Managing Household Hazardous Waste: Looking for a Solution

Blake R. Tresan

Introduction

The home is a toxic waste site. Households contain surprisingly large quantities of hazardous materials. Common household items such as paint, batteries, light bulbs, and cosmetics have hazardous substances in them. These common items, and thousands more, are hazardous because the chemicals they contain can harm the environment and humans. If used as intended and stored properly these materials don't pose a serious threat. Unfortunately, once they are no longer useful, most are carelessly disposed of. The typical American household will throw out most of its hazardous waste along with the rest of its household refuse, with lesser quantities poured down the drain, gutter, or on the ground (Brown, 1987). These unmanaged wastes are causing groundwater contamination, toxic soils, and air pollution.

This loading of hazardous wastes into landfills and elsewhere poses a serious threat to the environment and humans. Unfortunately, proper disposal is no easy task. The State of California has only one landfill permitted to receive hazardous wastes, and with so many laws regulating the handling of hazardous waste, insurance costs are astronomical. This regulatory climate has led to such high costs and inconvenience that the average household rarely disposes of its hazardous waste properly. However, people's lack of knowledge about what is hazardous also contributes significantly to the reason why so much hazardous waste is disposed of improperly. Ten years ago, virtually nothing was done to correct this problem. Today a great deal of effort is put into devising proper household hazardous waste management programs. The purpose of this paper is to look at the household hazardous waste problem in Alameda County, to review management techniques, and to make a suggestion for a hazardous waste collection facility for the Berkeley area.

Past Studies

The majority of studies concerning hazardous waste management focus on large industrial generators. However, in the past few years a growing body of knowledge has accumulated specifically concerning the management of hazardous wastes generated in households. These studies have been conducted by state, municipal, academic, and private agencies.

The California Waste Management Board's Household Hazardous Waste Committee, in October of 1987, submitted its first report to the Board (CWMB,1987). Guidelines for determining types of hazardous waste, public information programs, environmental impacts, worker safety, and recycling and treatment potential are all covered in this report.

Studies conducted by municipalities and regional groups have been the most numerous. Studies of particular interest have been carried out by the municipalities of Seattle, Washington (Goldberg, 1987), Albuquerque, New Mexico (Brown, 1987), as well as by the Asssociation of Bay Area Governments (Meiorin, 1987) in California. These studies have tended to be empirical evalutions of collection programs conducted within their regional vicinity. Alameda County has put together a hazardous waste management plan in response to the Tanner Bill.

Recently, university departments have become interested in studying household hazardous waste management. The most interesting studies have been on determining the quantity and composition of household hazardous waste (Rathje et al., 1987). The economics of recycling household hazardous wastes (Cohen, 1984), as well as attitudes of individuals towards alternative methods of hazardous waste management (Knappenberger, 1984) have been studied.

Past and Present Management Programs

Federal, state, and regional agencies, as well as citizens' groups, have become involved in the planning and implementation of household hazardous waste management programs. These programs take a variety of forms, and must be reviewed prior to the development of an appropriate system for Alameda County.

The most common household hazardous waste management technique utilized has been

the one-day collection event. Since the first "collection day" in 1981, over 500 have been carried out nationwide (Brown, 1987). These programs involve the setting up of temporary transfer stations where the general public can bring hazardous waste for free disposal. Fifty such programs have been carried out in the San Francisco Bay Area in the past five years, including four in Alameda County this past summer (Meiorin, 1987). However, one-day collection events suffer from a lack of participation and high operating expenses (Goldberg, 1987). Berkeley Health Officer Vince Spencer, who helped run the Albany-Berkeley-Emeryville collection day, said the project cost the City of Berkeley $60,000 to dispose of the hazardous waste from only 720 households. Due to its excessive costs and large time commitment, Spencer called the event a "frill" and does not foresee the city sponsoring another such program for at least another few years (Spencer, 1987, pers. comm.).

A less common method of household hazardous waste management has been one-time door-to-door collection. This type of program was implemented by fire departments in Gresham, Oregon and San Bernardino, California. A program such as this offers the most convenience to households, but costs more per barrel collected than any other programs (Knappenberger, 1984; Goldberg, 1987).

In some communities privately-owned hazardous waste transfer stations exist. For example, in Richmond, California, Bay Area Environmental, Inc. accepts hazardous wastes from households for $10 per gallon. However, the disposal fee discourages public participation. Privately-owned hazardous waste management businesses are geared towards industries and not households (Lynch, 1987, pers. comm).

