

Gateway Realty, to educate citizens about their impact on the environmental issues of Global Warming, Tropical Rainforests, and Tree Planting.

- Earth Day Dance and Poster Contest Show - Fairfield High School Students for Peace and the Armijo High School Peace Club co-sponsored a cooperative dance and environmental poster contest for both schools to raise funds and community consciousness for Earth Day 1990.
- Recycling Outreach - A cooperative display of the AHS Peace Club and the FHS Students for Peace was presented at the Solano Mall during Public Schools Week.
- Green Ribbon Week - AHS and FHS student peace clubs declared that the week prior to spring break would involve activities promoting environmental awareness and encourage behaviors from students and the community as a whole that contribute to a more sustainable earth. The City of Fairfield and the FSUSD administrations supported the theme day concepts of Adopt-A-Tree, Recycle, Alternative Transportation, Green Pledge.

### **PLEASANT HILL BAYSHORE DISPOSAL**

Pleasant Hill Bayshore Disposal provides curriculum for a district-wide school recycling program. They provide each school with a packet of materials to copy and distribute that includes a curriculum on recycling, household hazardous waste education materials, and household hazardous waste wheels. Arm and Hammer's Safe Substitutes brochure is also included.

Pleasant Hill Bayshore Disposal also provides the opportunity for schools to visit their facility, which includes a sorting and processing yard for recyclable materials.

### **SOLANO GARBAGE COMPANY**

The company makes presentations to the schools that emphasizes both information and instruction. Solano Garbage will disseminate recycling curricula to schools when the curbside program begins. They are also beginning a pilot program to introduce newspapers and environmental and recycling issues into the schools as complimentary curriculum.

## **B.3. COMMERCIAL AND INDUSTRIAL**

### **SUPERIOR PACKING COMPANY**

Superior Packing Company in the unincorporated county, is one of largest employers in the Dixon area, and stresses recycling with employees. The management believes that the more people know about reducing, reusing and recycling, the more they will participate. Superior Packing Company recycles all cardboard and all scrap metal. They are interested in recycling more materials.

## **B.4. GOVERNMENT**

### **GREATER VALLEJO RECREATION DISTRICT**

The Recreation District practices both source reduction and recycling. It recycles white office paper and used motor oil and reuses colored office paper by passing it on to youth programs so that the blank side can be used. There is no formal employee education program or policy.

### **SOLANO COUNTY**

All Solano County government offices have a white paper and computer paper recycling system that is serviced by Solano Garbage. They also do a limited amount of recycled product procurement, such as recycled white paper. Many offices have double-sided copiers to source reduce paper waste.

## **C. SELECTION OF PROGRAM ALTERNATIVES**

Education and public information program activities will be designed to target specific waste generators. The activities will inform them about services and activities for specific wastes and educate them on the importance of incorporating the reduce, reuse, recycle ethic in their purchasing and waste handling habits. For optimum public outreach, comprehensive programs will need to be developed to include not only mass media communication and mailings, but communications to targeted groups, as well as one-on-one interpersonal communications.

Coordination and cooperation between the County and the other jurisdictions in Solano County will provide the most cost-effective approach to education and public information programs. Each jurisdiction might take the lead on specific activities with other jurisdictions utilizing or providing resources.

This section describes the education and public information program alternatives for each of the targeted waste generator and population groups, introduced in the previous section. The alternative activities are listed by component: source reduction, recycling, composting and special waste. Although Household Hazardous Waste is a separate element of the County Integrated Waste Management Plan, it makes sense to take advantage of the communication channels presented in the following selection of programs. Therefore, household hazardous waste is addressed, where appropriate, to give the reader a sense of how education and public information for the source reduction, recycling, composting, and special wastes components apply to the Household Hazardous Waste Element also.



## C.1. RESIDENTS

### GENERAL PROGRAMS

#### Printed Materials (1992)

Develop a series of printed materials for direct mail and distribution through the schools and libraries, at public events, with distribution of curbside collection bins, in garbage bills, at buy-back\drop-off recycling centers, at community centers, at public information desks, the landfill and other appropriate locations to hand out printed information. Design "how-to" materials which incorporate a long-range view of waste management on each topic as part of a planned series. A consistent graphic design should be used as consistency in graphic design will establish visibility and a high profile for the County's education and public information program and increase its cost-effectiveness. Examples of printed materials could include:

"Recycle it Solano!"

"Shopping Smart to Reduce Waste"

"Composting in the County of Solano"

#### Regular Education and Public Information Programming (1992)

Begin regular education and public information programming with the cooperation of civic, environmental and business groups, and local public broadcast media. Regular programming should use existing modes of communication as opposed to creating new ones. Regular programming can include guest editorials in the local newspapers.

#### Neighborhood Block Leader Program (1992)

Organize a Neighborhood Block Leader Program. Train a pool of volunteers to promote source reduction, recycling, composting, and special and household hazardous wastes management. These volunteers will personally encourage their neighbors to use recycling and composting services, to adopt source reduction habits, to use safer alternatives, and to properly handle special and household hazardous wastes.

#### Annual Media Campaign (1992)

In cooperation with other jurisdictions and recycling service providers, produce an annual media campaign to increase public awareness about source reduction, recycling, composting, and special and household hazardous wastes management programs. The timing and focus of the media campaign should be coordinated with Spring Clean-Up and/or the kick-off of new programs and services. Emphasize community pride themes specific to Solano County (eg. agricultural roots, entrepreneurial style and concern for the environment) to promote the "reduce, reuse, and recycle" ethic and activities. Involve all local radio, television and newspaper media.

**Information Booth(s) (1992)**

Build a portable source reduction, recycling, composting, and special and household hazardous wastes management information booth or booths for constant display at schools, and for rotating display at community celebrations and public events throughout Solano County, such as the County Fair.

**Video (1994)**

In cooperation with the cities, produce a video on source reduction, recycling, composting and household hazardous and special wastes management to be broadcast on the local cable station, available for check-out at the local library, used in presentations to schools, community groups, and by Neighborhood Block Leaders and Master Composters. The County has already begun this program through a \$5000 grant to Ideas in Motion. Ideas in Motion will produce a half-hour video on the impact of AB 939 on the San Francisco Bay Area. The County will get 10 copies of the video in late 1991.

**Resource Conservation Directory (1994)**

In cooperation with other jurisdictions and recycling service providers produce a Resource Conservation Directory. The Resource Conservation Directory can include, but is not limited to, a list of the buy-back/drop-off sites, yard waste drop-off sites, backyard composting demonstration sites and workshop registration information, curbside and multi-family recycling collection information, organic waste collection information, household hazardous and special waste collection services, a guide to reuse and repair businesses and information on the waste exchange warehouse.

**SOURCE REDUCTION PROGRAMS****Surcharge at the Disposal Facility (1992)**

Work with local media to educate the public and solicit community input into establishing a surcharge at disposal facilities. The surcharge will raise revenue to fund some of the SRRE programs and will provide a financial incentive to decrease the quantity of waste disposed.

**Drought Resistant Landscaping Ordinance (1992)**

Work with local media to educate the public and solicit community input into establishing a drought resistant landscaping ordinance. Notify the public in advance and hold a public hearing to solicit community input. Publicize ongoing waste reduction impacts. This education program will be coordinated with water districts and public utilities that have an interest in decreasing the consumption of water.

### **Upstream Yard Waste Management Education/Backyard Composting Demonstration Site (1994)**

Develop a "Master Composter" program for backyard composting education, including providing printed "how-to" information brochures and affordable composting bins. Provide free workshops at a Solano County demonstration site for technical assistance on methods for backyard composting. Educate residents in the various benefits of compost and mulch use at home, and methods of upstream yard waste management (i.e., on site management as opposed to collection and processing at a centralized site) by including this information in the backyard composting brochure. Promote through the local media, Neighborhood Block Leaders, Master Composters, and at composting demonstration sites.

### **Quantity Based Residential Hauling Fees (1994)**

Work with local media to educate the public and solicit community input into establishing quantity based hauling fees for residential customers. Information will be disseminated through the news media and garbage bill inserts. Publicize the ongoing waste reduction impacts of charging customers based on the quantity of waste set out for pick-up.

## **RECYCLING PROGRAMS**

### **Collection Service (1992)**

Kick-off single and multi-family recycling collection service by providing advance notice through garbage bill inserts. Provide a "how-to" brochure and a letter from the chairperson of the County Board of Supervisors with the distribution of curbside recycling bins to every household. Cultivate community support and their participation in the service through editorials and articles in the local print and electronic media. Begin recruiting Neighborhood Block Leaders.

### **Expansion of Existing Buy Back and Drop Off Centers (1992)**

Work with recycling service providers and community groups to publicize the locations and materials accepted, and to promote the expansion and use of the buy back/drop off centers. Include buy back and drop off centers in the Resource Conservation Directory. Promote the recycling programs through the Neighborhood Block Leader Program.

### **Feedback to the Public (1992)**

Provide feedback on the progress of the recycling programs (i.e. amount of materials recycled/resources saved and the economics of the programs). Provide feedback through advertisements in local newspapers, Neighborhood Block Leaders, garbage bill inserts, flyers distributed in recycling containers, and the publishing of annual reports.

**Building Policies and Codes that Emphasize Design for Recycling (1992)**

Work with local media to publicize and solicit community input into proposed changes to building policies and codes that emphasize design for recycling.

**Expansion of Collection Service (1996)**

Inform residents of the expansion of the single-family and multi-family recycling collection service by distributing "how-to" flyers with the collection containers or placed on residents doorknobs. Promote through Neighborhood Block Leaders, the local press, and electronic media.

**COMPOSTING PROGRAMS****Christmas Tree Collection Service (1993)**

Publicize and promote the Christmas Tree collection service by printing informational flyers. They should be distributed to residents, at the point of purchase, by local Christmas tree retailers. Promote through the local print and electronic media, Neighborhood Block Leaders, Master Composters, recycling information kiosks, libraries, and schools.

**Benefits of Using Compost and Mulch for Home Purposes (1996)**

Educate the public on the benefits of using compost and mulch for home purposes through the distribution of the composting brochures and flyers, through Neighborhood Block Leaders and Master Composters, and through articles in the local newspaper and advertisements.

**Yard and Wood Waste Drop-off Site (1994)**

Work with local media and yard waste collection service providers to publicize the locations and to promote the use of the yard and wood waste drop-off site.

**Feedback to Public (1993)**

Provide ongoing feedback to the public on the amount of Christmas Trees, yard and food waste collected and composted, how this material is used, and how compost can be obtained from the program. Provide feedback through advertisements in local newspaper, Neighborhood Block Leaders, Master Composters, at informational kiosks, flyers deposited in collection containers, and the publishing of annual reports.

**Yard Waste Collection Service-Single Family (1994)**

Inform residents about the expansion of the yard waste collection service by providing advance notice through garbage bill inserts and a "how-to" brochure and a letter from the Chairperson of the County Board of Supervisors with the distribution of yard waste collection containers to the remaining households. Continue to cultivate community support of the collection service through the local print and electronic media, through Neighborhood Block Leaders, Master Composters and recycling information booths.



**Food Waste Collection Service (1998)**

Inform residents about the expansion of the food waste collection service by providing a "how-to" brochure or flyer to every household. Continue to cultivate community support of the collection service through editorials and articles in the local print and electronic media, through Neighborhood Block Leaders, Master Composters and the recycling information booths.

**SPECIAL WASTE PROGRAMS**

**Tires (1992)**

Promote the purchasing of used and retread tires by including consumer information in the Resource Conservation Directory.

**Dead Animals (1993)**

Work with the Solano County Animal Shelter to promote the spaying and neutering of pet animals by assisting in the distribution of the shelter's literature through Neighborhood Block Leaders. List Solano County Animal Shelter as an information source for pet spaying and neutering in the Resource Conservation Directory.

**C.2. YOUTH**

**GENERAL PROGRAMS**

**Seminar for Educators (1992)**

With the cooperation and assistance of The County Office of Education, the school districts, and recycling service providers, organize a seminar for curriculum directors to present a wide variety of curriculum materials currently available for all grades in source reduction, recycling, composting and household hazardous waste.

**Evaluation and recommendations (1993)**

Incorporate evaluation recommendations from teachers on the curricula into a final set of curriculum materials to be updated annually or as needed. Monitor State legislation that may mandate the development and use of state-wide curricula.

**"Localize" curriculum (1992)**

Localize the selected curriculum materials for grades K-12 and prepare for test use in the classroom.

**Systems in Schools (1993)**

With the cooperation and assistance of the Office of Education, the school districts, representatives from the private schools and recycling service providers, compile information

resources on alternatives for source reduction, recycling and composting systems in school settings. Assist school districts in selecting and implementing systems suitable for each school. Introduce the students and staff to the systems and how they will participate by organizing special school and classroom activities. Activities can include designing and decorating classroom recycling containers, designing classroom and school bulletin boards on recycling how's and why's, and going on field trips to the city's drop-off/buy back centers.

#### **Annual School Assemblies (1993)**

Schedule annual school assemblies at each elementary, junior high and high school to address the accomplishments of their school's source reduction, recycling and composting efforts. Timing of school assemblies to coincide with Earth Day or the annual media campaign would further enhance the students' understanding of their accomplishments.

#### **Compost Education and Training (1994)**

Target the 4-H Club, Future Farmers, Boy Scouts, Girl Scouts and other youth organizations for compost education and training through Master Composter workshops.

### **C.3. COMMERCIAL AND INDUSTRIAL**

#### **GENERAL PROGRAMS**

##### **Letter of Introduction and General Information Brochure (1992)**

In coordination with the County and other cities, produce a letter of introduction and a general informational brochure on source reduction, recycling, and household hazardous and special wastes management in commercial and industrial settings. Mail these materials to all Solano County businesses and industries.

##### **Slide Show or Video (1992)**

In coordination with the other cities, produce/obtain a slide show or video presentation on conducting waste audits, source reduction activities and recycling in office and non-office business settings and industries.

##### **Instructional Booklet (1992)**

In coordination with the other cities, produce an instructional booklet on conducting "do-it-yourself" waste audits, incorporating source reduction into purchasing and work habits, setting up recycling systems in office and non-office business settings and industries, and household hazardous and special wastes management.

##### **Technical Assistance (1995)**

Target large waste generators and commercial complexes; schedule presentations to provide technical assistance for conducting waste audits; and set up source reduction, recycling,

composting, and household hazardous and special wastes management systems in office and non-office business settings and industries.

#### **Model Business/Industry Program (1994)**

Develop a Model Business Program for identifying and awarding public recognition to successful workplace source reduction, recycling, composting and household hazardous and special wastes management systems. Adapt the recycling logo for use by these businesses and industries to indicate to the public that these establishments and their customers are helping to achieve the source reduction and recycling diversion goals. This logo may be used in printed material, advertising, window and street signage. Businesses and industries identified for their model systems will serve as models to other businesses and industries on how to integrate these systems into daily operations. Involve local media in promoting these model businesses and industries.

#### **Regional Waste Exchange (1994)**

Promote the Regional Waste Exchange through the chamber of commerce and other business and industry groups' newsletters and meetings.

#### **Education Program for Developers, Architects, Builders, and Other Construction Industry Professions (1994)**

Develop a Building Industry Resource Guide to include information on building design for recycling, reuse and recycling of construction materials, and sources of recycled construction materials. Distribute the Building Industry Resource Guide at City and County Planning and Building Departments and through industry groups.

#### **Mandatory Commercial/Industrial Sector Recycling (1996)**

Work with the cities and local media to educate businesses and industries, and solicit input into establishing a mandatory commercial/industrial recycling ordinance. Notify businesses and industries in advance and hold a public hearing to solicit input. Publicize ongoing waste reduction impacts.

### **C.4. GOVERNMENT**

#### **Government Modeling (1992)**

To provide a model for the public, businesses and industry, conduct waste audits for all government office and non-office operations. With employee input, establish in-house waste diversion goals. Produce written guidelines and provide employee training on new government procurement and waste handling practices that include how to integrate the priorities of source reduction, reuse and recycling, composting and special and hazardous wastes management into regular operational procedures. Establish awards program and provide feedback to employees on the success of in-house source reduction, recycling,

composting, and special and household hazardous wastes programs. Work with local media to provide ongoing promotion of government agencies' adoption of the "reduce, reuse and recycle" ethic.

#### **Government Procurement Ordinance (1992)**

Notice residents and hold a public hearing on the proposed local government procurement ordinance that favors durability, recyclability, reusability and recycled material content. Educate residents in advance of hearing through articles in the local newspaper and by producing a segment for local cable television.

#### **Government Composting (1994)**

Give special instruction to departments and agencies that deal with large volumes of organic material about the proper separation of this material for composting.

## **D. PROGRAM IMPLEMENTATION**

The Education and Public Information Program is to be administered by the Solano County Department of Environmental Management. The Department of Environmental Management will be responsible for implementation and will work in cooperation with solid waste service providers, the school board and educators, community events coordinators, Neighborhood Block Leaders, Master Composters, community service organizations, homeowners associations, the Cooperative Extension Service home/farm advisor, University of California at Davis and Solano County Farm Bureau, civic, environmental and business groups, model businesses, and industries and local print and electronic media. Furthermore, some Education and Public Information activities may be implemented through a county-wide agency that is yet to be created. This agency would be funded through a landfill surcharge and would perform waste management tasks that are most efficiently performed on a county-wide basis.

Education and Public Information programs will be phased in from 1992 to 1998. In 1998, when all programs have been implemented, they will require approximately one Full-Time Equivalent (FTE) within Solano County staff, and will cost an estimated \$64,000 per year (see Table VI-1). The start up costs are also indicated in Table VI-1. About two FTE's are required for the start-up of programs in the first year of their implementation. Many EPI programs are to be implemented as a part of the source reduction, composting, recycling, or special waste program of which they are a part. In some cases, the EPI activity will be implemented by a waste hauler or processor. Increased disposal fees and increased collection fees will provide funds for the programs. Sources of funds for programs are specified in the Funding Component (see Chapter VIII).



The implementation schedule for each task of the Education and Public Information Component is presented by population targeted and component addressed.

## D.1. RESIDENTS

### GENERAL PROGRAMS

#### Printed "How-to" Materials Short Term/Start-up Year: 1992

- |            |   |
|------------|---|
| March 1992 | Use community pride theme to develop recycling logo.  |
| March 1992 | Begin to develop and print "how-to" materials: <ol style="list-style-type: none"> <li>1. "Recycle It Solano!"/Spanish and English (March)</li> <li>2. "Shopping Smart to Reduce Waste" (Dec. 1992)</li> <li>3. "Composting in the County of Solano" (Jan.-Feb. 1993)</li> </ol>   |
| June 1992  | Begin distributing "how-to" materials to the public through direct mail, the schools and libraries, at public events, with distribution of curbside collection bins, through the Neighborhood Block Leaders, in garbage bills, at the transfer station, at buy-back/drop-off sites, at community and senior centers, churches, shopping malls, public information desks, the landfill, and other appropriate locations. |
| July 1992  | Begin distributing "how-to" materials to new residents via Neighborhood Block Leaders, homeowners associations, realtors, Welcome Wagon and other community service organizations.  |

#### Regular Education and Public Information Programming Short Term/Start-up Year: 1992

- |            |   |
|------------|---|
| Sept. 1992 | Identify existing avenues of communication appropriate for source reduction, recycling, composting, and special and household hazardous waste management information. Existing avenues of communication should be identified for all target waste generators and populations. |
| Oct. 1992  | Begin producing articles and messages for the targeted mediums.   |

Examples include: articles, editorials, and weekly columns in the local newspapers; and articles submitted to the chamber of commerce newsletter and other newsletters of civic, environmental, and business groups.

**Volunteer Neighborhood Block Leaders**  
**Short Term/Start-up Year: 1992**

- Sept. 1992                      Gather informational materials on existing Neighborhood Block Leader Programs.
- Oct.-Dec. 1992              Develop a packet of materials to assist block leaders in promoting source reduction, recycling, composting, and special and household hazardous wastes management.
- Jan.-Feb. 1993              Develop a recruitment strategy and recruit a corps of volunteers as Neighborhood Block Leaders.
- March 1993                    Begin recruiting and training block leaders in public education and grassroots outreach.
- March 1993                    Provide block leaders with printed "how-to" materials for distribution and the recycling video, when available.

**Annual Media Campaign**  
**Short Term/Start-up Year: 1992**

- Jan. 1992                      Organize a local steering committee composed of representatives from civic, business, industry and environmental groups, schools, the senior and hispanic communities, government, and media.
- Feb. 1992                      Develop community pride theme to promote "reduce, reuse, recycle, and compost" emphasis and activities.
- Feb.-March 1992            Select date(s) and plan activities for media campaign. Coordinate timing and focus of media campaign with kick-off of new programs and services. The date will be selected for optimum news coverage and publicity. For example, in conjunction with traditional local festivities, "Recycling Awareness Week" or Earth Day.

- April 1992                      Develop media kit fact sheets.
- April 1992                      Organize radio and television talk shows and prepare articles related to source reduction and recycling for local newspapers.

**Information Booth(s)**  
**Short Term/Start-up Year: 1992**

- Feb. 1992                      Design portable "theme" booth and display using the Solano County logo.
- March 1992                      Purchase or solicit donated materials and labor to build an information display.
- March 1992                      Coordinate with local recycling service providers to have recycling containers placed and serviced at public events.
- March 1992                      Develop lending system for the information display booth to be used by schools and community groups for special events.

**Video**  
**Short Term/Start-up Year: 1993**

- Jan.-March 1993                      Produce or obtain a video in cooperation with the cities and the recycling service providers.
- April 1993                      Schedule the video into the local cable television station's regular programming. During the annual media campaign, the video should be scheduled during the prime viewing time.
- April 1993                      Begin incorporating the video into presentations and make copies available to the community for private viewing through the local library, schools, and recycling service providers.

**Resource Conservation Directory**  
**Short Term/Start-up Year: 1994**

- Jan.-Feb. 1994                      Gather information for directory.
- March-April 1994                      Produce the directory in cooperation with Solano County and collection service providers.

April 1994                      Distribute Resource Conservation Directory to residents through collection service providers, at libraries and schools, at public events, through the Neighborhood Block Leaders, at the transfer station, at buy-back/drop-off centers, at community and senior centers, at the Housing Authority, at churches, at the shopping malls, at public information desks, at the landfills, and at other appropriate locations.

**SOURCE REDUCTION PROGRAMS**

**Surcharge at Disposal Facility  
Short Term/Start-up Year: 1992**

Feb.-April 1992              Write guest editorials and news articles for local media to educate the public and solicit community input for the new rate structure.

**Drought-Resistant Landscaping Ordinance  
Short Term/Start-up Year: 1992**

Jan.-March 1992              Write guest editorials and news articles to educate the public and solicit community input.

March 1992                      Notify public and hold public meeting.

Sept. 1992                      Supply Neighborhood Block Leaders, Master Composters, water districts, public utilities, and the County Building Division with informational materials on drought resistant landscaping.

**Upstream (on site) Yard Waste Management Education/Backyard Composting Demonstration Site  
Short Term/Start-up Year: 1994**

Jan.-Feb. 1994                Collect information on Master Composter Programs from other jurisdictions.

Feb.-March 1994              Develop printed materials and signage at demonstration sites on methods for backyard composting. Incorporate information on benefits and methods of other forms of upstream yard waste management into composting educational materials.



March-April 1994 Develop a packet of materials to assist Master Composters in promoting backyard composting and other forms of upstream yard waste management.

April 1994 Kick-off pilot by "christening" demonstration site. Invite media.

April 1994 Begin recruiting and training a corps of volunteers as Master Composters.

**Quantity Based Residential Hauling Fees**  
**Short Term/Start-up Year: 1994**

June-Aug. 1994 Write guest editorials and news articles; and work with local media to educate the public and solicit community input.

**RECYCLING PROGRAMS**

**Recycling Collection Service**  
**Short Term/Start-up Year: 1992**

March 1992 Begin publicizing the impending start-up of the recycling collection service preparation through the local media. Write guest editorials and news articles for local papers.

June 1992 Produce a letter of introduction from the mayor and a "how to" brochure.

Sept. 1992 Notify residents in advance of start-up through garbage bill inserts.

Oct. 1992 Distribute letter and brochure with the recycling containers.

Oct. 1992 Involve local media in kick-off of program.

Oct. 1993 Begin recruiting block leaders.

**Expansion of Existing Buy Back/Drop-off Centers**  
**Short Term/Start-up Year: 1992**

July 1992 Work with the local media, recycling service providers,

Neighborhood Block Leaders, and community groups to publicize the locations and materials accepted.

March 1993 List in Resource Conservation Directory.

**Feedback to the Public**

**Short Term/Start-up Year: 1992**

July 1992 Gather information and print flyer with amounts of materials collected, resources saved and the economics of Solano County recycling programs.

Aug. 1992 Produce informational flyers.

Sept. 1992 Distribute flyers in recycling containers and through Neighborhood Block Leaders.

Sept. 1992 Place graphic advertisements in local newspapers. Work with local media to update the public on the progress of the recycling efforts.

**Building Policies and Codes Emphasizing Design for Recycling**

**Short Term/Start-up Year: 1992**

Nov. 1992 With the input of architects and builders and the County Architect and Building Division, develop draft building policies and codes emphasizing design for recycling.

Nov. 1992 Through guest editorials and news articles, work with local media to educate the public and solicit community input.

Sept. 1993 After policy and code changes work with architects, builders, etc. and local media to publicize residential developments which have incorporated recycling into design. Information will be made available to the public through the Department of Environmental Management, the Building Division, the County Architect, and General Services.

**Expansion of Collection Service  
Medium Term/Start-up Year: 1996**

- April 1996                      Publicize impending expansion. Write guest editorials and news articles in local paper.
- May 1996                        Reproduce the letter of introduction from the Chairperson of the County Board of Supervisors and the "how to" brochure.
- May 1996                        Notice residents in advance of start-up through garbage bill inserts.
- June 1996                        Distribute letter and brochure with the recycling containers.
- June 1996                        Continue recruiting Neighborhood Block Leaders.

**COMPOSTING PROGRAMS**

**Christmas Tree Collection Service  
Short Term/Start-up Year: 1993**

- Sept.-Oct. 1992                Produce collection information flyers.
- Oct. 1992                        Identify Christmas Tree retailers and distributors.
- Nov.-Dec. 1992                Distribute flyers to retailers and distributors.
- Nov.-Dec. 1992                Supply Neighborhood Block Leaders and Master Composters with flyers to distribute.

**Benefits of Using Compost and Mulch for Home Purposes  
Short Term/Start-up Year: 1992**

- Jan.-Feb. 1992                Include information on the benefits of using compost and mulch for home purposes in the "how-to" collection service brochure and the back yard composting information and demonstration sites.
- April 1992                        Begin distribution of brochures and backyard composting materials through the Neighborhood Block leaders, Master Composters, nurseries, landscapers, and garden centers.

April 1992                      Begin writing articles and producing advertisements for local media on the benefits of using compost and mulch.

**Yard and Wood Waste Drop-Off Site  
Short-Term/Start-up Year: 1993**

Feb.-March 1993              Work with local media, collection service providers, Neighborhood Block Leaders, and Master Composters to publicize the location of the drop-off site.

March 1993                      Incorporate information on the yard and wood waste drop-off site into the Resource Conservation Directory.

April 1993                      Work with Neighborhood Block Leaders and Master Composters to distribute the Recycled Resource Directory and promote the use of the yard waste drop-off sites.

**Feedback to the Public  
Short Term/Start-up Year: 1993**

May-June 1993                Gather information on the amounts of Christmas Trees, and yard and food waste collected and composted and how residents can obtain compost/mulch.

July-Aug. 1993                Produce informational flyers.

Sept. 1993                      Distribute flyers through Neighborhood Block Leaders and Master Composters and post at information kiosks.

Sept. 1993                      Produce graphic advertisements and place in the local newspapers.

**Yard Waste Collection Service Expansion (Single Family)  
Medium Term/Start-up Year: 1996**

Jan - Feb 1996                Publicize the impending start-up of the yard waste collection service expansion through the local media.

Feb - Mar 1996                Reproduce "how-to" brochure and letter of introduction from the Chairperson of the County Board of Supervisors and the mayors



of cooperating cities to be distributed with yard waste collection containers.

April 1996 Notify residents in advance of start-up through garbage bill inserts.

May 1996 Create a media event of container distribution to involve local media in kick-off of program.

**Food Waste Collection Service  
Medium Term/Start-up Year: 1998**

Jan.-Feb. 1998 Publicize the upcoming expansion of the food waste collection service through the local media.

Feb. 1998 Notify residents in remaining neighborhoods in advance of start-up through garbage bill inserts.

March 1998 Distribute "how-to" printed materials in yard waste collection containers or attached to residents' doorknob.

**SPECIAL WASTE PROGRAMS**

**Tires**

**Short Term/Start-up Year: 1992**

Jan.1992-Jan.1993 Compile information on sources of used and retread tires.

March 1993 Supply Neighborhood Block Leaders with information.

March 1993 Include information in the Resource Conservation Directory.

**Dead Animals**

**Short Term/Start-up Year: 1993**

Jan. 1993 Obtain copies of the Solano County Animal Shelter spaying and neutering literature.

Feb. 1993 Distribute through Neighborhood Block Leaders.

March 1993 List Solano County Animal Shelter in the Resource

Conservation Directory.

## D.2. YOUTH

### GENERAL PROGRAMS

#### Seminar for Educators

Short Term/Start-up Year: 1992

Jan.-March 1992 In cooperation with the Solano County Office of Education, gather existing curriculum materials and examples of experiential learning from other jurisdictions, the Department of Conservation, and other states.

March 1992 Confer with school district and private school representatives to develop seminar dates, location, invitation list, and seminar content.

April 1992 Conduct seminar with samples of the gathered curriculum materials.

April 1992 Choose suitable curriculum materials.

#### Evaluations and Recommendations

Short Term/Start-up Year: 1992-1993

Sept. '92-May 1993 During one-year test period, gather recommendations and evaluations from educators on curriculum.

June-July 1993 Incorporate recommendations into final set of curricula materials.

#### Localize Curriculum

Short Term/Start-up Year: 1992

June-July 1993 Incorporate Solano County recycling facts and local geographic, historic, and cultural landmarks into chosen recycling curriculum.

Aug. 1993 Conduct teacher seminar to review and prepare for test use in the classroom.

**Systems in School****Short Term/Start-up Year: 1993**

- Jan.-March 1992      Assess current systems and compile information resources on alternatives for source reduction, recycling, composting, and household hazardous and special wastes management systems in school settings.
- April 1992            Form a task force in each school district and consult recycling service providers to develop and implement systems.
- Sept. 1993            Coordinate creative classroom activities to introduce students and staff to the systems and to illustrate the school's commitment and their responsibility to participate.

**Annual School Assemblies****Short Term/Start-up Year: 1993**

- Sept-Dec. 1993      Work with individual schools to schedule an annual school assembly.
- Jan-March 1994      Provide schools with information resources on guest speakers, singers, storytellers, etc. for the school assemblies.
- March-April 1994    Assist schools in arranging for local media coverage of assemblies.

**Compost Education and Training****Short Term/Start-up Year: 1994**

- Sept. 1994            Identify Solano County youth groups suitable for composting training (eg. Boy Scouts, Girl Scouts, 4-H Club, Future Farmers).
- Jan. 1994             Begin contacting youth groups and schedule special youth training sessions at backyard composting demonstration site for ongoing training workshops.

### D.3. COMMERCIAL AND INDUSTRIAL

#### GENERAL PROGRAMS

##### Letter of Introduction and General Information Brochure Short Term/Start-up Year: 1992

- Jan.-Aug. 1992      Produce a letter of introduction and a general informational brochure on source reduction, recycling, and household hazardous and special wastes management in commercial and industrial settings. Brochure should include reply card to request additional specific information and services.
- Sept. 1992          Mail materials to all businesses and industries in the unincorporated county.
- Sept. 1992          Publicize collection services available to businesses and industries through the local media, the various Chamber of Commerce newsletters, and through other business and industry groups.

##### Slide Show or Video Short Term/Start-up Year: 1992

- Jan.-Feb. 1992      Identify regional businesses and industries that have completed waste audits, incorporated source reduction into business practices, and integrated recycling and household hazardous and special wastes management systems.
- Feb.-Aug. 1992      Photograph/film model businesses and industries and produce slide show or video for presentations.

##### Instructional Booklet Short Term/Start-up Year: 1992

- Jan.-Feb. 1992      Gather existing information on conducting waste audits, incorporating source reduction into purchasing and work habits, and setting up recycling and household hazardous and special waste management systems in commercial and industrial settings.



- Feb.-Aug. 1992 Produce "do-it-yourself" instructional booklet.
- Sept. 1992 Begin distributing to businesses and industries.

**Technical Assistance  
Short Term/Start-up Year: 1995**

- Sept. 1995 Identify large waste generators such as business parks, large industries, and shopping malls.
- Oct. 1995 Begin contacting the above, as well as businesses and industries requesting assistance, to schedule an on-site visit to provide technical assistance.

**Model Business/Industry Award Program  
Short Term/Start-up Year: 1994**

- Jan.-Aug. 1994 Develop a program for identifying and awarding public recognition to successful business and industry source reduction, recycling, composting, and household hazardous and special wastes management systems.
- Feb. 1994 Adapt the recycling logo for use by these businesses and industries to indicate to the public that these establishments and their customers are helping to achieve the county's waste diversion goals.
- Jan.-Aug. 1994 Incorporate logo into printed materials, advertising, and window signage.
- Sept. 1994 As businesses and industries are identified as models, work in cooperation with local media, business, and industry groups to publicize.

