

## Chapter 1

### BERKELEY'S HOUSEHOLD HAZARDOUS WASTE ALTERNATIVES

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If used or discarded improperly, hazardous substances found in the home can be detrimental to human health and the environment. Stored indefinitely, these substances pose a threat to the health of residents, and if a fire occurs, to firefighters. Sanitation workers loading waste into garbage trucks can also be hurt by these substances. Even small quantities disposed in municipal landfills may cause low-level organic toxic substances to contaminate groundwater many years after the trash is covered (Dunlap and Shew, 1976).

In order to assess aspects of the use and disposal of hazardous substances by Berkeley residents, Djon Gentry, Cheryl Swanson, Michelle Pappé, and Nancy Knappenberger conducted a telephone survey of 69 random households in Berkeley. This report analyzes survey responses to questions concerning disposal practices and the need for a disposal project, and then explores the possibility of a project that provides for the safe disposal of household hazardous substances in Berkeley.

#### Past Projects

Many people across the country have realized that household hazardous waste is a problem. Citizens' groups, local governments, and planning agencies are busy writing proposals for disposal projects. The details of the proposals differ due to the diverse needs of the communities involved, but nearly all the proposals are based on one of several experimental programs including information projects, transfer stations, and door-to-door collection.

The cheapest and least formal of the programs is a publicized information system, such as that being implemented by Clark Bledsoe at the Louisville and Jefferson County Department of Public Health in Kentucky. The program was begun in response to the many problems caused by improper waste disposal in and around Jefferson County, and the public awareness that followed (Bledsoe, 1984). The advice given emphasizes recycling, or using up household substances, due to the expense of commercial disposal. The program does not serve commercial establishments, which are referred directly to the agency that enforces hazardous waste laws in Kentucky.

The most popular option is a transfer station, either permanent or temporary, where people bring waste to be stored until a hauler picks it up. A permanent transfer station is operating in Richmond, and temporary transfer stations have been set up in both Sacramento County and the City of Palo Alto.

The Richmond transfer station is run by Bill Wahbeh of Bay Area Environmental. Waste is accepted from small businesses, homes, and institutions for \$2/gallon. The waste is separated by chemical type, and packed into 55-gallon drums. The drums are stored at the transfer station for a month or two until 80 or 90 drums are collected--enough for a truckload (Wahbeh, 1984). A waste hauler is then hired to take the waste to a Class-I disposal site.

The Sacramento and Palo Alto projects were temporary transfer stations funded mainly by public entities. The transfer stations were open Saturdays for consecutive weeks, and citizens could bring household waste for free disposal. As a public service and for publicity purposes, some commercial waste companies donated services. The Sacramento project served 250 households on ten consecutive Saturdays (Purin, 1984); the Palo Alto project served 144 households on two consecutive Saturdays (Burns, 1984).

An option thought by many to be the most convenient to homeowners is door-to-door collection of household wastes. Such a program was implemented by the fire department in Gresham, Oregon. Fire trucks were used to pick up wastes from four sections of the city on four consecutive Saturdays. This free service was advertised as part of a spring clean-up and recycling campaign, and a free fire safety inspection was offered at the time the waste was picked up (Stricker, 1984).

Although only experimental projects have been implemented in the U.S., in British Columbia, Canada, a more integrated program is being implemented. Secure transfer stations called "Regional Special Waste Storage Facilities" are being built in eight areas of the province, and capital and operating expenses are being absorbed by the provincial government. Free disposal is offered for small quantities, but there is a fee for larger amounts. Although some facilities are not yet built, many are operating, and full operation is expected within the next two years (Hubbard, 1984).

#### Survey of Berkeley Residents

In order to understand how Berkeley residents use and dispose of household hazardous substances, four members of the Environmental Science Senior Seminar conducted a telephone survey of 69 random households in Berkeley. The methodology and possible biases are discussed in the appendix to Section IV. A.