The newest and most promising management plan is the permanent transfer station specifically for collection of household hazardous wastes. Both San Bernardino and San Francisco Counties have employed such a collection station. The San Francisco County facility, which just opened in January, is operated by a local solid waste management firm, Sanitary Fill Company, under a county contract. The San Francisco program has only been permitted by the California Department of Health for one year's operation. However, Larry Sweetser, environmental compliance manager for the Sanitary Fill Company, foresees the facility becoming a permanent fixture in San Francisco (Sweetser, 1987, pers. comm.). San Bernardino County has been operating six permanent facilities since 1986. The facilities are located at fire stations and the County Agricultural Commisioner's Office (Roberts and Van Stockum, 1987). Both programs are funded by surcharges on solid waste disposal fees.

A key factor in the implementation of all these management techniques has been public

education. Target households have been informed of the existence of programs in a variety of ways. The most common have been fliers, newspaper advertisements, public service messages on radio and television, and leaflets left on garbage cans (Goldberg, 1987).

Regulations

To devise an effective management plan for Alameda County's household hazardous waste, it is important to identify the regulations currently affecting waste. Any household hazardous waste management program must abide by the laws governing hazardous wastes. Due to the small quantities of hazardous waste generated in households compared to businesses and large industries, federal regulations currently exempt household hazardous waste. However, recent federal laws mandate the phasing out of land disposal of untreated hazardous wastes over the next few years. Although the EPA has yet to begin regulating household hazardous waste, the California State Legislature has been quite active.

In 1986, Assembly Bill 1809 (Tanner) became California law. The bill requires all counties to incorporate a program for the safe management of hazardous wastes into their solid waste management plan. This bill also authorizes cities or counties to increase solid waste collection fees to offset the cost of establishing, publicizing, and maintaining a household hazardous waste management program.

Magnitude of the Problem

How much hazadous waste are households in Alameda County actually producing? An average household generates 66.2 grams of hazardous waste every week or 3.4 kilograms (7.5 lbs) in a year (Rathje et al., 1987). Alameda County has approximately 450,000 households (McCormack, 1985), which is equivalent to 1.5 million kilograms of hazardous waste generated each year in Alameda County (Table 1 and Figure 1).

City	Population	Number of Households	Hazardous Waste (Kg/yr)
Alameda	70,300	28,120	95,608
Albany	15,100	6,040	20,536
Berkeley	106,500	42,600	144,840
Castro Valley	45,500	18,200	61,880
Dublin	15,600	6,240	21,216
Emeryville	4,860	1,944	6,610
Fremont	145,500	58,200	197,880
Hayward	98,500	39,400	133,960
Livermore	52,100	20,840	70,586
Newark	36,350	14,540	49,436
Oakland	351,100	140,440	477,496
Piedmont	10,350	4,140	14,076
Pleasanton	40,750	16,300	55,420
San Leandro	65,400	26,160	89,944
San Lorenzo	20,500	8,200	27,880
Union City	47,700	19,080	6,872
TOTAL	1,126,110	450,444	1,531,240

Table 1. Population, number of households, and household hazardous waste generation in Alameda County (Rathje et al., 1987).

