to the Solvent Services Company's transfer station in San Jose.

The 1986 manifest data indicate that a total of 111 firms in Alameda County used the Vine Hill/Baker complex in Contra Costa County. Now that this facility is closed, it is not known where these wastes are being managed. Table 3-8 summarizes available data on the 9,595 tons of wastes sent to this facility in Martinez in 1986; over 1,000 tons each of waste oils, organic liquids, oily sludges and resins; and over 2,000 tons of non-metallic inorganic liquids. Table 3-9 presents data on the 21 largest Alameda County generators using Vine Hill/Baker in 1986, each sending over 100 tons there. The six largest generators together sent almost 5,000 tons. All waste flows over 100 tons are shown. Details on all the individual generators are included in Appendix C.

F. SMALL GENERATOR WASTES

The No Survey Method in the TRM lists several industries as typical small quantity generators. The total number of Alameda County businesses in each of these industries, based on County Business Patterns data, is multiplied by conversion factors developed by DHS to determine the quantities of wastes each small generator produces. Tables 3-10 and 3-11 present data and estimates calculated using the No Survey Method. In a February 1988 survey of SQG, 305 of the 470 firms participating said they do not generate any hazardous waste. This finding may indicate that the number and amount of waste thought to be produced by SQG's may be high.

Because the wastes generated by these firms are diverse and the amounts generated per firm are small, owners and managers often have a difficult time disposing their wastes in an economical and environmentally-sound manner. Waste haulers are accustomed to dealing with larger waste generators and are resistant to accepting small amounts because of excessive per-shipment handling and disposal costs. The small generators are in the position of being required to dispose their wastes properly but without reasonable and accessible means to do so.

Table 3-7
Imports and Exports of Hazardous Wastes
Alameda County–1986

Waste Generated		**Tons Per Year[a,b] 66,101**
Waste Exported	**County Destination**	
Contra Costa	12,013	
Fresno	972	
Kern	290	
Kings	7,719	
Los Angeles	6,623	
Orange	52	
Sacramento	1,192	
San Bernadino	225	
San Francisco	121	
San Mateo	5,317	
Santa Barbara	3,363	
Santa Clara	1,929	
Shasta	164	
Solano	4,912	
Sonoma	20	
Stanislaus	615	
Unknown	13,130	
Other (Out of State)	302	**58,959**
Waste Remaining in Alameda		**7,142**
Waste Imported		
Contra Costa	68	
Kings	1	

Continued

Table 3-7
Imports and Exports of Hazardous Wastes
Alameda County–1986

Waste Generated		**Tons Per Year[a,b]** **66,101**
Waste Exported	**County Destination**	
Los Angeles	1,317	
Marin	33	
Orange	21	
Sacramento	181	
San Diego	1	
San Francisco	322	
San Joaquin	84	
San Luis Obispo	44	
San Mateo	3,347	
Santa Clara	203	
Santa Cruz	72	
Solano	7	
Sonoma	2	
Unknown	499	
Other (Out of State)	15	6,217
Net Waste to Alameda County		**13,359**

[a]Corrected for 593 tons incorrectly manifested in Alameda County. See Table 3-2.
[b]Figures rounded to the nearest ton.

Table 3-8
Hazardous Wastes Entering
Vine Hill/Baker Facility From Alameda County Generators

1 Waste Group/Waste Category	Tons
WASTE OILS	
221 waste and mixed oil	822
223 unspecified oil containing waste	241
	1,063
2 HALOGENATED SOLVENTS	
741 liquids w/halogenated organics 1,000 mg/L	52
	52
3 NONHALOGENATED SOLVENTS	
212 oxygenated solvent	4
213 hydrocarbon solvent	8
214 unspecified solvent mixture	91
	103
4 ORGANIC LIQUIDS	
133 aqueous with organics 10 percent	16
134 aqueous with organics 10 percent	1,001
342 organic liquid with metals	7
343 unspecified organic liquid mixture	166
	1,190
7 OILY SLUDGES	
222 oil/water separation sludge	1,019
352 other organic solids	2
	1,021
8 HALOGENATED ORGANIC SLUDGES AND SOLIDS	
451 degreasing sludge	6
	6
9 NONHALOGENATED SLUDGES AND SOLIDS	
241 tank bottoms	173
252 other still bottoms	87
491 unspecified sludge waste	23
	283

Continued

Table 3-8 Hazardous Wastes Entering Vine Hill/Baker Facility From Alameda County Generators	
1 Waste Group/Waste Category	**Tons**
10 DYE AND PAINT SLUDGES AND RESINS	
291 latex paint 461 paint sludge	74 1,003
	1,077
11 METAL-CONTAINING LIQUIDS	
111 acids with metals 121 alkali with metals 132 aqueous with metals	553 739 359
	1,651
12 METAL-CONTAINING SLUDGES	
171 metal sludge	287
	287
14 LIQUIDS CONTAINING CYANIDES	
711 liquids w/cyanides 1,000 mg/L	3
	3
15 NONMETALLIC INORGANIC LIQUIDS	
112 acids without metals 113 unspecified alkali solution 122 alkali without metals 123 unspecified alkali solution 131 aqueous solution with reactive ions 135 unspecified aqueous solution	214 18 502 196 1,041 186
	2,157
16 NON METALLIC INORGANIC SOLIDS AND SLUDGES	
421 lime sludge	477
	477
	Continued

Table 3-8 Hazardous Wastes Entering Vine Hill/Baker Facility From Alameda County Generators	
1 Waste Group/Waste Category	**Tons**
18 MISCELLANEOUS	
331 off-spec., aged, or surplus organics	27
541 photochemicals/photoproc. waste	6
561 detergent and soap	20
581 gas scrubber waste	175
	228
GRAND TOTAL	**9,598**