The responses to questions that assess residents' attitudes toward a disposal project are listed in Table 1A-D. 45 (65%) of the respondents were concerned about the disposal of household hazardous substances; 9 (13%) were not very concerned (Table 1A). 56 (81%) would definitely use a free service that would come to their homes to collect waste, and over 50% would definitely use each service mentioned (Table 1B). 55 (80%) would be willing to pay a \$1/year surcharge on their refuse bills, but only 20 (29%) would be willing to pay a \$5 or more user fee (Table 1C). Furthermore, only 27 (39%) would be willing to travel 5 or more miles to dispose of the waste (Table 1D).

**A** How important to you is the question of disposing of hazardous substances currently found in your residence? Please rate your feeling on a scale of 1 to 5 with 5 being "very concerned"; and 1 being "not at all concerned."

4	5	15	21	24	(number of people out of 69)
1	2	3	4	5	(rating)
		not at		very	
		all concerned		concerned	

**B** If there were several options for disposing of hazardous materials, would you please tell us whether or not you would definitely use each service, might use each service, or would not use each service.

	Would	Might	Not
A community "Dump Day" where you would take your hazardous waste to a special location, where it would be properly packaged and taken away.	57%	30%	13%
A neighborhood oil recycling collection site.	62%	16%	22%
A permanent community collection site for free disposal of other hazardous waste.	74%	20%	6%
A free service that would come to your home to collect wastes.	81%	15%	4%

**C** How much would you be willing to pay for these services?

nothing	10(14%)	people
\$2 user fee	16(23%)	"
\$5 user fee	12(17%)	"
\$8 user fee	8(12%)	"
\$1/year tax on garbage bill	55(80%)	"

**D** How far would you be willing to travel to dispose of this waste?

less than 5 miles*	61%
5-10 miles	33%
10-20 miles	4%
more than 20 miles	2%

\*including those not willing to travel

	% who use	% who dispose of waste#	Disposal method & No*
<b>E</b> Household cleaners(bleach, disinfectants, detergents, oven cleaners, window cleaners).....	96	12	a(4),b(4),f(1)
Chemical drain openers.....	41	5	f(1)
Auto, furniture, metal, or floor polish.....	58	12	b(4),f(1)
Motor oil and gasoline.....	52	37	b(5),c(1),d(3) e(15),f(1)
Antifreeze.....	39	14	b(1),c(9)
Engine cleaners/radiator flushes.....	19	6	c(4)
Paints, thinners.....	68	36	a(2),b(8),c(2) d(5),f(10),g(2)
Wood preservatives, stains, varnishes.....	52	15	a(1),b(4)
Weed killers, herbicides.....	26	7	no data
Swimming pool chemicals.....	1	0	"
Insecticides.....	78	10	b(5),d(1),f(1)
Miscellaneous(includes photo chemicals, batteries, unknowns, roofing tar, bullets).....	--	--	a(1),f(10)

# in the past year

\* Letters indicate method of disposal, according to the key below. Numbers indicate the number of people who reported using that disposal method. Those who disposed of a substance but did not specify the method are included in the second column, but not in the third.

a)down the drain    c)storm drain    e)recycle    g)evaporate(atmosphere)  
b)trash    d)pour on ground    f)store as a disposal method

Table 1. Responses to the Berkeley Household Survey.

The respondents' answers to questions concerning disposal practices are listed in Table 1E-F. The most commonly disposed substances were motor oil/gasoline, and paints/thinners. In both categories of substances, nearly 40% of the respondents had discarded something in that category during the past year (Table 1E). The most popular methods of disposal were the trash (31 instances were reported), storing as a disposal method (23 instances), and pouring down the storm drain (16 instances) (Table 1E). 23 (33%) of the respondents have hazardous wastes stored around their homes they wish they could discard safely.