**Regional Waste Exchange  
Short Term/Start-up Year: 1994**

- Sept. 1994 Begin writing articles about the regional waste exchange to include in the local media and business and industry group newsletters.

**Education Program for Developers, Architects, Builders and Other Construction Industry Professions**

**Short Term/Start-up Year: 1994**

- Sept. 1994                      Compile information on building design for recycling, reuse, and recycling of construction materials and sources of recycled construction materials.
- Oct.-Dec. 1994              Develop Building Industry Resource Guide.
- Jan. 1995                      Distribute the Guide through the Solano County Department of Environmental Management, Planning and Building Division, through the County Architect, and through industry groups.

**Mandatory Commercial/Industrial Sector Recycling**

**Medium Term/Start-up Year: 1996**

- Jan. 1996                      Notify businesses and industries of public hearing.
- Jan. 1996                      Evaluate comments and suggestions from businesses and industries at the public hearing and incorporate into a revised ordinance.
- Feb. 1997                      Begin publicizing the annual waste diversion impacts as a result of the ordinance.

**D.4. GOVERNMENT**

**Government Modeling**

**Short Term/Start-up Year: 1992**

- Jan. 1992                      Work with local media to provide ongoing promotion of government agencies' adoption of the "reduce, reuse, and recycle" ethic.
- Jan.-March 1992              Conduct waste audits for all government departments and agencies within the County.
- March 1992                      With employee input, establish in-house waste diversion goals.

March-April 1992 Produce written guidelines and provide employee training on new government procurement practices for source reduction, and recycling, and household hazardous and special wastes management into work and waste-handling operations.

May 1992 Establish awards program and provide feedback to employees on progress of in-house programs.

**Government Procurement Ordinance**

**Short Term/Start-up Year: 1992**

Jan. 1992 Notice residents of public hearing.

Jan.-Feb. 1992 Educate residents in advance of hearing through articles in the local newspapers.

Feb. 1992 Hold public hearing.

March 1992 Continue to write articles for the local newspapers and other community newsletters about purchases made by the County as a result of the ordinance.

**Composting**

**Short Term/Start-up Year: 1994**

April 1994 Give special instruction to County departments and agencies that deal with large volumes of organic material about the proper separation of this material for composting.

**E. MONITORING AND EVALUATION**

This section provides program monitoring and evaluation mechanisms for the recommended education programs.

**E.1. MONITORING METHODS**

A combination of both quantitative and qualitative data gathered at regular intervals will monitor the progress and evaluate the effectiveness of the education and public information programs. The education and public information objectives are stated in quantifiable terms as much as possible so that progress may be monitored and measured. In addition to

monitoring the overall tonnage of materials entering the landfill and recovered through recycling services, three primary measurements will be regularly used to monitor and evaluate the effectiveness of the education and public information programs:

### **SURVEYS**

Mail-back, phone interviews, or in-person interviews will measure the increase in public awareness about source reduction, recycling, and composting, etc. and their related services or activities. A pre-survey may be done in order to more accurately evaluate the progress of public awareness and habits about source reduction, recycling, composting, and special and household hazardous wastes management.

### **PARTICIPATION RATE TRACKING**

Tracking of participation rates in response to education and public information activities within each of the four main target populations will measure the increase in public participation about source reduction, recycling, and composting service and activities.

### **SAMPLING**

Selected sampling of solid waste at the point of generation within each of the target populations (residents, youths, commercial/industrial, and government) will measure the degree of change in quantity and type of waste disposed.

Qualitative evaluations will also be incorporated to complement quantitative data collected. The County Local Task Force is a valuable resource for evaluating the effectiveness of education and public information programs. Because task force members represent different target populations, their recommendations can help to set the theme and target program messages most effectively.

Feedback from businesses, government agencies, and schools will also be requested on a regular basis to monitor the progress of education and public information programs. Employee suggestions and questions will indicate the type of information needed at the workplace. Classroom pre-tests and post-tests will measure students' understanding of waste management issues.

Quarterly status reports will briefly summarize the progress of the County's education and public information programs, changes and new programs recommended. A summary and update of these quarterly reports will contribute to the annual report for the California Integrated Waste Management Board.

## **E.2. CRITERIA FOR EVALUATING EDUCATION AND PUBLIC INFORMATION PROGRAM EFFECTIVENESS**

Criteria for evaluation should reflect the education and public information objective and also pinpoint program successes and shortfalls. The following list of criteria should be used for evaluating the education and public information programs relating to source reduction, recycling, composting and special and household hazardous wastes management.

1. Attainment of short-term and medium-term objectives.
2. Level of awareness of programs by geographic area of the unincorporated county.
3. Level of awareness of programs by target waste generator or population.
4. Participation rates in programs by geographic area of the unincorporated county.
5. Participation rates in programs by target waste generator or population.
6. Discrepancy between program awareness and program participation rates by geographic awareness.
7. Discrepancy between program awareness and program participation rates by target waste generator or population.
8. Accessibility of program information by target waste generator or population.
9. Analysis of change in consumer habits by target waste generator or population.
10. Overall cost of the education and public information programs.

## **E.3. RESPONSIBLE AGENCY/PERSON**

The Solano County Department of Environmental Management will have the overall responsibility for monitoring, evaluating and reporting to the Solano County Board of Supervisors or the appropriate department head on the progress of the education and public information component. The monitoring, evaluating, and reporting will be performed by a county-wide agency that will coordinate and implement SRRE and HHWE programs that are most efficiently performed on a county-wide basis.



#### E.4. FUNDING REQUIREMENTS AND REVENUE SOURCES

Education and public information program monitoring and evaluation will be prepared by the county-wide waste management agency. The county-wide agency will be funded through a landfill surcharge.

#### E.5. CONTINGENCY MEASURES

If the monitoring and evaluation system shows a shortfall in the attainment of the education component, the county-wide Program Manager will develop a special report identifying the following:

- Areas in which the Education and Public Information programs are deficient.
- Potential measures to increase participation.
- Potential measures to increase program efficiency.

The special report will be submitted to the Solano County Board of Supervisors or the appropriate department head for their consideration and direction. The county-wide program manager will implement any measures adopted by the Board of Supervisors as a result of the special report.

TABLE VI-1: COST ESTIMATES OF EDUCATION AND PUBLIC INFORMATION PROGRAMS (IN 1991 DOLLARS)

	Start-Up Year	Start-Up Year (a)		Succeeding Years	
		FTE	Annual Cost (a)	FTE	Annual Cost (b)
<b>RESIDENTS-ALL PROGRAMS</b>					
Annual Media Campaign (c)	1992	0.03	2,488	0.03	2,488
Regular Programming	1992	0.10	5,962	0.10	5,962
Printed Material (c)	1992	0.20	16,379	0.02	1,992
Resource Conservation Direct	1994	0.05	3,981	0.02	2,492
Neighborhood Block Leader	1992	0.10	5,712	0.10	5,712
Recycling Info Booth	1992	0.04	2,735	0.00	0
<b>RESIDENTS-SOURCE REDUCTION</b>					
Yard Waste Mgmt./Backyard Composting (c)	1994	0.15	14,942	0.15	8,942
Qty. Based Res. Hauling Fees	1994	0.01	496	0.03	1,488
Surcharge at Disposal Facility	1992	0.01	496	0.00	495
Ordinance/Drought Resistant Landscape	1992	0.01	496	0.01	991
<b>RESIDENTS-RECYCLING</b>					
Collection Service	1992	0.03	2,488	0.00	0
BB/DO Centers	1992	0.03	1,988	0.01	696
Ordinance/Building Design	1992	0.01	496	0.00	0
Feedback to Public	1992	0.02	1,492	0.02	1,492
Collection Service Expansion	1996	0.03	2,488	0.00	0
<b>RESIDENTS-COMPOSTING</b>					
Christmas Tree Recycling	1992	0.02	1,492	0.02	1,492
Promote Benefit of Use	1992	0.01	496	0.01	496
SF Curbside Collection	1996	0.03	2,488	0.00	0
Drop-off Site	1993	0.02	1,492	0.01	996
Feedback to Public	1993	0.02	1,492	0.02	1,492
Food Waste Collection Expansion	1998	0.05	3,481	0.00	0
<b>YOUTH-ALL PROGRAMS</b>					
Seminar for Educators (c)	1992	0.04	3,085	0.00	0
Localize Curriculum (c)	1992	0.04	3,985	0.00	0
Incorporate Recommendations (c)	1993	0.02	992	0.00	0
Systems in Schools (c)	1993	0.02	1,242	0.00	0
Annual School Assemblies (c)	1993	0.06	4,977	0.06	4,977
Compost Education and Training (c)	1994	0.02	1,242	0.02	1,242

TABLE VI-1 (CONTINUED)  
PROGRAMS (IN 1991 DOLLARS)

SPECIAL WASTE-ALL PROGRAMS

Tires (c)	1992	0.01	996	0.01	996
Dead Animals (c)	1993	0.01	996	0.01	996

COMMERCIAL/INDUSTRIAL-ALL PROGRAMS

Introductory Letter/Brochure	1992	0.05	3,231	0.01	696
Slide Show/Video (c)	1992	0.20	11,923	0.01	496
Instructional Booklet (c)	1992	0.10	6,962	0.01	996
Technical Assistance	1995	0.10	4,962	0.05	2,481
Regional Waste Exchange (c)	1994	0.02	992	0.01	496
Model Business Program	1994	0.04	2,385	0.04	2,185
Construction Industry Educational Programs (c)	1994	0.03	1,988	0.03	1,738
Mandatory Recycling	1996	0.03	1,888	0.03	1,888
Agricultural Compost Education	1998	0.04	2,735	0.04	2,735

GOVERNMENT AND OTHER INSTITUTIONS-ALL PROGRAMS

Modeling	1992	0.04	2,985	0.04	2,985
Procurement Ordinance	1992	0.03	2,488	0.02	1,492
Composting	1994	0.01	996	0.01	696

Total: 1.88 134,634 0.95 64,325

- (a) The start-up costs for EPI activities are included in the contingency budget in the source reduction, recycling, composting, and special waste components.
- (b) annual costs include staff costs at \$49,616 per year per FTE and material costs.
- (c) Programs which can be done in cooperation with other jurisdictions.

## **CHAPTER VII SUMMARY FACILITY CAPACITY**

Most of the unincorporated county's solid waste is disposed at Potrero Hills Landfill, B&J Landfill, Rio Vista Landfill, and American Canyon Landfill in Napa County. The American Canyon Landfill is due for closure in the next two years.

By implementing the plans in the SRRE, the unincorporated county will avoid disposing 88,500 tons of waste by 2005. Diversion programs throughout Solano County will divert about 2.4 million tons of refuse by 2005. This amounts to approximately six years of capacity at current disposal rates. The assumptions used here are that the waste generation rate rises until 2005 at a rate commensurate with the projected rate of growth for population and jobs in the unincorporated county. Without new diversion programs, the county has sufficient disposal capacity until about 2015. The implementation of the planned diversion programs throughout the county will ensure sufficient capacity in the county's landfills for the entire county's refuse until about 2028.

Diversion facility capacity needs will increase over time as the diversion percentages increase. The SRRE addresses these needs by phasing in facilities over time. Construction of diversion facilities must be planned to maintain flexibility. An effort to develop a regional processing facility will be made with construction and start-up of advanced facilities to occur in the short term in some cities and in the medium term in other cities. The facilities will initially be intermediate processing facilities designed to separate recyclables collected in the curbside collection programs. They will have the potential to be converted at a later date to comprehensive materials recovery facilities. This approach to facility construction avoids the financial risk of large processing facilities in the short term and maximizes the opportunity for market development based on high quality source separated or semi-source separated materials. It emphasizes collection facilities rather than processing facilities in the short term (prior to January 1, 1995).





# CHAPTER VII

## FACILITY CAPACITY COMPONENT

### A. EXISTING FACILITIES

In this chapter solid waste facilities are defined as both disposal facilities and potential diversion facilities. This definition goes beyond the minimum standard specified for this component in the AB 939 regulations (disposal facilities only). Potential diversion facilities are included because other components of this element do not describe possible sites at which new programs can be located.

#### A.1. EXISTING LANDFILLS

All wastes disposed of from the unincorporated areas in Solano County are disposed by the franchised haulers or self-haulers. The wastes are disposed of at the various landfills servicing the County, as discussed below. Rate schedules for the landfills in the unincorporated part of Solano County are in Table VII-1.

##### RIO VISTA LANDFILL

The eastern portion of the County is serviced by the Rio Vista Landfill. The landfill is operated by Rio Vista Sanitation Service on property leased by the City of Rio Vista from the State of California. The land was incorporated into the City of Rio Vista in 1991.

The landfill is permitted by the CIWMB under Facilities Permit No. 48-AA-0004, and the Regional Water Quality Control Board under Board Order No. 91-115. The facility is permitted to accept non-hazardous solid waste, consisting of garbage, refuse, demolition debris, appliances, dewatered sewage and water treatment sludge. The site has a permitted fill area footprint of 20 acres, containing approximately 250,000 cubic yards of remaining permitted disposal capacity. The gross facility size is approximately 20 acres. At its current disposal rate, the Rio Vista Landfill has over 27 years of remaining disposal capacity. There are no plans for expansion or closure.

The facility accepts approximately 15 tons per day of municipal and special wastes for disposal on a six day basis. All of this material is generated in Rio Vista or the surrounding unincorporated areas within Solano County.

##### B&J LANDFILL

The north and northwestern portion of Solano County disposes of its waste at the B&J Landfill. The landfill is owned and operated by the B&J Dropbox Corporation, a NORCAL subsidiary. The landfill is located at 6426 Hay Road, 1/4 mile west of Highway 113.

The landfill is permitted by the CIWMB under Facilities Permit No. 48-AA-002, and the Regional Water Quality Control Board under Board Order No. 89-178. The facility is permitted to accept non-hazardous solid waste, consisting of garbage, refuse, demolition debris, appliances, dewatered sewage sludge, and dewatered water treatment sludge. The site has a permitted fill area footprint of 161 acres, containing approximately 6.0 million cubic yards of remaining permitted disposal capacity. The gross facility size is approximately 161 acres. At its current disposal rate, the facility has over 39 years of remaining disposal capacity. There are no closure plans for the short or medium terms. An additional 320 acres adjacent to the site has been designated in the CoSWMP as a potential expansion site.

The facility accepts approximately 200 tons per day of municipal and special wastes for disposal on a seven day basis. All of this material is generated in Vacaville, Dixon, or surrounding unincorporated areas within Solano County.

#### **POTRERO HILLS LANDFILL**

The central and southern portion of Solano County disposes of its waste at the Potrero Hills Landfill. The landfill is owned and operated by Potrero Hills Landfill, Inc. The landfill is located approximately four miles southeast of Suisun City off Kildeer Road about one mile south of Route 12.

The landfill is permitted by the CIWMB under Facilities Permit No. 48-AA-0075, and the Regional Water Quality Control Board under Board Order No. 85-121. The facility is permitted to accept non-hazardous solid waste, consisting of garbage, refuse, demolition debris, appliances, dewatered sewage and water treatment sludge. The site has a permitted fill area footprint of 190 acres, containing approximately 17.6 million cubic yards of remaining permitted disposal capacity. The gross facility size is approximately 320 acres. At its current disposal rate, the facility has over 35 years of remaining disposal capacity. There are no plans for closure in the short or medium terms. Additional property adjacent to the site is owned by Potrero Hills Landfill, Inc. It could serve as an expansion area for the site, but has not been requested for such designation in the CoSWMP.

The facility accepts approximately 650 tons per day of municipal and special wastes for disposal on a seven day basis. Most of this material is generated in Suisun City, Fairfield, or surrounding unincorporated areas within Solano County. A maximum of 242 tons per day may be imported from Contra Costa County until late 1993 (three years after the date on which the Inter-County Agreement was finalized).

#### **AMERICAN CANYON LANDFILL**

The southwestern portion of the unincorporated county is serviced by the American Canyon Landfill in Napa County.

## A.2. POTENTIAL DIVERSION FACILITY SITES

The unincorporated county has many potential diversion facility sites. Existing facilities in the unincorporated county and in the cities could be expanded. Some of the sites available throughout the county are the following:

- The Rio Vista Landfill.
- The Rio Vista Corporation Yard.
- The old Rio Vista Airport is being redeveloped as an industrial park.
- The B&J Landfill.
- The Vacaville Sanitary Services yard.
- The Vacaville Recycling Center located at the City Water Treatment Plant.
- The Dixon Corporation Yard.
- The Solano Garbage Company Corporation Yard and the adjacent property.
- The Fairfield-Suisun Wastewater Treatment Plant. There is land at this site that may be available for the landspreading of sewage sludge. It is not available for the treatment or handling of most solid wastes.
- The Potrero Hills Landfill site. Due to Bay Conservation and Development Commission restrictions, buildings cannot be constructed at the landfill site, although outdoor diversion activities, such as concrete recycling, may be acceptable.
- The Central Solano County Integrated Resource Recovery Facility. Currently in the planning stage, the facility is scheduled for construction in the short term by Solano Garbage Company.
- The Vallejo Garbage Service corporation yard.
- The Vallejo Water Pollution Control Plant.
- VALCORE Recycling.

The unincorporated areas are too discontinuous and have too low a population and jobs density to justify separate diversion facilities. Potential city sites are therefore potential sites for the neighboring unincorporated areas as well. The Lambie Industrial Park in the unincorporated county may be the best potential site for diversion activities from the County's perspective. It is centrally located to the cities of Rio Vista, Dixon, Vacaville, Fairfield, and Suisun City. It is not excessively far from Benicia. Although utilities at the site are limited, a yard waste processing operation could potentially be integrated with the operations of Greenall Corporation, a manufacturer of soil amendments located at the site.

The Lambie Industrial Park might also be the best potential regional site for a major processing facility. Over time, industries using secondary materials could be encouraged to locate near the processing facility in exchange for long-term purchase arrangements for materials recovered in the processing facility. The central location for the aforementioned five cities would minimize transport costs both for collection and delivery to market of finished goods.

### **A.3. PLANNED FACILITY PHASE-OUTS OR EXPANSIONS**

No facilities in the unincorporated Solano County are planned to be phased out in the short-term or medium-term planning periods.

In the northern portion of Solano County, the B&J Landfill is considering an expansion which would increase the landfill by approximately 320 acres.

The Solano Garbage Company Corporation Yard is being expanded for an interim recycling facility to handle materials from curbside collection. According to Solano Garbage Company, it will be replaced by 1995 by the Central Solano County Integrated Resource Recovery Facility.

The American Canyon Landfill in Napa County is to be phased out during the short term planning period.

## **B. DISPOSAL FACILITY NEEDS PROJECTION**

### **B.1. NEEDS PROJECTION, REGULATORY FORMAT**

Waste generation has been projected for the 15 year period beginning in 1991 (See Tables VII-2 and VII-3). This projection is presented in a format prescribed by the CIWMB regulations. The projection is based on unit generation factors developed for the unincorporated county in the Initial Waste Generation Study. The Association of Bay Area Governments (ABAG) and California Department of Finance records were used to project resident and employee population growth for the unincorporated county.

The disposal capacity needed until 2005 in the absence and in the presence of new diversion programs is shown in Table VII-2 and Table VII-3, respectively. The projections indicate that in 2005, the unincorporated county will have saved over 88,500 tons of disposal capacity by implementing new diversion programs. This is equivalent to over six years of disposal capacity at the current disposal rate. Diversion programs throughout the entire county will save about 2.4 million tons of disposal capacity by 2005. This is equivalent to about 7.6



years of disposal capacity at the county's current disposal rate. An extrapolation of the projections in Tables VII-2 and VII-3 indicates that if the jurisdictions in Solano County do not implement new diversion programs, the currently permitted disposal capacity will be exhausted in about 2015. If the planned diversion programs are implemented, permitted disposal capacity will be available until about 2028.

In Tables VII-2 and VII-3, the column "Additional Capacity" is calculated in accordance with CIWMB regulations. Please note that the capacity needs of the unincorporated county have been addressed by treating all waste from all cities in Solano County (except Rio Vista) as importation. Imports also come from Contra Costa County until 1993.

## **B.2. NEEDS PROJECTION, LAY FORMAT**

Disposal capacity needs are subjective. Secure capacity for durations ranging from 15 to 50 years is often sought by local governments. The secure capacity needed depends on the likelihood that additional capacity, or alternatives to landfilling, will be available at a later time.

The unincorporated county is not addressed in any of the cities' franchise agreements. The unincorporated county does not have any independent franchise agreements with haulers. Consequently, the unincorporated areas have no landfill rights or reservations. Landfill rights and reservations should be established for the unincorporated areas either directly, or through revision of the city franchise agreements.

Any such revisions should allow the unincorporated areas to reap the benefits of diversion programs in the form of additional landfill capacity reserved for their wastes.

## **C. FACILITY IMPROVEMENT ACTIVITIES**

The Solano County Local Task Force will prepare a Siting Element in accordance with AB 939 in 1992. Key facility improvement recommendations follow:

- Consider establishing one or more comprehensive drop-off/buy-back centers which handle a wide range of materials. These facilities could be independently operated in the unincorporated county, or be cooperative arrangements with cities.
- Participate in all future collection equipment and container purchase decisions for all cities offering service in the unincorporated areas. This participation



should focus on maximizing future flexibility in implementing diversion programs.

- Identify a site or several sites on which extensive materials processing facilities could be constructed in 1995 through 1996. Pursue regionalization options with other Solano County jurisdictions. Review will be through the Local Task Force as mandated by AB 939.
- Facilitate the development of infrastructure at the Lambie Industrial Park. A phased set of requirements for the developer might permit some diversion facilities and industry to be constructed in the near term with full infrastructure and other types of development occurring at a later (specified) time.
- Evaluate and, if appropriate, permit the siting of a disposal and/or processing site for drilling mud.
- Facilitate zoning, permitting, and other land use and city code compliance issues for industries which process recyclable materials, or provide markets for those materials.
- Require all new developments to provide adequate space in their site plans or building layouts for future diversion activities.

## D. FACILITY IMPROVEMENT ACTIVITIES MONITORING

Implementation schedules are provided in other chapters of this document for the recommended diversion programs. Major steps in getting new facilities in place and ready for use are included in those schedules. Schedules should be reviewed, and progress evaluated, at least four times per year.

TABLE VII-1: DISPOSAL RATES AT SOLANO COUNTY LANDFILLS

<u>B&amp;J Landfill</u>	<u>Rate (in dollars)</u>	
Automobiles (all)	5.00 minimum	
Station Wagon (all)	6.00 minimum	
Pick up trucks (small)	Brush	Mixed Debris
Bed Height	6.00	8.00 min.
+ 1 foot	7.00	11.00
+ 2 feet	8.00	15.00
above cab	10.00	17.00
Standard trucks	7.00	9.00
Bed height		
+ 1 foot	8.00	12.00
+ 2 feet	9.00	16.00
above cab	11.00	20.00
Brush	5.00/yard <sup>3</sup>	
Demolition Disposal	8.00/yard <sup>3</sup>	
Loose Trash Refuse	7.00/yard <sup>3</sup>	
Compacted Trash	12.00/yard <sup>3</sup>	
Loose Trash Refuse	7.00 yard <sup>3</sup>	
Tires-automobile	3.00 each	
Auto w/ rim	5.00 each	
Truck	6.00 each	
Truck w/ rim	8.00 each	
Heavy equip. tires	75.00 each	
Appliances, refrigerator, washer, dryer	8.00 each	
Stuffed Chair or Sofa	8.00 each	
Mattresses & Box Springs		
Twin	7.00 each	
Full	8.00 each	
Tree Stumps	20.00 min.	
3x3x3	57.00	
4x4x4	170.00	
5x5x5	175.00	
6x6x6	200.00	
7x7x7	250.00	
8x8x8	280.00	
Dead Horse or Cattle	150.00	
Engine Blocks	20.00	
	15.00	
Motorcycle Frames		

W/motor	20.00
Complete	25.00
Boats (wood, aluminum, fiber)	15.00 min.
Boat Trailers	20.00 min.
Golf Carts	30.00
Bales of Hay	2.00
Cement, Asphalt-clean	6.00/yard <sup>3</sup>
Cement w/ rebar	7.50/yard <sup>3</sup>

Potrero Hills Landfill

Residential Rear Loader	25.50/ton	
Industrial Drop Box	25.50/ton	
Commercial Front Loader	25.50/ton	
Trash (Min On Scale)	25.50/ton	6.30/yard <sup>3</sup>
Brush/Trimings	19.70/ton	4.80/yard <sup>3</sup>
Mixed Demo/Roofing	25.50/ton	10.00/yard <sup>3</sup>
Concrete w/Demo	30.35/ton	
Concrete w/Rebar or Wire	10.80/ton	
Clean Dirt	0.00/ton	
Mixed Clean Fill	7.75/ton	
Sludge, Alum & DE	10.20/ton	
Sewage Sludge Cake	10.20/ton	
Grit	25.50/ton	
Mud + Spec Hndlg	25.50/ton	
Poles/Timber & Piling	25.50/ton	
Tree Stumps	50.15/ton	
Alcohol Liquor	35.45/ton	
+ Special Handling	70.00/ton	
Pesticide Container: Cans, Barrels, Drums, Bags		35.15/yard <sup>3</sup>
Asbestos Friable		60.15/yard <sup>3</sup>
Asbestos Non-Friable		40.15/yard <sup>3</sup>
Food Waste	35.45/ton	
Spec Hndlg		70.00/yard <sup>3</sup>
Unsecured Ld		7.50/yard <sup>3</sup>
High Moist Waste	35.45/ton	
Dead Cat/Dog		10.00 each
Dead Horse/Cattle		120.00 each
Pickup, Cmpct		7.80 each
Pickup, Std		8.30 each
Cars		5.55 each
Station Wagon		6.30 each
Mattress, Box Springs, Chair, Car Seat		7.55 each
Sofa/Couch		11.05 each



TABLE VII-2: PROJECTED DISPOSAL CAPACITY REQUIREMENTS  
(With Current Diversion)

YEAR	Generation	Imports (a)	Diversion	Transformation	Disposal Capacity (b)	Exports (c)	Additional Capacity (d)		Disposed in Unincorporated County (e)
							(tons)	(cubic yds)	
1990	15,685	295,859	1,612	0	12,041,000	2,055	(11,733,123)	(24,443,967)	307,877
1991	16,484	303,459	1,694	0	11,733,123	2,112	(11,416,986)	(23,785,350)	316,137
1992	17,328	311,372	1,781	0	11,416,986	2,171	(11,092,238)	(23,108,792)	324,749
1993	18,221	388,306	1,873	0	11,092,238	2,231	(10,689,814)	(22,270,410)	402,424
1994	19,166	384,761	1,970	0	10,689,814	2,293	(10,290,150)	(21,437,777)	399,664
1995	20,165	397,376	2,072	0	10,290,150	2,356	(9,877,037)	(20,577,128)	413,113
1996	20,131	406,596	2,069	0	9,877,037	2,417	(9,454,795)	(19,697,459)	422,242
1997	20,106	416,073	2,066	0	9,454,795	2,479	(9,023,162)	(18,798,224)	431,634
1998	20,089	425,822	2,065	0	9,023,162	2,543	(8,581,858)	(17,878,842)	441,304
1999	20,081	435,844	2,064	0	8,581,858	2,608	(8,130,605)	(16,938,733)	451,253
2000	20,081	446,152	2,064	0	8,130,605	2,675	(7,669,111)	(15,977,289)	461,494
2001	20,123	638,057	2,068	0	7,669,111	2,713	(7,015,712)	(14,616,044)	653,399
2002	20,167	467,331	2,073	0	7,015,712	2,751	(6,533,039)	(13,610,475)	482,674
2003	20,213	478,360	2,077	0	6,533,039	2,790	(6,039,334)	(12,581,925)	493,705
2004	20,261	489,693	2,082	0	6,039,334	2,830	(5,534,292)	(11,529,756)	505,042
2005	20,311	501,339	2,087	0	5,534,292	2,870	(5,017,599)	(10,453,315)	516,693
	308,609	6,786,400	31,716	0		39,893			7,023,401

Notes: (a) Beginning in 1993, waste from Vallejo and Benicia is assumed to be imported. Until April, 1993, 88,500 tons of waste per year is imported from Contra Costa County.

Other imports include waste from incorporated cities that goes to Portrero Hills Landfill and the B & J Landfill.

(b) Disposal Capacity is the existing landfill capacity within the unincorporated Solano County (Potrero Hills and B&J Landfills).

(c) Exports from the unincorporated county include waste to Yolo County and the Rio Vista Landfill.

(d) Additional Capacity is calculated according to CIWMB regulations Section 18744(b)(2). The equation is:

$$\text{Additional Capacity} = \text{Generation} + \text{Imports} - \text{Diversion} - \text{Transformation} - \text{Disposal Capacity} - \text{Exports}$$

(e) The total quantity of waste disposed in the unincorporated Solano County.



TABLE VII-3: PROJECTED DISPOSAL CAPACITY REQUIREMENTS  
(With Projected Diversion)

YEAR	Generation	Imports (a)	Diversion	Transformation	Disposal Capacity (b)	Exports (c)	Additional Capacity (d)		Disposed in Unincorporated County (e)
							(tons)	(cubic yds)	
1990	15,685	295,859	1,612	0	12,041,000	2,055	(11,733,123)	(24,443,967)	307,877
1991	16,484	299,724	1,698	0	11,733,123	2,112	(11,420,725)	(23,793,139)	312,398
1992	17,328	293,334	2,686	0	11,420,725	2,171	(11,114,920)	(23,156,045)	306,707
1993	18,221	291,465	4,501	0	11,114,920	2,231	(10,811,965)	(22,524,891)	305,579
1994	19,166	296,376	5,175	0	10,811,965	2,293	(10,503,891)	(21,883,070)	311,275
1995	20,165	292,864	5,485	0	10,503,891	2,356	(10,198,703)	(21,247,263)	308,596
1996	20,131	263,914	7,267	0	10,198,703	2,417	(9,924,341)	(20,675,678)	279,555
1997	20,106	230,192	9,932	0	9,924,341	2,479	(9,686,455)	(20,180,082)	245,748
1998	20,089	226,122	10,165	0	9,686,455	2,543	(9,452,951)	(19,693,617)	241,599
1999	20,081	225,224	10,502	0	9,452,951	2,608	(9,220,757)	(19,209,880)	240,628
2000	20,081	229,932	10,562	0	9,220,757	2,675	(8,983,982)	(18,716,599)	245,269
2001	20,123	235,385	10,585	0	8,983,982	2,713	(8,741,772)	(18,211,995)	250,722
2002	20,167	240,985	10,608	0	8,741,772	2,751	(8,493,979)	(17,695,761)	256,323
2003	20,213	246,741	10,632	0	8,493,979	2,790	(8,240,447)	(17,167,571)	262,081
2004	20,261	252,656	10,657	0	8,240,447	2,830	(7,981,018)	(16,627,094)	268,000
2005	20,311	258,736	10,684	0	7,981,018	2,870	(7,715,524)	(16,073,983)	274,085
	308,609	4,179,509	122,750	0		39,893			4,416,442

Notes:

(a) Beginning in 1993, waste from Vallejo and Benicia is assumed to be imported. Until April, 1993, 88,500 tons of waste per year is imported from Contra Costa County.

Other imports include waste from incorporated cities that goes to Portrero Hills Landfill and the B & J Landfill.

(b) Disposal Capacity is the existing landfill capacity within the unincorporated Solano County (Potrero Hills and B&J Landfills).

(c) Exports from the unincorporated county include waste to Yolo County and the Rio Vista Landfill.

(d) Additional Capacity is calculated according to CIWMB regulations Section 18744(b)(2). The equation is:

$$\text{Additional Capacity} = \text{Generation} + \text{Imports} - \text{Diversion} - \text{Transformation} - \text{Disposal Capacity} - \text{Exports}$$

(e) The total quantity of waste disposed in the unincorporated Solano County.



## CHAPTER VIII SUMMARY FUNDING

The estimated annual cost of all selected programs in the unincorporated county is \$642,000 in 1995 and \$1.3 million in 2000. Almost all of these costs are for recycling and composting programs. Most costs will be covered through user (refuse collection) fees and landfill fees and will be collected by waste haulers and landfills.

Program costs shown are on a gross basis. That is, resale revenues have not been subtracted from gross program costs. Education and public information costs for each program have been included in the cost estimates.

Expansion of the recycling programs after 1995 are particularly expensive programs. They include the construction (or expansion) and operation of processing facilities for residential, commercial, and industrial recyclables that are commingled or mixed with disposable refuse. The aggressive implementation of other, less expensive, diversion programs could decrease the cost of the recycling facilities planned for the medium term.

The breakdown of funding needs for all SRRE programs (short plus medium term) by funding type, assuming all selected funding mechanisms actually occur, is shown in Figure ES-6. In this SRRE, raising user fees is the contingency in the event that a landfill surcharge is not implemented.

Resale revenues may be primarily retained by the County rather than by the service provider. If resale revenues were retained in a separate fund, they could be used as contingency funds or to decrease the size of fee increases in the medium term. The fund could also be used for the following purposes:

- An incentive payment to the service provider for performance better than some contractually defined standard.
- Non-profit recycling groups funded for services not yet provided by the main service providers.
- Seed money provided to local businesses to make use of secondary materials and create jobs.
- Donations made to a regional non-profit organization which provides educational services throughout Solano County.