Table 3-9 Largest Alameda County Users of Vine Hill/Baker, 1986 (Tons)	
PETERBILT MOTORS, INC.	1,078
Aqueous solution with organic residues Unspecified organics (nonsolvents)	(897) (102)
NAVAL AIR STATION ALAMEDA	986
Lime sludge Alkaline solution with metals Waste oil and mixed oil	(394) (169) (132)
KAISER ALUMINUM & CHEMICAL CORP. I	824
Oil/water separation sludge	(780)
LAWRENCE LIVERMORE NATIONAL LAB	713
Alkaline solution with metals Acid solution with metals	(519) (121)
INTEL CORP. LIVERMORE CAMPUS	679
Aqueous solution with reactive anions	(664)
NUODEX	677
Paint sludge	(677)
KAISER ALUMINUM & CHEMICAL CORP. II	451
Aqueous solutions with reactive anions	(341)
Gas scrubber waste	(111)
SAN FRANCISCO CAN PLANT	386
Waste oil and mixed oil	352
NAVAL SUPPLY CENTER OAKLAND -- ALAMEDA FACILITY	364
Paint sludge	(148)
AC TRANSIT	359
Alkaline solutions without metals	(191)
Oil/water separation sludge	(157)
ARATEX SERVICES, INC.	331
Metal sludge	(252)
FMC CORP.	203
Acid solution with metals	(139)

Continued

Table 3-9
Largest Alameda County Users of Vine Hill/Baker, 1986
(Tons)

CAMPBELL CHAIN DIV., MC-GRAW EDISON CO.	197
Unspecified alkaline solution	(139)
CTS PRINTEX	169
PACIFIC GALVANIZING	160
Acid solution without metals	(160)
PACIFIC GAS AND ELECTRIC	152
Unspecified aqueous solution	(151)
NAVAL SUPPLY CENTER OAKLAND	147
Off-spec., aged or surplus inorganics	(105)
DEL MONTE CORP.	147
Unspecified oil-containing waste	(147)
FLINT INK CORP. CALINK DIV.	145
Alkaline solution with metals	(125)
H.B. FULLER CO.	127
Tank bottom waste	(106)
INDUSTRIAL ELECTRICAL MFG. INC.	102

Table 3-10
No Survey Method Summary
1986 County Business Patterns
Alameda County

Industry	Tons per Year	% of Total	No. of	% of All	WC1	WC2	WC3	WC4	WC5	WC6	WC7	WC8	WC9	WC10	WC11	WC12	WC13	WC14	WC15	WC16	WC17	WC18	TOTAL
Pesticide End Users	4	0.01	5	0.07					3													1	4
Pesticide Appl. Ser.	207	0.65	210	3.03					133													74	207
Chemical Manufacturing	546	1.70	23	0.33	465	19	19	15				1	1		4			1	17			4	546
Wood Processing	41	0.13	10	0.14						41													41
Formulators	174	0.54	49	0.71		45	45	26	6						4	6		2	29			11	174
Laundries	219	0.69	222	3.21									219									0	219
Other Services	157	0.49	204	2.95		1	1	141											7			7	157
Photography	220	0.68	105	1.52		3	3	2						2	51	51			2			106	220
Textile Manufacturing	0	0.00	0	0.00																			0
Equipment Repair	145	0.45	265	3.83		56	56	20						1					6			6	145
Vehicle Maintenance	20,583	64.16	2,284	32.99	15,810	253	253	48						48		48			143			3,980	20,583
Construction	605	1.89	1,375	19.86		91	91	290						56					8			69	605
Motor Freight Terminals	10	0.13	8	0.12		1	1							2								6	10
Metal Manufacturing	6,639	20.70	829	11.97	5,089	66	66	19				9	9	34	45	85		45	1,132			40	6,639
Furn/Wood Mfr'g and Ref'g	597	1.86	84	1.21	494	14	14	19				2	2	45								7	597
Printing and Ceramics	299	0.93	387	5.59		36	36	5						25	17	3		12	18			147	299
Cleaning Agents	25	0.08	8	0.12		3	3	4	6			0	0						8			1	25
Other Manufacturing	960	2.99	118	1.70	687	90	90	57				1	1		22		6					6	960
Paper Industry	7	0.02	2	0.03		2	2	2				0	0						1			0	7

Continued

Table 3-10
No Survey Method Summary
1986 County Business Patterns
Alameda County

Industry	Tons per Year	% of Total	No. of	% of All	WC1*	WC2	WC3	WC4	WC5	WC6	WC7	WC8	WC9	WC10	WC11	WC12	WC13	WC14	WC15	WC16	WC17	WC18	TOTAL
Educational and Voc Shops	42	0.13	123	1.78																			
						5	5	11						6					13			2	42
Analytical and Clinical Labs	365	1.14	302	4.36		71	71	71						68			3		78			3	365
Wholesale and Retail Sales	240	0.74	310	4.48		15	15	2	12					20					18			158	240
TOTAL	32,085	100.00	6,923	100.00	22,545	771	771	732	160	41	0	13	232	307	152	193	9	60	1,480	0	0	4,628	32,085
Percent of Total Wastes					70.28	2.40	2.40	2.28	0.50	0.13	0	0.04	0.73	0.96	0.47	0.06	0.03	0.19	4.61	0	0	14.42	100.00

WASTE CATEGORIES

1. Waste Oil
2. Halogenated Solvents
3. Nonhalogenated Solvents
4. Organic Liquids
5. Pesticides
6. Dioxins and PCBs
7. Oily Sludges
8. Halogenated Organic Sludges and Solids
9. Nonhalogenated Organic Sludges and Solids
10. Dye and Paint Sludges and Resins
11. Metal-Containing Liquids
12. Metal-Containing Sludges
13. Metal-Containing Liquids
14. Cyanide and Metal Liquids
15. Nonmetallic Inorganic Sludges
16. Nonmetallic Inorganic Sludges
17. Soil
18. Miscellaneous Wastes

NOTES

*Less than 0.5 tons per year.
*Adjusted for manifested waste oil (see Table 4.1)