Since many people did not tell us the amount they discarded, only what they discarded and how, I did not try to estimate the actual amounts going into each waste stream. Of the people who did estimate amounts, answers were typically one gallon or less for paints/thinners and engine cleaners/radiator flushes. For oil and antifreeze, answers were usually expressed as 2 or 3 times/year. For insecticides and household cleaners, amounts were usually small, such as an inch or two left on the bottom of a container. Although these were typical amounts, some of the quantities disposed of were quite large. One person put 2 quarts of pesticides in the trash, while another put 5 gallons of paints and thinners in the trash.

#### Discussion of Results

The major biases in the analysis of these results stem from the fact that many people aren't aware of the dangers of these products. With the exception of motor oil (see paper by Djon Gentry), people expressed little guilt when their disposal practices were not optimal. Consequently, one bias is that people probably did not remember disposing of hazardous substances if they were unaware of the hazards at the time of disposal. The second bias is that when asked about their attitudes concerning a disposal project, their answers may have been somewhat arbitrary, for many people had never formed opinions about the issues.

Although biases do exist, many people are concerned about the issues and have substances in storage that they wish to discard safely. Furthermore, although the amounts that are improperly disposed of may seem insignificant, if extrapolated to the entire Berkeley population, there may be a problem. These results show that a disposal project is needed, and would be a welcome community service.

#### Who Should Organize Project?

Theoretically, a small quantity transfer station could be a profit-making business, since waste disposers and haulers offer large scale discount prices. For example, Chemical Waste Management charges nearly half the price of disposing of a 55-gallon container to dispose of a one-gallon container. (30-40 one-gallon containers can be packed into a 55-gallon container) (Wahbeh, 1984). In addition, one 55-gallon drum costs \$300 to transport and dispose, while 80 or more drums cost

\$40 to \$50 per drum (Berkeley Solid Waste Management Commission, 1983). Of course, collecting small quantities of hazardous waste for a profit would work only if illegal disposal was much more difficult. For small to medium-sized businesses, illegal disposal may not be worth the potential cost, especially if enforcement gets tougher in the future. However, it is doubtful that homeowners will opt to pay the entire cost for disposal. Bill Wahbeh estimates that the cost to Bay Area Environmental for the handling and disposal of a 55-gallon drum is \$110, which amounts to \$3-4 per gallon container. The results of our survey show that most people in Berkeley would not be willing to pay this much. Therefore, it appears that a private, financially viable household hazardous waste disposal service is impossible in Berkeley, and public financing is necessary.

Any publicly financed project must be organized by one or two lead agencies. A regional approach may be the best, for just like any environmental issue, damages cross community borders. However, the EPA and the California Department of Health Services (DHS) are in the initial stages of regulating the major producers of industrial waste, and until this program is underway, small generators will be ignored. Local government must then take the responsibility for implementing a project.

In some communities, the appropriate initiator of a household waste project may be immediately apparent. The one-day project being planned for spring 1984 in Sunnyvale is a good example. The Sunnyvale Fire Department is unique in that it is licensed as a waste hauler, and has a hazardous materials response team which can perform emergency clean-ups. The department even operates a transfer station which is licensed to store hazardous wastes for up to seven days (Rand, 1984).

The Sunnyvale Fire Department is unique in that it has experience dealing with hazardous waste. In communities such as Berkeley, where such a situation does not exist, it seems that the biggest concern is whether the agency has a good working relationship with state and local governments. This is important not only for efficient organization and community confidence, but can be essential for interagency cooperation. For example, the Ventura Regional County Sanitation District planned to implement a disposal project, but was forced to cancel it due to the cost of documents required by another agency. It appears that interagency politics were responsible for the project's failure.

Since touchy political situations characterize any project with the label "hazardous waste," I think the initial organizing should be done by the city government in Berkeley. Since many diverse groups are active in Berkeley politics, it is important for the city council to approve a basic plan, and sponsor the project, while calling on other agencies such as the fire department and private companies for support.