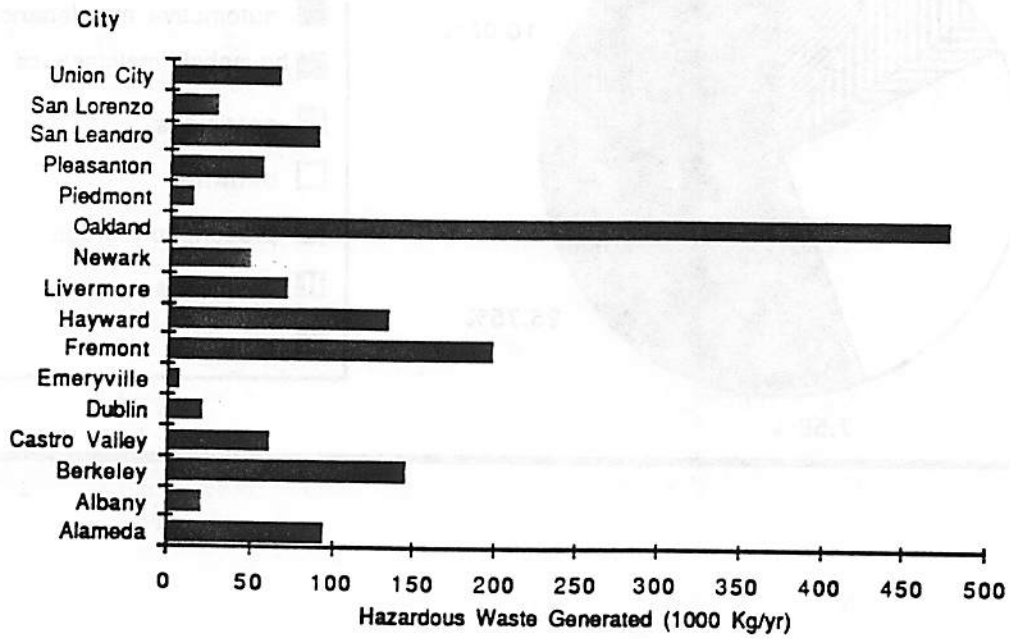

Figure 1. Household hazardous waste generation by city in Alameda County (Rathje et al., 1987).

All hazardous waste is not alike. Hazardous waste is generally separated into five hazard classes: toxics, corrosives, flammables and reactives, infectious waste, and radioactive materials. Determining the composition of the waste flow is very important because of the incompatability of one waste class with another. The majority of household hazardous waste comes from the first three categories (few households produce infectious or radioactive waste, although fire alarms do contain radioactive chemicals). The composition of waste generated by a household will vary from house to house. The greatest source of hazardous waste in the solid waste stream by weight comes from batteries (27%), with household maintenance goods (26%), cleaners (13%), automotive maintenance wastes (10%) pesticides and other yard wastes (7%), and cosmetics (7%) following in declining order (Figure 2)(Rathje et al., 1987).

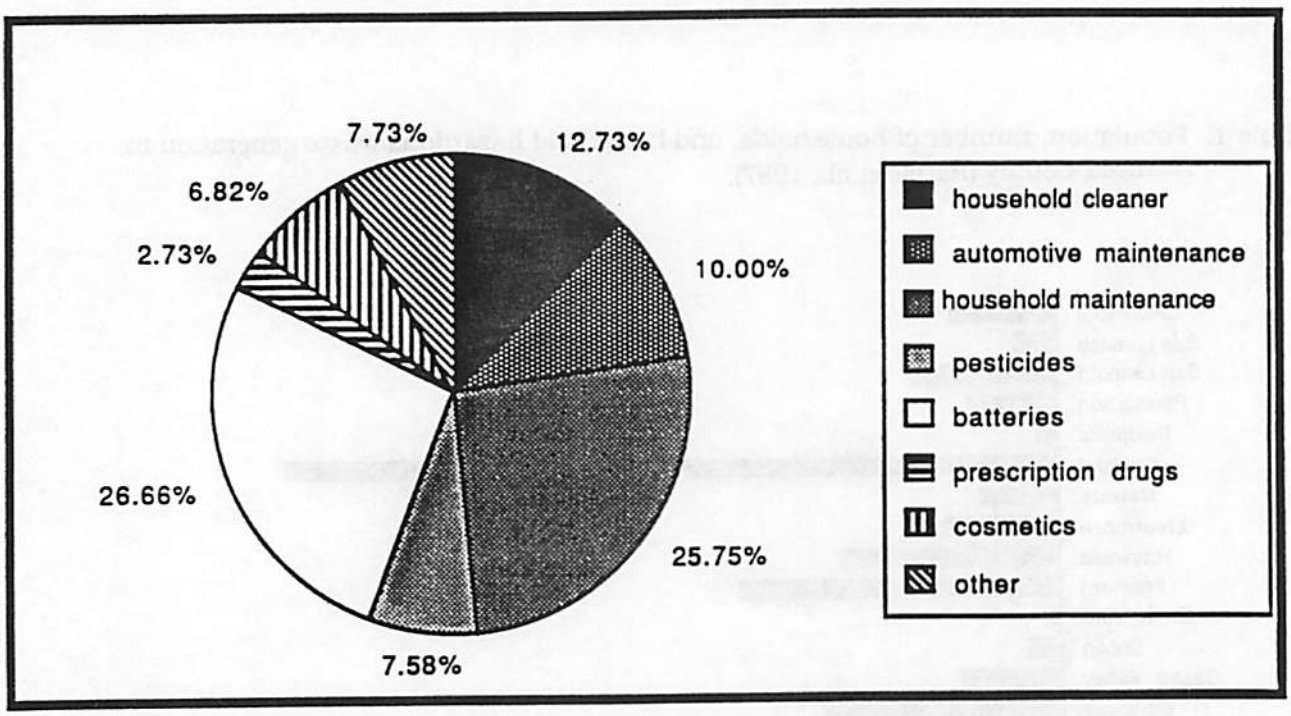

Figure 2. Relative Composition of Household Hazardous Waste Found in Solid Waste Stream (Rathje et al., 1987).