Table 3-11
Distribution of Small Generators by City
Alameda County
(No Survey Method)

City	Vehicle Maintenance[a]	(Tons/Year) Construction[a]	Metal Manufacturing[b]	All Other[a]	Total
Oakland	6,552	193	1,729	1,355	9,829
Fremont	3,026	89	570	626	4,311
Hayward	1,894	56	735	392	3,077
Berkeley	1,955	57	328	404	2,744
Alameda	1,389	41	379	287	2,096
Pleasanton	887	26	761	184	1,858
San Leandro	1,231	36	218	255	1,740
Livermore	1,033	30	338	214	1,615
Union City	918	27	305	190	1,440
Newark	722	21	518	149	1,410
Emeryville	91	3	741	19	854
Dublin	403	12	3	83	501
Albany	290	8	5	60	363
Piedmont	192	6	9	40	247
Totals	20,583	605	6,639	4,258	32,085

[a]These wastes were distributed by city assuming that each city generates an amount of waste that is proportional to its population.
[b]Metal manufacturing wastes by city were determined assuming that each city generates an amount of waste from this business sector that is proportional to the amount of total corrected manifested waste for each city.

Federal law (specifically, the Hazardous Waste and Solid Waste Management Amendments of 1984 to the Resource Conservation and Recovery Act) defines small quantity generators as those who generate between 100 and 1,000 kilograms of hazardous waste per month. California law does not differentiate between those who generate less than 100 kilograms per month and those who generate more, so California laws and associated regulations apply to all hazardous waste generators no matter what the quantity.

Small quantity generators are a highly diverse, broadly dispersed group. Many of them are small businesses without highly-trained personnel or sophisticated waste management practices such as auto repair shops, gas stations, dry cleaners, and printing and duplicating shops. Typical wastes include: contaminated solvents, paint sludges, plating solutions, photographic solutions, acids, and waste pesticides.

Table 3-12 summarizes the Alameda County small quantity generator waste stream profile. The estimate for waste oil is large, accounting for 70 percent (22,545 tons) of all small quantity generators generation.

Solvents (halogenated and non-halogenated combined) account for nearly 5 percent of these wastes (1,540 tons). Vehicle maintenance, construction, and manufacturing are the three industries that generate the most small generator solvent wastes. Each utilizes heavy machinery which is commonly cleaned with solvents.

Closely following solvents, in order of contribution to the small generator waste stream are non-metallic inorganic liquids (1,479 tons). These come primarily (77 percent) from metal manufacturing. Many processes involved in metal work require use of strong acids and bases.

Miscellaneous wastes compose a significant percentage (14 percent) of the small generator waste stream: 4,627 tons. Table 3-10 shows that these miscellaneous wastes are generated in large part by the vehicle maintenance industry. This estimate can be misleading because lead-acid batteries are one waste included in this miscellaneous waste category. In fact, the No Survey Method conversion formulas attribute approximately 85 percent of all vehicle maintenance wastes to batteries. All waste stream estimates are based on weight; thus, lead-acid batteries account for a disproportionately large amount.

From the perspective of different groups of small generators, vehicle maintenance accounts for 20,583 tons (64 percent of the total), and fully 33 percent of all the businesses covered. Waste oils are dominant, of course, at 15,810 tons; miscellaneous wastes account for most of the rest.

Table 3-12
Small Quantity Generator Waste Stream[a]
Alameda County
No Survey Method

Waste Category	Tons Per Year	Percent
1. Waste Oil	22,545[b]	70.27
2. Halogenated Solvents	771[c]	2.40
3. Nonhalogenated Solvents	771[c]	2.40
4. Organic Liquids	732	2.28
5. Pesticides	160	0.50
6. Dioxins	41	0.13
7. Oily Sludges	--	0.00
8. Halogenated Organic Sludges and Solids	13	0.04
9. Nonhalogenated Org. Sludges and Solids	232	0.73
10. Dye and Paint Sludges and Resins	307	0.96
11. Metal-Containing Liquids	143	0.44
12. Metal-Containing Sludges	193	0.60
13. Metal-Containing Liquids (700 Series)	9	0.03
14. Cyanide and Metal Liquids	60	0.19
15. Nonmetallic Inorganic Liquids	1,480	4.61
16. Nonmetallic Inorganic Sludges	0	0.00
17. Soil	N/A	
18. Miscellaneous Wastes	4,628	14.42
Total	32,085	100.00

[a]Based on 1985 Alameda County Business Patterns.
[b]This number has been adjusted to account for the amount of oil manifested in 1986.
[c]These categories were split evenly since no distinction was made in EPA survey data.

Metal manufacturing accounts for another 21 percent of all small generator wastes: 6,639 tons. Most (5,089 tons) are again waste oils, plus 1,132 tons of non-metallic inorganic liquids. Together these two categories of small businesses account for almost 85 percent of all the wastes from these 6,923 firms; no other grouping comes to 3 percent by itself.

The estimates in Table 3-11 show the possible spread of hazardous waste generation by small generators among the 14 cities of Alameda County. These estimates are very approximate. Oakland accounts for 31 percent of the County's total: 9,973 tons. Fremont comes next at 4,217 tons; Hayward and Berkeley follow (3,079/2,805 respectively). Together these four cities account for 63 percent of the County total from small generators.

The summary in Table 3-13 illustrates that Alameda County's 6,923 small generators are for the most part (46 percent) small businesses with less than five employees. Only 9.3 percent have greater than 50 employees. This is shown graphically on Figure 3-3. It is significant to note that in the estimated waste stream small generators account for approximately one-third (32,085 tons) of the total estimated County hazardous waste stream, and that the major portion of these wastes comes from businesses with fewer than 50 employees.

SMALL QUANTITY HAZARDOUS WASTE GENERATOR SURVEY

1. INTRODUCTION

The purpose of this Alameda County Small Generator Survey was to confirm waste stream profiles for the major SQG industries in the County, and to obtain basic information about Alameda County's hazardous waste management practices and attitudes, particularly regarding barriers to further waste reduction.