The impact of this funding option is to initially increase program costs.



# CHAPTER VIII

## FUNDING COMPONENT

### A. INTRODUCTION

AB 939 requires development and implementation of source reduction, recycling, and/or composting programs (referred to here as diversion programs). These programs generally have two features in common:

1. They provide a reduced environmental impact compared to landfilling or transformation of wastes.
2. They cost more in the short term than landfilling or transformation.

These programs will benefit current and future residents of the unincorporated county by reducing the potential for ground and groundwater contamination and by preserving a scarce resource: landfill space. It is only in the context of these benefits that the additional costs of source reduction, recycling, and composting can be economically justified. The California diversion objectives, 25% by 1995 and 50% by 2000, and the threat of \$10,000-per-day fines, make planning and implementation of these programs a practical necessity regardless of the local cost and/or benefit.

Waste collection and waste disposal fees in the entire State of California have been quite inexpensive compared to metropolitan areas around the United States. The tip fee per ton at the landfill or resource recovery facility is the usual measure of waste disposal costs. Table VIII-1 is a sampling of disposal costs from around the country.

The disposal costs in some areas are up to five times those available in Solano County (collection costs vary primarily with labor costs, truck types, and distances traveled, and therefore are less region-specific). Many of these communities have experienced a "rate shock" effect as disposal costs have quadrupled within the last five years. While adequate landfill space will mitigate these dramatic rate increases in Solano County, it is reasonable to expect rapidly increasing rates for both garbage and diversion programs in the unincorporated county due to increasing stringent regulations and increased public concern about the environment.

Operational and capital costs have increased. Operational costs have increased primarily due to more stringent regulatory standards. Facility siting and permitting costs have increased dramatically. Capital costs have increased due to the need to construct new facilities or upgrade existing ones. In addition, existing landfill owners are often financially constrained by meeting current financial assurance rules for past disposal practices, including corrective



action costs. It is clear that municipalities need to structure waste management charges in a manner that reveals the full costs involved, and provide for an equitable distribution of these costs.

The purpose of this chapter is to aggregate the projected costs of the various diversion programs for each component and to discuss alternative funding mechanisms. Specifically discussed are:

- Current funding structures for solid waste management
- Funding alternatives
- A selected funding plan
- Projected program costs.

Funding mechanisms selected and a summary of the costs are included at the end of this chapter. Appendix F contains a discussion of key funding concepts.

It is important to note that programs are often operated at costs which are higher than needed, but are done so because of other considerations, such as educational value and quality of materials collected. As discussed in the components where program selection is discussed, low cost is not the only criterion. The relative costs per ton for selected programs are presented in Table VIII-2.

## **B. CURRENT FUNDING STRUCTURE**

Solid waste collection in the unincorporated county is required for all industrial and commercial establishments and persons residing in a congested area, where "congested area" is defined as an area where there are two or more contiguous parcels of three acres or less which are developed with buildings suitable for human occupation. The unincorporated county is divided into five collection areas for each of which a collector may apply for a nonexclusive permit. Service is provided by Vallejo Garbage Service, Solano Garbage, Rio Vista Sanitation Service, and Vacaville Sanitary Service. Haulers bill customers directly and there is no franchise fee. Current residential charges in other United States cities are presented in Table VIII-3.

Industrial and commercial establishments and persons residing outside of a congested area may take their solid waste to Rio Vista, B&J, and Potrero Hills Landfill in Solano County, and American Canyon Landfill in Napa County.

The unincorporated county's share of the solid waste importation fee from Contra Costa County will be a maximum of \$621,500 for the three years of the current contract. These funds must be utilized for "mitigation for adverse environmental impacts associated with the importation of Contra Costa's municipal solid waste to Solano County."

Solano County is currently receiving quarterly payments for the importation of Contra Costa municipal solid waste to the Potrero Hills Landfill. The importation is governed by an inter-county agreement between Contra Costa County and Solano County, and an Memorandum of Understanding between Solano County and its cities.

Contra Costa County pays Solano County a fee of six dollars per ton, and Solano County distributes a portion of the revenue received to its jurisdictions. The first \$350,000 (from 58,333 tons) was entirely distributed to the Cities in equal shares. That is, Benicia, Dixon, Fairfield, Rio Vista, Suisun City, Vacaville, and Vallejo each got \$50,000. Solano County retains 50% of all future revenue from the six dollar per ton charge, and distributes the rest to the jurisdictions. These subsequent distributions are based on an evaluation of impacts to the respective cities, as follows:

<u>Jurisdiction</u>	<u>Local Share</u>	<u>% of Total Fee</u>
Suisun City	40%	20.0
Fairfield	25%	12.5
Benicia	15%	7.5
Dixon	5%	2.5
Rio Vista	5%	2.5
Vacaville	5%	2.5
Vallejo	5%	2.5
County Share	NA	50.0

Since the maximum tonnage of importation allowed is 265,500 tons over the three year period and the import surcharge on 58,333 tons was used to make the initial distribution to the jurisdictions. The maximum funds the County may retain are:

$$207,167 \times \$6/\text{ton} \times 50\% = \$621,500 \text{ (for the entire three year period)}$$

### C. FUNDING ALTERNATIVES

The funding mechanisms discussed below relate to how the public sector can fund public costs of diversion programs and by which private haulers and facility operators can receive pay for their services.

## C.1. OPERATING COST FINANCING

Operating costs include all ongoing costs of diversion programs (and existing solid waste services) other than amortized capital costs. These costs include labor, fuel, and lease payments.

### TAX FINANCING

Three commonly used options exist for tax financing of solid waste services. The first of these is property taxes. The advantages of property taxes include easy administration and smooth increases. Property taxes are often used to provide subsidies for user fees, so that these fees can be introduced gradually over time in order to phase in the full cost of solid waste collection and disposal into the user's fees. Property taxes are usually used only for the administrative and promotional costs of recycling, composting, or source reduction programs. However, the operating costs of diversion programs are generally too high to be paid except through explicit charging mechanisms.

It can be argued that using property taxation to fund solid waste management creates inequities in that the costs of the solid waste system are not borne by those who benefit the most. The system may penalize those who generate little waste while subsidizing those who produce a greater share. Moreover, within the property tax system, solid waste must compete with other budgetary items for funding priority. This also has the effect of hiding the true costs of the solid waste system. However, taxes (general funds) are used in many regions as a short term mechanism.

Sales taxes are the second tax financing option. A retail sales tax surcharge can be added at the local level if two-thirds of the voters approve. A hybrid sales tax/user fee concept was implemented in Minnesota in 1989; the State levies a 6% sales tax on the service of garbage collection and returns the collected funds to municipalities to support recycling programs. The primary advantage of such a sales tax is that it targets those who use the service. The primary disadvantage is that it can sometimes be regressive. The potential for sales taxes on services is currently being discussed at the state level in California. The Integrated Waste Management Board indicates that counties currently do not have the ability to impose such taxes.

Special levies based on property valuation, waste generation, or gross sales, are also an option. The advantages to this approach are that referenda are not required and there is the potential to bypass general levy limits. Wisconsin recently imposed a \$2,170-per-year flat "recycling fee" on all large businesses and industries "for the privilege of doing business in the state."

**USER FEES**

User fees, or fees for service, provide an equitable approach to waste system funding. Fees can be structured to reflect the actual costs of a system, and can be used as behavioral modification incentives (for example, volume-based charges). Billing for services can be public or private. Franchise arrangements, whether billed by the municipalities or by the hauling company, represent one kind of user fee. The method currently used by the unincorporated areas in Solano County are discussed earlier in this chapter. Franchise fees can be used to fund the public sector costs of regulating haulers and monitoring compliance with environmental standards or to support other solid waste management initiatives.

Another billing mechanism for user fees is the use of utility fees. Utility fees can be paid either directly to Solano County or through utilities. Solid waste item(s) are added to commercial and/or residential utility billings. For example, the City of Minneapolis added a solid waste item to its quarterly water use and sewage billing. In Minneapolis, this utility fee can be reduced for individual residences by a credit issued for utilization of a city-owned standardized and bar-coded recycling container.

**Utility fees:**

- Eliminate the need for a separate waste system billing.
- Introduce a flexible method for dealing with future alterations to the solid waste system.
- Utilize an already existing means of control and enforcement of waste system charging.
- Spread actual costs over all users within a given service-level group.

Yet another user fee option is the use of disposal/processing site "tip" fees or surcharges on these tip fees. Tipping fees at facilities are in relation to the service received if they are for:

- Disposal site financial assurance and environmental controls.
- Future landfill siting and planning.
- Educational efforts related to source reduction.
- The operational costs and profit of the facility.
- Household hazardous waste programs.

Tipping fee surcharges may be added by Solano County (as local enforcement agency) for the funding of landfill supervision and could also be used for funding public sector diversion program costs.



User fees may vary with the quantity of waste collected or disposed, or be a flat fee per user. Variable fees send price signals to consumers which promote rational behavior. They are also less reliable as funding mechanisms since users will tend to shift their behavior away from expensive services, thereby reducing revenue to the service provider. Variable rates are discussed in greater detail in Chapter II.

The flat fee concept may be appropriate for the fixed minimum costs of service. For example, the cost of providing once a week residential collection for at-curb 20 gallon mini-can service could be charged as a flat service charge, with variable fees related primarily to disposal costs charged for higher levels of service.

### **RECOVERY PROGRAM REVENUES**

Recovered material sales generate revenues for Solano County. Recyclables, such as aluminum, cardboard, compost products, and refuse-derived fuel (mixed paper) can be sold. If private vendors are utilized for recycling and/or composting, they usually retain the product sale revenue as an offset against collection, processing, and/or market costs. Product revenues are not considered adequate, in terms of quantity or reliability, to fund diversion programs. Most recycling programs are net "losers" from a project economics perspective; they offer environmental benefits to justify their net costs.

Secondary materials are commodities and, as such, the sales price varies substantially over relatively short periods of time. The newspaper glut of 1989-90 illustrates the folly of relying on product sales revenues to fund recycling programs. Recycling program costs have been estimated in this document using gross costs of similar programs elsewhere. These gross costs do not include resale revenues. This has been done so that private service providers and the City of Suisun City are not at risk of a funding shortfall if secondary market prices decline.

### **WASTE IMPORTATION FEES**

AB 939 allows a City or County to assess "special fees of a reasonable amount on the importation of waste from outside the County to publicly owned or privately owned facilities" (AB 939, Part 2, Section 41903).

In 1984, Solano County voters passed an initiative (Proposition E) that limits to 95,000 tons per year the amount of solid waste that can be imported into Solano County. The ordinance requires any proposal to import solid waste in excess of the 95,000 tons be submitted to a vote of the electorate (County Plan, 1989). The measure is interpreted to exclude from the 95,000-ton limitation the following special solid wastes which are not disposed of by traditional landfill disposal methods: drilling muds disposed of at special solid waste disposal sites approved by the Environmental Health Division; and special solid wastes that are



land-farmed on areas other than active municipal landfills, or which can be incorporated into daily landfill cover (County Plan, 1989).

Solid waste import fees from Contra Costa County can be utilized for "mitigation of adverse environmental impacts associated with importation of Contra Costa wastes", according to three-year agreement between Contra Costa and Solano Counties. Such waste import fees are generally used for any solid waste expenses. Future waste import agreements with Contra Costa or other counties can provide substantial funding for diversion programs, which could reduce garbage collection service costs or obviate the need for taxes to support diversion programs. However, waste importation agreements require two-thirds voter approval, and result in area residents assuming the environmental risks of other people's wastes.

#### **OTHER SOURCES OF INCOME**

The County also receives a "Solid Waste Planning Fee" from all nine haulers permitted within the County. In Fiscal Year 1990/91, the total revenue to the County is \$50,000, and the same amount is budgeted for Fiscal Year 1991/92. This money is for planning County-wide solid waste programs, including the unincorporated portion of the County.

The County also collects a landfill surcharge as local Enforcement Agency. The duties of this designation are outside the scope of the SRRE programs; the funding is completely segregated, and not discussed further in this document.

Other sources of income could include AB 2020 unused redemption funds if available. California State sources indicate that currently there are no AB 2020 funds available.

## **C.2. CAPITAL COST FINANCING**

### **BORROWING**

Government-issued, tax-exempt bonds ("municipal bonds") are commonly used to capitalize necessary public sector activities such as roads and schools. In general, solid waste facilities are eligible for tax-exempt bonding. However, materials which have economic value are not considered waste and are not eligible. Mixed waste processing or transfer is generally eligible. Yard waste and recycling facilities are in a "gray area". Such tax-exempt bonding is subject to both California State and Federal rules and regulations. Bond Counsel is necessary, and a Bond Advisor prudent, in issuing such bonds.

### **PRIVATE FINANCING**

Contracting out waste management services can reduce the need for capital costs. Although private capital is more expensive than public funding, these expenses can be offset by lower operating costs. Private financing can be flexible, and could reduce or eliminate the public

sector's need to raise capital. It also tends to have higher effective financing rates, due to the fact that a private company will expect a return on investment commensurate with the financial risks assumed.

### **CURRENT-REVENUE CAPITAL FINANCING**

The County can fund the initial costs of source reduction, recycling, and composting on a "pay-as-you-go" basis, as opposed to borrowing the money. Although this approach is not feasible for large capital needs, it may be acceptable for some relatively smaller activities, such as yard waste composting. In addition, if capital spending programs can be phased in over several years, this approach could become more practical as each year another capital item could be paid from current funds. Advantages include simplicity and the absence of interest costs. Disadvantages include the difficulty of maintaining the availability of relatively large amounts of liquid capital within budgetary and levy constraints. Another potential difficulty is the equity issue of charging current residents for facilities that may have useful lives of up to 20 years when current residents do not directly benefit from these facilities.

### **C.3. INSTITUTIONAL FACTORS**

Contractually, the unincorporated county can choose to negotiate a single franchise agreement which includes garbage collection and disposal, recyclables services, and yard waste services. Alternatively, separate franchises may be developed for these new services with one or more service providers.

Another option that the unincorporated county can consider is disaggregating recyclable material sales revenue from the collection and processing services. This would account for the real cost of collection of recyclables (similar to the system in place for garbage service) without creating the perception that haulers are getting rich from sales revenues. While product sales revenues are not expected to cover collection costs, they could reasonably cover marketing and transport costs after collection, and still provide a net profit.

The net profit from product sales could be allocated in a number of ways. The processor/transferor/broker would get a portion. The hauler could get a portion so that they have incentive to collect more and/or clean products. Also, non-profit groups can be given a role in the operation, educational or "special event" oriented, and a portion of the net revenues. This option may encounter significant institutional barriers since it diminishes private sector control over marketing of collected materials and increases the public sector administrative burden.

## D. PROJECTED COSTS

Table VIII-4 illustrates the program-by-program costs projected through the year 2000. All costs are in 1991 dollars and include education and public information and contingency costs. Costs increase in later years due to population and projected tonnage increases, not due to any inflation of the dollars.

Costs include both capital and operating costs. Income from the sale of recycled material is not included in the estimates. The net cost to the County may be only about 60% of what is estimated in Tables VIII-3 and VIII-4 if the contingency allowance is not needed and if resale revenues (estimated to be about 30% of the program costs) to be recovered.

The initial program costs reported in Table VIII-4 are the total estimated annual costs developed in the implementation section of each relevant component of this SRRE. Those costs are based on typical costs of similar programs implemented in other communities. The total cost of programs consists of two components: a capital cost (i.e., start-up costs) and other costs (i.e., operation, maintenance, etc.). In some cases the typical total cost of a program was used without identifying the individual costs of the two components. Therefore, capital costs are not always specified for programs that may actually have significant capital costs.

Since it is not anticipated that Solano County will build, or provide financing for, major facilities required by this SRRE, the total annual cost of programs is of primary importance. Capital costs are expected to be handled by private parties.

The actual cost of any facility will depend on the program and geographical area served by that facility. The capital costs of new facilities have not been specifically identified because the scope of individual facilities has not been determined. For example, the Central Solano County Integrated Resource Recovery Facility which is planned for construction will be a part of some, but not all, of the recycling and composting programs. Furthermore the facility will serve a geographic area that has not been clearly defined yet. Capital costs are included in the costs of each program.

### D.1. COST-SAVINGS MEASURES

This SRRE is intended to be a "safe" plan. That is, it does not assume that diversion objectives can be achieved without major expenditures on costly programs. Low cost programs such as backyard composting and recycling drop-off sites are assumed to make only modest contributions to diversion objectives.

In implementing this plan, total costs may be minimized by the aggressive implementation of certain programs that typically have low unit costs (i.e., a low cost per ton of material processed or recovered). This aggressive implementation could decrease the cost of other more expensive programs. Some examples follow.

- Backyard composting of the more putrescible yard wastes such as grass and some leaves would reduce the need for frequent curbside collection of yard waste. Woody and brushy yard waste could be collected monthly or quarterly. Putrescible yard waste must be collected weekly or bi-weekly.
- Drop-off centers that accept mixed paper and cardboard from residents can make the inclusion of these materials unnecessary in the curbside collection program. Including these materials in a curbside collection program significantly increases the net cost of the program.
- A high participation rate among businesses in a source separation program could make a Materials Recovery Facility that accepts mixed refuse unnecessary.
- A good market for mulch (i.e., shredded wood, twigs, and leaves) can reduce the need for a composting operation. Yard waste composting requires a processing period of more than one month, and frequent aeration (usually by turning the material with heavy equipment). These two facts contribute significantly to costs that can be avoided if material is only chipped or ground to produce mulch.

## **E. SELECTED FUNDING MECHANISMS**

Selection of funding mechanisms was based on the following criteria.

### **E.1. FINANCIAL CRITERIA**

- **Sufficiency and Stability.** The funding mechanism should be stable and sufficient to assure program support as planned.
- **Low Cost.** The funding should provide the lowest cost possible.
- **Use of Private Financing/Equity.** Public initiatives should not compete where private parties are willing to provide related services.



- **Proven Approach to Financing.** Innovative funding ideas can take too long to implement, be unstable, or result in unanticipated administrative burden, and as a result are discussed only as possibilities, not primary funding mechanisms.
- **Voter Approval.** Voter approval is avoided in primary funding recommendations since approval is uncertain and AB 939 requires implementation of these programs.
- **Impact on Debt Capacity.** Bonding is avoided generally; selected programs are not capital intensive.
- **Administrative Burden.** Expensive administrative requirements in the public and private sector are avoided when possible.

## **E.2. OTHER CRITERIA**

- **Fairness.** Most funds will be raised proportionately to the generation of wastes. Ability to pay is not deemed a significant problem in Suisun City.
- **Enforceability.** Volume-based charging programs will require the need for enforcement expenditures.
- **Behavioral Impacts.** Funding incentive systems (such as volume-based charges) intended to discourage waste generation, or to encourage participation in diversion programs, are favored.
- **Economic Efficiency.** Artificial surcharges or manufactured costs beyond the real cost of services are avoided so as not to create economic inefficiencies. Generators should make decisions which result in waste based on the expectation of paying the true cost of waste management, no more and no less. Artificial costs are also prohibited by AB 939 (Part 2, Section 41901) funding mechanisms.
- **Competitive Impacts.** Institutional arrangements will not favor one business over another, nor will waste management costs put Solano County businesses at a disadvantage in competing with out-of-County competitors.

## **E.3. PRIMARY MECHANISMS SELECTED**

### **FUNDING SOURCES**

There are no public sector, capital intensive requirements recommended in this plan. All funds are proposed to be funded through private sector investment, and where necessary, the use of current revenues for public sector expenditures.



Recycling collection (processing and marketing) and yard waste composting will be initiated by negotiating separate agreement(s) (user fees) with existing garbage haulers or independent recycling companies.

The County's costs (monitoring programs, coordinating existing efforts, planning new efforts and so forth) are to be paid for out of a landfill surcharge. The cost of monitoring all waste in the county (not just the unincorporated area) will be shared with the Cities. An allocation of the cost of one full-time equivalent (FTE) employee is shown in Table VIII-6.

If future waste importation agreements are negotiated, these revenues may be used to substantially reduce the required landfill surcharge. However, waste importation is not recommended.

Source Reduction, Education and Public Information, and other program cost are recommended to be funded on a county-wide basis, and are proposed to be funded out of either a county-wide landfill surcharge or waste importation fees. A county-wide landfill surcharge is recommended because it:

- Gives generators an economic incentive to divert wastes (as a volume-based charge).
- Improves the relative economics of the diversion alternatives.
- Eliminates the negative environmental factors associated with waste importation.

The county-wide surcharge on tons disposed in Solano County landfills should be implemented as soon as possible, so that funds will be available when needed for funding diversion programs. A county-wide program for raising funds through a landfill surcharge can be much more efficient than jurisdiction administered surcharges and can provide consistent treatment to landfill operators with the County.

The County, as Local Enforcement Agent (LEA), needs to raise funds for monitoring landfill activities (AB 939, Chapter 2, Section 43200), and as coordinator for other waste monitoring programs as described in the waste generation chapter of this document. These funds are raised through the landfill surcharge now. This additional "SRRE landfill surcharge" would be added to the LEA surcharge infrastructure and thereby add a minimal amount of additional administrative burden.

The funds for jurisdiction specific SRRE implementation costs should be rebated to each jurisdiction based on the tons of jurisdiction waste disposed less the cost allocation for county-wide waste monitoring services to be performed by the County. See Table VIII-6.

If Solano County does not impose a landfill surcharge, the unincorporated area's SRRE implementation funds will be raised through the use of waste import fees, when available, and general funds if waste importation fees become unavailable.

**FUNDING TASKS**

The following tasks need to be accomplished:

1. SRRE and HHWE approval by the Solano County. The Solano County plan to raise "County-wide" funds for certain diversion programs needs to be approved before the funding mechanisms can be further defined.
2. A Memorandum of Understanding between the jurisdictions and the County related to the sharing of funds from the "SRRE Landfill Surcharge" should be secured.
3. Set up segregated accounts fees received from the landfill surcharge and, if any, waste importation fees.
4. Renegotiate with the permitted haulers or independent recyclers to provide short term diversion programs as described herein.

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TABLE VIII-1: TIPPING FEES

<u>City</u>	<u>Tipping Fee (\$/Ton)</u>
Boston	12-60
Dallas	5-10
Detroit	44-48
Los Angeles	10-20
Minneapolis/St. Paul	65-95
New York City	120-160
Philadelphia	70-75
San Francisco Bay Area	18-20

TABLE VIII-2: REFUSE COLLECTION FEES

<u>City</u>	<u>\$/Month</u>
San Francisco	8.49
El Cerrito	9.20
Hayward	9.70
Stockton	12.00
San Diego	10.25
Portland, OR	11.15
Snohomish County, WA	13.55
Minneapolis	17.50 (a)

(a) Residents get a \$7.00/month discount if they participate if they separate recyclables for curbside collection.

TABLE VIII-3: UNIT COSTS OF SRRE DIVERSION PROGRAMS

	Initial Program Cost(a)	Tons Diverted(b)	Unit Cost (\$/Diverted Ton)
<b>SOURCE REDUCTION PROGRAMS</b>			
Surcharge at Disposal Facilities	6,821	(e)	NA
Drought-Resistant Landscape Ordinances	2,479	(e)	NA
In-House Source Reduction at County Offices	2,481	(e)	NA
School Curriculum & Student Projects	5,221	(e)	NA
Waste Surveys	2,981	22	136
Quantity-Based Hauling Fees	4,962	(e)	NA
Upstream Yard Waste Management Education/Demo Site	16,212	380	43
Awards, Commercial & Industrial Generators	3,106	(e)	NA
Participation in Regional Waste Exchange	2,361	(e)	NA
Technical Assistance to Businesses	8,567	21	408
<b>RECYCLING PROGRAMS</b>			
SF & MF Residential Curbside	183,192	677	271
Commercial/Industrial Recycling	46,604	641	73
Expanded Drop Off/Buy Back	20,870	230	91
Salvage at MSW Facility	9,981	414	24
New Processing Facility (d)	115,888	630	189
Expanded Comm/Ind Recycling	3,101	(c)	
Expanded Residential Curbside	223,962	835	268
<b>COMPOSTING PROGRAMS</b>			
Christmas Tree Collection and Chipping	4,560	22	207
Drop-Off and Processing	16,771	568	30
SF Curbside Collection and Processing	274,307	1,942	141
Food Waste Collection and Composting	52,845	350	151



TABLE VIII-3 (CONTINUED)

	Initial Program Cost(a)	Tons Diverted(b)	Unit Cost (\$/Diverted Ton)
<b>SPECIAL WASTE PROGRAMS</b>			
Asbestos	1,240	(e)	NA
Tires	1,861	(e)	NA
Dead Animals	1,240	(e)	NA
Drilling Mud	6,202	(e)	NA
<b>OTHER PROGRAMS</b>			
Other EPI	34,557	(e)	NA
Share of County Waste Monitoring Staff	9,923	(e)	NA
Quantitative Field Analysis (QFA)	75,000	(e)	NA

Notes:

- (a) The program cost is the estimated cost of a program in 1991 dollars and based on 1991 waste generation rates.
- (b) Tons diverted based on 1990 waste generation rates.
- (c) Tons diverted included in the new processing facility tonnage.
- (d) cost per ton includes costs of expansion of comm/ind recycling and NPF.
- (e) There is no significant and measurable diversion achieved through these programs.

TABLE VIII-4: PROJECTED COSTS OF SRRE DIVERSION PROGRAMS  
SHOWN IN YEAR TO BE INCURRED IN 1991 DOLLARS

Program	Initial Cost(a)	1992 Funding Required	1993 Funding Required	1994 Funding Required	1995 Funding Required	1996 Funding Required	1997 Funding Required	1998 Funding Required	1999 Funding Required	2000 Funding Required
		1	2	3	4	5	6	7	8	9
<b>SOURCE REDUCTION PROGRAMS (b)</b>										
Surcharge at Disposal Facilities	6,821	7,535	7,924							
Drought-Resistant Landscape Ordinances	2,479	2,739	2,880	3,029	3,187	3,182	3,178	3,175	3,174	3,174
In-House Source Reduction at City Offices	2,481		2,882	3,032	3,190	3,184	3,180	3,178	3,176	3,176
School Curriculum & Student Projects	5,221		6,065	6,380	6,712	6,701	6,693	6,687	6,684	6,684
Waste Surveys	2,981			3,643	3,832	3,826	3,821	3,818	3,816	3,816
Quantity-Based Hauling Fees	4,962			6,063	6,379	6,369	6,361	6,355	6,353	6,353
Upstream Yard Waste Mgmt Education/Demo Sit	16,212			19,810	20,843	20,807	20,782	20,764	20,756	20,756
Awards, Commercial and Industrial Generators	3,106			3,795	3,993	3,986	3,981	3,978	3,977	3,977
Participation in Regional Waste Exchange	2,361			2,885	3,035	3,030	3,026	3,024	3,023	3,023
Technical Assistance to Businesses	8,567				11,014	10,995	10,982	10,972	10,968	10,968
<b>SUBTOTAL:</b>		<b>10,274</b>	<b>19,751</b>	<b>48,637</b>	<b>62,186</b>	<b>62,081</b>	<b>62,004</b>	<b>61,951</b>	<b>61,927</b>	<b>61,927</b>

TABLE VIII-4 (CONTINUED)

Initial Program Cost(a)	1992 Funding Required	1993 Funding Required	1994 Funding Required	1995 Funding Required	1996 Funding Required	1997 Funding Required	1998 Funding Required	1999 Funding Required	2000 Funding Required	
<b>RECYCLING PROGRAMS (b)</b>										
Establish Residential Curbside	183,192	202,381	212,811	223,848	235,516	235,119	234,827	234,628	234,535	234,535
Commercial/Industrial Recycling	46,604	51,486	54,139	56,947	59,915	59,814	59,740	59,689	59,666	59,666
Expanded Drop Off/Buy Back	20,870	23,056	24,244	25,502	26,831	26,786	26,752	26,730	26,719	26,719
Salvage at MSW Facility	9,981	11,027	11,595	12,196	12,832	12,810	12,794	12,783	12,778	12,778
New Processing Facility	115,888				148,988	148,737	148,552	148,427	148,368	148,368
Expand Comm/Ind Recycling	3,101					3,980	3,975	3,972	3,970	3,970
Expand Residential Curbside	223,962					287,445	287,088	286,846	286,731	286,731
<b>SUBTOTAL:</b>		<b>287,950</b>	<b>302,789</b>	<b>318,493</b>	<b>484,082</b>	<b>774,691</b>	<b>773,729</b>	<b>773,075</b>	<b>772,767</b>	<b>772,767</b>
<b>COMPOSTING PROGRAMS (b)</b>										
Christmas Tree Collection and Chipping	4,560	5,038	5,297	5,572	5,862	5,853	5,845	5,840	5,838	5,838
Drop-Off and Processing	16,771		19,483	20,493	21,561	21,525	21,498	21,480	21,471	21,471
Curbside Collection and Composting	274,307					352,061	351,624	351,326	351,186	351,186
Food Waste Collection and Composting	52,845							67,683	67,656	67,656
<b>SUBTOTAL:</b>		<b>5,038</b>	<b>24,780</b>	<b>26,065</b>	<b>27,424</b>	<b>379,438</b>	<b>378,967</b>	<b>446,329</b>	<b>446,152</b>	<b>446,152</b>
<b>SPECIAL WASTE PROGRAMS (b)</b>										
Asbestos	1,240	1,370	1,440	1,515	1,594	1,591	1,590	1,588	1,588	1,588
Tires	1,861	2,056	2,162	2,274	2,393	2,389	2,386	2,384	2,383	2,383
Dead Animals	1,240		1,440	1,515	1,594	1,591	1,590	1,588	1,588	1,588
Drilling Mud	6,202	6,852	7,205	7,578	7,973	7,960	7,950	7,943	7,940	7,940
<b>SUBTOTAL:</b>		<b>10,277</b>	<b>12,248</b>	<b>12,883</b>	<b>13,554</b>	<b>13,531</b>	<b>13,515</b>	<b>13,503</b>	<b>13,498</b>	<b>13,498</b>

SHOWN IN FEV8 TO BE INCLUDED IN THE DOTTAGE  
LARGE AREA PROTECTED COR2 OF 2888 DIVISION PROGRAMS

TABLE VIII-4 (CONTINUED)

	Initial Program Cost(a)	1992 Funding Required	1993 Funding Required	1994 Funding Required	1995 Funding Required	1996 Funding Required	1997 Funding Required	1998 Funding Required	1999 Funding Required	2000 Funding Required
<b>OTHER COSTS</b>										
Other EPI (b)	34,557	38,177	40,144	42,226	44,427	44,352	44,297	44,260	44,242	44,242
Waste Monitoring Staff	9,923	10,826	10,826	10,826	10,826	10,826	10,826	10,826	10,826	10,826
Quantitative Field Analysis (contingency)	75,000	0	0	0	0	0	75,000	0	0	0
<b>SUBTOTAL:</b>		49,003	50,971	53,053	55,254	55,179	130,124	55,086	55,069	55,069
<b>TOTALS (1991 \$):</b>		362,542	410,538	459,130	642,499	1,284,920	1,358,338	1,349,945	1,349,412	1,349,412
<b>Waste Generation Projection (Tons)</b>	15,685	17,328	18,221	19,166	20,165	20,131	20,106	20,089	20,081	20,081

(a) The cost of a program in 1991 \$, based on 1991 tonnages. Costs are adjusted according to the relative waste generation projections for each subsequent year.

(b) Most EPI costs are included in the source reduction, recycling, composting, and special waste programs of which they are a part. Other EPI costs are those costs not associated with other programs.

\* Funding required adjusted for increase in tonnage generated.

Facility costs are amortized over 20 years at 12%. Other capital costs are amortized over 5 years at 10%.

All capital costs have been increased by 15% to include estimated financing expenses.

Costs are on a gross basis (revenue from sale of recyclable materials is not included).

A 25% contingency is included in all cost estimates.

TABLE VIII-5: SOURCES OF PROGRAM FUNDING

	User Fee	Franchise Fee	Landfill Surcharge	Sales Tax	Waste Importation Fee
<b>SOURCE REDUCTION PROGRAMS</b>					
Surcharge at Disposal Facilities			X		
Drought-Resistant Landscape Ordinances			X		
In-House Source Reduction at County Offices			X		
School Curriculum & Student Projects			X		
Waste Surveys			X		
Quantity-Based Hauling Fees	X	X			
Upstream Yard Waste Mgmt Education/Demo Site			X		
Awards, Commercial and Industrial Generators			X		
Participation in Regional Waste Exchange			X		
Technical Assistance to Businesses			X		
<b>RECYCLING PROGRAMS</b>					
SF & MF Residential Curbside	X	X			
Comm/Ind Recycling	X	X			
Expanded Drop Off/Buy Back			X		
Salvage at MSW Facility			X		
Expanded Comm/Ind Recycling	X	X			
Expanded Residential Curbside	X	X			
New Processing Facility	X	X			
<b>COMPOSTING PROGRAMS</b>					
Christmas Tree Collection and Chipping	X	X			
Drop-Off and Processing	X	X			
SF Curbside Collection and Processing	X	X			
Food Waste Collection and Composting	X	X			
<b>SPECIAL WASTE</b>					
Sludge			X		
Asbestos			X		
Tires			X		
Dead Animals			X		
Drilling Mud			X		

TABLE VIII-5 (CONTINUED)

TABLE VIII-5 (CONTINUED)

	User Fee	Franchise Fee	Landfill Surcharge	Sales Tax	Waste Importation Fee
OTHER PROGRAMS (No Direct Diversion)					
EPI Programs - County-Wide			X		
EPI Programs - Specific to Uninc. Co.	X	X			
Waste Monitoring Staff			X		
Quantitative Field Analysis (QFA)			X		
Other Studies			X		





## CHAPTER IX SUMMARY INTEGRATION

Program integration can occur in four ways:

- Physical facilities for more than one program can be shared, thereby creating economies of scale.
- Regionalization of services can occur, again creating economies of scale
- Price signals can be used to direct behavior into more ecologically sound patterns.
- Markets and end uses can be stimulated to create a private sector motivation for diversion programs that will eventually replace government-mandated motivation.