However, data from collection days and from the permanent collection facilities indicate that paint is the most common household hazardous waste item (Figure 3) (Meiorin, 1986; Sweetser, 1988, pers. comm.).

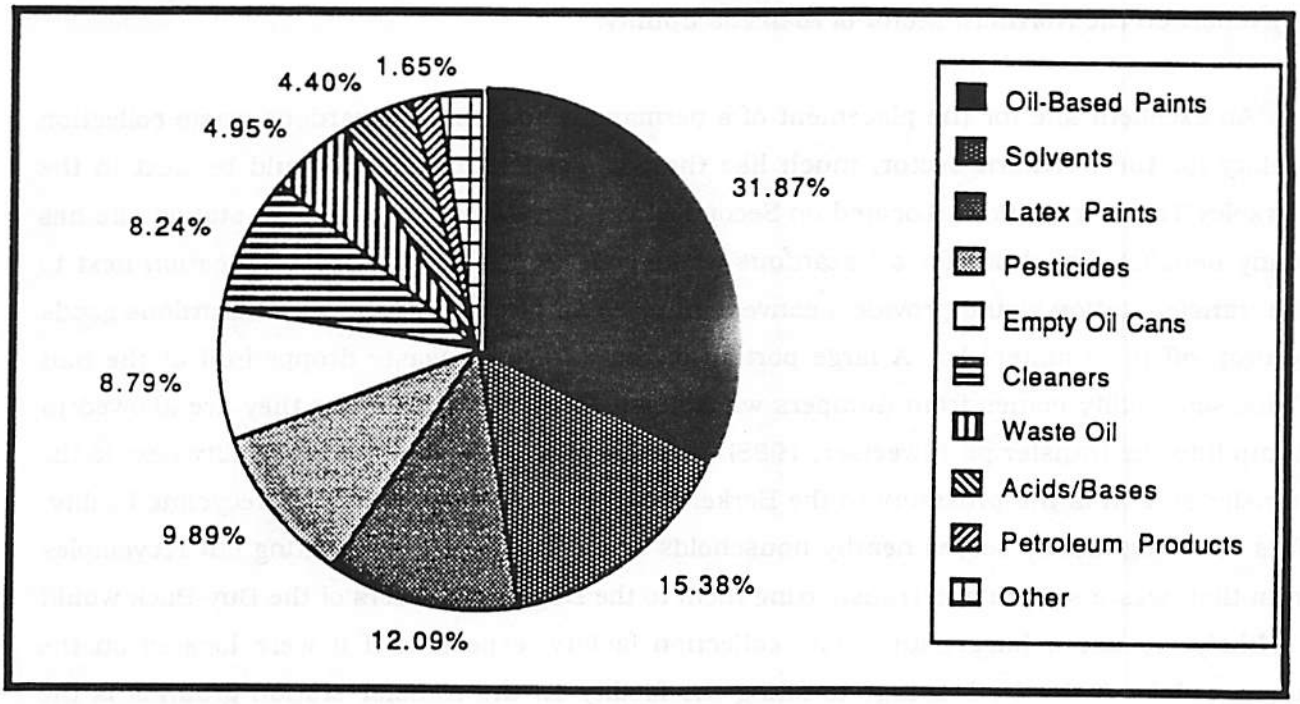

Figure 3. Composition of household hazardous waste brought to collection facilities. (Meiorin, 1987).

Siting a Collection Facility

A comprehensive management plan has to integrate hazardous waste education with collection. For the purpose of this paper I will only focus on the collection process. To design a hazardous waste collection program, Alameda County must be looked at demographically. Alameda County is made up of 15 cities spread out over a large area. Unfortunately, the majority of households are not willing to drive over five miles to dispose of their hazardous wastes properly (Knappenberger, 1984). Therefore, for collection purposes the County must be broken down into smaller subunits. Any map of Alameda County shows four distinct population centers: North (Emeryville, Berkeley, Alameda, Albany); Central (Oakland, Piedmont, San Leandro); South (Fremont, Hayward, San Lorenzo, Union City, Castro Valley); and Inland (Livermore,

Dublin, San Ramon, Pleasanton). Determining the locations of collection facilities for all four sectors is, unfortunately, beyond the scope of this paper. Therefore I will focus the rest of my report on the Northern sector of Alameda County.