A questionnaire was developed and survey undertaken to aid Alameda County in developing hazardous waste management programs suited to small quantity generators. The survey was also designed to demonstrate the usefulness of identifying small quantity generators by industry type.

Three types of industries in Alameda County were targeted for this survey of small quantity hazardous waste generators: vehicle maintenance, construction, and metals manufacturing. This selection was based on survey results from national studies,[5] and on the results of applying EPA/DHS "No Survey Method" techniques to the county's overall business patterns.[6] Firms in

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[5]Ruder, E.; Wells, R.; Battaglia, M.; and Anderson, R. (Abt Associates, Inc.) National Small Quantity Hazardous Waste Generator Survey-Final Report, prepared for EPA, Office of Solid Waste, February 1985.

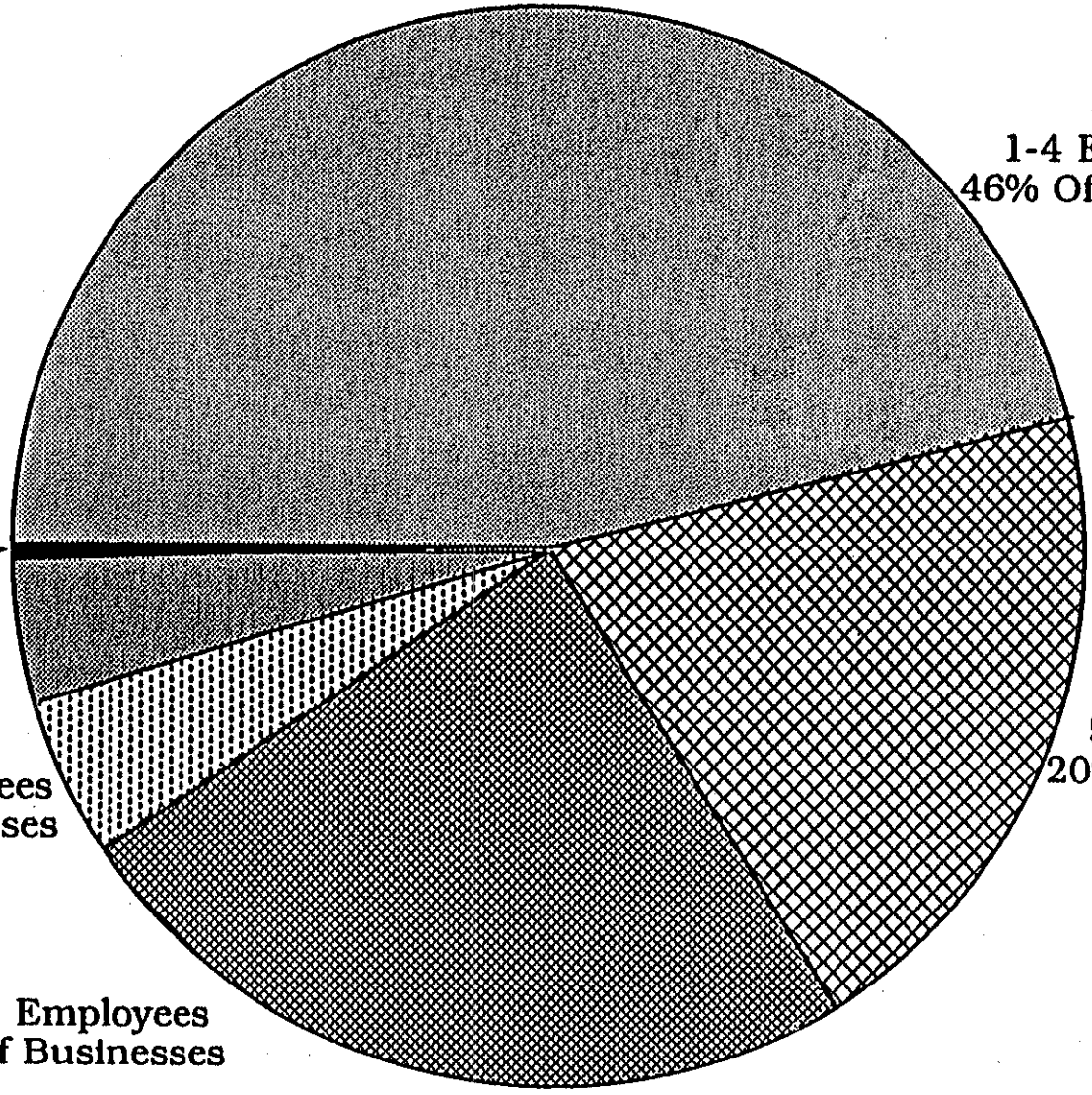
[6]The "No Survey Method" provides estimates of hazardous waste generation by typical firms in different industry groupings. These projections were applied to standard data on business patterns in Alameda County.

Table 3-13 Small Generators By Size of Firm[a]		
Number of Employees Per Business	**Number of Businesses**	**Percent of Businesses**
1-4	3,177	46
5-9	1,395	20
10-49	1,701	25
50-99	329	5
100-499	284	4
500+	37	1
Total	6,923	101

[a]Source: 1985 Alameda County Business Patterns

Figure 3-3

1986
Small Quantity Generators*
In
Alameda County



*6,923 Small Businesses Total

these categories were randomly sampled using Standard Industrial Classification (SIC) codes for businesses in the three main industrialized cities of Alameda County: Oakland, Hayward, and Fremont.

These three industry categories comprise the three largest groups of small quantity generators nationally, and roughly 85 percent of all small quantity generators in Alameda County based on the results of the No Survey Method. Therefore, the results of this telephone survey can be considered representative of small quantity vehicle maintenance, construction, and metals manufacturing generators in Alameda County.