Physical facilities have been integrated by focusing on flexible collection equipment decisions with minimal processing equipment and facility siting in the short-term.

Regionalization is addressed in two ways. First, physical facilities can be shared between jurisdictions. In the SRRE plan, no definite sites are selected, but options are discussed. Second, regionalization is supported by an increase in staffing levels allowing staff to participate with other county-wide organizations promoting source reduction, education, and public information activities across jurisdiction boundaries.

Price signals are necessary if consumers are to make informed decisions. Two mechanisms for letting consumers know the true costs of landfill disposal are suggested. First, garbage service bills could distinguish between the cost of collection and the cost of disposal. This is an inexpensive form of public education. A second mechanism is the creation of a landfill replacement trust fund. Users would be charged a calculated depletion cost for landfill use in addition to the costs visible today. Such a charge would send a more accurate signal to users about the true cost of waste disposal and would help promote more efficient use of valuable landfill capacity. Both price signal mechanisms are suggested in the SRRE, but are not selected. The landfill replacement trust fund will require expert legal review prior to implementation.



# CHAPTER IX

## INTEGRATION COMPONENT

### A. INTEGRATION METHODOLOGY

The advantages and disadvantages of individual diversion programs have been discussed in their respective chapters. Programs must be evaluated in an integrated way in order to ensure that the best possible diversion program selections are made. This chapter discusses four integration methods which support the goals and objectives of this document.

#### A.1. PHYSICAL FACILITIES

- There is a danger that physical facilities may be built or purchased which are not compatible with other existing or future physical facilities.
- This could lead to a future dilemma. Defer implementation of a desirable program until it is economically sensible to replace equipment, or scrap equipment prior to completion of its useful life.
- To avoid this problem, it is important to coordinate physical plant improvement programs.

In the cities of Solano County, the issue of coordinating programs has been addressed by grouping physical plant purchases in two stages. One stage primarily occurs in the short term, and the second stage primarily occurs in the medium term. Physical plant improvements in 1992 are focused on collection equipment for source separated recyclables and the processing equipment needed to support source separation collection programs. Physical plant improvements in 1996 are focused on processing facilities for centralized separation of commingled recyclables and/or refuse. These are procurement guidelines, not strict rules. Equipment purchases will be made with the intention of supporting all new diversion programs in the following years.

The major facilities used by the unincorporated areas of Solano County will, in most cases, be those built or purchased to serve the nearby cities. Unincorporated areas will be included in diversion programs either as the programs are implemented in the nearby cities or somewhat later.

Yard waste collection at curbside in the unincorporated areas will not occur until the medium term while most cities will have yard waste collection programs in the short term. This is because the program is not needed by the unincorporated to achieve the 25% diversion

objective. Curbside collection is costly, and suburban and rural residents are in a better position to compost and to mulch in their yards than are city dwellers.

## A.2. REGIONALIZATION

Some activities, notably source reduction education activities and public information activities, are best conducted on a regional basis. Certain data gathering or annual report functions are also less expensive when conducted regionally. Equipment purchase decisions may also benefit greatly by regional discussions or regional usage arrangements. Because the population of the unincorporated county is spread out, the different areas of the unincorporated county must cooperate with whichever jurisdiction is closest. Opportunities for cooperation will be identified as the SRRE plan is implemented.

To maximize the efficiency of such efforts, the County will consider the use of a single service provider in common with other jurisdictions. This may occur by centralizing certain administrative functions in one non-jurisdictional organization. The County currently participates in the Solano County Integrated Waste Management Local Task Force, and will continue to do so unless another organization is created which replaces the functions of the Task Force.

Creation of an organization that could promote waste diversion and natural resource conservation across jurisdictional boundaries would have clear advantages, but it also has the disadvantage of creating another layer of bureaucracy. Some possible means of creating this integration mechanism are:

- A non-profit organization, supported by a minimum annual payment from each participating jurisdiction and voluntary contributions. All voluntary contributions would, by charter, be spent in the contributing jurisdiction.
- Expansion of County staff to handle these functions.
- A community services district.
- A joint powers authority.

## A.3. PRICE SIGNALS

Price signals to the public will be integrated with the diversion programs under this plan. In other words, users of refuse services will be charged for those services in ways that support the diversion goals. Two mechanisms for providing market price signals to the public are suggested for consideration. Both relate to letting consumers know the true costs of landfill disposal. First, disposal costs could be listed separately from refuse collection services on all refuse bills. This is a very inexpensive form of public education. Second, a replacement



cost trust fund could be established. Funds raised by surcharging the disposal fee portion of refuse bills would be set aside in a trust fund to be used only for replacement of the landfill at some future time. This replacement might be another landfill, an advanced technology materials recovery facility, a waste-to-energy plant, or any other disposal options suitable when existing landfill capacity has been consumed. Charging for facility replacement (depletion) will stimulate participation in all diversion programs selected.

This trust fund concept is similar to that used by the water and wastewater utilities. Users of these utility services are charged for both current costs and the likely costs of building a new treatment plant when the current plant useful life has expired. This type of fund is used to ensure high-quality replacement facilities without inordinate rate increases at the time of replacement.

The trust fund charges per ton disposed could be based on an adjustable index based on actual costs of typical replacement facilities in the San Francisco Bay Area, California, or a larger area. A sample calculation is provided in Appendix F.

In addition, the County will implement a variable rate pricing structure for refuse services after recycling and composting services have been provided to most community residents and businesses. With variable pricing, waste generators are charged according to the volume of refuse they produce. The variable rate structure is an integrating price signal mechanism in that it encourages reduction of waste while simultaneously encouraging generators to direct waste into recycling and composting programs.

#### **A.4. MARKET AND END USE STIMULATION**

Stimulation of markets and end uses for reusable and recyclable materials will ultimately increase diversion through all selected programs. In that sense, market stimulation is an integrating mechanism. Market stimulation is discussed in more depth in Appendix E.

Some recycling collection services must be subsidized at this time if customers are to participate in them at the very high levels required to comply with AB 939 diversion mandates. It is possible that these subsidies can be discontinued in the future if resale values for recyclables increase significantly. Subsidies are distortions of free market price signals. They are necessary for a short period of time in order to stimulate participation in collection activities and to increase the market value of recyclable materials.

Markets and end uses can be developed locally in three ways:

- Expanding existing industries to use secondary materials
- Encouraging new industries that use these materials to locate nearby.

- Encouraging or requiring consumers to change their purchasing habits.

All three approaches can be supported in many ways including property or sales tax exemptions, preferential zoning or local permit procedures, utility arrangements or government property leases at favorable rates, and governmental mandates. Each of these approaches should be explored on a case by case basis. All of these programs will be more successful if the local government commits to using all reasonable means to promote local or stable market development.

## **B. INTEGRATED DIVERSION PROGRAM PROJECTIONS**

Each diversion program has been projected to divert a percentage of the generated waste stream. The total rate of diversion for the county is projected to exceed 25% in 1995 and to exceed 50% in 2000 (see Table IX-1 and Figure IX-1). These projections are planning level estimates only. Significant divergence from them on a material by material basis and on a program by program basis should be expected as programs develop and the waste stream composition. Diversion rates will be tracked through annual monitoring programs.

Source reduction is emphasized through activities such as school curricula, a quantity-based hauling fee, waste surveys in the commercial sector, a yard waste management demonstration site, etc. The projected diversion through source reduction is conservatively estimated to be about three percent of the waste stream in the year 2000. The County will endeavor to achieve a far greater rate of source reduction and to accurately measure it. However, since source reduction is often difficult to quantify, a very conservative estimate is used for planning purposes.

Recycling and composting are projected to achieve a 50% diversion rate in the late 1990's. Almost every recyclable and compostable waste type that is present in a substantial quantity in the unincorporated county's waste stream is targeted for diversion. Ambitious participation rates are needed to achieve the projected rates of recycling and composting. Education programs aimed at all waste generation sectors are included in the SRRE. A quantity-based hauling fee is included in the Source Reduction Component. Experience throughout the United States indicates that such fees significantly improve recycling rates. Mandatory participation in curbside collection programs for recyclable and compostable materials is reserved as a contingency measure.

Special wastes in Solano County are being handled in an environmentally sound manner. There is little or no opportunity for recycling or composting them. Drilling mud might be an exception, but the technology of recycling it has not been evaluated. Source reduction activities are recommended that build upon other environmental and social policies. The

potential diversion rate for special wastes is insignificant in contributing to the State-mandated diversion objectives. The reduction of waste tires will be promoted through education, as will the promotion of the spaying and neutering of pets.

No transformation at CIWMB-permitted facilities is planned except for the burning of tires at the Oxford Energy power plant in Westley, California. Arrangements for the incineration of tires requires no involvement by the County. Some wood from the unincorporated county may be burned as fuel in power plants that are not permitted by the CIWMB. The County is involved in some aspects of regulating wood chipping operations, while other local and state agencies regulate the power plants. Transformation is given a low priority in this SRRE because most materials that burn can be diverted in other ways. Solano County intends to attempt to utilize those other means before evaluating the feasibility of transformation. After 1995, 10% of the generated waste can be counted as diverted if it is burned.

## C. PROGRAM IMPLEMENTATION SCHEDULE AND RESPONSIBILITIES

The Solano County Department of Environmental Management is the lead agency for most programs selected for implementation in this SRRE (see Table IX-2). The programs will be phased in during the period 1991 through 2000 as shown in Table IX-2. More detailed implementation schedules that show tasks required for the implementation of programs are shown in Tables II-5, II-4, IV-4, V-4, and Chapter VI. Some programs may be implemented in cooperation with other jurisdictions in Solano County. The Solano County Integrated Waste Management Local Task Force will coordinate efforts as is deemed appropriate by State regulations and by the jurisdictions in the county.

Two sources of funding for the implementation of the SRRE programs will be used. They are increased refuse collection fees and increased tipping fees at disposal sites. Most funds will come from the collection fees. A tipping fee surcharge will be implemented at the discretion of the County. If it is not imposed, then all revenue will come from collection fees.

In the unincorporated areas collection fees are agreed upon periodically by the franchisee (hauler) and the City. The unincorporated areas currently piggyback onto the nearby city's price structure and service provider. The County does not regulate fees, and residents in the unincorporated areas generally pay more for collection than do residents within incorporated areas. This is partially due to the greater transportation and labor costs. County staff will need to audit past costs and revenues from the various haulers and project new costs and revenues to provide adequate funding of the planned programs. Projected revenue requirements for each year through 2000 are given in Table VIII-4. A county-wide agency

may coordinate or implement some SRRE tasks. However, each jurisdiction is responsible for meeting mandated diversion requirements.

## D. STAFFING REQUIREMENTS

Success of program implementation depends on several factors including:

- Adequate funding.
- Active public involvement.
- Stable or local markets or end-uses for collected materials.
- Energetic program administration.

In this SRRE, the estimated personnel requirements are those needed for planning and monitoring of programs and for the implementation of tasks that will almost certainly be done by Solano County staff. Other personnel costs will arise in the implementation of various tasks. These latter personnel requirements are assumed to be filled by private contractors. Solano County may choose to hire its own employees to fill some of these personnel needs.

The minimum personnel requirements are two FTE's (full time equivalents) in the short term and 2.4 FTE's in the medium term. The programs to be managed and monitored by the County staff are listed in the implementation schedules in Chapters II-VI.

TABLE IX-1: INTEGRATED DIVERSION PROGRAM PROJECTIONS

YEAR	SOURCE			TRANSFOR- MATION	TOTAL
	REDUCTION	RECYCLING	COMPOSTING		
1991	0.6%	9.7%	0.0%	0.0%	10.3%
1992	0.7%	14.7%	0.1%	0.0%	15.5%
1993	0.8%	22.2%	1.6%	0.0%	24.7%
1994	1.0%	22.2%	3.8%	0.0%	27.0%
1995	1.2%	22.2%	3.8%	0.0%	27.2%
1996	1.4%	26.0%	8.7%	0.0%	36.1%
1997	1.7%	31.6%	16.2%	0.0%	49.4%
1998	2.0%	31.6%	17.0%	0.0%	50.6%
1999	2.4%	31.6%	18.4%	0.0%	52.3%
2000	2.7%	31.6%	18.4%	0.0%	52.6%

Notes: Diversion numbers are shown as mass fractions of the entire projected waste stream in each year. Diversion shown has been estimated from component tables on a program by program basis. However, the projections are allocated in the following fashion:

- 40% of a program's estimated additional diversion is applied in the stated year.
- the remaining 60% is applied in the following year.

From year to year, the percentages are cumulative, not additive.



TABLE IX-2: PARTIES RESPONSIBLE FOR PROGRAM IMPLEMENTATION

Program	Overall Responsibility	Implementation Period
<b>SOURCE REDUCTION PROGRAMS</b>		
Surcharge at Disposal Facilities	County LEA	1992-
Drought-Resistant Landscape Ordinances	County Staff	1992-
In-House Source Reduction at City Offices	County Staff	1993-
Waste Surveys	County Staff	1994-
Quantity-Based Hauling Fees	County Staff	1994-
Upstream Yard Waste Management Education	County Staff	1994-
Awards, Commercial and Industrial Generators	County Staff	1994-
Participation in Regional Waste Exchange	County Staff	1994-
School Curriculum & Student Projects	County Staff	1993-
Technical Assistant to Businesses with Office Space	County Staff	1995-
<b>RECYCLING PROGRAMS</b>		
SF & MF Residential Curbside	County Staff	1992-
Comm/Ind Recycling	County Staff	1992-
Expanded Drop Off/Buy Back	County Staff	1992-
Salvage at MSW Facility	County Staff	1992-
New Processing Facility	County Staff	1995-
Expanded Comm/Ind Recycling	County Staff	1996-
Expand Residential Curbside	County Staff	1996-
City Policies and Market Development	County Staff	1992-
<b>COMPOSTING PROGRAMS</b>		
Christmas Tree Collection and Chipping	County Staff	1992-
Drop-off and Processing	County Staff	1993-
SF Curbside Collection and Processing	County Staff	1996-
Food Waste Collection and Composting	County Staff	1998-
<b>SPECIAL WASTE PROGRAMS</b>		
Asbestos	County Staff	1992-
Tires	County Staff	1992-
Dead Animals	County Staff	1993-
Drilling Mud	County Staff	1992-

TABLE IX-2 (CONTINUED)

OTHER PROGRAMS

Education and Public Information	County Staff	1992-
Waste Monitoring Staff	County Staff	1992-
Quantitative Field Analysis (QFA)	County Staff	1997

Note: Programs proceed indefinitely unless otherwise specified

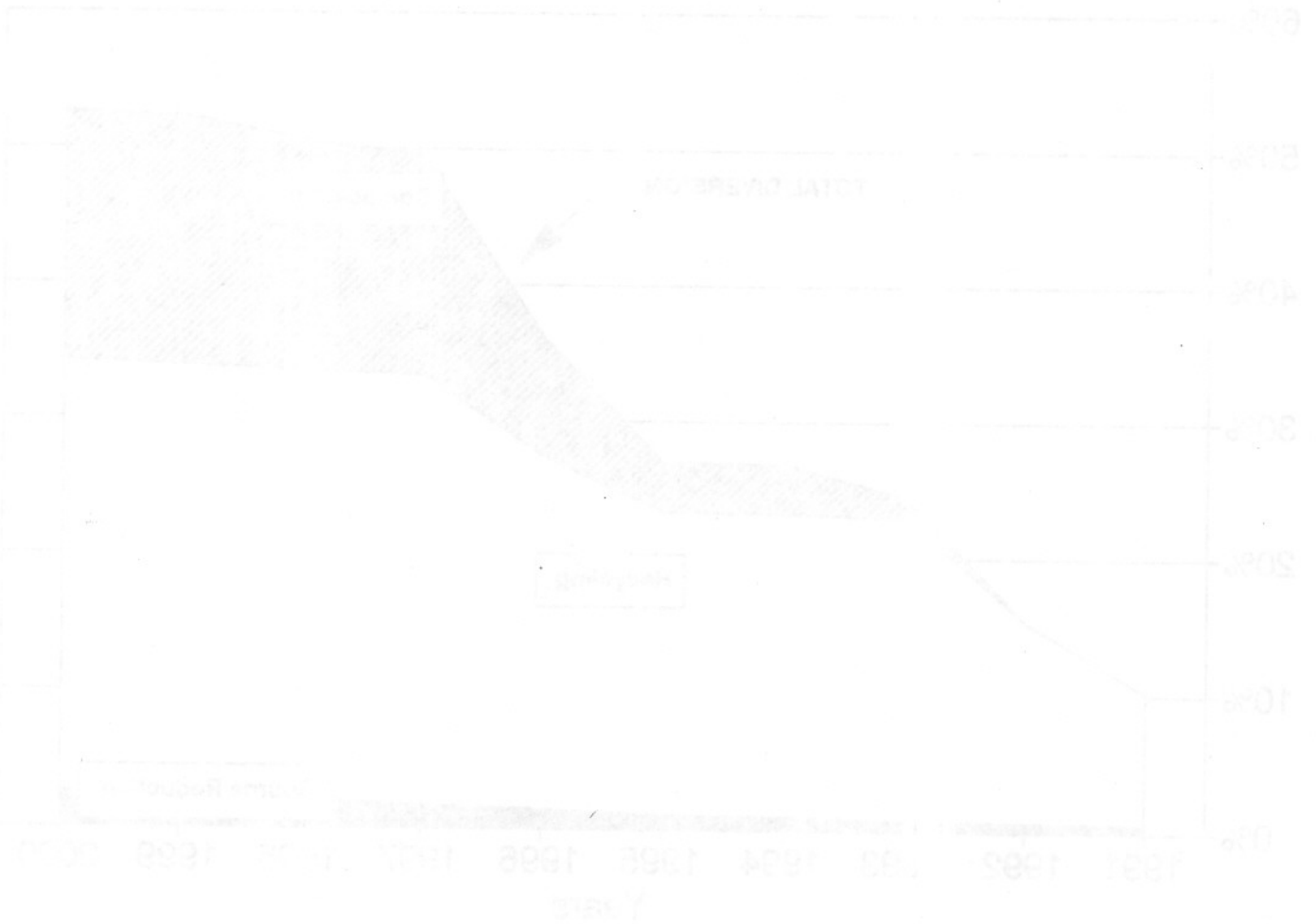
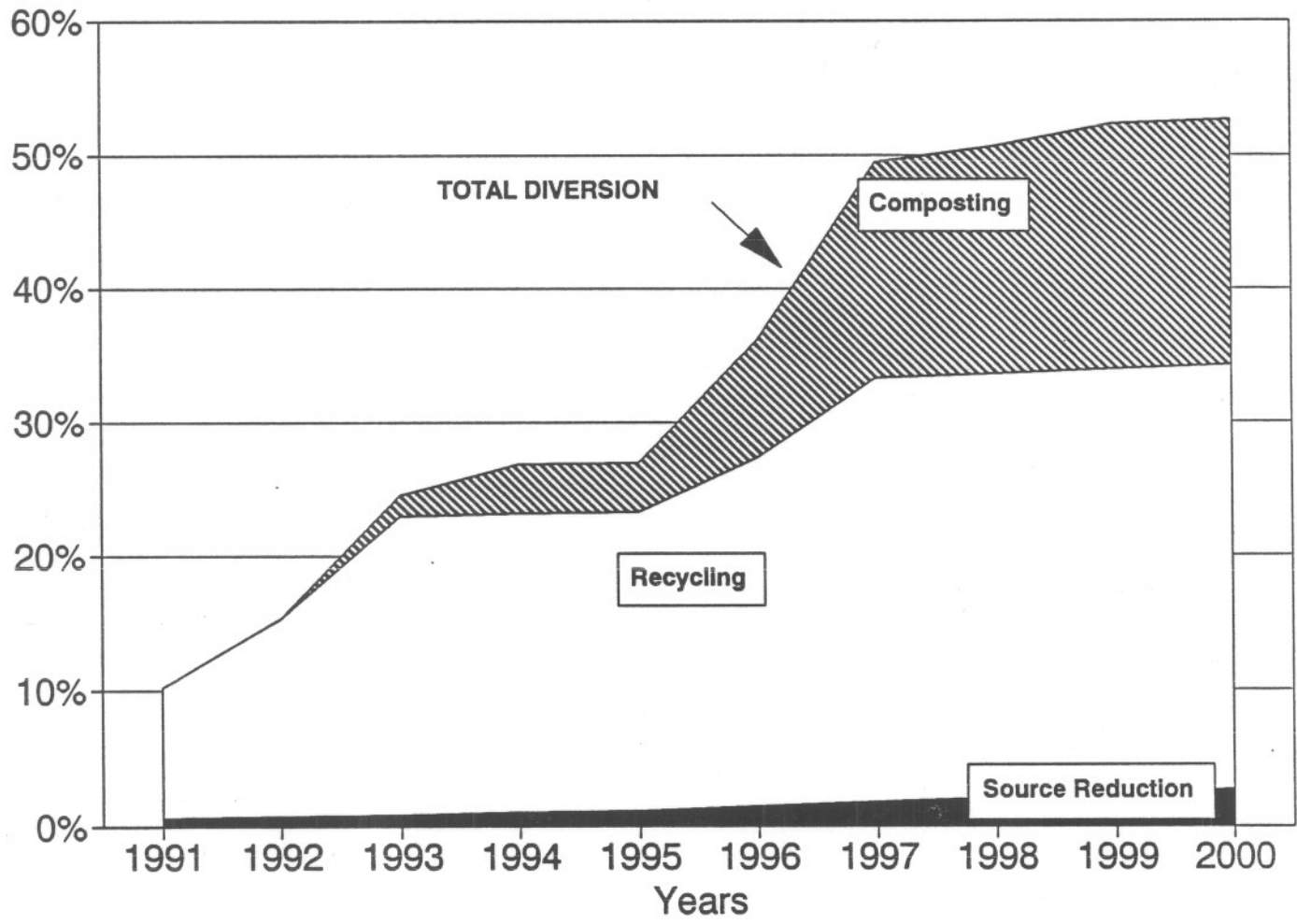


FIGURE IX-1: INTEGRATED DIVERSION PROGRAM PROJECTIONS



## APPENDICES



# **APPENDIX A**

## **WASTE GENERATION STUDIES**

This appendix describes studies that will be carried out as needed to document progress toward diversion goals and to aid with the assessment of ongoing and planned diversion programs.

### **DISPOSAL STUDIES**

In a disposal study franchised waste haulers report the weight of refuse they deliver to landfills for disposal on a monthly basis. The quantity is reported by jurisdiction and by waste generation sector (or vehicle type). The disposal site to which the waste is delivered is specified.

The permitted landfills report the quantity of waste they receive on a monthly basis. The jurisdiction and the waste generation sector (or vehicle type) from which the waste originates are reported. Quantities and sources of special wastes including tires, various types of sludge, asbestos, auto shredder residue, and infectious waste are specified.

Certain generators of waste report the quantities they generate and send to disposal sites on a monthly basis. These generators include wastewater treatment plants, drilling operations, and water purification plants.

Data collected by the California Department of Health Services on the generation and disposal of special wastes and hazardous wastes is maintained.

### **STUDIES FROM OTHER JURISDICTIONS**

Nationwide and California waste generation studies and waste composition studies are monitored. These studies can predict qualitative changes in the local waste stream that might justify a new or a revised diversion program. Furthermore, studies done in jurisdictions that implement similar diversion programs can serve as a guide as to the success of the programs.

### **RECYCLING STUDIES**

In recycling studies the California Department of Conservation's records on the quantity of materials diverted through 2020 redemption centers are monitored to identify trends in the rate at which materials are recovered.



When available records from recycling centers and waste haulers on the quantity of materials they recycle are maintained. The flow of recyclable materials into and out of permitted landfill sites is reported on a monthly basis. Ideally, the quantities flowing into the site are identified by the jurisdiction and waste generation sector from which the materials originate.

In all recycling studies the quantities of recycled materials are reported along with the type of program through which the materials are collected (e.g., drop-off, buy-back, curbside collection). Sufficient information on the fate of the materials must be collected to ensure that materials are not double-counted.

Data available from processors and buyers of recycled materials are collected on a regular basis. These processors and buyers include auto shredders, paper mills and dealers and users of waste paper, processors of plastics, and processors of used concrete and used asphalt. These entities are often unwilling to share their records, but there are some exceptions.

Commercial and industrial generators of recyclable wastes are contacted periodically to determine trends in recycling rates for office paper, cardboard, certain plastics such as polystyrene, glass, etc. Sampling these generators not only reveals trends in the rate of recycling, but it also helps in identifying particular problems in the implementation of commercial and industrial recycling programs. The data can be collected as part of an auditing program which includes the inspection of waste receptacles.

## **SOURCE REDUCTION STUDIES**

A bottom up approach to the monitoring of a source reduction program involves the monitoring of the quantity of specific materials that are used. Data must be collected from private businesses that often do not maintain usable records or do not want to reveal their records. However, some businesses are anxious to publicize the results of successful waste reduction programs.

A top down approach to monitoring source reduction programs uses data from the disposal studies and recycling studies. The waste generation rate is predicted from previous studies. The difference between the predicted rate and the sum of the current rate of waste disposal, waste recycling, and waste composting equals the rate of source reduction. To be meaningful this type of study must be done systematically for several years.

## **HOUSEHOLD HAZARDOUS WASTE STUDIES**

Results of HHW collection events and ongoing programs are compiled. The quantities of waste oil and used car batteries that are collected for reuse and recycling are monitored and compared to the quantities of batteries and motor oil sold.

**FIELD STUDIES**

Field studies aimed at selected materials are done as the need arises. They can be done at the source of generation or at the point of disposal. An example of a targeted field study at the source of generation is the inspection of commercial waste bins for items such as cardboard and high grade ledger paper. In many cases, estimates of quantities that are based on visual surveys are sufficient for evaluating the success of diversion programs. In other cases, the weight of the various waste types need to be measured.

A visual survey of the emptied contents of packer trucks at a landfill can be an effective way to estimate quantities of divertable materials being disposed. The contents of self-haul vehicles and debris boxes can be quantified by a visual survey. A full-scale QFA, if required, would involve the physical sorting of residential and commercial refuse.

## APPENDIX B WASTE SURVEYS

The objectives of a waste survey are to identify the types and quantities of materials being discarded, and then to identify source reduction and/or recycling opportunities for these wastes. Before performing a waste survey, the jurisdiction or consultant should get top management approval from the target firm for both the survey and its follow-up.

### GATHERING WASTE GENERATION INFORMATION

The first step in a waste survey is to meet with the people who handle the solid waste and with those responsible for the equipment or procedures from which the waste is generated. These people can help plan and conduct a walk-through. During the walk-through, all the mixed waste and recycling receptacles are observed and discussed to answer the following questions:

- What is the volume of the container?
- How often is the container emptied?
- How full is the container on an average emptying day or hour?
- What kinds of materials are in the container when it is emptied?

Answering these questions offers a glimpse of the quantity and types of waste generated on-site, although the resulting data are subject to error if the survey is performed only once. More reliable data can be generated if the volume of the waste is carefully tracked over time by company personnel. Even better data can be generated if scales are used to weigh the waste. The most rigorous waste surveys involve sorting and weighing the waste by material type (e.g., glass, wood, paper), or function on-site (e.g., Line X steel tailings).

The waste survey offers enough information to target some of the mixed waste materials for reduction or recycling, and to target some of the currently recycled materials for reduction.

## IDENTIFYING WASTE REDUCTION AND RECYCLING OPPORTUNITIES

After the waste survey walk-through, there are a number of follow-up steps to reduce the amount of waste generated. The following categories of source reduction measures and recycling opportunities should be brought to the attention of the waste generator:

- Good operating practices.
- Technology changes.
- Input material changes.
- Product changes.
- Recycling opportunities.

Ultimately the firm surveyed will need to take responsibility for making some changes, although assistance by the jurisdiction beyond the initial survey may be appropriate in many cases.

**Good operating practices** refer to the human aspect of manufacturing operations. Many of these measures are used in industry largely as efficiency improvements and good management practices. Good operating practices can often be implemented with little cost in all areas of a plant, including production, maintenance operations, and raw material and product storage. Good operating practices include the following:

- **Management practices:** employee training, incentives and bonuses, and other programs that encourage employees to reduce waste.
- **Material handling and inventory practices:** programs to reduce loss of input materials due to mishandling, expired shelf life of time-sensitive materials, and improper storage conditions.
- **Loss prevention** minimizes wastes by avoiding leaks from equipment and spills.
- **Waste segregation practices** reduce the volume of nonrecyclable wastes by preventing the mixing of waste types.
- **Cost accounting practices:** programs to allocate waste treatment and disposal costs directly to the departments or groups that generate waste rather than to general company overhead accounts.

**Technology changes** are oriented toward process and equipment modifications to reduce waste, primarily in a production setting. Technology changes can range from minor changes that can be implemented in a matter of days at low cost to the replacement of processes involving large capital costs. These changes include the following:

- Equipment, layout, or piping changes.
- Uses of automation.
- Changes in process operating conditions, such as flow rates, residence times, pressures, and temperatures.

**Input material changes** minimize waste by reducing or eliminating the materials that enter the production process. Also, changes in input materials can avoid the generation of hazardous wastes within the production processes. Input material changes include material purification and material substitution.

**Product changes** are performed by the manufacturer of a product with the intent of reducing waste resulting from a product's use. Product changes include product substitution, product conservation, and changes in product composition.

**Recycling** through use and/or reuse involves the return of a waste material to the originating process as a substitute for a virgin input material or to another process as an input material.

Historically, waste management has not been a significant cost factor in material process and technology decisions. As disposal rates rise dramatically and firms are encouraged by waste management cost savings to analyze their waste streams, many firms will find that reducing waste not only saves disposal costs, but may save much more through decreased purchasing.

## SELECTING AND IMPLEMENTING CHANGES

The following criteria are important in identifying which changes to make:

- Estimated cost.
- Estimated tons or cubic yards of waste to be avoided.
- Estimated savings due to decreased waste hauling.
- Estimated savings due to decreased purchasing requirements.
- Ease of implementation.

- Worker health/safety considerations.

After changes are selected, the firm must map out their planned changes in terms of:

- Volume or weight abatement goals for targeted materials.
- Budget and/or staff time allocation.
- Parties responsible for implementation.
- Methods to measure progress.
- Timing and forum for regular communications in-house.



# APPENDIX C

## DESCRIPTION OF EVALUATION CRITERIA

Following is a description of the criteria used to evaluate recycling, composting, and special waste programs.

### 1. EFFECTIVENESS IN WASTE DIVERSION

- Low: Less than 5% of total waste stream diverted.
- Medium: 5 to 10% of total waste stream diverted.
- High: More than 10% of total waste stream diverted.

### 2. HAZARDS CREATED

- Low: Impacts or hazards are severe or unmitigable.
- Medium: Impacts or hazards are mild or mitigable.
- High: Few or no hazards or nuisances exist, and/or hazards can be adequately contained.

### 3. FLEXIBILITY TO CHANGING ECONOMIC, TECHNICAL, OR SOCIAL CONDITIONS

- Low: Program tied to particular technology, market, or social institution, and little adaptability is possible.
- Medium: Program may be hampered by predictable, moderate changes, and some adaptation is possible with significant program alteration.
- High: Program is flexible, and much adaptability is possible.

### 4. CONSEQUENCES ON THE WASTE STREAM

- Low: Waste generation is shifted toward a less recyclable and/or more polluting waste type.
- Medium: No change in waste generation or no change in recyclability or pollution level of waste generation.
- High: Waste generation is shifted toward a more recyclable and/or less polluting waste type.

## 5. FEASIBILITY IN SHORT-TERM AND MEDIUM TERM

- Low: Program cannot be implemented within the planning period.  
 Medium: Local conditions and experience with similar programs indicate that program can be implemented by year 2000.  
 High: Local conditions and experience with similar programs indicate that program can be implemented by 1995.

## 6. CONSISTENCY WITH LOCAL POLICIES, PLANS, ORDINANCES

- Low: Major changes in existing codes and ordinances required prior to program implementation.  
 Medium: Minor changes in existing codes and ordinances required prior to program implementation.  
 High: No changes in existing codes and ordinances required prior to program implementation.

## 7. FACILITY REQUIREMENTS

- Low: Major expansion or new facilities required.  
 Medium: Moderate expansion of existing facilities required.  
 High: No significant expansion of existing facilities required.

## 8. INSTITUTIONAL BARRIERS

- Low: Severe institutional barriers, such as waste stream ownership agreements and/or long term franchise contracts.  
 Medium: Moderate institutional barriers or moderately difficult to overcome.  
 High: Few or easily overcome institutional barriers.

## 9. COSTS

- Low: Cost per ton diverted significantly higher than existing waste management cost per ton.  
 Medium: Cost per ton diverted higher than existing waste management cost per ton.