An excellent site for the placement of a permanent household hazardous waste collection facility for the northern sector, much like the San Francisco facility, would be next to the Berkeley Transfer Station. Located on Second Street and Gilman, the transfer station site has many beneficial qualities for a hazardous waste collection facility. For one, location next to the transfer station would provide a convenient place for dumpers found with hazardous goods to drop off their materials. A large portion of the hazardous waste dropped off at the San Francisco facility comes from dumpers whose loads are inspected before they are allowed to dump into the transfer pit (Sweetser, 1988). Another reason for locating the facility next to the transfer station is the proximity to the Berkeley Buy-Back Center, a drop-off recycling facility. This recycling facility serves nearby households which are used to separating out recyclables from their waste stream and transporting them to the Buy-Back. Users of the Buy-Back would be likely to use a hazardous waste collection facility, especially if it were located on the adjacent lot. A third advantage to siting the facility on the transfer station grounds is the proximity to the freeway. Located only two blocks from Interstate 880, this facility would enable trucks transporting hazardous materials for treatment, recycling, and disposal to avoid passing through any residential areas. A fourth reason for siting a collection facility at the transfer station is the unlikelihood of the NIMBY (Not In My Back Yard) syndrome. The land surrounding the transfer station is zoned for manufacturing and is already used by heavy industries. The closest residences are located three blocks away at the University of California at Berkeley's Albany Village, a married student housing complex. The fact that these students only live here temporarily might lessen their concern over any potential environmental impacts associated with such a facility.

The Berkeley Transfer Station handles waste from most of northern Alameda County. Along with the municipal waste from Berkeley and Albany, many households from Emeryville and El Cerrito also dump their household wastes at the Berkeley Transfer Station (Arnold, 1988). The transfer station receives 85,000 tons of waste per year, with 75 per cent coming from the City of Berkeley refuse trucks. The remaining 25%, or 21,000 tons, arrives in privately owned vehicles. Before entering the transfer station, people must first check in at a pay booth. Signs are posted at the booth informing users that the dumping of hazardous materials is illegal. The signs also give the phone number and address of two local hazardous

waste management firms (Bay Area Environmental and Zero Waste), but for the reason already discussed, these firms are rarely used by households. Although, I only witnessed three vehicles entering, I did not see their loads inspected. This would lead me to believe that hazardous waste is entering the Berkeley Transfer Station and eventually being dumped at the DePauli Sanitary Landfill in Livermore.

In discussions with Berkeley City officials about the possibility of siting a hazardous waste collection facility at the Transfer Station, I was confronted with several reasons why the City shouldn't have such a facility. Insurance costs appears to be the main stumbling block (Reploge, 1988, pers. comm.; Skinner, 1988, pers. comm.; Spencer, 1988, pers. comm.). San Francisco was able to avoid such expensive insurance costs by receiving variances from the Department of Health. Unfortunately, variances can take up to several years to be processed. Insurance costs, although the most costly, are not the only costs the Berkeley Officials were worried about. Construction of the facility, paying a trained chemist to operate it, and disposal costs would all require significant quantities of money. However, the San Francisco facility was able to cover all these costs by only adding a five cent surcharge to solid waste bills. Another concern expressed was that the site lay below the 100-year flood zone. This means that if a major flood where to occur, the site might be inundated with water, causing potentially dangerous health hazards (Spencer, 1988, pers. comm).

Interestingly enough, the above-mentioned concerns have been overlooked in the construction of a very similiar facility by the Berkeley City Fire Department. A small building is being built on the transfer station grounds to house hazardous materials. The building will only be used for the one-to-two day storage of abandoned hazardous materials confiscated by the fire department (Hyatt, 1988, pers. comm.). This facility will save the City from paying excessive prices to firms such as International Technology (IT) to come and make emergency pick-ups of the material off the street. Despite its similiar purpose, Fire Chief Hyatt wouldn't consider opening up this facility's doors to household users (Hyatt, 1988, pers. comm.). The fire station facility would be too small to handle the amount and variety of hazardous material. However, the fact that such a facility has already been permitted indicates that a household collection facility could also be permitted.