Each respondent was told that the survey was being conducted to provide background information for Alameda County's preparation of its hazardous waste management plan, and assured that all specific answers would be kept confidential. Respondents were asked: (1) if their business used any of a few industry-specific hazardous materials, and (2) if their business managed any other hazardous wastes not previously mentioned. A negative response to both questions terminated the survey process at that point. This could mean that the responses under-represent actual condition.

An initial pool of almost 1,200 businesses was drawn randomly from a recent listing of Alameda County businesses by SIC codes.[7] During the three-and-a-half day interview period in February 1988, calls were placed to the telephone number listed for 874 of the firms.

Of the 470 cooperating firms, 305 (65 percent) said they did not generate any hazardous wastes; another 29 (6 percent) said they did not generate the hazardous wastes specified by the interviewer (from the lists supplied in the DHS TRM). These 29 firms were not asked the questions about how they managed the specific list of wastes, but did respond to the questions about waste reduction practices.

One hundred thirty-six Alameda County small businesses reported that they did generate one or more of the listed hazardous wastes, and responded to the complete interview: 56 in vehicle maintenance; 51 in metals manufacturing; and 29 in construction. Nearly all of these 136 firms generating hazardous wastes were small generators under the federal EPA definition (that is, they generate less than 1,000 kilograms of hazardous waste monthly). Of the three industry groups surveyed, small generators comprise 80 percent of vehicle maintenance, 90 percent of metals manufacturing, and the entire set of respondents from construction.

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[7]The SIC codes used for each industry are listed in California Department of Health Services, Technical Reference Manual of the Guidelines for the Preparation of Hazardous Waste Management Plans. California Department of Health Services, Toxic Substances Control Division, Sacramento, California, June 30, 1987.

Table 3-14
Scope of Telephone Survey -- Alameda County Small Generators

Business Identified (Total)	1,200	
Telephone calls placed	874	
Telephone contact impossible	341	39 percent
Firms contacted	533	61 percent
Firms declining to disclose information	63	12 percent
Firms cooperating	470	88 percent
Firms reporting no hazardous waste generation	305	65 percent
Firms generating no hazardous wastes on DHS list	29	6 percent
Firms generating hazardous wastes on DHS list	136	29 percent
Firms responding to questions on waste reduction	165	
Firms responding to complete questionaire Vehicle maintenance firms Metals manufacturing firms Construction firms	136 29	 56 (41 percent) 51 (38 percent) 21 percent

In the first section of the survey, companies were asked to provide information about their years in business, size, and membership in trade associations. Responses to these questions helped situate these companies with respect to expected waste management. For example, some fairly new companies with few employees might not have any hazardous waste management policy whatsoever; yet other new companies may be more likely to be educated and aware of hazardous waste issues. The survey was partly designed to determine how and why such a business would or would not have a waste management or waste reduction plan.

The following three sections summarize each industry's waste streams and their disposal practices. Section 5 then discusses current and future waste reduction efforts, and crucial issues facing each of the three industries surveyed.

2. THE VEHICLE MAINTENANCE INDUSTRY

Fifty-six businesses in the Alameda County vehicle maintenance industry were covered in complete interviews: 27 "service only" stations; 16 "gas and service" stations; and 13 sales or rental companies. Half of these 56 companies had been in business less than 10 years. Most were small companies; 85 percent reported fewer than 40 employees, and half reported less than 8 full-time employees. Roughly one-third of these stations belonged to one or more of 9 different trade associations.

The major hazardous wastes generated by this industry grouping consisted of waste oils, brake fluids, cleaning solvents, lead-acid batteries, spent catalytic converters, and oil-based paints. Ninety-four percent of the waste oil generated by businesses in this sector was sent offsite to one of a dozen oil companies or oil recycling firms. The annual rates of waste oil generation ranged from 5 gallons to 13,000 gallons, with half of the businesses reporting that they generated 1,000 gallons or less annually.

Nearly all of the lead-acid batteries generated by service stations were sent offsite either to battery companies or to battery recycling firms. Roughly half of the firms generated 100 batteries or less annually, though one firm generated as many as 2,600 batteries each year.

Small amounts of brake fluid were generated by approximately half of the respondents, generally in the range of 20 gallons per year per company. A few franchise outlets of major oil companies produced much larger amounts, and one generated as much as 3,300 gallons of waste brake fluid annually.

A little over half of the stations surveyed reported that they generated cleaning solvents, most of which were disposed by the solvent hauling and recycling company Safety-Kleen. The average amount produced annually was roughly 190 gallons. Old catalytic converters and oil-based paints were generated in very small amounts.

3. THE CONSTRUCTION INDUSTRY

The construction industry is made up of many different contractor services. Twenty-nine interviews were completed with construction industry companies. These companies included firms specializing in:

1) Concrete pouring
2) Roofing
3) Heat and air conditioning installation
4) Glass installation
5) Painting and drywall installation
6) Insulation
7) Floors and tile installation
8) Refinishing
9) Metals/Plastics

Half of these companies had been in business 15 years or less, with a range of 2 to 68 years. These were small companies, half of them employing less than 10 employees. Almost two-thirds of the companies surveyed belonged to a trade association.

Roughly half of these companies reported that they disposed their waste thinners, paints, acids, and solvents offsite. The other half reported that they recycled their own hazardous wastes onsite. The largest waste streams consisted of thinner (1 to 1,040 gallons per year) and solvents (1 to 440 gallons per year).

Respondents were asked questions about waste pre-treatment at two different points in the survey. When asked if they pre-treated their wastes before disposing them into sewers, respondents consistently replied "yes." The answers were more useful in finding out if businesses pretreated wastes at all than in discovering whether or not people actually poured hazardous wastes into their sewers. This is true for all respondents in the three industry types surveyed.

Inferences made from the responses of these industry members can only be tentative due to the small sample size and the diverse nature of the businesses grouped under the "construction industry" category.