#### Funding

Sacramento has shown that this type of project may be funded by many sources. The Sacramento project was initiated by the County Health Department, and received a grant from the DHS, a private

foundation grant, funds from the County Regional Sanitation District and Sacramento City Waste Removal, and contributed services from American Waste Container Service, Inc. and the Golden Empire Health Systems Agency (Purin, 1983 and 1984). However, it is likely that some of these sources, such as the DHS grant and private foundation support, were given to Sacramento because the idea was very new. Even though the project being planned by San Diego is of an experimental nature, this project is being funded only by city and county sources. It seems even less likely that a project implemented mainly as a service to the Berkeley community would be funded by state or private grants, unless there was something very unusual or original about the project.

There are only a few private disposal companies in the Bay Area that are able to offer donations and services for household waste projects. These companies are Chemical Waste Management, Safety Specialists, Inc., and IT Corporation. Chemical Waste Management hauled and disposed of the Palo Alto waste without charge. IT Corporation is planning to package and dispose of the waste for the Sunnyvale project at a discount, and will provide all the needed services for a project in Oakland. Of the three companies, Safety Specialists seems most interested in the household hazardous waste issue, for they actually have specialized plans approved by DHS and EPA that deal with household waste. The plans include packaging, computerized generation of a manifest, and a contingency plan. This service was provided at no charge to Palo Alto--the city had to pay for only materials and advertising (Frazier, 1984).

The Safety Specialists were also the most willing to discuss funding. They have agreed to donate their services to two additional communities as a public service, and would be willing to work with Berkeley. In the near future, however, they may have to establish a billing rate (Frazier, 1984).

Bay Area Environmental, the company that operates the transfer station in Richmond, may soon offer its services at more convenient sites within communities. If the company continues to charge low fees for services and disposal, Berkeley should consider hiring the company to implement the project.

As communities start contracting with companies to run programs, these companies will be less likely to donate services. It appears that Safety Specialists, IT Corporation, and Bay Area Environmental are both community service oriented, and may never make a profit on these services. However, to get the most out of private industry donations for a pilot project, Berkeley should plan a project very soon.

A permanent project should be funded by more reliable sources, such as a tax on refuse bills. In Berkeley, 80% of those surveyed would be willing to pay a \$1/year tax. Peter Burns of the Palo Alto project estimates that a similar project done twice a year would add only 72¢/year to each resident's sewer and landfill bills. Since few Berkeley residents are willing to pay the cost for disposal in a user fee, it appears that a tax is the best solution.

### Site

A review of many disposal programs indicates that providing a collection site is superior to door-to-door collection. A site is less expensive, and makes packaging and storage much easier. The director of the Gresham project (a door-to-door program), emphasizes that a collection site is much better, citing problems with packaging and emergency response plans (Stricker, 1984). San Diego is also planning a door-to-door project as one phase of its program. The initiators of the project believe that people may be more likely to use the door-to-door program. Our survey results show that this may be true; 80% would use a door-to-door service, and 57% would use a community dump day. However, this margin does not seem wide enough to justify the problems associated with a door-to-door program. Furthermore, we know that a collection site can lead to a substantial turn-out--in Palo Alto 0.7% of the households in the city used the site.

A major dilemma is that people support the idea, but do not want the site near their homes or businesses. This has not been a problem for any of the temporary transfer stations, but the permanent site in Richmond has been stymied by lawsuits. Even though the transfer station is surrounded by Chevron Chemical, which stores large quantities of hazardous substances, groups are suing the city and state, trying to get the transfer station's license revoked. In setting up a transfer facility, one must be aware that the words "hazardous waste" are emotionally loaded, and must be dealt with carefully.

With temporary transfer sites this problem does not seem to be critical. Sacramento is planning another project this spring in which some high schools will be used as collection sites (Purin, 1984). Peter Burns of the Palo Alto project feels that collection sites at schools or churches could cause a public liability problem. Although none of the survey respondents objected to the temporary dump day, a few said they wouldn't want a permanent collection site near their home. Considering these factors, it seems that the best location for a pilot project should be somewhere isolated from homes, within the City limits (survey results show that people aren't willing to travel very far), and a place with which people are familiar. Two sites in Berkeley seem appropriate--the landfill and the recycling center at 2nd and Gilman.