Another reason Berkeley isn't interested in siting a household collection facility is their limited liability. San Francisco began its household waste collection facility due to the fear of eventual liability for contamination at the Altamont Sanitary Landfill (Sweetser, 1988, pers. comm.). Because San Francisco was dumping all of its waste in Alameda County, San Francisco's

References

Arnold, L., Supervisor, Berkeley Refuse Department, Berkeley, CA. Personal Communication, 4/4/88.

Brown, T.S., 1987. Household hazardous waste: the unresolved water quality dilemma; *Journal of the Water Pollution Control Federation*, v.59, no. 3, pp.120-124.

California Waste Management Board (CWMB), 1987. *Household Hazardous Waste Advisory Committee Recommendations to the California Waste Management Board*. October 1987. Sacramento, CA 63pp.

Cohen, A., 1984. The Role of Recycling in Community Collection of Hazardous Waste. In *Hazardous Materials: a community perspective;* Doris Sloan, ed.; U.C.Berkeley Environmental Sciences Senior Seminar Report, Berkeley, CA pp. 133-145.

Goldberg, J.S., 1987. *Household Hazardous Waste Management: A Survey of Selected Programs in North America and Europe*, Municipality of Metropolitan Seattle, Seattle, WA 157pp.

Hyatt, R., Fire Chief, Berkeley Fire Department. Personal Communication. 4/5/88.

Knappenberger, N., 1984. Berkeley's Household Hazardous Waste Alternatives. In *Hazardous Materials: a community perspective;* Doris Sloan, ed.; U.C. Berkeley Environmental Sciences Senior Seminar Report, Berkeley, CA pp 93-101.

Lynch, J., Operations Manager, Bay Area Environmental, Inc. Richmond, CA. Personal Communication, 10/26/87.

McCormack, D., 1985. *McCormack's Alameda '86;* Donnan Publications, Martinez, CA pp.10-17.

Meiorin, E.C., 1987. *Alameda County pilot collection program for household and small quantity generators of hazardous waste;* Association of Bay Area Governments, Oakland, CA, 18pp.

Rathje, W.L., D.C. Wilson, and W.W. Hughes, 1987. *A characterization of hazardous household waste in Marin County, California;* Association of Bay Area Governments, Oakland, CA 53pp.

Reploge, S., Risk Management Officer, City Manager's Office, Berkeley, CA. Personal Communication, 3/22/88.

Roberts, R.L., and S. Van Stockum, 1987. *San Bernardino County Pilot Project, Household Hazardous Waste Collection Centers*. Department of Environmental Health Services, San Bernardino County, CA 28pp .

Skinner, N., Councilmember, City of Berkeley, CA. Personal Communication, 4/4/88.

Spencer, V., Berkeley Health Officer, Environmental Health Department, City of Berkeley. Berkeley, CA. Personal Communication, 10/27/87, 3/22/88.

Sweetser, L., Environmental Compliance Program Manager, Sanitary Fill Company, San Francisco, CA. Personal Communication, 10/29/87, 3/21/88.

liability became greater than that of cities within Alameda County, which dump their waste within Alameda County. Therefore, Berkeley is not under the same pressures to minimize its hazardous waste coming from households (Skinner, 1988, pers. comm.).

Conclusions

Modern life has many side-effects. The technology that makes life so convenient, unfortunately, also poisons us. Hazardous chemicals now, and for the near future, will continue to taint almost every item we use. Although reducing the amount of hazardous chemicals used in products offers the best long-term solution to the problem, efficient collection in conjunction with proper disposal can help alleviate some of the damage now occuring and provide a framework planners can use to design more and more effective systems.

California, through the Tanner Bill, has taken a strong step forward in addressing the hazardous waste problem. Unfortunately, the same legislative body that designed the Tanner Bill is also responsible for the multitude of regulations surrounding hazardous waste that make its management especially dificult. Nevertheless, counties will be forced to take some sort of action in an effort to manage their hazardous wastes. So far, the management systems with the best track records have been the permanent collection facilities. Therefore they are likely to be adopted in counties that presently have no hazardous waste collection facility.

In the case of Alameda County, several such facilities will be necessary, with at least one in the Berkeley vicinity. The Berkeley Transfer Station site provides a potentially ideal location. Although financial and environmental reasons presently discourage Berkeley from constructing and operating such a facility, both can be minimized with intelligent management.

A Berkeley household hazardous waste collection facility is not the final solution. However, in order to protect the environment and ourselves, a collection facility should exist. At all costs, homes should not be toxic waste sites.