4. THE METALS MANUFACTURING INDUSTRY

Fifty-one completed interviews were obtained from diverse businesses in the metals manufacturing industry which consists of machine shops, sheet metal workers, sign manufacturers, metals manufacturing shops, tool and die shops, and wrought iron shops. Half of these companies had been in business nine years or more. Typically, these were larger businesses than those in the vehicle maintenance industry; half of them employ 16 or more employees. Almost two-thirds were members of trade associations.

Acids, oil-based paints, oxidizers, cleaning solvents, and rinse water from plating baths were all cited as wastes generated by this industry. Approximately two-fifths of the companies surveyed reported that they generated waste acids and alkalis; half of these wastes were hauled offsite, and the other half recycled onsite. Half of the companies generating waste acids produced less than 153 gallons annually.

Eighty percent of the respondents said that they generated waste cleaning solvents, half of them at levels below 60 gallons per year, but some as much as 13,000 gallons annually. One quarter of these businesses generated waste paint, mostly at levels below 100 gallons per year. Almost all of the wastes mentioned above were hauled away by recyclers or solvent-hauling companies.

5. CURRENT WASTE REDUCTION PRACTICES AND PLANS

The second part of the Alameda County Small Generator Survey focused on waste management efforts that these companies have made, as well as programs that they have planned for the future. By asking whether or not a company had already made efforts to reduce their wastes, the survey determined what means businesses had used to achieve waste reduction, along with a qualitative assessment of their success rates.

When asked if their companies had taken steps in the last three years to reduce the amount of hazardous waste generated, a little over one-third of the construction industry respondents answered "yes." Waste reduction actions were reported by two-fifths of the service stations and half of the metals manufacturing industry respondents.

Those companies that had reduced their hazardous waste streams were asked if they had achieved reductions through:

- Onsite Recycling
- Process or Procedure Changes
- Substitution (of production inputs)
- Pretreatment of Wastes
- Use of Consultants
- Internal Waste Audits
- Other Steps

Respondents were also asked if they felt that a given reduction scheme had reduced their waste streams "as much as possible," or if there was still "room for improvement."

Process changes rated consistently highest among all "waste reducers." A significant amount of product substitution also occurred in all three industries, (approximately 60 percent of all waste reducer respondents reported trying some form of product substitution). Roughly two-thirds of the vehicle maintenance and metals manufacturing respondents who had used process changes and substitution reported that their efforts had reduced wastes "as much as possible." Answers from the construction industry revealed that construction businesses had even more success with process changes and substitution.

Of the "waste reducers," one-quarter of the vehicle maintenance and construction industry respondents, and one-third of the metals manufacturing respondents had used the services of a consultant. The two respondents from the construction business who had used a consultant reported having improved their waste reduction efforts as much as possible, while a small number of vehicle maintenance and metals manufacturing industry respondents said that there was still room to improve upon the waste reduction they had achieved with the services of a consultant. Two-thirds of the metals manufacturing businesses who had reduced their waste production had performed an internal audit of their hazardous waste generation streams. Audits had been done by a smaller proportion of vehicle maintenance (42 percent) and construction (30 percent) industry respondents, though this level of interest in use of waste audits is still quite impressive. Only the vehicle maintenance respondents reported that there was still significant room for improvement after completing their internal waste audits.

Of the "other methods" cited for reducing hazardous wastes, most were either onsite recycling plans (very prevalent among construction industry respondents), process changes that discontinued the use of a class of chemicals, or changes in the spectrum of services offered.

Both "waste reducers" and "nonreducers" were then asked if and how they had received information on waste reduction: from seminars or meetings, trade associations, suppliers, or the government. Approximately one-half of the respondents reported receiving information from trade associations. Suppliers generally reached more of the companies (60 percent). This was somewhat less true of metals manufacturing businesses; here 40 percent were reached by suppliers. Government agencies reached 40 to 50 of the companies surveyed.

Evidently, information about hazardous waste management is available and being distributed to many small quantity generators. For example, only 11 percent of the vehicle maintenance respondents reported receiving no information from trade associations, suppliers, or government agencies. A quarter of this group had received information from all three of these sources. This same group was less well-supplied with new information on changing laws and regulations regarding hazardous waste disposal (a final section at the end of the survey asked respondents how well they were kept abreast of ongoing legislation and administrative rule changes concerning hazardous waste management). Almost a quarter of the respondents had received no information on changing laws from either their trade associations, suppliers, or the government; indeed, only 17 percent of those who answered the "changing laws" questions received information from all three sources.

These results were mirrored fairly closely by the construction industry respondents, but substantially fewer metals manufacturing businesses reported receiving very much information--from any source. It can be inferred from the survey results that no single source of information consistently supplied industry members with both general hazardous waste management information and follow-up information at regular intervals on changing laws and regular requirements. It should also be noted that this issue is a relatively minor one to many small generators, in contrast to large businesses, academics, consultants, and lawyers who pay attention to these issues. Dry cleaners and service stations rarely have time to do so. They care most about

those regulations actually in effect that directly affect them--usually limited to those requirements actually being enforced by local health, sewer, or fire agencies.

In the next section, respondents were given five questions concerning various forms of aid for managing and reducing hazardous wastes. These included assistance with regulations and permits, information on waste minimization techniques, onsite consultations, financial assistance, workshops, printed information, or toll-free information lines.

Members of the metals manufacturing industry expressed the most interest in these possible assistance packages. Approximately half said they would request help with laws, minimization techniques, and onsite consultations.

Only a quarter of these respondents expressed any desire for financial assistance, however. This may mean that they did not fully understand the question. For example, they might not want a loan if they were afraid they could not pay it back; or some may be so unaware that they do not realize that effective regulatory compliance costs money.

Roughly two-thirds of the construction industry respondents reacted favorably to the idea of receiving assistance in understanding laws and regulations, in learning about waste minimization techniques, and in receiving onsite consultations. Only a quarter of these respondents expressed any desire for financial assistance, however.