**High:** Cost per ton diverted roughly equal to or less than existing waste management cost per ton.

#### 10. END USES OR MARKETS

**Low:** Markets are currently nonexistent or unstable.

**Medium:** Potential for medium-term development and/or stabilization of markets. Markets exist but are subject to moderate fluctuations and/or are not local.

**High:** Existing and potential markets are available, local, and relatively stable.

#### 11. INVOLVEMENT OF WASTE GENERATORS

**Low:** Program has no effect on behavior of waste generators, or tends to obscure the potential commodity value and/or environmental consequences of waste.

**Medium:** Waste generators somewhat encouraged to recognize potential commodity value and/or environmental consequences of waste.

**High:** Waste generators strongly encouraged to recognize potential commodity value and/or environmental consequences of waste.

# **APPENDIX D MEASUREMENT METHODS FOR PROPOSED SOURCE REDUCTION ACTIVITIES**

## **COUNTING WASTE AVOIDED THROUGH SOURCE REDUCTION ACTIVITIES**

In order to identify changes over time in solid waste generation rates per capita, each jurisdiction must track the tons of waste being landfilled, transformed (burned), composted, or recycled. This "top-down" method of counting waste generated from within a jurisdiction's boundaries will not offer reliable estimates of waste tons avoided through specific source reduction activities. Top-down estimates for tons of waste avoided may be inaccurate because the other factors affecting waste generation, such as changes in economic activity or the ratio of jobs to residents, overshadow incremental changes due to source reduction activities. The California Integrated Waste Management Board has stated that the top-down approach is unacceptable as a means of measuring the results of jurisdiction planned source reduction activities.

The second measurement method is the "bottom-up" approach, whereby the tons of waste avoided from each individual source reduction activity are estimated and then summed for all activities. For some source reduction activities, the bottom-up measurement approach can offer good data for the tons of solid waste avoided. For other source reduction activities, the bottom-up measurement approach can be time-consuming, expensive, or unworkable. For example, an awards program designed to increase awareness about the concept of source reducing solid waste can convince some waste generators to become less wasteful, but identifying these parties and the amount of waste they avoid is not practical.

Waste diverted through source reduction programs can be counted towards state-mandated diversion goals only if reasonable estimates of tons avoided can be documented. Therefore the tons to be avoided are projected for only those source reduction programs for which a bottom-up measurement is feasible.

The following section lists assumptions and background data used to project waste quantities avoided by the recommended source reduction activities (see Table II-3). The last section in this appendix suggests the protocol to measure source reduction activity results after implementation.

## ASSUMPTIONS USED TO PROJECT TONS AVOIDED

### SURCHARGE ON WASTE RECEIVED AT MIXED WASTE FACILITIES

The tons of solid waste to be avoided as a result of charging higher tipping fees at landfills, transfer stations, or other mixed municipal solid waste handling facilities have not been included in diversion goals because they cannot be readily measured. If significant staff time and budgeting for well-designed survey work were available, residents and businesses could be surveyed for their response to increased hauling fees passed on to them through their haulers. Even this approach would yield questionable results, since survey responses would be subjective estimates made by persons who are not in the habit of analyzing their waste generation behavior.

### TECHNICAL ASSISTANCE TO COMMERCIAL AND INDUSTRIAL WASTE GENERATORS

- Waste generators representing 0.5% of the commercial and industrial waste stream will implement source reduction programs.
- Each firm implementing a full scale source reduction program will be able to target 50% of their waste items for reduction.
- For each waste item addressed, an average of 86% of the given waste item can be avoided (fact sheet "Source Reduction Newspaper Industry Case Study" Minnesota Office of Waste Management, 1991. St. Paul, MN).

These assumptions result in a diversion fraction of about 0.2% of the commercial and industrial waste streams.

### DROUGHT-RESISTANT LANDSCAPE ORDINANCE

- Each new household landscaped with drought-resistant plants will generate 25% less yard waste (short term) and 60% less yard waste (medium term) than if landscaped with nondrought-resistant plants.
- New households and yard waste generation will increase at a rate proportional to the projected population increases identified in *Projections 1990*, Association of Bay Area Governments.

## IN-HOUSE SOURCE REDUCTION PROGRAM FOR GOVERNMENT OFFICES

- Programs will reduce waste by 10.8 lbs. per employee per year (fact sheet "Solid Waste Reduction Pilot Project" Minnesota Office of Waste Management, 1990. St. Paul, MN).
- Number of government employees.

## QUANTITY-BASED HAULING FEES

While this is the most powerful tool to promote source reduction of solid waste by residents, projections for tons to be avoided cannot be estimated without detailed economic modelling based on factors such as existing and planned recycling programs, type of quantity-based hauling system implemented, local attitudes, and the passage of time. For this reason, tons to be avoided as a result of quantity-based hauling fees are not included in the diversion goals for source reduction.

## YARD WASTE MANAGEMENT EDUCATION

- Yard waste reduction resulting from a well-designed education campaign can result in a 50% reduction in grass clippings set out for collection, a 25% reduction in leaves set out for collection, and a 25% decrease in the amount of brush set out for collection. Assuming the local yard waste composition is composed of 20% grass by weight, 20% leaves by weight, and 60% brush by weight, the total decrease in yard waste set out for collection would be 30% reduction in yard waste set out at the curb for those who participate.
- Households representing about 25% of the yard waste stream will participate and achieve the above source reduction estimates.

These assumptions result in a 7.5% reduction in the tons of yard waste set out for collection.

## AWARDS PROGRAM, PARTICIPATION IN A REGIONAL OR STATE-WIDE WASTE EXCHANGE, SCHOOL CURRICULA AND STUDENT PROJECTS, AND TECHNICAL ASSISTANCE TO BUSINESSES WITH OFFICE SPACE

The tons of solid waste to be avoided through these activities cannot be readily projected.



## **MONITORING METHODS FOR PROPOSED ACTIVITIES**

### **TECHNICAL ASSISTANCE TO COMMERCIAL AND INDUSTRIAL WASTE GENERATORS AND ASSISTANCE TO BUSINESSES WITH OFFICE SPACE**

Each waste generator receiving assistance will be requested to fill out a form identifying the amount of waste collected from them before City/County assistance, and again six months after City/County assistance. The jurisdiction will make its own assumptions regarding the density of the waste abated if the data are only available in cubic yards. The tons abated, as reported, will then be summed for all participants in the jurisdiction's technical assistance program.

### **DROUGHT-RESISTANT LANDSCAPE ORDINANCE**

The jurisdiction will work with haulers to determine the average quantity of waste set out per household in neighborhoods constructed after passing the ordinance and compare these quantities with yard waste collected from pre-ordinance neighborhoods. All neighborhoods chosen for measuring yard waste set-outs will be similar in lot-size and demographics. This information will be tracked over a period of years to account for weather differences and changes in foliage production as the landscaping grows older.

### **IN-HOUSE SOURCE REDUCTION PROGRAM FOR GOVERNMENT OFFICES**

The jurisdiction will gather information from purchasing staff to estimate the reductions in paper used, disposable cups used, etc. as well as tracking the amount of waste collected and recycled from City and County facilities by contracted haulers. The jurisdiction will also need to chart its progress as related to the number of full-time employees. (In explanation, if the number of government employees doubles over a five year period, but the amount of waste generated increases by only 50%, then government employees have probably become less wasteful.)

### **YARD WASTE MANAGEMENT EDUCATION**

City and County staff will need to request the assistance of the firms collecting yard waste from the curbside to identify how quantities change for given sections of the City and County.

## SCHOOL CURRICULA AND STUDENT PROJECTS

On a school-by-school basis where students are participating in on-site composting or other source reduction projects, the students will include as part of their projects the weight of the waste they are keeping out of the waste stream.

## PARTICIPATION IN A REGIONAL WASTE EXCHANGE

In future years most regional or state waste exchanges will most likely be operated with an extensive computer database. The jurisdiction will monitor exchanges involving parties from the within the jurisdiction through printed reports from the database system.

## AWARDS PROGRAM, SURCHARGE ON WASTE RECEIVED AT MIXED WASTE FACILITIES, AND QUANTITY-BASED HAULING FEES

A feasible measuring scheme is not available for these source reduction activities.

# APPENDIX E

## DEVELOPMENT OF MARKETS FOR DIVERTED MATERIALS

Understanding post-consumer materials markets is critical to the success of a diversion program. Throughout the U.S., business and private citizens are driving market development and demand for recycled products. To be effective, policy options must stimulate private investment so that governments are not left to bear an unsustainable burden.

This appendix discusses the development of markets for two types of diverted materials: recycled materials and yard waste products.

### RECYCLED MATERIALS

#### ASSESSING MARKETS

A preliminary market analysis will show what markets are currently available or may be available in the future. National and some regional market information is available in the trade publications (for example, *Recycling Times* includes a markets page for post-consumer materials). It is also important to identify specific local, national, and international buyers with which the City will actually deal. With this information, materials to be recycled can be targeted within the local waste stream.

Each of the recyclable materials has unique characteristics, and market development must be understood in the context of each material. Demand-directed efforts are required for some materials, more stringent market specifications for others, and supply-directed efforts for others. For some materials, all of these factors are important. A market study for specific materials for the entire Highway 80 corridor from the Bay Area to Sacramento would be appropriate.

#### LOCAL MARKETS

A strong emphasis should be placed on local recycling and manufacturing, given the lag between environmental consciousness and industrial capacity to recycle. Both the city and the manufacturer benefit when waste is recycled locally. Each stage of production increases the economic benefits of recycling. In addition to decreasing dependence on volatile foreign markets, recycling waste close to home provides jobs, saves waste disposal costs, and increases recycling program revenues. Local markets and end uses can be developed in three primary ways, as described in the following section.

**Use Of Secondary Materials By Existing Industries**

Standard specifications, permit requirements, and codes governing new construction can be modified to encourage the use of recycled materials. Candidate materials include cellulose fiber insulation manufactured from newsprint, glass fiber insulation manufactured from post-consumer glass, glass cullet as an aggregate for french drains and some paving uses (glasphalt), recycled plastic parking curbs, traffic cones, or park benches, paper products with a minimum recycled content, and rubberized asphalt using crumb rubber from old tires.

Government procurement procedures should initially give a preference to these materials, and to private sector developers who use these materials. Government requirements for use of these materials in all new construction should be phased in, if necessary to stimulate the market, after sufficient experience with the materials is obtained.

The codes which govern site layouts and landscaping may also be used to stimulate secondary material use among existing industry. For example, some cities currently have planning policies which require new supermarkets to set aside space in their site plan for future redemption centers. Foresight during the building permit process can make diversion programs much more successful at a later time.

**Encouraging New Industries That Use Secondary Materials**

New industries can be encouraged to locate nearby. A good example of this is plastic lumber production from post-consumer HDPE. Manufacturing facilities exist in other parts of the United States, primarily the Midwest and East, but are not yet sited in California. The Recycling Market Development Zone concept could be used to assist in financial startup of this industry.

Long term commitments to deliver collected recyclables to these industries are likely to be necessary in order to encourage them to locate here. Adequate feedstock to achieve economic scale will likely require interjurisdictional cooperation. These issues will need to be discussed between potential candidates and the City. Consequently, benefits of programs like this are not quantified in this document. It is assumed that their benefits will not become clear until the medium term planning period.

**Influencing Consumer Behavior**

Consumer buying preferences change over time and can be directed into more economically and ecologically sound patterns. This approach is also medium-term in nature, and is not quantified in this document. It is critical, however, to long term success of diversion programs as a whole. A county-wide program of education and, possibly, financial incentives to encourage resource-conscious buying practices can help influence the success of market development efforts.

## LOCATING AND CHOOSING A BUYER

### Types of Buyers

There are three general "outlets" for secondary materials: brokers (or dealers), end users, and internal markets.

Brokers purchase materials and sell them to end users. Brokers accumulate materials, guarantee that they meet certain specifications, and then provide them to end users as a "raw" material feedstock. Most end users prefer secondary materials obtained through brokers, because a large quantity of uniform quality product can be guaranteed. Brokers are reliable buyers, as they often purchase materials even when the market is down, stockpiling in anticipation of higher prices. Many brokers will transport materials, and they usually require little processing other than a clean product.

End users are the facilities that actually reprocess or remanufacture the post-consumer materials. For example, a paper mill accepting post-consumer scrap paper is an end user. Selling directly to the end user may result in a better price, but could also require meeting more stringent product specifications (for example, the waste may have to be baled). Many end-users also require the supplier to deliver the materials, which adds costs.

Internal markets such as municipal government agencies not only provide an outlet for some materials, but also promote a recycling "awareness" within the government. Examples might include using tires to build playground equipment.

### Contract Vs. Open Market

Secondary materials are usually sold either on the open or "spot" market or through some type of contract arrangement. On the open market, decision makers must locate a buyer each time enough material has been accumulated to be sold. By selling materials in this manner, the community can get the best price for the materials at the time. When the markets are down, however, the community may be faced with low prices or no buyers at all. A contract is an agreement between the community and a broker or end user to deliver a certain amount of material at a certain price for a specified amount of time. A contract helps protect the community from market fluctuations and ensures an outlet for materials. The agreed price, however, may at times be below the actual market price for the material.

When possible, many decision makers choose to develop contracts with buyers, mainly because it reduces the risk of having no outlet for materials. Post-consumer materials markets fluctuate greatly, and many programs are not equipped to handle flat markets (for example, material may have to be stored and then sent to a landfill if no buyers are available).



### **Cooperative Marketing: An Option For Small Generators**

Cooperative marketing involves combining materials and resources from different groups into a larger pool that may be more marketable. Small communities and businesses have traditionally had little success in establishing relationships with secondary materials brokers and end-users, mainly because smaller communities neither have the resources to perform market research nor enough materials to garner the attention of brokers. Combining materials and using a cooperative marketing strategy can bring materials from these communities into the marketplace.

Cooperative marketing can be developed within existing management structures. For example, Solano County or ABAG may do market research and make arrangements for the collection and delivery of recyclables to a broker. Another option would be for an independent organization to serve as the link between small towns and brokers or end-users. An example of such a group is the New Hampshire Resource Recovery Association, a non-profit organization that serves as a link to secondary materials markets for many of New Hampshire's municipalities.

Aside from regional arrangements, cooperative marketing can take several other forms, including:

- Drop-off centers using a centralized recycling center for marketing.
- Different recycling centers combining materials.
- Recycling centers or communities exchanging marketing ideas and information.

One market development activity could involve the cooperative marketing of old newspaper (ONP) by the recyclers in the County to a single mill, and working out a tolling agreement between the mill and a local newspaper.

### **MARKET FACTORS**

The primary factor in marketing is the quality of the recovered material. Quality is defined in recognized written standards and published as material specifications. The more closely a material conforms to the published specification, the easier it is to sell and the higher the price it will command. In periods when market demand is slack, high quality materials will be continuously purchased while lower-quality materials may become unsalable.

Other major influencing factors are the volume and consistency of quality standards of the recovered material that the seller can provide to the marketplace. The intrinsic factors of



material quality, volume, and consistency interact with equally important external market factors. Material markets on the West Coast are influenced not only by domestic demand, but also are heavily affected by overseas market developments.

Many factors affect secondary materials markets. The most important variables include:

1. The general condition of both the domestic and global economies.
2. The supply of materials, both virgin and secondary, on the world market.
3. World relationships between geographically competing supply sources, domestic and foreign market production, and generation rates.
4. The capacity of smelters and mills for secondary materials as well as expansion of existing and construction of new secondary materials production facilities.
5. The level of demand and price competition between domestic and export markets.
6. Variations in export freight pricing policies between conference and non-conference shipping lines. (Conference lines are usually more expensive and "set" their prices in a cartel-like fashion.)
7. The direction, rate, and volatility of virgin commodity markets.
8. Currency exchange rates in relation to the U.S. dollar.
9. International trade and tariff policies, regulations, and agreements.
10. Cartel agreements between virgin producers of prime raw materials.

The status of the secondary materials marketplace at one time will be the result of the dynamic interaction of all these factors. The relative importance and degree of impact of each factor changes constantly.

#### **Old Newspaper: A Market Development Example**

The recent history of the newspaper market illustrates some of these forces at work. The newspaper glut that developed initially in 1989 was the result of an unanticipated and unplanned series of events. However, the end result is that a new level of demand has been established that will lead to higher recovery rates and probably to higher market value for old newspaper (ONP), perhaps by 1992. In some areas of the country, ONP value has already appreciated substantially. The series of events is instructional and can be summarized as follows:

1. Solid waste management became a highly visible issue in 1986; attention focused on recycling as an alternative to disposal. ONP recycling was a focus in 1988-89.

2. States adopted legislation to encourage or require community-based "recycling", mostly in 1988-89. Recycling meant collection of separated materials.
3. Numerous large curbside and other programs were implemented in 1988-89.
4. Newsprint demand boomed during 1985-87; producers made commitments to new, mostly virgin fiber capacity scheduled to become available in 1989-91.
5. The demand for ONP slowed temporarily in late 1988 when exports dropped. The price for ONP collapsed in the East, and this spread across the United States.
6. Attention became focused on newspaper publishers, with legislative, political, and environmental pressures to save curbside programs from economic distress.
7. Many publishers developed a plan to purchase recycled newsprint.
8. Demand was established for more recycled newsprint. ONP animal bedding programs and other alternative uses for ONP spawned more interest.
9. Several newsprint producers committed capital investment to produce recycled newsprint.
10. This newly established demand for ONP will in turn require increased recovery of ONP in the years ahead.

The key lessons to be learned are as follows:

- Supply can increase much more rapidly than demand in the short term.
- Solid waste management goals can be used as a method to "jump start" new market demand; however, temporary disruption of the existing system can occur.
- Industry will respond as quickly as prudent planning and construction will allow, provided the message is clear and the economic/social benefits are equally clear to them. Industry needs to be convinced that the public commitment is sustainable so it can justify investments that have long-term pay backs.
- The supply and demand for the material will stabilize at a higher level once these new investments are in place.

The newspaper glut was not a market failure, but a disequilibrium between supply and demand caused by governmental efforts to promote collection of newspaper for environmental rather than economic reasons. The net result of the glut was short-term pain for long-term gain.

An excess supply situation can happen with other materials if collection (supply) begins before market demand. A well-planned program that ties market demand to supply is the preferred approach. Caution must be exercised in assuming revenue from the sale of such materials in a transition period. Obviously, oversupply will bring prices down sharply (but temporarily). Negative prices, that is, paying buyers to take materials (at less than disposal costs), are possible.

Market disequilibriums causing revenue shortfalls can be expected to last one to four years, about the period necessary for the market (demand) to react by planning, permitting, building, and starting commercial operation of new facilities in response to the availability of supply. Of course, if there are dramatic increases in collection there may be no capacity at all, and some separated materials may get landfilled or burned. A balanced approach by government supporting both collection efforts (supply) and market development (demand) is appropriate.

Some market development activities have been suggested which have the potential to "jump start" new markets that are slow in developing. These recommendations will not interfere with basic positive effects (efficiency and innovation) of the free enterprise system, but will accelerate the development of such markets. About three years after the end of sudden increases in the supply of materials (caused by new collection programs coming on line), the markets should reach a state of relative equilibrium. While equilibrium for commodities will not bring a completely stable price, the need for any government-supported market development activities will be eliminated. However, since most markets for recyclable materials are national, market equilibrium is not completely predictable, and some amount of instability should be anticipated.

The "jump start" mechanisms are no longer needed when materials are being captured and recycled in substantial percentage. Market sustenance or growth efforts should be the domain of the private sector after equilibrium has been achieved. Supply (collection) may have to be subsidized indefinitely because of the low value of some recyclables.

## PRICE TRENDS

Prices for secondary materials are cyclical. They can vary from 40 to 100 percent of value within a six to twelve month time frame. The previous section presented the major market forces that determine secondary materials prices. However, clearly identifiable trends in the pricing cycle can be used to define realistic, median material prices. These median prices are effective tools to project near and long-term potential pricing scenarios for recovery programs.

Secondary material is a demand driven product; scrap is bought, not sold. The pricing of material reflects the greater economic leverage of buyers in relation to sellers. Final consumers of secondary materials, mills and smelters, will buy material at the lowest price to which the market will respond.

Market prices per ton for recycled materials in Northern California in early 1991 were as follows:

Newspaper	\$30-40
High Grade Paper	\$90
Cardboard	\$30
Mixed Paper	\$0-5
Aluminum	\$2000-2200
Tin	\$20-70
Glass	\$100-135
PET Plastic	\$700-800

#### **Old Newspaper (ONP)**

ONP is the most commonly recycled item in residential drop-off and curbside programs. A closed loop end use for ONP is new newsprint; linear uses include insulation, packing, building materials, animal bedding, and kitty litter. AB 1305 (1989) requires that all commercial consumers of newsprint certify to the State that the newsprint they use has a minimum recycled fiber content.

#### **High Grade Paper**

High grade paper comprises approximately 25% of all waste paper recovered in the U.S. There are many grades within this category, most of which can be recycled in a closed loop. High grades receive substantial prices on the market, which make the material competitive with virgin inputs in areas where recycled supply is dependable. Market prices depend upon the price of pulp. Since high grade paper is often used as a substitute for pulp, prices tend to fall with the price of pulp, but the market is more stable than for other grades of waste paper. Markets are also expanding with the increasing push for recycled products, especially recycled office paper. All of the large paper dealers in the region deal in at least several grades, the most common being white ledger, colored ledger, and computer printout. The Gaylord plant in Antioch is a local end user.

### **Old Corrugated Containers (OCC)**

OCC composes over half of the waste for many commercial establishments and manufacturing facilities, and it makes up about 50% of the waste paper recovered in the U.S. End uses for OCC include manufacturing new corrugated containers, cereal boxes, pad bases, and wall board. It can also be shredded and used as animal bedding. Many local paper dealers handle OCC. The Gaylord paper plant in Antioch uses 60% recycled fiber in the manufacture of new corrugated cardboard. OCC has strong domestic and export markets, with demand expected by many industry analysts to outstrip supply within the next five years. Markets are probably sufficiently strong to preclude distinct market development activities. A collapse of the OCC market would seriously affect the success of the selected diversion programs, particularly in the commercial and industrial sector.

### **Mixed Paper**

The housing industry and currency exchange rates greatly affect the demand for waste paper. Export of mixed paper has increased substantially in the past year. The primary use of waste paper is the manufacture of combination boxboard which is used to make boxes for shoes, clothing, and dry foods. Other uses include the manufacture of roofing felt and construction paper building materials. "Supermix," a grade of waste paper containing a higher content of high-grade fibers, is usually exported to East Asia, where it is manually sorted into its constituent grades for recycling.

Magazines are also within this category, through they are considered a separate paper grade. Demand for magazines is weak but growing, as manufacturers of recycled newsprint find that a percentage of magazines in the mix improves the final furbish. Potential buyers in the Bay Area include Jefferson-Smurfit in Oakland and San Jose; Weyerhauser in San Jose; Domtar Corp. in San Leandro (which uses mixed paper for manufacturing the liner for its sheetrock); and DAI El Paper in Burlingame. Demand for mixed paper may grow as demand for OCC outstrips supply and new uses are found for mixed paper to replace kraft fibers. However, contamination levels must be kept to a minimum.

### **Aluminum Cans (UBC)**

Aluminum cans are remelted and made directly into can stock. Aluminum scrap is used primarily by secondary aluminum producers. Current scrap market value ranges from \$800 to \$1100 per ton. With AB 2020 redemption value, the total market price ranges from \$2000 to \$2200. Ample markets for aluminum exist both here and abroad.

### **Steel Food and Beverage Containers**

Tin cans that are used as food containers are actually steel cans with a thin coating of tin. The percentage of tin in steel cans is about 25%. Growth in curbside collection of steel cans has been an important element in the expansion of steel can recycling.



### **Glass Cullet**

Waste glass usage in the U.S. is estimated at 25 to 30% of all glass produced. Cullet is primarily traded on the U.S. market, so its market price remains fairly constant. A primary concern for end use markets is the quality of the material. In the glass plant, contamination can cause damage to equipment or result in poor product quality. One of the problems with commingled curbside collection is that it produces multi colored shards of glass. Markets for mixed-color cullet are not as stable or lucrative as those for color-sorted containers.

Two primary end uses for recovered glass are cullet for new glass and as a raw material for making secondary products, such as glassphalt paving material, foamed insulation, and construction material. The glass market has recently been problematic for recyclers due to increased quality standards being imposed and requests for color-sorted materials.

### **High-Density Polyethylene (HDPE) Plastic**

HDPE is used in milk and water jugs, as well as a broad array of containers. HDPE can be recycled into non-food containers and other plastic products, such as recycling bins and garbage cans. Several of the large paper dealers in the region purchase HDPE, though processing occurs in the Midwest and on the East Coast. Some HDPE is also exported to China and other Pacific Rim countries.

The market outlook for HDPE is favorable, as manufacturers of plastic containers and of products sold in them strive to improve the environmental image of plastic. Markets for plastics are fairly new, but as processing technologies are developed, plastics recycling will grow and new markets will develop. Market development may be assisted through purchase preferences. A collapse of the market for this material, as for any of the targeted plastics, would have only a minor effect on diversion rates.

### **Polystyrene (PS) and Expanded Polystyrene (EPS)**

These plastics consist of the same polymer. PS is most commonly used for brittle plastic containers, such as for cottage cheese and yogurt containers. EPS is commonly referred to as Styrofoam, though this is a trade name. Local markets for polystyrene products include Free-Low Packaging Corporation in Redwood City, the National Polystyrene Recycling Corporation plant in Hayward, and Bay Polymer in Fremont. Polystyrene can be used in the manufacture of office equipment, videotape casings, flower pots, toys, insulation, textiles, fiber fill, industrial paints, and carpet yarn.



## YARD WASTE

Several different products can result from the processing of yard waste materials. The most logical products for a given community depend on many variables, including characteristics of the yard waste, the degree to which the different components are or can be separated, facility size and processing capabilities, local market conditions, and overall program goals and objectives.

### END USES FOR YARD WASTE PRODUCTS

The most common products resulting from yard waste processing are described in the following sections.

#### Boiler fuel

Boiler fuel can be produced from essentially any brushy/woody yard waste through size reduction. Grass clippings and leaves are not desirable components in boiler fuel. However, materials handled as boiler fuel cannot be credited toward recycling goals until after January 1, 1995, and then only in specified circumstances.

#### Mulch

Mulch (also known as landscape chips) is a material applied to the surface of the soil, most often around the base of plants, to conserve moisture, suppress weeds, moderate soil temperature, or reduce erosion. Reduction of larger woody materials in size, particularly when done with a chipper, results in a relatively acceptable mulch. Size reduction of smaller brushy materials yields a less desirable product that is considered unacceptable by many users. Experience in various communities has shown that if the quality of the chips is good, paying markets are relatively easy to develop.

#### Bulking Agent For Municipal Sludge Composting

Bulking agents are required in sludge composting to improve porosity, provide structural support, and keep the compost mass from becoming anaerobic. Wood chips and sawdust are the most common bulking agents used in the process. Co-composts made from various mixtures of sludge and yard waste are attractive and versatile materials with many uses. Co-compost mixtures may be used directly or mixed with nutrients and/or bulking agents to produce a wide variety of soil amendments and mulches. The co-compost can be screened to make products with textures ranging from a rich, fine, soil-like material to a coarse mulch of one to two inch wood chips. Co-compost with the coarse yard waste removed retains a higher proportion of sludge than the screened coarse materials or the non-screened co-compost.

There are two sludge composting operations in the Bay Area: an operation in South San Francisco run by Tillo Products, Inc., and East Bay Municipal Utility District (EBMUD) in Oakland. At present, EBMUD uses only chipped fir bark purchased on the spot market as a bulking agent in their sludge composting, but significant changes in their processing system to start using wood chips from recovery operations are being considered. Other sanitary districts in the area are also considering co-composting projects.

### **Compost**

Compost is produced as a result of biological decomposition of organic materials. Leaves and grass clippings are good compost feedstock materials in that they decompose fairly quickly. Woody materials are very slow to decompose and will remain largely intact through the process. They are, however, sometimes beneficial in the compost process. They serve as a bulking agent which allows for better aeration. The presence of undecomposed wood in finished compost is unacceptable to some users, and removal by screening may be necessary.

Studies and experience have shown that sufficient markets for yard waste compost can consistently be developed provided the quality is suitable. Sometimes aesthetic appeal is more important than physical and chemical properties. Market development activities are important. Revenue should not be expected during the initial years of production. Once markets have been developed and product awareness has improved, it should be possible to price compost similar to a good quality topsoil.

### **Size Reduced Yard Waste**

This material is produced by size reducing mixed yard waste (as compared to landscape chips which are produced from larger, segregated woody materials). Some states have programs which include application of uncomposted yard waste to agricultural lands. Other states are testing the feasibility of using this material as daily cover at landfills. Reclamation of disturbed lands is another possibility. Direct uses for this type of material are limited to situations where appearance and consistency are not critical. Alternatively, it does appear that there is some potential for marketing this material to parties that would process it into other products. Payment to the party would probably be required.

## QUALITY PARAMETERS FOR YARD WASTE PRODUCTS

The following table summarizes the range of yard waste products and the quality variations for each:

### Yard Waste Products and Quality Variations

<u>Product</u>	<u>End Uses</u>	<u>Grading Parameters</u>	
Uncomposted Fines	Soil tilth amendment	Particle size	
		Moisture content	
		pH	
Composted Fines	Soil fertility amendment	N-P-K ratio	
	Feedstock for topsoil blend	pH	
	Feedstock for potting mix	Particle size	
		Moisture content	
Chips	Boiler Fuel	Contamination	
		Metals content	
		Consistency	
	Mulch	Boiler Fuel	Moisture content
			Btu value
			Particle size
			Particle size
			Homogeneity
			Contamination
			Moisture content
Color and texture			
Bulking agent	Boiler Fuel	Moisture content	
		Particle size	
		Contamination	
Size reduced yard waste	Landfill cover Landspreading	Contamination	

## MARKETS

Public agencies, agriculture, and landscaping industries are often identified as the most appropriate potential markets for compost products. These markets are moderate to large in size, have a need for and experience in managing organic materials, tolerate a relatively wide range of product specifications, and present some potential for producing revenue.

Product specifications and the amount of product variation that can be tolerated vary for different categories of users. For example, use of compost as a component of greenhouse mixes is often cited as a potentially lucrative market. Nursery growers do pay considerable amounts for high quality sphagnum moss peat. However, the growers have very specific needs with respect to density, porosity, pH, and other parameters. Furthermore, consistency of product and availability during peak planting times are critical. It may be unwise to target highly specific and demanding markets during the initial stages of a composting operation because of uncertainties about compost quality and consistency. However, as a better understanding of product characteristics and variability develops, these markets can be pursued.

Initial, less demanding markets might include landscapers, landfills, parks, forestry and highway departments, and agricultural lands. Nonetheless, it is still important that the needs of these users be recognized. For example, surveys have consistently shown that landscapers are a good potential market for compost; they are interested in using the product and are capable of consuming large quantities. Successful marketing to this group will require that the producer understand issues such as transport and handling needs, and periods of peak demand.

A distinction should be made between existing and potential markets. An existing market is one in which a product is now and has historically been both available and in demand. By this definition, compost products, mulch, and other soil amendments derived from yard waste should be considered a potential market.

Every geographic region is unique in the types of related businesses that flourish and the soil use practices that are accepted. For example, an urban area may have a great need for compost within the public agencies and the landscaping industry. A suburban area may have greater needs in the plant growing industries, such as nurseries. The location of the compost operation and economic and population growth of the area will be good indicators of future trends in soil product consumption.

The markets for yard waste by-products are also influenced by the following factors:

- The proximity of potential users to the source of compost/mulch.
- The quality of the compost/mulch.
- The quantity of competing compost/mulch and other soil amendments.

There is variation in how much, if any, revenue can be anticipated from different market sectors. The goals of any marketing effort are to distribute all of the material produced and to maximize net revenues. These two objectives must be balanced against each other. For example, successful marketing to the nursery industry may result in higher revenue per unit of compost sold, but there may not be sufficient demand for all compost produced.

During the initial stages of production it is unlikely that revenues will be generated from the sale of compost or mulch. After an initial period, during which time compost quality can be matched to consumer needs, it should be possible to develop paying markets for the products. However, no known community yard waste collection, processing and marketing system operates with a net profit. Private firms may operate at a profit because tipping fees are normally in place to supplement high production costs and relatively low revenues.

There is currently a strong demand for boiler fuel. A suitable material for this market can be produced from the brush and/or woody portion of yard waste. Whether or not this option should be developed depends largely on the state's position on applicability of the practice to recycling goals. The extent to which Solano County expects to meet recycling goals through yard and wood waste management practices is also an important factor. In other words, economics and relative market certainty may support managing a portion of the yard waste in this way even though tonnages diverted to boiler markets would not credit towards recycling goals.

## MARKET STRUCTURE FOR COMPOST AND MULCH

In the Bay Area, as with most urban areas of the country, wholesale and retail markets for soil and wood products are somewhat complex. In general, there are producers or processors, retailers, commercial growers, wholesale distributors, and institutional and home users. The following table summarizes the markets for yard waste products:

### Markets for Compost and Mulch Products

#### Fines

##### Retailers

Soil vendors  
Nurseries/greenhouses  
Lawn and garden centers

##### Commercial Users

Nurseries  
Agriculture  
Gardeners  
Landscapers  
Construction firms  
Agriculture  
Sod growers  
Gardeners

##### Institutional and Home Users

Caltrans  
Other local & state agencies  
Landfills  
Sewage sludge composting  
Land reclamation projects  
Golf courses  
Parks

#### Chips

Landfills  
Boiler fuel plants  
Bark processors  
Landscapers  
Land reclamation

Each market is discussed below.