### Licensing

In order to pursue a temporary collection site at either the landfill or the recycling center, what permits and licenses would be needed? Of all the state and federal agencies, only the DHS regulates this type of project. According to Title 22 of the California Administrative Code, any facility where hazardous wastes are transferred from one vehicle to another or are stored or consolidated, is defined as a "transfer station" and must obtain a permit. However, the Code allows the DHS to grant a variance if the hazardous waste is "insignificant as a potential hazard to human health, domestic livestock or wildlife." This gives the DHS much administrative discretion, and

because the DHS encourages these projects, a variance is easy to obtain for a temporary transfer site.

After talking to City and County officials, it appears that no permits would be required by local agencies for a project at the recycling center or the County landfill.

#### Liability to Households

When collection programs were first discussed, liability and manifesting requirements were not clear. Household liability is less of a problem now, especially after the passage of AB 1015 (1983). This bill exempts small generators from manifesting requirements and hauler registration when the quantity of waste does not exceed 5 gallons or 50 pounds. Instead, the project director may act as the generator of the waste.

Because the laws in California require strict liability for generators of hazardous waste, it is theoretically possible for a homeowner to be sued, if the waste they generated caused a future problem. At the Richmond transfer station, the homeowner is identified and recorded. The question of whether this liability will keep homeowners from bringing waste to a transfer station has been debated (Berkeley Solid Waste Management Commission, 1983). If names are not taken, however, there is practically no chance that residents could be charged for future damage.

#### Operation Procedures

In order to get a variance from the DHS, a general operation plan should be written so the DHS can conclude that the project poses "insignificant" hazards. Usually a private firm such as Safety Specialists is hired to take care of these details. Security, safety equipment such as eyewash and emergency showers, and a contingency plan worked out with various emergency response teams in the area should be considered. It should be specified whether labpacking (placing the original containers with vermiculite into a 55-gallon drum) or some other packing method is to be used, and how the different chemical classes will be kept separate. A chemist, or other experienced technician, should be hired to supervise the packing.

The most difficult part of the operating procedures is how to handle wastes from businesses, nonresidents, or other wastes that the program may not be authorized to accept. Since radioactive and infectious wastes are not regulated by DHS and are subject to other agency requirements, they may not be taken. Examples of wastes that household projects usually discourage are explosives, PCB's, unknowns, water reactives, and those defined as "extremely hazardous" by the California Administrative Code. In most cases, project leaders decide to accept all wastes, even though they advertised that they would not. In many cases they were forced to contact an official who could handle the waste, such as the bomb squad. The reason for this is that if wastes are turned away, the final destination of the waste is not known. Probably the best procedure is to accept



the wastes, but inform the generator of the proper disposal method. In any case, some strange types of substances should be expected, and a plan to deal with them should be developed.

#### Publicity and Education

It is obvious from the survey response that people need and want more information concerning disposal and use of hazardous substances. This should be a major aim of any project. Posters, placards in BART and buses, and a mailing with utility bills should be used to advertise the program. A "hazardous materials hotline," much like the service operated in Kentucky, could be implemented.

#### Summary of Recommendations

The Berkeley City Council should agree upon a plan for a pilot disposal project, and call upon the services of an experienced company, such as Bay Area Environmental or Safety Specialists. A waiver from the DHS should be obtained, and an extensive education program and "hazardous materials hotline" should be developed. Since the response in Palo Alto was very good, it seems that a one or two day pilot project would be sufficient. The project site should be either the landfill or the recycling center, but because there is less activity at the landfill on Saturdays, perhaps the landfill is preferable. After the pilot project is implemented, depending on the results, a permanent plan for dealing with household hazardous waste should be drawn up, with funding from a refuse tax.

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