Similarly, approximately two-thirds of the vehicle maintenance industry respondents reacted favorably to receiving assistance in understanding laws and regulations, in learning about waste minimization techniques, and in receiving on-site consultations. In this industry, a larger number (two-thirds) of the companies said that they would request financial assistance if it were available.

Most of the respondents preferred a mix of toll-free information lines and printed information to acquire information on managing and reducing their hazardous wastes. Construction industry respondents favored the toll-free lines slightly more than the printed information option.

Regardless of business type, almost all of those businesses who achieved some waste reduction did so with their own capital. Of those companies that did reduce their hazardous wastes, few expressed any interest in seeking financial assistance to further their waste reduction programs (62 percent 'no,' 27 percent 'yes,' the remainder 'not sure'). On average, two-thirds of all the respondents who did not reduce wastes were also uninterested in seeking financial assistance for waste reduction. Almost no respondents reported using any other financing arrangements such as bank loans, Small Business Administration (SBA) loans, or leasing schemes for waste management and reduction equipment.

6. PROGRAM PROPOSALS

An information center for hazardous waste management and reduction, could be accessed by a toll-free information line. Operators of an information center could be very efficient if they had access to on-line data that covered general issues as well as process-specific waste management details. A highly cross-referenced data base and/or links to appropriate agency officials and waste management firms should, ideally, enable information center operators to maintain a short turn around time for consultations.

G. WASTES FROM LEAKING UNDERGROUND TANKS

A small but predictable element of Alameda County's hazardous wastes will be contaminated soils from leaking underground tanks. The Regional Water Quality Control Board (RWQCB) is the lead agency monitoring identification and cleanup of contamination from leaking tanks. Table 3-15 presents estimates, based on RWQCB data and manifest data for tank cleanups, for the amount of contaminated soil that leaking underground tank excavations will produce in a typical year. There are 5,614 tanks in Alameda County. Approximately 10,520 tons of contaminated soil will require excavation due to leaks in these tanks. Based on a 10- to 15-year remediation schedule, this will generate approximately 900 tons of hazardous waste each year until remediation is complete.

H. HOUSEHOLD HAZARDOUS WASTES

An estimated 1,900 tons of hazardous waste are generated annually by Alameda County's 492,000 households, 7.56 pounds per year each, based on a recent survey in Marin County.

Households were recognized as a significant source of hazardous waste in the early 1980s. Pilot programs in Seattle, Washington and in Massachusetts inspired communities across the United States to learn more about the hazardous wastes generated by households; to educate residents about safer use, storage, and disposal; and to organize collection events to promote safer and more environmentally-sound disposal. Other problems associated with household hazardous waste include: contaminated leachate from municipal landfills, safety hazards to refuse collectors into and landfill operators, contamination of septic tanks, contamination into sanitary and storm sewers, and air pollution in urban areas due to evaporation of volatiles.

Table 3-15 Contaminated Soil From Underground Tank Cleanups[a]	
Fuel Tanks	4,187
Farm Fuel Tanks	92
Other Tanks[b]	1,335
TOTAL TANKS	**5,614**
Estimated Leaking Tanks	1,965[c]
Estimated Tanks Requiring Soil Excavation[c]	561
Soil per Excavation[d]	25 Tons
Estimated Soil Excavation Requirement	14,025
	0.75[e]
Estimated Probable Soil Excavation	10,520 Tons
Yearly Contaminated Soil Generation	700-1, 050 Tons Per yr[f]

[a]Tank census based on data from RWQCB Underground Container Program, 5/87
[b]Other than fuel storage; e.g., waste oil, solvent, etc.
[c]Based on national surveys, approximately 35 percent of all underground tanks will leak and another 10 percent of all tanks have required soil excavation.
[d]Based on 11 soil excavations in Alameda, Sonoma, and Marin Counties from DHS manifest summaries that clearly showed excavation for fuel tank remediations.
[e]Assume 75 percent of all leaking tanks are identified (consultant estimate).
[f]Based on a 10- to 15-year tank remediation schedule (consultant estimate).

The generation of household hazardous waste in Alameda County can be described in two ways: (1) in terms of estimated average amounts generated by each household in the county, and (2) in terms of amounts collected during household hazardous waste collection programs sponsored by various cities around the county. The first method is an extrapolation with many remaining uncertainties, and the second, though an actual measured volume, represents only the contribution of a highly motivated sector of the population and includes at least some material stored over a long period of time, not generated in one year.

Two studies have been conducted in the Bay Area in the last few years to determine the average amount of hazardous waste generated by individual households each year. Both studies were sponsored by the Association of Bay Area Governments (ABAG).

A 1985 study investigated household hazardous waste generated in the Bay Area and analyzed possible management approaches. The study included an analysis of use and disposal of hazardous household products in Hayward. Homeowners and tenants were questioned about the following product types:

- Household Cleaners
- Chemical Drain Openers
- Auto/Furniture Polishes
- Engine/Gasoline Cleaners
- Antifreeze
- Paints/Paint Thinners
- Wood Preservatives
- Pesticides (Insecticides)
- Herbicides
- Pool Chemicals
- Motor Oil
- Radiator Flushes

The respondents were also asked about how these products were discarded and in what volumes. Disposal methods included:

- Poured into Storm or Sanitary Sewers
- Discarded in Municipal Trash Collection
- Poured on the Ground
- Poured onto the Street
- Stored in a Basement or Garage
- Recycled

This study estimated a range of average annual volumes of hazardous waste from 1.8 to 3.5 gallons per household. More than half the homes surveyed used cleaners, pesticides, polishes, and paints/thinners. About a third discarded motor oil and antifreeze, even more so in suburban residential areas. The most common disposal method was in the municipal trash. Though motor

oil was more frequently recycled than other products in 1985, falling crude oil prices since that time have decreased the availability of free oil recycling services and the practice has become less common. Using a 1987 California Department of Finance estimate of 492,000 households in Alameda County, the data from this ABAG study would indicate a countywide annual generation rate of between 886,000 and 1,723,000 gallons per year.