**Producers/Processors**

On the producer or processor level, the topsoil market is dominated by a few large businesses that produce compost, fertilizers, and other soil products. There are also many small soil vendors that generate soil by occasional excavations. Some producers/processors blend soil with other materials to meet the specifications of particular customers. In general, most soil products and wood chips in the Bay Area market are produced in the area. An exception is that most peat is produced in Canada and the Northwest and shipped to markets throughout the country.

**Retailers**

Most compost and mulch is purchased wholesale by retailers from the producers and processors. Retailers often bag the products or blend them with other materials to meet their needs and the needs of their customers. Retailers include businesses such as nurseries, lawn and garden centers, and greenhouses. There are several hundred such specialized businesses in the Bay Area. In addition, businesses such as convenience stores, department stores, and even some drug stores sell bagged topsoil, potting soil, peat moss, mulch, bark, and other soil or landscaping products. The sales volume at each type of outlet is not known.

**Commercial Growers**

Commercial growers include the agricultural industry, landscapers, nurseries, lawn maintenance businesses, sod growers, and commercial gardeners. Some of these businesses are large consumers of soil products and also retail the products in bulk or in bags to customers. They tend to purchase soil, mulch, and other products wholesale from the producers and processors. Many agricultural businesses are not large consumers of soil products but do consume fertilizers in large volumes. Growers such as vineyards, cash croppers, and bedding plant businesses are more likely to need soil amendment and moisture retention agents. Landscapers and commercial gardeners require an aesthetically pleasing product but also one with qualities such as moisture retention and high organic content.

Commercial agriculture is often ruled out as a potential market for compost products because little, if any revenue can be expected. Commercial farmers have a history of purchasing inputs such as fertilizer, pesticides, and water. The large agricultural firms contacted indicated that they would not be interested in purchasing compost unless a nitrogen shortage became extremely acute and the compost had a beneficial nitrogen value. The fertilizer value of yard waste composts is relatively low, and very high application rates, 5 to 8 tons/acre, would be required to supply the nutrient requirements of most crops.

Although commercial farmers have not traditionally purchased organic matter inputs, there is an important trend toward "low input" agriculture to reduce operating costs, including fertilizer. The National Association of Conservation Districts announced a resolution in

February, 1990, urging the Soil Conservation Service to adopt "beneficial compost and sludge application" as a soil conservation measure and add it to the National Handbook of Conservation Practices. Once a practice is listed in the Handbook, it becomes eligible for cost sharing. Such a step would encourage a much larger number of farmers to become involved with composting and land application. Many growers do not have the equipment necessary to apply large volumes of material.

There are potential agricultural applications for compost on the islands in the Bay-Delta region. Oxidation and erosion is leading to an impending failure of hundreds of miles of weak levees. These levees must be reinforced. An additional problem is that the islands of the Delta have lost a substantial volume of peat soil to erosion and weathering over the years, and the resultant lowering of the ground level has made the area susceptible to flooding. A long term solution to the problem is to raise the ground level by adding organic amendments. A pilot project and full-scale proposal to explore this solution was initiated in the 1970's by the Association of Bay Area Governments, but was later discontinued due to inadequate funding and potential water quality problems from the compost "leachate." The project would have involved barging sewage sludge and organic solid wastes from the Bay Area to the Delta, and co-composting the materials. The finished product was to be used to buttress weak levees and to control island floor subsistence. While such a program is not feasible from a narrow economic analysis, the Delta is of great environmental and economic significance to California, and it must be protected. Funding from the state or other sources for a composting project should be explored.

### **Institutional and Home Users**

Other markets include recreational users (golf courses, parks), institutional users (landfills, land reclamation projects, highway projects), and homeowners. Recreational users such as golf courses are often reluctant to purchase yard waste products due to a concern about workability of the material or the free-flowing capability. Parks, in contrast, are large users of mulches and barks for trails, vegetative plantings, and erosion control. Park operators tend to generate their own mulches and bark from tree maintenance conducted within the parks. Institutional users comprise a large market but one that normally offers a very low price (if any) for soil products. These users will be essential during the early phases of a program before commercial marketing is fruitful.

Homeowners generally purchase soil amendments and landscape materials from retail businesses, but they will readily divert to other sources if available. Some homeowners use compost and mulch generated on their own property by backyard composting, brush chipping, and mulching. Since backyard composting and mulching usually generate small amounts of material, those homeowners may also buy commercial products.

### Seasonal Variations in Market Demand

Although yard waste is generated year-round in the Bay Area, the end user demand for soil amendments, mulches, and similar products is greater from spring to autumn. The drought experienced in recent years has kept the demand for such materials fairly consistent in all seasons. Demand fluctuates according to gardening, landscaping, and vegetation planting schedules. Demand for institutional and construction uses is relatively stable.

### COMPETING PRODUCTS

Municipally produced compost will have to compete in a soil amendment market with several high quality, readily available soil amendments and soil mixes. However, competing high quality products are not always considered obstacles in the marketing of new products. Good examples include the propensity of fast food restaurants to locate on opposite corners of the same intersection, or the "copy-cattng" of existing national brands of food and health products by competing manufacturers. Theoretically, a high quality product could increase the overall demand for all soil amendments.

The most important competitive advantage of yard waste compost is certain physical and chemical properties that make it an excellent soil amendment. For example, compost's ability to retain water is superior to many competing products. While yard waste compost is not a direct substitute for fertilizers and fine grade top soil, it is a suitable substitute for certain soil amendments, and can be blended very effectively with other feedstocks to produce a variety of soil blends and mixes.

Some competing materials commonly used by landscapers and gardeners are: bark (mostly pine and cypress) from timber industries, peat, topsoil, manure, and sawdust from mills. These materials are normally sold uncomposted. A few examples of products that have been firmly established in existing markets are detailed below.

#### Peat

One of the most widely used and highest priced competing products is peat moss. Peat is high priced because of its consistency, light weight, nutrient holding capacity, ability to increase soil porosity, and ability to add moisture retention to soil in gardening and nursery applications. When peat prices have risen, lower priced substitutes have temporarily replaced peat in some markets. However, when peat prices decline, those substitutes are then replaced by peat. Peat is often sold to wholesalers in bulk form by the cubic yard. It is then packaged in bags for sale to the retail market. Peat is frequently blended with topsoil, vermiculite, fertilizers, or other materials to produce a hybrid product for a specific retail need.

**Topsoil**

Topsoil brokers deal in large volumes of soil amendment products and related materials such as landscape rock. Topsoil is used as top dressing for lawns in new developments, on golf courses or other recreational facilities, and as a soil amendment for agricultural use. Topsoil is most often sold in bulk form by the cubic yard. Brokers typically sell to building contractors, landscapers, or other businesses. Some topsoil is packaged in bags of one or two cubic feet for sale to the public. Topsoil is infrequently blended with other materials such as peat.

**Manure**

Race tracks, cattle ranches, zoos, and other livestock management facilities produce manure which is frequently sold or given away to distributors. Manure is often anaerobically stabilized by itself, with straw bedding, or with other bulk material to produce an "aged" product that is valuable as a fertilizer and soil amendment. The agriculture industry is a common user of manure, but only because it typically generates manure; the industry does not typically purchase manure. Manure is primarily traded in bulk form. The sale of bagged materials to the public through retail establishments such as lawn and garden centers and nurseries accounts for a small part of the manure market.

**Potting soil**

Potting soil is a more specialized material than topsoil. It is most often a commercial grade blend of some or all of the following: topsoil, peat, vermiculite or polystyrene pellets, sands and silts, and fertilizer. Potting soils are commonly sterilized to eliminate plant diseases and weed seeds. Potting soil is usually produced by large nurseries or lawn and garden centers. Thus, it is rarely traded wholesale in bulk form. Its typical retail form is in 5 to 40 pound bags. It is used for nursery stock, house plants, and gardening.

**OBSTACLES TO COMPOST MARKETING**

The manufacturing of any new product faces obstacles, and compost is no exception. The obstacles focused upon here include costs, contamination, and consumer resistance to change. However, experiences with programs throughout the country have shown that marketing or distribution of finished compost poses few problems if the product is aesthetically appealing and the end-user has reasonable assurance that it does not contain harmful substances. In many situations, marketability of compost has proven to be the least of barriers in developing large scale organic material recovery operations. Inadequate processing capability, inability to obtain suitable facility sites, and limited funding for equipment and labor often prove to be more problematic than material marketing.



**Costs**

Achieving and maintaining the proper purity, appearance, porosity, texture, consistency, and chemical balance of a commercial quality product requires capital investments ranging from minimal investments for low-technology composting operations to expensive bagging machinery and equipment costs for high quality product operations. A manufacturing process aimed at producing a compost to compete with commercially produced composts would, in most instances, place heavy financial risks on local government budgets.

**Contamination**

Depending on its origin, yard waste compost may be contaminated by lawn chemicals, lead from paint and auto exhaust, disease organisms, tree spray chemicals, automobile exhaust pollutants, broken glass, metal, rocks, weed seeds, and other foreign material. Contamination limits potential marketability by diminishing the product's quality or increasing the costs of processing.

The utilization of proper monitoring procedures can eliminate or substantially reduce the potential for contamination. Dilution of toxics also occurs in the blending process, when other feedstocks are added to create a finished product.

**Consumer Reluctance to Change**

Another obstacle is the inertia of end-users against changing products. Essentially, when consumers have already found a product that has worked to their satisfaction, absent a sufficient difference in price, they are likely to be reluctant to change. The reluctance is magnified when there are uncertainties associated with consistent supply and quality of the newly introduced product.

Reluctance to change can be overcome by a variety of marketing strategies. Among the keys to acceptance is the provision of accurate information about the product to consumers through carefully targeted public education.

## **APPENDIX F**

### **KEY FUNDING CONCEPTS**

There are misconceptions and myths related to the economics and financing of various solid waste management programs which occasionally lead to a misunderstanding of the costs and feasible options available to the public sector. This appendix attempts to clarify these issues and discuss their relevance in a local context. Topics discussed include:

- Advance disposal fees.
- Avoided costs.
- Depletion costs.
- Diversion credits.
- External costs.
- Flow control.
- Inequities hurting recycling economics.
- Landfill contingency funding.
- Life cycle costs.
- Opportunity costs.
- Volume based charges.

#### **ADVANCE DISPOSAL FEES**

An advance disposal fee is a charge added to initial product sale to cover disposal costs. Such fees are added to product costs before it is sold to the end user. For instance, a 25¢ per battery fee could be added prior to the initial purchase of a battery by a consumer. The fee would probably be added into the price of each item by the manufacturer; however, if such a fee were levied against a select few product types, it could be a separate line item added to the product purchase price like a sales tax. The idea of such a fee is that particularly toxic or difficult-to-dispose-of items would carry a heavier fee and thus pay for their own disposal instead of being treated like average wastes. With current disposal methods most waste is charged by volume or tonnage without regard to what the material is. Advance disposal fees also encourage users to use less of particular materials by increasing their cost.



While this is an attractive idea, there is no way of knowing where a product will be disposed. Therefore, advance disposal fees could only be practically implemented at the State or Federal level; they require a substantial administrative burden.

California is currently studying this concept. In Wisconsin, a fee of \$1.50 is imposed for each tire on a used car purchased in that state. In Minnesota, the State Legislature is considering a bill to establish advance disposal fees on the wholesale level on certain packaging materials which are not recycled. In Florida, virgin newsprint carries a 10¢-per-ton tax. In Rhode Island, a new car battery costs \$5 extra if the buyer doesn't turn in an old battery.

## AVOIDED COSTS

Avoided costs are the overall costs of a waste management system that will be eliminated by the addition of diversion programs. As an example, suppose recycling PET (including separation, collection, processing, transportation to market, less product sale revenue) has a net cost of \$50 per ton, and the current landfill program for these materials (including collection, disposal, closure, and post-closure amortization) costs \$30 per ton. Then the "avoided cost" is \$30 per ton. The overall change in waste management cost is an increase of \$20 per ton.

Avoided costs are sometimes listed as a revenue. They are not. However, they can in some cases represent real savings between alternative solid waste management programs and current programs. This concept is sometimes used by recycling advocates to justify recycling subsidies.

Avoided costs are variable costs in that they refer to those costs that fluctuate with output. This means that certain fixed costs will not be eliminated. This is difficult to figure fairly. For instance, in the previous example, the garbage trucks will take fewer trips to the landfill and thus avoid some fuel costs, but can a truck be sold? At the landfill, some tipping fee tonnage is avoided; however, the landfill also has certain fixed costs which have to be spread over whatever tonnage comes in. Thus the landfill fee per ton rises.

As an illustration, suppose:

- Total collection and landfilling costs = \$75 per ton on 10,000 ton per year. An audit shows that 50% of these costs can be avoided for each ton diverted.
- The diversion programs in aggregate can divert 50% of all waste from disposal (as the AB 939 year 2000 goal requires) at a net cost of \$50 per ton.
- Thus, the eliminated cost of disposal is:

5,000 tons (diverted) x \$37.50 = \$187,500 per year. This is the avoided cost of disposal.

- Diversion programs cost  
5,000 tons x \$50 per ton = \$250,000 per year.
- Thus, the overall change in waste management costs is an increase of \$62,500.

In order for this analysis to be fair, all costs should be included for each alternative management option. In the case of landfilling there are questions about whether the externalities, depletion, and adequate closure and post-closure costs are included.

## DEPLETION COSTS

Economists often figure depletion costs for the usage of scarce resources, for example, oil being pumped from a well. Landfills can also be viewed as a scarce resource. This is not because of a shortage of land, but because siting and permitting a landfill is becoming difficult. Future landfills will be farther away, more environmentally safeguarded, and have more financial assurance requirements. The size of the depletion cost depends on the alternative management costs, a discount rate, and the number of years of remaining landfill capacity (Mulvey, 1989).

One formulation for this cost (Mulvey, 1989) is:  $DC = (C_R - C_L)/(1+r)^n$

Where:

DC	=	the depletion cost
$C_R$	=	cost of replacement (in current dollars)
$C_L$	=	cost of landfilling (current facility)
r	=	a discount rate to bring dollars to their current value
n	=	the number of years until the replacement is necessary

For example, suppose:

$C_R$	=	\$75 per ton (not unreasonable for a newly sited, new generation landfill with substantial transfer costs to this new facility)
$C_L$	=	\$30 per ton (including disposal, closure, and post-closure)
r	=	5%
n	=	30 years

Then:

$$DC = (75-30)/(1+.05)^{30} = \$10.41 \text{ per ton.}$$

Thus, the value of the depletion, even with replacement 30 years from now, would be over \$10 per ton. Solano County could add a landfill surcharge on top of fees charged by landfill operators to reflect this cost. The funds generated could be escrowed to provide for future waste disposal capacity and/or used now to offset diversion program cost increases (which would otherwise be funded by increased franchise fees). AB 939 (Part 2, Section 41901) allows collection of fees only for those costs directly related to the implementation of the programs in this plan. However, increased landfill fees have a substantial effect on reducing waste going into a landfill and may be acceptable as a source reduction program, and thus allowable.

Because of the speculative nature of the assumptions required for this calculation, the value of this depletion is largely dependent on the community's willingness to site alternative facilities. Since this cost will not provide funds for any of the diversion programs, depletion costs are not considered further within the Funding component. Chapter IX of this document describes an innovative application of this concept to fund a public trust which would also improve the relative economics of the proposed diversion programs.

## **DIVERSION CREDITS**

Some communities have attempted to capture the avoided cost of landfilling caused by the implementation of a recycling program through a diversion credit. The diversion credit is simply a contract mechanism between the municipality and the hauler to return some of the avoided-cost-of-disposal savings caused by the recycling program to the municipality.

This seems reasonable when the garbage franchise does not include the recycling effort and it is hard to quantify the tonnage that will be diverted. The credit allows payment to be better matched to the actual tonnage of the garbage franchisee. However, if the impact of the recycling programs are generally known, the franchise agreement can be negotiated with the reduced tonnage in mind and no credit mechanism is necessary.

The City of Naperville in Illinois uses a formula-based diversion credit to reduce city payments to a private hauler for the labor and variable costs of garbage truck operation. These costs were avoided by the implementation of a recycling effort (Foshay, 1990).

## **EXTERNAL COSTS**

External costs are those costs which are a result of a solid waste project, but which are not clearly identified and not paid out of project revenues. For example, separate collection of recyclables can cause traffic congestion on residential streets. On the other hand, an

effective source reduction program would cause less traffic congestion as the number of truck routes is reduced.

Other factors often omitted from project economic analysis are:

- The differential damage to the environment of alternative solid waste practices.
- Different energy requirements, and the environmental impacts of energy required (pollution, depletion, and so forth).
- Litter and noise costs for residents near solid waste facilities (landfills, recycling centers, processing facilities).
- Costs of inconvenience to the waste generators (particularly in separating recyclables).

Such costs are by their nature external to the project economics, and very hard to measure. These costs occur, roughly, in all solid waste management practices and are impractical to quantify objectively and are thus not considered further in this document.

## FLOW CONTROL

Flow control is the terminology used in the bond industry to indicate that a bond issuer has control over the waste intended to go to a certain facility. Any issuer of debt (public or private) must assure the financial community that the funds for debt service will be available as necessary. When a bond issue relies on project revenues (for example, tipping fees at a compost facility) to meet the debt service requirements, they will also have to show that the tonnage of waste arriving (on which the tipping fee will be received) is quite certain.

In some states local jurisdictions have the authority to require a waste hauler to take municipal solid waste to a specific facility. This is legislative flow control, and is usually required by financial people for large debt offerings.

In cases where the cost of the new management option is lower than with the current system, some people refer to an economic flow control. However, this is a misnomer because economics can change rapidly and there is really no "control" at all.

In areas where waste collection is franchised, the jurisdiction can simply acquire flow control through the franchise agreement: this is a contractual flow control. This will be sufficient for the financial industry if the financing terms are tied to the period of the franchise. A five-year franchise agreement would normally lead to a five-year amortization of debt and consequently quite high tip fees. Investors can put substantial pressure on communities (and

haulers) to secure longer franchise agreements or separate flow control agreements before building capital intensive facilities.

## **INEQUITIES HURTING RECYCLING ECONOMICS**

Recycling is at an economic disadvantage because of inequities in financing and subsidies of virgin materials (extracted raw materials). In financing large resource recovery projects, the public sector has often contributed through public expenditures and risk-minimizing measures designed to make massive private investments attractive and profitable (Solid Waste Report, 1989). In addition, these projects are indirectly subsidized through the use of tax-exempt bonding, and occasionally through capital assistance grants.

The marketing of recycled materials competes with marketing of virgin materials. Tax rules allowing depletion allowances and capital gains tax treatment (government grants to mining companies and to pulpwood producers but not to salvagers of used material) are the two chief examples of a tax advantage to produce virgin materials which doesn't apply to recycled materials. Market development activities by local government may be able to offset these inequities.

## **LANDFILL CONTINGENCY FUNDING**

There are three principal sources of future financial need for landfills: closure, postclosure care (thirty years required by State Water Quality Control Board), and contingency action(s).

The event of closure is relatively familiar, and funds can be set aside in a timely and effective manner to match the expected future liabilities. Closure takes place as each cell in a landfill is closed, with final closure occurring only when capacity is exhausted.

Postclosure care is more complicated and must be planned for according to current, state-of-the-art or EPA-mandated standards, such as leachate monitoring and collection. Postclosure cannot be anticipated with the same degree of accuracy as can closure costs, and therefore it is more difficult to reserve the appropriate amount of funds.

The most problematic are so-called contingency actions. In fact, the word contingency is perhaps inappropriate here in its meaning of possible event. This use gives some the impression that corrective action is not very serious because it may not occur. It is more accurate to think of landfill contingencies in terms of when they will occur. Most garbage has been and is now disposed in unlined areas. Such landfills leak. The difficult part is finding the leak and measuring its size. Understanding that contamination is virtually certain gets rid of some of the uncertainty on contingency action. The when of contingency action is directly related to landfill design. Landfills which have yet to detect groundwater problems



at their facilities usually are those with no monitoring systems. Once a monitoring system is in place and operating at a landfill constructed without a liner, it is relatively certain that contamination will be found. That is the bad news. The good news is that some of the unknown has been taken out of contingency action.

AB 939 indicates that owners or operators of landfills shall have prepared an initial estimate of closure and postclosure maintenance costs, and that the owner or operator has established a trust fund or equivalent financial arrangement acceptable to the Board (CIWMB). These funds are to be utilized for closure and postclosure care. It is interesting that AB 939 (Section 46026) requires owners or operators to have an up-to-date postclosure plan "...to maintain the landfill for at least thirty years after closure." Yet, Section 43604 (Financial Ability) requires only "...evidence of financial ability for postclosure maintenance at all times equal to the estimated cost of fifteen years of postclosure maintenance." In Solano County, the Regional Water Quality Control Board requires 30 years for post-closure; the newest County permits (e.g., Solano Garbage Landfill) are for 30 years.

Finally, the future liabilities of landfill leakage will require corrective action. In California, these costs may be financed through the State Solid Waste Disposal Site Cleanup and Maintenance Account in the Solid Waste Management Fund. This account may collect twenty million dollars (\$20,000,000) per year, but cannot exceed one hundred million dollars (\$100,000,000) in total. The cleaning up of a single small landfill in the State of Minnesota has been estimated to cost ten to fifteen million dollars.

Local government should monitor the financial assurance mechanisms of all landfills within its jurisdiction and scope of responsibility (those landfills which have been the recipients of Solano County solid waste), as the EPA has brought legal action not only against the owners, but also against governments contributing waste to leaking landfills.

## LIFE CYCLE COSTS

Some solid waste management alternatives are much more capital intensive than others, yet can be less expensive overall. The concept of life cycle costs is simply that all project costs (and revenues) over the life of a project should be aggregated and discounted to current dollars so that they can be compared on a common basis. Project costs include capital, operations, maintenance, transportation, and residual disposal. Project revenues include any product or energy sales and possibly a salvage value for any facilities or land at the end of the planning period. When salvage value is highly uncertain, it is omitted entirely. The overall figure used for comparison is the total present value of net costs required.

The present value of costs is the approach used in this document to model the cost of the proposed diversion programs. See Table VIII-7.



## OPPORTUNITY COSTS

Opportunity cost is the label accountants use to identify the cost of missed opportunities in the use of resources. For instance, if a person could earn \$50,000 a year but chooses to stay home with his or her children, the opportunity cost is \$50,000 per year (ignoring tax effects).

In the solid waste context, it is necessary to input the cost of resources used in various programs so that the full cost is shown regardless of existing ownership. For example, in figuring the cost of a secondary materials transfer station, the value of the land must be included even if it is now owned by the jurisdiction.

The opportunity cost of land for landfills is sometimes omitted by publicly owned landfills. It is either not valued or valued at the original acquisition value, not the market value of the land. However, in Solano County the landfill owners are all private and no doubt include the value of the land in the tipping fee passed through to their customers.

## VOLUME BASED CHARGES

Volume- (or weight-) based charges for solid waste services are an attempt to encourage waste generators to reduce or recycle by allowing a reduction in garbage service fees corresponding to the reduction in wastes generated. Many communities have found these incentives highly effective in reducing waste volumes.

Implementation of volume-based charging programs has taken on many different variations around the country. In most cases the residents are allowed to subscribe for a level of service (one can, two cans, etc.), and they pay for the subscribed service whether they use the full capacity or not. This might better be termed volume-based capacity charges. Some areas provide incentive to individual residents by requiring the use of specially marked garbage bags or ties that the community sells. This approach, which is sometimes referred to as the metered bag approach, matches even more closely the amount of waste generated to the payment required. As an example, the City of Grand Rapids, Michigan offers solid waste collection through a prepaid bag per tag system. Tags are sold for \$.35 each to the city's 10,000 residents and the city will only pick up refuse designated with a tag. A few communities are going even further by using weight-based rates. This is like the charging structure for water or electric utility usage. Seattle uses a weight-based system because "they would like to have every bit of recycling and waste reduction result in direct savings to the customer" (Skumatz, 1989).

A volume- or weight-based system that requires haulers to keep track of weekly set-out amounts costs more to administer than traditional charging structures. These costs would

need to be included in future franchise rate negotiations. However, the metered bag system can actually save haulers administrative burden by eliminating individual billing. Moreover, some haulers like the system because they are able to make fewer stops, since people do not set out a half-filled can or bag (Carlson, 1986).

In poor areas where the variable rate is quite substantial, volume-based charging can contribute to illegal dumping, thus creating enforcement costs and raising questions of fairness to the poor.

Volume-based charging schemes are typically revenue-neutral. That is they do not raise (or cost) new funds but merely shift the burden among residents. For a further discussion of volume-based charges, see Chapter II.



**HOUSEHOLD  
HAZARDOUS WASTE  
ELEMENT**



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# CHAPTER I

## INTRODUCTION

AB 2707 requires all California cities and counties to prepare and adopt Household Hazardous Waste Elements (HHWEs). Each HHWE is to describe how the local community will handle household hazardous waste (HHW). More specifically, each element is to identify:

a program for the safe collection, recycling, treatment, and disposal of hazardous wastes, as defined in Section 25117 of the Health and Safety Code, which are generated by households in the city and which should be separated from the solid waste stream. (Chapter 3.5 of the Public Resources Codes, Article 1)

This document comprises incorporated Solano County's HHWE. It describes HHW, discusses existing HHW management efforts within the unincorporated county, identifies and evaluates potential management efforts, and suggests a strategy for future management of these wastes.

Despite their relatively low share of the total waste stream, HHWs can present very real dangers to the unincorporated county. Since the public is generally uninformed about the degree of hazard different substances present, HHWs are commonly disposed of illegally on the ground or into sewers. Even when disposed of in landfills, hazardous substances can leak into the sources of our drinking water.

Pursuant to Titles 22 and 23, Section 66310, hazardous wastes (including HHWs) may only be disposed of in Class I (TSD, or treatment, storage and disposal) facilities. Since there are no such facilities in Solano County, HHWs can not be legally disposed of anywhere in the County. Only waste which may be legally disposed in a landfill can be counted towards the diversion requirements of AB 939. Therefore, HHWs that are diverted from landfills or other depositories in Solano County may not be considered towards AB 939 diversion requirements. The unincorporated county, then, desires to reduce and possibly eliminate improper HHW disposal not on the grounds of fulfilling diversionary requirements but to ensure public health and safety and protect the natural environment.

### A. HHW RECYCLING AND REUSE OPPORTUNITIES

#### WASTE OIL

Used motor oil is deposited in a tank on the grounds of a collection facility until the tank is full or has accumulated a minimum accepted quantity for pick-up by an oil recycling

business. The collector of the used oil then pays an oil recycler to take the oil to a facility which processes the oil into supplemental fuels, industrial oils, and other products. The cost for this service is less per ton than hazardous waste tipping fees.

Frequently, oil recyclers are refusing to accept oil loads which appear to have been contaminated by consumer additives such as chlorine, gasoline, water, or dirt. The service stations or landfills must then resort to having hazardous waste haulers take away the oil to a hazardous waste landfill. Subsequently, many service stations have discontinued their waste oil collection programs because of uncertain costs.

The use of drop-off fees for public disposal of waste oil discourages its proper disposal. Service stations charge the public for the disposal fees since the stations pay a disposal fee to oil recycling businesses. Unlike other recyclable materials, used oil cannot be sold to recyclers. Service stations make a profit only in the difference between what they charge the public for disposal and what oil recycling companies charge for disposal.

Evergreen Oil, Inc., of Newark, California is the largest waste oil recycling company in the United States (*Resource Recycling*, September, 1990). It serves each facility in Solano County that accepts used motor oil, thus providing a stable and nearby market for waste oil.

### **AUTOMOTIVE BATTERIES**

Automotive batteries contain lead which is a highly toxic substance. A 1986 EPA study (Putnam, Hayes & Bartlett) found that of 786 landfill sites on the National Priorities List (Superfund), 55 were listed with lead as a significant contaminant. Since about two-thirds of all lead in municipal solid waste comes from automotive batteries (Franklin and Associates), a correlation is likely between automotive batteries and lead contamination in landfills.

An average 36-pound automotive battery contains 18 pounds of recoverable lead, 1 gallon of sulfuric acid (about 9 pounds), polypropylene, polyvinyl chloride rubber separators and 3 pounds of sulfates and oxides to which the lead is bound (*Resource Recycling*, February, 1990). Lead smelters buy back batteries in large quantities from whomever can collect the minimum required in order to justify freight to a smelting facility. For example, many service stations in Solano County have California Battery Exchange from Concord, California retrieve loads of ten or more batteries. They normally pay around one dollar per battery. Once California Battery Exchange accumulates approximately 1,300 batteries (one truck-load), a lead smelting plant outside of Los Angeles will provide freight and \$0.05 per pound, or \$2,600 per truck-load.

The level of battery recycling depends heavily on the unstable market for lead. Prices have fluctuated from as low as \$0.19 per pound in 1985 to as high as \$0.53 per pound in 1979

(*Resource Recycling*). Since finding a consistently stable market for lead may be difficult, focusing on the already existing local market should be a higher priority.

### **LATEX PAINTS**

Most users of household paint have some paint left after a single use. In fact, there are approximately 16 million gallons of old latex paint stored in California homes (Household HazWaste, Santa Clara, CA). If latex paints are not given away or swapped to other potential users, they can be collected, bulked, filtered, colored, and resold. Standard Brands from southern California provides paint recycling services.

### **ANTIFREEZE**

The California Department of Health Services classifies used antifreeze as a hazardous waste on the basis of ethylene glycol's toxicity to humans (*Resource Recycling*, Dec. 1990). Until two years ago there were no feasible markets for used antifreeze so almost all consumers disposed of it in the garbage. Six percent of household users poured it into the sewer. (See Table IV-1).

Markets for antifreeze are in place in many regions of the country, and the Bay Area is sure to follow shortly. Evergreen Oil, Inc. of Newark, California picks up used antifreeze at various sites and pays Antifreeze Environmental Services of Palo Alto \$1.40 per gallon to accept it. Antifreeze Environmental separates the water, ethylene glycol, and contaminants and then purifies the ethylene glycol in order to manufacture new antifreeze.

### **HOUSEHOLD BATTERIES**

Current markets for the recycling of household batteries are limited. The most developed market for batteries is in mercury-based button batteries used for watches and calculators since mercury can easily be recycled. Button batteries are a minority of the total batteries used. Markets for these and other batteries are not yet well-developed or stable. Those who wish to begin a battery collection program should secure agreements with stable and environmentally sound recycling companies prior to implementing such programs. Otherwise collectors can encounter exorbitant hazardous waste disposal fees.

### **OTHERS**

Many HHW containers are disposed of before their contents are fully depleted. These unused quantities of hazardous materials can be "swapped" or given away to another party who can find a use for the substance. A Household Hazardous Waste Collection Day provides an appropriate medium for this type of exchange. As citizens drop off materials, they can have the opportunity to choose from a table-full of collected materials which are still useful and have been determined to be safe for continued use.

## B. REGULATORY FRAMEWORK

The regulatory framework for HHW collection program permits is currently in a state of flux as personnel from both the Department of Health Services (DHS) and the California Integrated Waste Management Board (CIWMB) are discussing possible changes to the current framework. Since the framework listed here may be obsolete by the time of this document's release, one should confirm its status before pursuing any of the possible programs listed below. The appropriate contacts are the Household Hazardous Waste division at the CIWMB (916/322-2650), the State Office of Permit Assistance (916/322-8515), and Waste Management Division at the Region 2 DHS (415/540-3955).

State legislation known as the Tanner Act provides a procedure for cities and counties to process discretionary permits for development of a full scale local HHW collection and transfer/processing facility. Local jurisdictions must appoint a local assessment committee to advise the jurisdiction considering the permit application. The State Office of Permit Assistance can take up to a year, or even longer, to review applications for such facilities. One also needs to attain a permit from the State Department of Health Services (DHS) for the property on which the facility will reside.

The requirements stated in the Tanner Act can be bypassed through variances or permit by rule.

One common method of attaining approval for a HHW collection program without pursuing a full scale application is through variances from facility permit requirements. Section 25143 of the Health and Safety Code and Section 66310, Title 22 of the California Code of Regulations (CCR) authorize DHS to grant variances from the requirements of Hazardous Waste Control Law and Regulations. Before granting a variance, DHS must find that such action will not result in a hazard to the environment or public health and safety.

Applicants must base their requests for variances on either Section 66310 (a)(1) or Section 66310 (a)(2) of Title 22, CCR. Section 66310 (a)(1) states: "The hazardous waste at my facility is insignificant as a potential hazard to humans, domestic livestock, or wildlife because of its: small quantity; low concentration; and/or physical or chemical characteristics." Section 66310 (a)(2) states: "The hazardous waste at my facility is handled, processed, or disposed of pursuant to regulations of another governmental agency. The agency is: \_\_\_\_\_."

Certain HHW agencies "shall be deemed to have a permit" provided the provisions listed in Section 66392, Title 22, CCR, are met. The conditions under which permit by rule (PBR) may apply will very likely change in 1991. Inquiries about the PBR's most current status should be directed to the DHS.



Below are the permit requirements and regulations pertinent to each possible HHW collection program.