Another ABAG-sponsored study was conducted in 1986 by University of Arizona anthropologists. This study involved collecting waste material directly from the curb in several Marin County neighborhoods (about 1,000 households). The hazardous materials were then identified and weighed (the container weight was not included). Wastes included toilet bowl cleaners, bleach, cleansers, oil, antifreeze, batteries, pool chemicals, hobby products, and many other associated materials. Researchers estimated that the average household generated about 66.2 grams of hazardous waste each week, or about 3.44 kilograms per year (7.56 pounds per year). Extrapolating this estimate for the 492,271 households in Alameda County, this second ABAG study would indicate an annual countywide generation of about 1,860 tons.

It is important to remember that household hazardous waste is a relatively new area of study and average per household estimates are somewhat controversial. Study criteria tend to vary, and weight estimates cannot be directly compared to volume estimates. As more and more corroborating data are collected, the volume of hazardous waste generated by households will be more accurately determined.

I. CONCLUSIONS

Table 3-16 and 3-17 are designed to pull all these data together in a concise form. Types of waste are shown in Table 3-16, from those 770 firms using the manifest system plus 6,923 firms not using manifests and the households and underground tank cleanup estimates. These summary data exclude only the recycled wastes.

The countywide total of 85,107 tons is dominated by waste oil (30%), almost entirely from small generators outside the manifest system (88%). Miscellaneous wastes account for another 18 percent of the countywide total; here they split 60/40 between those using the manifests and those outside the system. Several other large total waste streams are worthy of note.

- Metal-containing liquids, 7,070 tons, 98% manifested
- Non-halogenated solvents, 5,217 tons, 85% manifested
- PCBs and dioxins, 6,016 tons, 99% manifested (one-time cleanup wastes).

Table 3-17 summarizes total hazardous waste generation in Alameda County by location. As expected by its size and industrial base, Oakland is the largest source by far of waste generation: 19,330 tons (23% of the county total). This sum is split rather equally between those small firms outside the manifest system and those using manifests (45% manifested). Clearly small-generator wastes from Oakland (9,973 tons) are a major priority for attention under this plan.

Table 3-16
Total Hazardous Waste Generation, By Type -- 1986
Alameda County
(Excludes Recycled Wastes)

Waste Category	Manifested Waste	Small Generators Wastes	Household Wastes	Tank Cleanup Wastes	Total
Waste Oil	3,196	22,545	--	--	25,741
Halogenated Solvents	744	771	--	--	1,515
Nonhalogenated Solvents	4,446	771	--	--	5,217
Organic Liquids	1,733	732	--	--	2,465
Pesticides	6	160	--	--	167
Dioxins + PCBs	5,975	41	--	--	6,016
Oily Sludges	3,222	--	--	--	3,222
Halogenated Organic Sludges and Solids	34	13	--	--	47
Nonhalogenated Org. Sludges and Solids	2,479	232	--	--	2,711
Dye and Paint Sludges and Resins	2,757	307	--	--	3,064
Metal-Containing Liquids	6,927	143	--	--	7,070
Metal-Containing Sludges	1,530	193	--	--	1,723
Metal-Containing Liquids (700 Series)	1	9	--	--	10
Cyanide and Metal Liquids	37	60	--	--	97
Nonmetallic Inorganic Liquids	2,905	1,480	--	--	4,385
Nonmetallic Inorganic Sludges	661	0	--	--	661
Soil	4,292	N/A	--	896	5,188
Miscellaneous Wastes	9,320	4,628	1,860	--	15,808
TOTALS	**50,266**	**32,085**	**1,860**	**896**	**85,107**

Table 3-17
Total Hazardous Waste Generation, By City -- 1986
(Excludes Recycled Wastes)

City	Manifested Wastes (Corrected) TPY	Small Generation Wastes TPY	Household Wastes[a]	Tank Cleanup Wastes[a]	Total
Oakland	8,707	9,829	536	258	19,330
Emeryville	7,379	854	7	4	8,244
Hayward	7,305	3,077	155	75	10,612
Fremont	5,637	4,311	247	119	10,314
Newark	3,901	1,410	59	28	5,398
Alameda	3,759	2,096	114	55	6,024
Livermore	3,352	1,615	85	41	5,093
Berkeley	3,267	2,744	160	77	6,248
Union City	3,032	1,440	75	36	4,583
San Leandro	2,173	1,740	100	48	4,061
Pleasanton	1,378	1,858	73	35	3,344
Piedmont	91	247	16	8	362
Albany	46	363	24	11	444
Dublin	33	501	33	16	583
Unincorporated	206	*	176	85	467
	50,266	**32,085**	**1,860**	**896**	**85,107**

[a]Assumed proportional to population.

Three other cities appear as large sources of waste generation; here, however, the relative proportions of manifest/small generator are quite divergent:

- Hayward, 10,612 tons, 69 percent manifested
- Fremont, 10,314 tons, 55 percent manifested
- Emeryville, 8,244 tons, 90 percent manifested

Emeryville is dominated by larger generators using DHS manifests; Fremont has a very large small-generator component; and Hayward falls into the more-balanced category. Together these three cities account for another 34 percent of the county total.

Seven more cities fall into the net range in terms of their waste generation (from 3,323 to 6,309 tons). Again, the relative importance of small businesses to the total is quite varied.

- Berkeley, 6,248 tons, 52 percent manifested
- Alameda, 6,024 tons, 63 percent manifested
- Newark, 5,398 tons,72 percent manifested
- Livermore, 5,093 tons, 66 percent manifested
- Union City, 4,583 tons, 66 percent manifested
- San Leandro, 4,061 tons, 53 percent manifested
- Pleasanton, 3,344 tons, 41 percent manifested

Together these seven account for 41 percent of the county total.