### **ONE-TIME, ONE-DAY HHW COLLECTION PROGRAM**

An application for a one-time, one-day HHW collection program should be submitted to the Region 2 DHS, Toxic Substances Control Program, 700 Heinz Building F, Suite 200, Berkeley, CA 94710.

The following information should be included:

- Name of agency having primary responsibility for conducting the collection program.
- List of agencies providing financial or other support to the collection program.
- List of contractors who are conducting the collection program.
- List of treatment, recycling, and disposal facilities who are receiving waste from the collection program.
- List of hazardous waste haulers who will be transporting hazardous waste from the collection program to above facilities.
- List of agencies who will be providing emergency services to the collection program (police department, fire department, hospital, bomb squad, and local/state emergency service).
- Description of the procedure to be used for packaging and bulking of latex paint, oil-base paint, solvents, corrosives, oxidizers, pesticides, herbicides, fungicides, waste oil, transmission fluid, used batteries, and unknown waste.
- Description of the procedure to be used for handling and disposal of the empty containers generated from bulking of the collected wastes at the collection site.
- Contingency plan.
- Certification statement.

### **RECYCLE ONLY COLLECTION**

After January 1, 1991 an HHW agency can conduct recycle only collection days free of hazardous waste permits, pursuant to AB 2597. Permanent facilities can be devoted to such collection. Temporary storage is permitted provided that the agency meets certain requirements. An operator of such an event cannot accept non-recyclable materials as it would be both illegal to operate without a hazardous waste permit and expensive to pay hauling and disposal costs at a Class-I landfill. The greatest disadvantage to this type of collection would be that citizens may come to a recycle only collection event with non-



recyclable materials, only to be turned away and effectively discouraged to properly dispose of such materials.

AB 2597 also amends Health and Safety Code 25201 to stress that no hazardous wastes are received and handled at the collection facility other than the following materials.

#### **Used Motor Oil**

A HHW collection agency cannot receive more than 20 gallons at a time from any one generator; and the containers must not exceed 5 gallons each. The used oil must be brought in by the generator of the used oil. A double-contained tank must be used for collection of the oil. The HHW collection agency can store the oil for up to 90 days without a permit.

#### **Lead Acid Batteries**

The HHW collection agency can store no more than one ton of them for up to a year and can store more than one ton, but for maximum of 180 days only.

#### **Latex Paint**

If a collection facility/event is properly authorized by DHS to accept latex paint as one of its hazardous wastes, then it can bulk the paint.

#### **Small Household Batteries**

The collector cannot store more than 200 pounds of batteries at any one time, and should store no batteries for longer than 180 days. The collection location, transporter, and receiving facility must retain for a period of three years a copy of the waste manifest or bill of lading used during transportation. The batteries must not be treated or reclaimed at the collection facility. State DHS staff recommends not collecting the household batteries unless there is a recycler to send them to. Since there are limited markets, the batteries may have to be disposed of as hazardous waste instead of being recycled.

#### **Antifreeze**

Antifreeze is the newest addition to the list of items exempt from permitting requirements. The antifreeze transported to the collection facility by any one individual cannot exceed a total volume of 5 gallons or a total weight of 50 pounds.

#### **TEMPORARY FACILITIES**

A temporary facility is one where the wastes are collected for less than two days per month for no more than twelve times per year, and the operator has 144 hours to get the wastes off-site. This two-day period begins the moment wastes come on site until the operator stops accepting wastes.

A Permit By Rule (PBR) packet for temporary facilities, will be available in 1991.

**PERMANENT FACILITIES**

The permitting process for permanent facilities is typically much more complex than that of other facilities. HHW agencies interested in acquiring a permit for a permanent facility should refer to Article 4, Sections 66371 through 66399, Title 22, CCR, and contact the CIWMB, the State Office of Permit Assistance and Region 2 DHS.

## CHAPTER II

# GOALS AND OBJECTIVES

Goals and objectives give direction to program efforts. The unincorporated county's goals state what it would like to accomplish. The objectives provide milestones by which movement toward parts of the goals will be measured. The goals and objectives for this HHWE are presented below. They are consistent with AB 2707, other pertinent legislation, and existing Solano County plans.

California Public Resources Code (PRC) Section 40051 requires that each jurisdiction:

- a. Promote the following waste management practices in order of priority:
  1. Source Reduction
  2. Recycling and composting
  3. Environmentally safe transformation and environmentally safe land disposal, at the discretion of the city or county.
  
- b. Maximize the use of all feasible source reduction, recycling, and composting options in order to reduce the amount of solid waste that must be disposed of by transformation and land disposal. For wastes that cannot feasibly be reduced at their source, recycled, or composted, the local agency may use environmentally safe transformation or environmentally safe disposal, or both of those practices.

The unincorporated county has selected goals and objectives which are aggressive but reasonably achievable.

### A. HOUSEHOLD HAZARDOUS WASTE ELEMENT GOALS

The following goals are consistent with the 1989 Solano County Hazardous Waste Management Plan (Tanner Plan):

1. To protect public health and safety, to minimize damage to the environment, to protect property from the adverse effects of [household] hazardous wastes, to promote an environment for residential responsibility, and to maintain the economic viability of the planning area and the state.
  
2. To manage [household] hazardous wastes over the long term in a way that is consistent with sound and safe management practices in this order of priority: source reduction, recycling and reuse, treatment (on-site and off-site), and residuals disposal.

3. To provide a policy basis for working with other governments in the region and the state toward the effective management of [household] hazardous wastes generated in the region and the state in accordance with the [household] hazardous waste management hierarchy.

## **B. HOUSEHOLD HAZARDOUS WASTE ELEMENT OBJECTIVES**

### **SHORT-TERM OBJECTIVES**

- At least 15% of the households in the unincorporated county will replace at least one HHW with a non-toxic alternative product or method each year.
- 25% of the households in the unincorporated county will either replace a HHW (as above), or take part in a HHW collection event each year.
- Collect 40% of all HHW generated and 80% of the used oil generated by 1995.
- Properly dispose of all non-recyclable HHW collected at collection events.

### **MEDIUM-TERM OBJECTIVES**

- At least 15% of the households in the unincorporated county will replace at least one HHW with a non-toxic alternative product or method each year.
- 25% of the households in the unincorporated county will either replace a HHW (as above), or take part in a HHW collection event each year.
- Collect 50% of all HHW generated and 90% of the used oil generated by 2000.
- Properly dispose of all non-recyclable HHW collected at collection events.

# CHAPTER III

## TARGETED WASTE TYPES AND CATEGORIES

### A. TARGETED WASTES

Typical household hazardous wastes include automotive products, paints and coatings, pesticides, cleaners, household batteries, polishes, adhesives, and sealants. California's Public Resources Code defines household hazardous wastes as residential waste materials determined by the CIWMB Board, the Department of Health Services (DHS), the State Water Resources Control Board (SWRCB), or the Air Resources Board (ARB) that are:

- Of such a nature that they must be listed as hazardous in state statutes and regulations.
- Toxic/ignitable/corrosive/reactive.
- Carcinogenic/mutagenic/teratogenic.

Table III-1 provides a list of common HHW types. Containers retaining a residue of hazardous material are also considered HHW. Solano County's Hazardous Waste Management Plan, Volume 1 and Appendix C estimates that HHW generation represents about .24% of the mixed waste stream and that the constituent categories are represented by the percentages listed in Table III-2. Although these categories do not exactly match the categories defined in CIWMB Form 303, all HHW types are included. The unincorporated county has targeted all HHW types since the inclusion of any of these materials in the mixed waste stream produces hazards to health and the environment.

### B. HOUSEHOLD HAZARDOUS WASTE GENERATION RATES

Solano County's approach, combining waste-sort information with survey information, represents a reasonable method of estimation. Solano County has chosen to use the County's estimate from the Tanner Plan in its calculations of HHW generation. Table III-2 presents the tonnages of HHW by category estimated and projected to be generated in the unincorporated Solano County for the years 1990, 1995, and 2000.

## **CHAPTER IV**

### **EXISTING CONDITIONS DESCRIPTION**

Household hazardous wastes are disposed of by citizens in a variety of ways. An Association of Bay Area Governments (ABAG) survey of residents found disposal with mixed municipal waste to be the most common management choice made for many materials. Twenty-five percent of those surveyed, however, said they dispose of motor oil on the ground or in the street, 98% indicated they disposed of auto and furniture polish on the ground and 83 percent indicated radiator flush liquids were poured into the street. With the exception of some used motor oil, very little household hazardous waste was recycled by respondents. Table IV-1 presents the results of this survey. It is assumed that these survey results are representative of current practices in the unincorporated Solano County.

#### **A. EXISTING SOURCE REDUCTION**

The State of California defines source reduction as any action which causes a net reduction in the generation of solid waste. Source reduction includes, but is not limited to, reducing the use of nonrecyclable materials, replacing disposable materials and products with reusable materials and products, reducing packaging, establishing garbage rate structures with incentives to reduce the amount of wastes that generators produce, increasing the efficiency of the use of materials. Source reduction does not include steps taken after the material becomes solid waste or actions which would impact air or water resources in lieu of land, including, but not limited to, transformation.

Currently, there are no such efforts taking place in the unincorporated Solano County.

#### **B. EXISTING COLLECTION**

##### **PUBLIC SECTOR**

Residents of the unincorporated areas of Solano County participated in three one-day HHW collection events in 1991. The events were held at the corporation yards in Vacaville on July 20, in Vallejo in April, and in Fairfield on June 29. Funding for much of the cost of the events was provided by International Technologies Corporation, which owed Solano County \$137,000 of in-kind services under a settlement agreement. The Solano County Board of Supervisors decided that these in-kind services were to be used for HHW collection events throughout the county.

In addition to exploring the possibility of a single collection event, Solano County has considered the possibility of a long-term joint venture with the other Solano County jurisdictions. Initial discussions with the cities have centered around the development of one



central HHW transfer and processing facility serving the entire county and the development of a number of satellite collection facilities. This multi-jurisdictional program is being considered in order to coordinate efforts and minimize HHW program costs.

### **PRIVATE SECTOR**

Currently, there are no private HHW collection endeavors taking place in the unincorporated county. Residents of the unincorporated county may participate in HHW collection programs in the incorporated jurisdictions of Solano County.

Table IV-2 lists the quantities of HHW accepted and their end-users.

## **C. EXISTING RECYCLING OR REUSE**

Recycling of HHWs that are generated in the unincorporated county occurs in incorporated areas of Solano County.

For descriptions of how HHWs can be recycled, please see Chapter I of this document.

## **D. EXISTING EDUCATION AND PUBLICITY**

Educational programs can be implemented to encourage the use of alternatives to HHWs, resulting in source reduction, the wise and complete use of HHWs, and appropriate disposal of HHWs. This results in fewer potential hazards to landfills and their surrounding environments.

There are no such programs in unincorporated Solano County.

## **E. EXISTING PROGRAMS TO BE REDUCED, PHASED OUT OR CLOSED**

There are no HHW program owners and/or operators in unincorporated Solano County has plans to decrease, phase out or close their operations.

## **F. EXISTING LOCAL REGULATIONS AND ZONING RESTRICTIONS**

There are no local regulations or zoning restrictions pertaining to household hazardous waste.

# CHAPTER V

## EVALUATION OF ALTERNATIVES

In this chapter, household hazardous waste program alternatives are evaluated in accordance with CCR Section 18751.3.

### A. DESCRIPTION OF ALTERNATIVES

The following program alternatives have been considered for implementation by Solano County.

#### PERIODIC COLLECTION EVENTS

Periodic collection events consist of residents delivering their HHW to a site that is open at least once per year and that remains open for no more than seven days at a time. Periodic collection events can be used to collect all types of HHW or they can be limited to the collection of certain types of HHW such as recyclable wastes (batteries, oil, latex paint, and antifreeze). If non-recyclable HHW is collected, it must be properly disposed. This alternative includes the proper disposal of non-recyclable HHW. The unincorporated county has considered the possibility of holding collection events both with and without the inclusion of a mobile trailer that is used to serve the other jurisdictions in the County. The trailer would transport necessary equipment for periodic events from jurisdiction to jurisdiction. The trailer would be used in conjunction with a permanent fixed HHW facility that would be used to receive HHW from the entire county.

#### PERMANENT HHW DROP-OFF SITES

A permanent HHW drop-off site is a facility that accepts either all types of HHW or only recyclable HHW (this type of site is commonly referred to as a "BOP drop" or a "BOPA drop" to denote that only batteries, oil, latex paint, and antifreeze are accepted) from residents at least one day each week. Gas stations and auto parts stores that accept oil or auto batteries from the do-it-yourself auto mechanics can serve as permanent drop-off sites. Solano County has considered the establishment of BOPA drops and has considered the construction of permanent satellite facility that would receive all types of HHW. The satellite facility would receive support from a central facility serving the entire county. Non-recyclable HHW from the satellite facility would be sent to the central facility for packing, storage, and transport to a disposal site. If non-recyclable HHW is collected at a permanent site, its proper disposal is an integral part of the program.

#### MOBILE HHW COLLECTION

Solano County has considered the collection of HHW on an on-call basis. That is, individual residents could request that a mobile unit be dispatched to their homes to collect HHW when

needed. Non-recyclable and/or recyclable HHW can be included in this type of program. If non-recyclable material is collected, its proper disposal is an integral part of the program.

### **CURBSIDE HHW COLLECTION**

Curbside HHW collection can be implemented as part of a curbside collection program in which nonhazardous recyclable materials are collected. Some jurisdictions have a curbside program for nonhazardous materials and have considered the addition of HHW to that program. Only motor oil and batteries have been considered for inclusion because there is insufficient experience with other HHW in other parts of the United States to justify their collection at the curb in Solano County.

### **LOAD-CHECKING PROGRAMS**

In a load-checking program, the contents of selected vehicles delivering waste to a landfill are examined and hazardous waste is removed prior to the burying of the refuse. Generally, only a small fraction of vehicles are selected. Vehicles from sources that are known to be potential generators of hazardous waste are sometimes a focus of the program. In some cases, hazardous material identified at the landfill is returned to its generator. In other cases it is recycled or properly disposed. One variation of this type of program is to train and instruct refuse collection crews to be alert to HHW in residential garbage cans and to leave the HHW at the residence. The crews can also notify the residents that HHW is not accepted with residential refuse.

### **WASTE EXCHANGE**

Waste exchange programs can consist of an information center or a warehouse. An information center is used to link potential users of hazardous waste with people who have hazardous waste to give away or to sell. The waste is not physically handled by the waste exchange operator. This type of waste exchange can also be used to direct people and businesses who have hazardous waste to waste recyclers. The recycling of oil and batteries can be promoted in this way. The operator only collects and disseminates information on possessors and potential users of the material. At a warehouse, hazardous material is stockpiled and distributed to users. Paint is sometimes the only material handled.

### **PRODUCT SUBSTITUTION**

The generation of HHW can be reduced by substituting nonhazardous materials for hazardous ones. At the local level, product substitution can be promoted by informing residents of the value of substitution and of the nonhazardous substitutes that are available. State and Federal programs could include bans on certain materials and product labeling requirements. Bans and labeling requirements are difficult or impossible to implement locally because local agencies do not have the power to implement them and/or because they would likely be ineffective. The ability of residents to purchase a material banned in Solano County in a

nearby county decreases the effectiveness of bans. Education and public information programs have been considered by Solano County to promote product substitution.

The seven alternatives discussed above are evaluated in the following section. In the following chapter, the selected alternatives are combined into a complete HHW program.

## **B. EVALUATION OF ALTERNATIVES**

CCR Section 18751.3 (b) specifies nine criteria to be used to evaluate the program alternatives. In this section of the HHWE, each criterion is discussed as it relates to the program alternatives. In many cases, alternatives are evaluated in relation to each other. The term "relatively" is used to describe an alternative as it compares to most or all of the other alternatives described in Section A.

### **CRITERION 1: HAZARDS CREATED BY THE ALTERNATIVES**

Any alternative that includes the handling of HHW entails the risk of human exposure to the waste and the risk of spillage or evaporation of the waste into the environment.

A load-checking program is probably the most hazardous of the alternatives because it involves looking for and retrieving hazardous waste from mixed refuse into which hazardous material may have spilled or in which the hazardous material may be difficult to identify. This is a major reason for not expanding load-checking programs beyond what is required by regulations governing the landfill operation.

Product substitution has no hazard associated with it except, perhaps, indirect hazards associated with the inferior performance of the non-hazardous substitute. For example, a mouse trap might be less effective than rat poison and result in an increase in the population of rodents. This type of indirect hazard can be mitigated by a more effective use of the nonhazardous substitute or by a limited or temporary use of the hazardous material. The low degree of hazard associated with product substitution is a major reason for selecting it as a program to be implemented.

All other alternatives entail a moderate degree of hazard that can be mitigated through proper training and public information.

### **CRITERION 2: ABILITY TO ACCOMMODATE CHANGING CONDITIONS**

The ability to accommodate changing economic, technological, and social conditions is limited by the construction or purchase of expensive facilities that are expected to last for several years. Also, creating in the public an expectation that a certain facility or program will always be available can limit the ability to implement a substitute program. Alternatives



that involve multi-year inter-jurisdictional agreements can limit the ability of a jurisdiction to implement substitute programs.

Periodic collection events that utilize a mobile trailer in conjunction with a central facility serving the entire county limit flexibility. This is a major reason for postponing the development of a county-wide program in Solano County until after 1995. Significant planning is appropriate before entering into this program. A permanent drop-off site limits flexibility if it includes an expensive facility. Relatively inexpensive BOPA drops or drop-off facilities at service stations and auto parts stores are relatively flexible.

Periodic collection events and permanent drop-off sites that do not have high start-up costs are relatively flexible.

Mobile collection and curbside collection are alternatives that can be modified over the course of a few years because mobile equipment typically has a life of about five years. These programs provide a high degree of convenience to users, so giving them up after they have begun can be difficult. The same can be true of waste exchanges.

Load-checking programs can usually be readily modified to accommodate changing conditions.

A product substitution program requires the education of the public which is a long term endeavor. Changing conditions can be accommodated over a period of several years.

### **CRITERION 3: TIME REQUIREMENTS FOR IMPLEMENTATION**

All of the alternatives can be implemented in the short-term or in the medium-term. The need for significant planning and inter-jurisdictional agreements for a county-wide program (consisting of a central collection and processing facility and a mobile unit at which periodic events would be held) makes the implementation of such a program difficult, but not impossible, in the short-term.

### **CRITERION 4: NEED TO EXPAND OR CONSTRUCT FACILITIES**

A central HHW facility serving Solano County in conjunction with permanent satellite drop-off sites or in conjunction with a mobile unit providing support for periodic collection events would be entail a major facility construction program. Periodic collection events handled at the local level would not require the construction of permanent facilities. Permanent BOPA drop-off sites would require a simple facility including a paved area with an optional roof. Corporation yards can be readily modified for this purpose.

Mobile collection and curbside collection would require simple facilities such as those for a BOPA drop if only recyclable materials are collected. If materials requiring disposal are

collected, a facility for storage, packing, etc would be required unless a private contractor were hired to immediately take the material to an already-existing facility.

A waste exchange information center would consist of an already-existing County office. A waste exchange warehouse would require the construction of a new warehouse or the identification and securing of an appropriate existing building.

A load-checking program might necessitate the construction of a storage facility at the landfill. Product substitution does not require an expanded facility or a new facility.

#### **CRITERION 5: CONSISTENCY WITH LOCAL POLICIES**

None of the alternatives are inconsistent with local plans, policies, or ordinances. Possible exceptions to this statement could exist if programs were carried out in certain ways. For example, if collection crews were to consistently remove HHW from residential waste and leave it at the residence while residents had no alternative means of disposing or recycling the waste, a conflict with local policies would occur. It is currently the local policy to provide a means of disposing household waste. It is the intent of the County of Solano to select and implement alternatives in a way to avoid this potential conflict.

#### **CRITERION 6: INSTITUTIONAL BARRIERS**

A county-wide program would require inter-jurisdictional agreements to be finalized. The jurisdictions of Solano County have expressed an interest in a county-wide program and intend to evaluate its feasibility during the next several years.

Periodic collection events, permanent drop-off sites, mobile collection, curbside collection, load-checking, and waste exchange warehouses are all subject to permitting, siting, and/or operating requirements that are readily manageable. Also, it is likely that these programs would be carried out by Solano County in cooperation with incorporated cities. The periodic collection events held in 1991 are examples of this cooperative approach. Residents of unincorporated areas were allowed to participate in the events held in nearby cities. The County contributed some funds to the program but the major responsibility for coordinating the events remained with the cities.

There are no institutional barriers to a load-checking program at a disposal site. The disposal sites are under the jurisdiction of the County.

There are no institutional barriers to the promotion of product substitution through public information. Product bans and product labeling requirements require the passage of new laws or regulations that are more appropriate at the State or Federal level. The barriers involved in the approval of these laws and regulations are a major deterrent to implementation at the local level.



**CRITERION 7: ESTIMATE OF COSTS RELATED TO IMPLEMENTATION**

Periodic collection events at which both recyclable and non-recyclable HHW is collected typically cost about \$100 to \$150 per participant. Transport and disposal of HHW in a Class I landfill costs about \$1 per pound of HHW. Events at which only recyclable material is accepted avoid this expense. Transport and disposal can amount to one-half or more of the total cost of an event. Aside from the cost of transport and disposal, the major costs are relatively fixed. That is they do not directly vary according to the number of participants or the quantity of waste collected. Therefore, the costs could vary significantly depending on the degree of participation.

Permanent drop-off sites that accept non-recyclable HHW are estimated to cost about the same as periodic collection events that accept non-recyclable HHW. Drop-off sites for oil and automobile batteries are often operated by service stations and auto parts dealers at no cost to residents. The acceptance of recyclable HHW at a drop-off site handling non-hazardous recyclable materials could either increase or decrease the net cost of the program depending on the market for the collected HHW.

A mobile collection program would cost about \$50,000 per year for a full time driver and a truck or van in which to collect material. Disposal of HHW would amount to about \$1 per pound. Administration of the program and sorting, packing, and storage of the waste to be disposed would probably be paid for through another HHW program of which the mobile unit would be a part.

Curbside collection of HHW would be included as a part of a curbside program for non-hazardous waste. Those programs typically have a net cost of \$1.00 to \$2.00 per household per month. The inclusion of oil and batteries in the program would add about \$0.10 per household per month to the cost.

Load-checking at landfills requires the diversion of labor and equipment from other tasks for a small fraction of each day. If 10% of one worker's time is occupied in checking loads the cost of the program would be about \$10,000 per year plus \$1 per pound of waste that must be sent to a Class I landfill. The figure of \$10,000 includes the use of mobile equipment and the provision of a small storage facility on site.

A waste exchange information center would cost about \$50,000 per year. This estimate is based on the cost of an operator earning \$40,000 per year and working half-time on the program. A cost multiplier of 2.5 is used in the estimate.

The cost of a product substitution program would be about \$0.25 per household included in the program plus the cost of labor to develop public information materials and to give

demonstrations and presentations to interested groups of people. Labor costs are estimated to be \$3000 per year.

### **CRITERION 8: END USES**

Available end uses are discussed in Section A of Chapter I of this HHWE. That discussion is incorporated into this section by reference. All of the alternative programs (except the product substitution program) could utilize the services of these recyclers. End uses is not an applicable criterion for the product substitution program.

All hazardous materials could be diverted through a waste exchange. The materials would have to be of a quantity and quality that would make them of value to a potential user. The end user would be anyone making use of the exchange. The exchange could be local, regional, or national.

### **CRITERION 9: EFFECTIVENESS IN REDUCING THE QUANTITY OF HHW GENERATED**

None of the alternatives would reduce the weight of HHW generated. Any decrease in the weight of HHW disposed would be balanced by an increase in the weight of HHW diverted through recycling or source reduction. The volume of HHW generated would not decrease as a result of the programs. Packing of materials for disposal in a Class I landfill could increase the amount of disposed material.

A waste exchange and a product substitution program would divert some material from disposal through source reduction. Most identified HHW consists of oil, batteries, paint, and antifreeze. Latex paint, which is recyclable, would be source reduced through the waste exchange. Oil based paint could be source reduced through the product substitution program. Oil, batteries, and antifreeze could be recycled through any of the programs except the product substitution program.

Load-checking programs recover a relatively small amount of recyclable material. The effectiveness of other programs in recycling oil, batteries, and antifreeze depends on the extent of the programs. They could all divert most of these recyclable materials and yield a diversion rate of 50% of identified HHW.

# CHAPTER VI

## PROGRAM SELECTION

### A. SELECTED PROGRAM

The following alternatives are selected for implementation by the County of Solano.

- Periodic Collection Events
- Permanent Drop-off Sites for Recyclable HHW
- Product Substitution
- Load Checking at Landfills

As the HHW program is implemented, Solano County will examine the feasibility of and need for the following alternatives which are considered to be contingency measures.

- Periodic Collection Events and a Central Collection, Storage, and Processing Facility in Cooperation with the Rest of Solano County
- Curbside Collection of Oil and Batteries
- Participation in a Waste Exchange in Cooperation with the incorporated portions of Solano County

In this Chapter, the selected alternatives are described. The county-wide collection program is also described because the jurisdictions of Solano County are interested in examining that alternative. It is not, however, selected for implementation in this HHWE.

### B. PROGRAM DESCRIPTION

#### PERIODIC COLLECTION EVENTS

Solano County will arrange with cities within the county to allow residents of unincorporated areas to participate in the one-day collection events sponsored by the cities. Non-recyclable HHW will be accepted at most or all of the events. Recyclable HHW will be accepted at all events. The events will be held at locations that are convenient for county residents. No inter-jurisdictional agreements are currently in place for cooperation on future HHW events.

This alternative was selected because it provides a way for residents to properly dispose of all types of HHW. It is more flexible and easier to implement in the short-term than a county-wide program because it requires only simple inter-jurisdictional agreements. The

events also serve as an educational tool. Demonstrations of and information on substitutes for HHW can be made available at the events.

The anticipated end uses for divertable HHW collected at the events are those discussed in Chapter I, Section A of this HHWE. That discussion is incorporated into this section by reference.

A private firm will be contracted with to handle the wastes received at the collection events. Trained personnel will receive HHW from residents within a designated area with controlled entry. The HHW will be identified and placed into containers suited for their storage, transport, and/or disposal. Solano County, the cooperating City, and the contractor will work together to secure the necessary permits for the collection events. All conditions of the permit will be adhered to in conducting the collection events. Recyclable materials will be delivered to recyclers and the non-recyclable HHW will be properly packed and transported to a Class I disposal site for disposal. Proper manifests will be maintained.

City or County Corporation Yards or other suitable sites will be the sites of the collection events. Necessary equipment will be brought to the site for the event and removed after the event. No new permanent facilities are needed.

The anticipated types and quantities of HHW to be collected from residents of unincorporated areas at the collection events are as follows. The quantities are stated in tons of waste per year for 1995 and 2000. For example, "20/40" would indicate 20 tons collected in 1995 and 40 tons in 2000. Anticipated quantities for other years would be in the range reported for the years 1995 and 2000. Whether the material is to be recycled or disposed is indicated in parentheses. Reused paint is indicated as being recycled to be consistent with common usage of the word "recycled" as it relates to latex paint.

• Waste Oil	3.0/5.0	(recycled)
• Halogenated Solvents	0.0/0.0	(disposed)
• Nonhalogenated Solvents	0.2/0.2	(disposed)
• Organic Liquids	0.1/0.2	(disposed)
	0.1/0.2	(recycled)
• Pesticides	0.1/0.1	(disposed)
• Nonhalogenated Organic Sludge	0.1/0.1	(disposed)

- |                                 |         |            |
|---------------------------------|---------|------------|
| • Dye and Paint Sludge/Solids   | 0.7/0.8 | (disposed) |
|                                 | 0.6/1.2 | (recycled) |
| • Nonmetallic Inorganic Liquids | 0.3/0.3 | (disposed) |
| • Other Inorganic Solid Wastes  | 0.4/0.5 | (disposed) |
|                                 | 0.4/0.8 | (recycled) |

Approximately 200 to 400 participants from unincorporated areas are expected to participate in collection events each year. These participants would represent about 10% of the unincorporated county's households. One person from each of the households would represent about 4% of the unincorporated county's population.

The County or the private firm that operates the collection event will be required to recycle material to the extent that is feasible. The recyclers discussed in Chapter I, Section A will be used if possible or other recyclers will be used. The possibility of distributing paint collected at previous collection events at the collection events will be considered by the County and implemented if it is found to be feasible.

Solano County will likely cooperate with the incorporated portions of the County in the planning and implementation of collection events. Some jurisdictions have cooperated in the past, but no arrangements have been made for future cooperation on HHW events. If no cooperative arrangements are made, The unincorporated county will implement the program by itself.

In the medium-term, the collection events might be done as part of a county-wide program served by a central facility, a mobile trailer, and a staff under the authority of a county-wide agency. The selection or creation of this agency has not occurred yet and no inter-jurisdictional agreements have been made.

#### **PERMANENT DROP-OFF SITES**

Drop-off sites for recyclable HHW will be easily accessible to residents of Solano County. One site at which oil is accepted is currently in operation at the Solano Garbage Company garage. Other potential sites will be investigated and established as is appropriate. The intent will be to divert recyclable HHW from the collection events to relieve congestion at the events. The drop-off sites will be open one day per week at least. Private firms may be sought to operate the site as part of their normal operation. For example, auto parts stores can collect batteries, antifreeze and oil. Hardware stores could accept paint. In some or all cases, the sites will be within incorporated areas but will be accessible to residents of unincorporated areas.



Permanent drop-off sites are a selected alternative because they can be a less expensive way of collecting HHW than periodic collection events and can relieve congestion at those events. Drop-off sites can help to reduce the cost of collection events by collecting recyclable material in a more cost-effective way. Also, permanent sites are available year-round rather than on only a few days per year. They provide a readily accessible outlet for major constituents of the HHW stream that are often improperly disposed because residents do not want to store them in their homes.

The anticipated end-uses are discussed in Section A of Chapter I. That discussion is incorporated into this section by reference.

The operators of the drop-off sites will provide adequate storage for waste they receive. The operators will be responsible for contacting recyclers to accept or pick up the accumulated waste. Disposal of HHW will not be required in this alternative unless contaminated material (such as oil containing bleach, brake fluid, etc) is inadvertently accepted. In that case, a hazardous waste hauler would be contacted to pick up the material and deliver it to a Class I disposal site.

Solano County intends to use existing facilities as drop-off sites to the extent possible. If a new site is found to be needed, it would consist of a paved area enclosed by a fence. Suitable containers would be placed at the site. A covered area may be included but is not required.

The anticipated types and quantities of materials to be collected and recycled through this program are as follows. The notation is as noted in the discussion of the periodic collection events above.

- |                                |         |            |
|--------------------------------|---------|------------|
| • Oil                          | 5.7/6.2 | (recycled) |
| • Organic Liquids (antifreeze) | 0.2/0.2 | (recycled) |
| • Dye and Paint Sludges/Solids | 1.0/2.4 | (recycled) |
| • Other Inorganic Solid Wastes | 0.6/1.4 | (recycled) |

Other hazardous waste categories would not be handled in this program.

The targeted participation rate is 5% of the households or about 2% of the population.

The collected material will be sent to recyclers as described above. Paint may be made available to residents either at the drop-off sites or at the periodic collection events.



No multi-jurisdictional arrangements are required for this program. However, they may be useful and will be developed as needed. Solano County will, however, seek private firms to serve as sites for accepting HHW as part of this program. Arrangements will be made as needed. Arrangements could include the payment of fees to firms, but this might not be needed. Public recognition of firms that cooperate with the County in collecting HHW may be adequate inducement. The County will assist, to an appropriate degree, cooperating firms in meeting regulatory requirements associated with the collection and storage of HHW.

### **PRODUCT SUBSTITUTION**

Solano County will provide residents with information on the importance of replacing HHW with nonhazardous substitutes. Appropriate nonhazardous materials and methods will be specified. Literature will be distributed. Demonstrations and oral presentations will be given at collection events, schools, and/or other public events and gatherings.

This alternative is selected because it is the only alternative to address certain important aspects of the hazardous materials problem. If all HHW were recycled or properly disposed, the use of hazardous materials at residences would still create environmental problems. For example, volatile matter from oil-based paint evaporates as the paint dries under normal and proper usage. The volatile matter pollutes the air. Also, hazardous material can enter landfills in a form in which it is not normally identified as HHW. Pesticides and herbicides on plant debris are examples. It is impractical to treat yard waste as a HHW even though it may contain HHW. An appropriate solution is to reduce, to the extent feasible, the use of HHW.

End uses are not applicable to this program.

Handling and disposal of HHW is not applicable to this program.

No facilities will be built or expanded to implement this program.

No HHW will be collected, recycled, or disposed in this program.

The targeted public participation rate is 15% of the households per year. That is, each year, 15% of the households should replace one hazardous material with a nonhazardous substitute. The substitute may be a method, a material, or an acceptance by the resident of a lack of convenience. An example of the last type of substitute is the acceptance of weeds in ones yard as a substitute for the use of herbicides.

This program does not include recycling or reuse of HHW.

No cooperative or multi-jurisdictional agreements are needed for the implementation of this program. The County may however seek the cooperation of other jurisdictions in developing educational materials and the County may seek the cooperation of organizers of public events to provide a forum for public information. The County will seek the cooperation of the public schools in including product substitution in existing or new environmental education curricula.

### **LOAD CHECKING AT LANDFILLS**

Load checking programs will continue in their current form and scope at the B&J Landfill and at the Potrero Hills Landfill. These programs are required by CIWMB regulations and are enforced by the Local Enforcement Agency (the Solano County Department of Environmental Management).

The program is selected because it is required by the State and because it deters the improper disposal of hazardous waste at landfills.

End uses for recyclable material that may be collected through the load checking program are discussed in Section A of Chapter I. That discussion is incorporated by reference.

A storage area is provided on site for collected hazardous waste. Material that must be disposed is removed through contract with a certified hazardous waste hauler. It is disposed at a Class I landfill. Hazardous material for which the generator is known is sometimes returned to the generator. It is the generators responsibility to properly dispose of it.

No facilities will be built or expanded to implement this program.

The quantity of hazardous waste collected in this program is targeted to be minimal because hazardous waste should not be sent to the landfill. Other programs are designed to provide proper methods of handling hazardous waste. For this reason, there are no targeted quantities. Likewise, there is no targeted public participation rate.

Recyclable material will be sent to recyclers as described above.

No cooperative or multi-jurisdictional arrangements are needed for this program except that the landfill operators will be required by the LEA to implement it. This is guaranteed through the landfill permitting process.

### **PERIODIC COLLECTION EVENTS AND A CENTRAL COLLECTION, STORAGE, AND PROCESSING FACILITY IN COOPERATION WITH THE REST OF SOLANO COUNTY - CONTINGENCY PROGRAM**

A county-wide program for the management of HHW has been discussed by the jurisdictions of Solano County. There is substantial support for such a program because of its potential for avoiding duplication of effort and for providing a high degree of service to residents. However, problems such as funding, siting, allocation of jurisdictional responsibilities, etc have not been discussed in sufficient detail to ensure that this program would be implementable. It is, therefore, reserved as a contingency measure to be considered for implementation after 1995. The following information on the program is included in this HHWE for informational purposes. Its inclusion does not imply a commitment to implement it. It does not contain all of the information required for a selected program because it is not being selected now.

The program takes advantage of the economies of scale available because of its county-wide organization. The cost of the program on a per household or per-ton basis will be smaller than could be achieved if the unincorporated county were to implement an independent program. At the same time the level of service provided will be adequate to encourage the participation of County residents.

For past programs in Vacaville and Vallejo, costs reached \$267 and \$140 per participant, respectively. A county-wide program is estimated to cost about \$60 per participant if 15% of households participated.

The facility requirements for the selected program are described below. A single, fixed site facility would serve all of Solano County. To provide HHW collection events convenient for all Solano County residents, mobile equipment would be used to serve several locations on at least a quarterly basis.

Site requirements include the following:

- Enough land to accommodate the building and operations (approximately one to two acres).
- Sufficient space for the permanent storage structure (approximately 10,000 to 12,000 square feet).
- An inventory of at least one hundred empty drums.
- Several pallets of absorbent.
- Several pallets for car batteries or paint cans.
- A double lined tank to store bulked oil.

- A large roll-off container for solid waste residue.
- An administrative building.

The storage structure would be used to house full barrels until full truckloads have been accumulated. It would be surrounded by low berms or curbing to provide secondary containment. Sufficient storage to accommodate at least two loads (eighty drums each) is required. Additional storage for consumable supplies to be used on-site or at the collection events would be required. Fencing would provide site security. Any outside storage or equipment loading or unloading areas would be paved to prevent accidental spills from contaminating the ground. The storage facility would be located on the lot in a manner to provide convenient access for the estimated 30 residents who may use the site per day.

Workspace would be required for bulking oil and/or paint and for a drop-off center and a warehouse for useable paint. Safety equipment, office equipment, laboratory equipment, and a forklift would also be required.

The administrative building would house:

- Offices for the administrator of the program and clerical staff of four.
- Changing rooms.
- Showers.
- Lavatories.
- A lunchroom.
- A small laboratory for categorizing unknown items.

A truck with a lift gate would be required to transport equipment and supplies to the site of each event and to transport empty and full drums to and from the site. In addition, a large handtruck would be needed to move full drums around the site. Safety equipment and testing equipment would also be required.

When each jurisdiction selects its site(s) for collection events, it should make at least one half acre available for the 65-foot trailer and for comfortable operation and collection. Parking lots in commercial areas may be acceptable from a technical standpoint, but nearby business may contest such a proposal. The vehicle would remain at the site from one to three days (depending on how quickly the operators would like to conclude the event). The surrounding area should be able to accommodate a maximum of 1000 cars passing through during one day of an event.

Materials that can be recycled are discussed in Section A of this chapter. They will not require disposal provided that end-users have been established.

Most other HHW types would require disposal at a Class I landfill such as the Kettleman Landfill. In most cases individual items would be lab-packed in 55-gallon drums for shipment and disposal.

The estimated and projected generation of HHW types for the years 1990, 1995, and 2000 are presented in Chapter III, Section B. This program would divert a substantial part of this waste from improper disposal. The quantities of HHW categories expected to be collected, recycled, or reused, and disposed of in the years 1995 and 2000 are presented in Tables VI-1 and VI-2.

The following are factors that may influence the accuracy of the numbers presented in Tables VI-1 and VI-2:

- The methodology of a waste generation study often is very inaccurate for waste types that occur in low concentrations such as HHW.
- The total weight of HHW generated includes the weight of containers, which are typically not HHWs by themselves. In many cases, the entire weight of a HHW may consist of the container, with only traces of HHW.
- Many wastes, such as used motor oil, that could be HHW are taken to commercial entities for disposal, making them hazardous waste, not HHW.
- Many HHWs are flushed down drains in the course of normal usage, and are therefore unquantifiable.

#### **OTHER CONTINGENCY PROGRAMS**

The other two contingency programs are waste exchanges and curbside collection of oil and batteries. The curbside collection program will be considered for implementation if the planned programs are not successful in providing a sufficiently convenient way for residents to get rid of oil and batteries. The curbside collection of oil and batteries would be done as part of the existing programs for the collection of nonhazardous recyclables in Solano County. Generally, these programs are carried out by a franchised waste hauler serving an incorporated area. The County would, by separate agreement or by amendment to an existing collection agreement, extend the program to residents of unincorporated areas. A waste exchange for HHW could be part of a waste exchange for other materials. It will be implemented if there is another program with which it can be conveniently included.



## CHAPTER VII PROGRAM IMPLEMENTATION

Solano County will use available assistance from the CIWMB as is deemed appropriate in implementing its selected HHW programs. Implementation schedules for selected programs follow. The County of Solano (COS) has overall responsibility for the implementation of selected programs. The Department of Environmental Management is expected to be the lead agency. All of the selected programs begin in the short-term and extend throughout the short- and medium-term.

Program/Task	Responsible Party	Completion Date
<b>Periodic Collection Events</b>	COS	Events to be held 1-4 times per year.
Set date of event	COS	9 months prior to event
Secure funding	COS	9 months prior to event
Select contractor	COS	8 months prior to event
Select site	Contractor/COS	7 months prior to event
Begin advertising event	Contractor/COS	6 months prior to event
Make necessary arrangements with recyclers and disposal site operator to receive waste	Contractor	4 months prior to event
Obtain permits	Contractor	3 months prior to event
Set up equipment at site	Contractor	1 day prior to event
Hold collection event	Contractor	day of event
Remove equipment and waste from site	Contractor	1 day after event
Evaluate event	Contractor/COS	1 month after event
<b>Permanent Drop-off Sites</b>	COS	Ongoing until at least 2000
Identify potential sites	COS	Ongoing until evaluation indicates successful program
Select/identify operator	COS	"
Negotiate with operator	COS	"
Secure funding	COS	"
Obtain permits	Operator/COS	"
Make arrangements for delivery of waste to recyclers	Operator/COS	"
Equip site	Operator/COS	"
Publicize program	Operator/COS	"



Operate site	Operator/COS	"
Monitor and evaluate program	Operator/COS	"
<b>Product Substitution</b>	COS	Continuous until at least 2000
Research strategies	COS	December, 1992
Produce literature	COS	1993 and on
Distribute literature	COS	1993 and on
Select/train speakers/demonstrators	COS	1992 and on
Provide demonstrations and oral presentations	COS	1993 and on
Conduct phone or mail survey of participation rates	COS	1994 and on (annually)
Evaluate survey results	COS	1994 and on (annually)

#### **Periodic Collection Events and a Central Collection, Storage, and Processing Facility in Cooperation with the Rest of Solano County - Contingency Program**

The implementation of this program is presented here for informational purposes only. The program has not been selected for implementation.

The primary responsibility for implementation of the HHW program will fall on the county-wide agency established to administer the program. All participating jurisdictions, including the unincorporated Solano County, will need to be involved and will need to locate appropriate sites for holding quarterly HHW collection events. The steps required for implementation and the primary responsible party for each are listed below.

- Establish county-wide agency, district, or authority to administer program.  
Responsibility: all jurisdictions.
- Designation of a HHW Planning Coordinator.  
Responsibility: all jurisdictions.
- Formation of a HHW subcommittee from the Local Task Force to develop criteria and recommendations for siting the centralized facility. The Local Task Force would also act as an advisory group to the HHW Planning Coordinator for all aspects of implementation of the HHW program including initial scheduling of HHW collection events.  
Responsibility: Local Task Force.
- Hiring of a consultant to assist in permit application, design and engineering.  
Responsibility: HHW Planning Coordinator.

- Formation of an unincorporated county advisory committee to develop criteria and recommendations for a site(s) on which to hold local HHW collection events.  
Responsibility: Solano County.
- Selection of a site for the centralized facility.  
Responsibility: Local Task Force recommendation with approval by cities and Solano County.
- Preparation and submittal of a permit application for the centralized facility which will include a design and operating plan.  
Responsibility: HHW agency with consultant services
- Final engineering and design of the centralized facility.  
Responsibility: HHW agency with consultant services.
- Designation of local site for the first HHW collection event in the unincorporated county.  
Responsibility: Solano County, with input from Local Task Force and all interested parties.
- Negotiation and signing of a service provider agreement to operate the program.  
Responsibility: HHW agency and all jurisdictions.
- Construction of centralized facility.  
Responsibility: HHW agency , with consultant services.
- Procuring equipment, supplies and possibly disposal contracts.  
Responsibility: HHW agency, with consultant services.
- Staff training.  
Responsibility: Service provider operating program.
- Notification of residents of date and location of first unincorporated county HHW collection event.  
Responsibility: Service Provider.
- Preparation and distribution of educational materials on HHW source reduction to area schools.  
Responsibility: HHW agency.
- Beginning operations and monitoring an evaluation of program.  
Responsibility: Service provider and HHW agency.
- Publicizing availability of unused paint inventory.  
Responsibility: Service provider.

The program can be implemented in the medium term. Implementation in the short-term is considered impractical because of the substantial degree of coordination among jurisdictions that is required and because of the need to establish or select a county-wide agency to implement the program. Figure VII-1 presents the schedule through the first thirty months after the start of the program. After that date continued operation and publicity of the program will gradually increase participation.

The estimated costs of the program are presented in Tables VII-1, 2, and 3. Table VII-1 presents the first and second year estimated costs of the program on a county-wide basis. Table VII-2 presents the estimated annual operating cost for the program after the second year on a county-wide basis. These costs were estimated using the experience of HHW collection event and program operators as a guide. Table VII-3 presents cost estimates for the unincorporated county including the County's share of the county-wide costs.

# CHAPTER VIII

## PROGRAM MONITORING AND EVALUATION

### A. METHODS

The methods that will be used to monitor the achievement of the HHW program objectives for each program are as follows.

#### PERIODIC COLLECTION EVENTS

- Monitoring and recording of the quantities and types of waste received
- Monitoring and recording of the number of participants
- Periodic surveys of public attitudes and opinions of the events

#### PERMANENT DROP-OFF SITES

- Monitoring and recording of the quantities and types of waste received
- Periodic surveys of public attitudes and opinions of the events

#### PRODUCT SUBSTITUTION

- Periodic surveys of the residents to assess any changes in the use of HHW

#### LOAD CHECKING AT LANDFILLS

- Periodic reports from landfill operators on extent of program and quantity of material recovered or returned to generators

Solano County will be responsible for monitoring, evaluating, and reporting on all HHW programs. Currently, the Department of Environmental Management is the lead agency for HHW programs. Private operators of collection events or drop-off sites will report to the County the quantity of each type of HHW they receive and where the HHW is sent.

### B. CRITERIA

The criteria for evaluating the effectiveness of programs are as follows.

### **PERIODIC COLLECTION EVENTS**

The collection events will be evaluated on the basis of quantities of various types of waste collected and recycled (the targeted quantities are specified in Chapter VI, Section B and are incorporated into this section by reference) and on the basis of the number of participants (the targeted participation rate is 10% of households per year).

### **PERMANENT DROP-OFF SITES**

The drop-off program will be evaluated on the basis of quantities of various recyclable materials received and recycled. The targeted quantities are specified in Chapter VI, Section B and are incorporated into this section by reference.

### **PRODUCT SUBSTITUTION**

The product substitution program will be evaluated on the basis of the number of participants in the program. The targeted participation rate is 15% of households each year.

### **LOAD CHECKING AT LANDFILLS**

The load checking program will be evaluated on the basis of its compliance with CIWMB regulations. The specified number of loads must be checked and collected materials must be properly recycled, sent to disposal, or returned to the generator.

### **OVERALL HHW PROGRAM**

The four programs together are targeted to collect and divert the quantities of HHW specified in Tables VI-1 and VI-2 and to achieve the participation rates specified in the objectives stated in Chapter II, Section B. The objectives are incorporated into this section by reference.

The funding requirements for monitoring and evaluation are estimated based on one month of work by a County employee and a nominal sum for supplies. This amounts to about \$5,000 per year. This amount is included in the overall project costs given in Chapter X. The funds would be raised through a surcharge on refuse collection bills or through the franchise fee which is reflected in that bill. Surcharges or fees will be set at a level to raise sufficient funds for the monitoring and evaluation of HHW programs.

If shortfalls in the attainment of objectives occur, the reasons for the shortfall will be assessed. Based on the assessment the following measures may be taken.

- Objectives for individual programs may be adjusted so that the overall HHW objectives are still met.
- Overall HHW objectives may be adjusted to a more realistic level.

HOUSEHOLD HAZARDOUS WASTE/PROGRAM MONITORING AND EVALUATION

- Programs may be modified to increase the effectiveness.
- Contingency programs may be implemented. Those programs include a county-wide collection program, a waste exchange, and curbside collection of oil and batteries.
- The County may consider regulations or ordinances that would promote the attainment of the objectives.



## CHAPTER IX

# EDUCATION AND PUBLIC INFORMATION

Education and Public Information related to HHW is an integral part of the comprehensive EPI program described in Chapter VI (Education and Public Information Component) of Solano County's SRRE. That Component is incorporated into this section by reference. A brief summary of the relevant parts of the EPI component follows.

Objectives include the following.

- By 1994 and 1998, 50% and 75%, respectively, of households will be aware of SRRE or HHWE programs.
- By 1995 and 2000, 50% and 75%, respectively, of households will regularly participate in SRRE and HHWE programs.
- By 1994, 50% of the public schools in Solano County will have HHW curriculum materials in use. By 2000 all public schools will have such curricula in place.
- In the short-term 50% of businesses and government agencies will be provided information on managing HHW they generate. In the medium term, all businesses and government agencies will be provided such information.

Existing HHW EPI activities in Solano County include the following.

- Printed information on used oil and other HHW collection is distributed in refuse collection billings and in newspapers by the franchised refuse haulers in the County.

Preferred alternatives for HHW EPI activities include the following.

- Inclusion of a HHW component in environmental education curricula in schools. The targeted audience is students and teachers. Indirectly, parents of students are targeted. Solano County will work with the school districts to implement this program.
- Demonstrations, oral presentations, and distributed literature in support of the product substitution program described in this SRRE. The targeted audience is all residents. Solano County will implement this program. It will work with various community groups in developing audiences. The need for literature

and presentations in languages other than English will be assessed. Non-English-language literature and presentations will be provided if they are found to be appropriate.

- Notification via printed literature of periodic collection events and of the location of permanent drop-off sites. This literature will be provided in whatever languages are found to be appropriate. The targeted audience is all residents. Information on drop-off sites will be particularly aimed at people who change their own automobile oil. Solano County and private businesses that operate drop-off sites will implement this program.
- Inclusion of information on HHW management in technical assistance programs to businesses and institutions. The targeted audience is managers of businesses and institutions. Through the managers, other employees are expected to be reached. Solano County will provide information to the managers.

The schedule for the school program is presented in detail in Chapter VI, Section D.2 of Solano County's SRRE. It is incorporated into this section by reference.

Education and public information tasks related to the product substitution program are given in Chapter VII of this HHWE. That information is incorporated by reference into this section.

Education and public information tasks in support of periodic collection events and permanent drop-off sites are specified in Chapter VII of this HHWE. That information is incorporated into this section by reference.

Technical assistance programs to businesses and model government programs that address HHW are scheduled in Chapter VI, Sections D.3 and D.4 of Solano County's SRRE. Those sections are incorporated into this section by reference.

Education and public information programs in support of Solano County's HHW programs are estimated to cost \$20,000 per year. Most of this sum is for the provision of educational materials to the schools. The schools will receive additional support from EPI programs that are not related to HHW. Revenue would be raised to meet these costs by levying a surcharge on refuse collection bills or by using some of the franchise fee revenue which is reflected in the refuse collection charges. The school curricula may be supported by Solano County via a disposal surcharge collected at the County's landfills. However, this is not a certainty, and the county's programs are not dependent on it.

Education and public information programs will be monitored and evaluated as follows.

- Residential awareness will be measured via written surveys conducted either through the mail or at public gatherings.
- Residential participation will be measured through head counts at collection events and by written surveys.
- The distribution of educational materials to schools will be determined by counting the number of books, etc distributed and by maintaining records of which schools and classes receive them.
- Programs aimed at businesses and institutions will be monitored by recording the number of businesses and institutions contacted via mail.

The criteria by which EPI programs are to be evaluated are specified in the EPI objectives stated at the beginning of this Chapter.

Solano County will be responsible for monitoring, evaluation, and reporting on EPI programs. The Department of Environmental Management is currently the lead agency. Schools will report relevant information on the distribution and acceptance of educational materials to the County.

The monitoring of EPI programs in support of HHW programs is estimated to cost about \$1000 per year. Revenues will be raised through a surcharge on refuse collection bills or through the franchise fee.

If monitoring performed pursuant to CCR Section 18751.5 (a) shows a shortfall in the attainment of the HHW disposal objectives, the remedial measures described in Chapter VIII of this HHWE will be considered for implementation. The remedial measures described in Chapter VIII are incorporated into this Chapter by reference.

Monitoring and reporting will be conducted annually.

## **CHAPTER X FUNDING**

The estimated cost of selected programs; including related planning and development, education and public information, and program monitoring and evaluation; are as follows. The cost of the EPI program aimed at the business community is included in the SRRE and is not included here to avoid the possibility of double counting costs.

### **PERIODIC COLLECTION EVENTS**

Periodic collection events are estimated to cost about \$100 per participant. Based on 400 participants per year, the cost in the unincorporated county would be about \$40,000 per year. If this cost were covered solely by a surcharge on residential refuse collection bills, the surcharge would amount to about \$0.80 per household per month.

### **PERMANENT DROP-OFF SITES**

The cost of drop-off sites vary depending on the type of site used. Sites operated by auto parts suppliers and service stations sometimes operate at no direct cost to the public or to the County. Solano County will pursue this sort of arrangement. In addition, \$2400 per year or \$0.05 per household per month will be budgeted for the development of HHW capacity at drop-off sites. The sites will be used for nonhazardous materials as well as HHW. The \$2400 is for the equipment, personnel, and contract services attributable to the inclusion of HHW in the drop-off program.

### **PRODUCT SUBSTITUTION**

The product substitution program is estimated to cost \$2400 per year or about \$0.05 per household per month. This includes \$1,000 per year for educational programs in schools and oral presentations at public events. The cost of preparing and distributing literature and surveys is \$1000 per year. The remaining \$400 is for coordination, monitoring, and reporting by County staff.

### **LOAD CHECKING AT LANDFILLS**

This program is already funded through disposal fees collected at the landfills. No additional cost is anticipated or budgeted in this HHWE. It is worth noting that the load checking program is not directed only at household hazardous waste. It is directed at hazardous waste from all sources that may be improperly sent to the landfills. Therefore, it would be misleading to attribute the cost of the program solely to the household hazardous waste program.

## PERIODIC COLLECTION EVENTS AND CENTRAL COLLECTION, STORAGE, AND PROCESSING FACILITY IN COOPERATION WITH THE REST OF SOLANO COUNTY - CONTINGENCY PROGRAM

The estimated costs of the contingency program are given in Tables VII-1, VII-2, VII-3, IX-1, IX-2, and IX-3. The annual cost is estimated to be \$99,000 per year. This program will not be implemented in the short-term.

The total estimated cost of short-term programs is \$44,800 per year. This sum could be raised through a \$0.90 surcharge on residential refuse collection bills in the unincorporated county if all residents were served by a franchised hauler. However, not all residents are served by a franchised hauler. At least some of this amount will be raised through such a surcharge. Grants and landfill disposal fees will be used to provide the remainder of the needed funds. The contingency is to raise all of the \$44,800 through the landfill disposal fees. Grants will be pursued as deemed appropriate. The CIWMB awards grants for various programs including:

- Construction of permanent structures;
- Educational programs;
- Programs that utilize volunteers;
- Collection programs;
- Load-checking programs; and
- Hazardous waste control and enforcement programs.

Program costs are summarized as follows. Program costs are equal to program revenues because revenue will be raised to meet the costs. Private costs of programs are expected to be negligible or to be reimbursable from public funds. Therefore, all costs given below can be considered public costs.

Program	Cost (\$/year)	Revenue Sources
Periodic Collection Events	40,000	Refuse Collection Surcharge/Landfill Fee CIWMB grants if available
Permanent Drop-off Sites	2400	Refuse Collection Surcharge/Landfill Fee CIWMB grants if available
Product Substitution	2400	Refuse Collection Surcharge/Landfill Fee CIWMB grants/



It is the intent of Solano County to attempt to minimize program costs without significantly compromising program effectiveness. One way to do this would be to aggressively implement the drop-off program in order to decrease the need for periodic collection events or to minimize the cost of those events. The majority of HHW is recyclable. Collecting recyclable HHW at drop-off sites would allow the collection events to focus on nonrecyclable HHW while accommodating fewer people. That is, collection events would be easier and less costly to implement if only nonrecyclable HHW were collected at the events.

Another possible cost-saving measure would be to achieve a high rate of participation in the product substitution program. The HHW objectives specify a minimum participation rate of 15% of households per year. However, if a 25% participation rate were achieved the participation objective for all HHW programs would be met with no contribution from the collection events.



Table III-1

COMMON HOUSEHOLD HAZARDOUS WASTES

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<u>Pesticides</u>	<u>Household Cleaners</u>
Garden	Floor
Indoor Insects (eg. flea spray)	Furniture
Outdoor insects	General Purpose
Fertilizer/pesticide mixtures	Rug
Herbicides	Upholstery
Fungicides (eg. wood preservative)	Window
	Laundry (eg. bleach, spot remover)
<u>Polish</u>	<u>Automotive Products</u>
Automobile	Motor Oil
Furniture	Transmission fluid
Shoe	Hydraulic fluid
Leather	Carburetor cleaner
Metal	Radiator cleaner
	Antifreeze
<u>Adhesives and Sealants</u>	Engine Cleaner
Caulk	Lubricant
Solvent-based adhesives	Used oil filters
	Waste oil in containers
<u>Batteries</u>	<u>Paint and Coatings</u>
Household (alkaline)	Solvent and thinner
Rechargeable	Oil-based paint
Automotive	Water-based paint
Other	Varnish and stain
	Spray paint
	Auto paint

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Source: SRI International, Waste Characterization Study: Assessment of Recyclable and Hazardous Components, Second Semiannual Progress Report, August, 1987 (Table appeared in Solano County Waste Management Plan, Volume I, Brown, Vence & Associates, August, 1989).

TABLE III-2

ESTIMATED HOUSEHOLD HAZARDOUS WASTE GENERATION WITHIN THE UNINCORPORATED COUNTY

Waste Group	% of total	Tons of Household Hazardous Waste Generated			
		1990	1995	2000	2005
Waste Oil	34.6	9.4	10.9	12.5	13.6
Halogenated Solvents(a)	0.6	0.2	0.2	0.2	0.2
Nonhalogenated Solvents(b)	6.7	1.8	2.1	2.4	2.6
Organic Liquids(c)	3.1	0.8	1.0	1.1	1.2
Pesticides	2.7	0.7	0.9	1.0	1.1
Nonhalogenated Org Sludges/Solids(d)	3.9	1.1	1.2	1.4	1.5
Dye and Paint Sludges/Solids	24.6	6.7	7.8	8.9	9.7
Nonmettalic Inorganic Liquids(e)	8.6	2.3	2.7	3.1	3.4
Other Inorganic Solid Wastes(f)	15.2	4.1	4.8	5.5	6.0
	100.0	27.2	31.6	36.1	39.4

- (a) An example is trichloroethylene.
- (b) Examples are paint thinner and some household cleaners.
- (c) Common example is antifreeze.
- (d) Some polishes and cleaners.
- (e) An example is bleach.
- (f) An example is batteries.

Table IV-1  
DISPOSAL METHODS USED FOR  
HOUSEHOLD HAZARDOUS WASTES

Substance	Disposal Method (Percent of Households Using Method)						
	Sewer	Trash	Ground	Street	Recycle	Storage	Other
Chemical							
drain opener	3	97	0	0	0	0	0
Paints/thinners	18	76	3	3	0	0	0
Motor Oil	0	29	14	11	32	11	4
preservatives	7	90	0	0	0	0	3
Pesticides	2	97	0	0	0	0	0
Herbicides	0	100	0	0	0	0	0
Gasoline/ engine cleaner	9	91	0	0	0	0	0
Household cleaners	8	91	0	0	1	0	0
Auto/furniture polish	0	2	98	0	0	0	0
Antifreeze	6	94	0	0	0	0	0
Radiator flush	17	0	0	83	0	0	0
Other chemicals	6	94	0	0	0	0	0

Source: Association of Bay Area Governments (Table appeared in Solano County Hazardous Waste Management Plan, Volume I, Brown, Vence & Associates, August, 1989).

TABLE IV-2  
Household Hazardous Waste  
Collection Programs  
Unincorporated County: 1990

		Quantity Accepted	Fees	End User	Restrictions
Waste Oil	Mankas Corner Auto B&J Landfill	25 gal not available	\$1 per gal no fee	B.C. Stocking Evergreen	none
Car Batteries	B&J Landfill	not available	no fee	not available	not available
Paint	B&J Landfill	not available	no fee	Vallejo's Paint Recycling Program	Latex paints only
Antifreeze	B&J Landfill	not available	no fee	Evergreen	

**TABLE VI-1**  
**PROJECTED COLLECTION OF HOUSEHOLD HAZARDOUS WASTE GENERATION WITHIN**  
**UNINCORPORATED SOLANO COUNTY**

Waste Group	Tons per Year		Percentage of Waste Type Collected	
	1995	2000	1995	2000
Waste Oil	8.7	11.2	80.0	90.0
Halogenated Solvents	0.0	0.0	10.0	10.0
Nonhalogenated Solvents	0.2	0.2	10.0	10.0
Organic Liquids	0.4	0.6	40.0	50.0
Pesticides	0.1	0.1	10.0	10.0
Nonhalogenated Organic Sludges/Solids	0.1	0.1	10.0	10.0
Dye and Paint Sludges/Solids	2.3	4.4	30.0	50.0
Nonmettalic Inorganic Liquids	0.3	0.3	10.0	10.0
Other Inorganic Solid Wastes	1.4	2.7	30.0	50.0
	<u>13.6</u>	<u>19.8</u>		
Percentage of Total HHW Generated:	43.1%	54.8%		

Note: The collection rate for non-recyclable materials remains constant from 1995 to 2000. However, the selected program calls for an increase in source reduction. The increase is not reflected in this table.

**TABLE VI-2  
HOUSEHOLD HAZARDOUS WASTE RECYCLING WITHIN  
UNINCORPORATED SOLANO COUNTY**

Waste Group	Tons per Year		Percentage of Waste Type Collected	
	1995	2000	1995	2000
Waste Oil	8.7	11.2	80.0	90.0
Halogenated Solvents	0.0	0.0	0.0	0.0
Nonhalogenated Solvents	0.0	0.0	0.0	0.0
Organic Liquids	0.3	0.4	30.0	40.0
Pesticides	0.0	0.0	0.0	0.0
Nonhalogenated Organic Sludges/Solids	0.0	0.0	0.0	0.0
Dye and Paint Sludges/Solids	1.6	3.6	20.0	40.0
Nonmettalic Inorganic Liquids	0.0	0.0	0.0	0.0
Other Inorganic Solid Wastes	1.0	2.2	20.0	40.0
	<b>11.6</b>	<b>17.4</b>		
Percentage of Total HHW Generated:	<b>36.6%</b>	<b>48.3%</b>		



TABLE VII-1  
CONTINGENCY HOUSEHOLD HAZARDOUS WASTE PROGRAM  
START-UP COSTS

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COUNTY-WIDE COSTS

FIRST YEAR COSTS:

PLANNING	\$50,000
SITE ACQUISITION & PERMITTING	\$200,000
BUILDING DESIGN & ENGINEERING	\$15,000
TOTAL FIRST YEAR COSTS	\$265,000

SECOND YEAR COSTS:

CONSTRUCTION	\$200,000
EQUIPMENT:	
TRUCK	\$90,000
FORKLIFT	\$30,000
HANDTRUCK	\$1,000
OIL TANK	\$10,000
SAFETY EQUIPMENT	\$30,000
OFFICE AND LABORATORY EQUIP	\$10,000
DRUM STORAGE UNITS	\$60,000
INITIAL INVENTORY OF SUPPLIES	\$25,000
INITIAL STAFF TRAINING	\$10,000
TOTAL SECOND YEAR CAPITAL COSTS	\$466,000

ONE HALF ANNUAL OPERATING COST \$608,000

TOTAL SECOND YEAR COSTS \$1,074,000

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TOTAL START-UP COSTS \$1,339,000

TABLE VII-2  
CONTINGENCY HOUSEHOLD HAZARDOUS WASTE PROGRAM  
ANNUAL OPERATING COSTS

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LABOR	
PROGRAM MANAGER	\$62,000
CLERICAL	\$30,000
COLLECTION EVENT SUPERVISOR	\$40,000
PUB/ED COORDINATOR	\$40,000
DRIVER	\$40,000
CHEMIST	\$40,000
TECHNICIANS (4)	\$120,000
OPERATORS (5)	\$125,000
TOTAL LABOR	\$497,000
ADVERTISING	\$50,000
ON-GOING STAFF TRAINING	\$3,000
SHIPPING/DISPOSAL	\$500,000
SUPPLIES	\$100,000
FUEL/UTILITIES	\$20,000
MAINTENANCE	\$25,000
EQUIPMENT REPLACEMENT	\$20,000
TOTAL ANNUAL COSTS	\$1,215,000

TABLE VII-3  
UNINCORPORATED SOLANO COUNTY  
CONTINGENCY PROGRAM COSTS

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FIRST YEAR COSTS:

STAFF TIME FOR PLANNING (.4 FTE)	\$20,000
CITY'S SHARE OF COUNTY-WIDE COSTS	<u>\$17,200</u>
TOTAL FIRST YEAR COSTS	\$37,200

SECOND YEAR COSTS:

STAFF TIME FOR PLANNING (.25 FTE)	\$12,400
CITY'S SHARE OF COUNTY-WIDE COSTS	<u>\$30,300</u>
TOTAL SECOND YEAR COSTS	\$42,700

ANNUAL COSTS FROM YEARS THREE ONWARD IN 1991 DOLLARS

LOCAL COORDINATOR (.15 FTE)	\$7,500
CITY'S SHARE OF COUNTY-WIDE COSTS	<u>\$79,000</u>
TOTAL ANNUAL COSTS	<u>\$86,500</u>

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TABLE X-1  
 INITIAL ALLOCATION OF COUNTY COSTS  
 FOR CONTINGENCY PROGRAM

City/County	Percentage
City of Benicia	7.2%
City of Dixon	3.1%
City of Fairfield	22.7%
City of Rio Vista	0.1%
City of Vacaville	21.0%
City of Vallejo	32.1%
City of Suisun City	6.7%
Unincorporated Solano County	6.4%

TABLE X-2  
COUNTY-WIDE REVENUE REQUIREMENTS  
FOR CONTINGENCY PROGRAM  
(in thousands of 1991 dollars)

Year	County Cost	Less Grant	25% Contingency	Total County Revenue Required
1	\$265	\$45	\$66	\$286
2	1,074	\$45	\$269	\$1,298
3	1,215	\$45	\$304	\$1,474
4	1,215	\$45	\$304	\$1,474
5	1,215	\$45	\$304	\$1,474
6	1,215	\$45	\$304	\$1,474
7	1,215	\$45	\$304	\$1,474
8	1,215	\$45	\$304	\$1,474
9	1,215	\$45	\$304	\$1,474
10	1,215	\$45	\$304	\$1,474
11	1,215	\$45	\$304	\$1,474
12	1,215	\$45	\$304	\$1,474
13	1,215	\$45	\$304	\$1,474
14	1,215	\$45	\$304	\$1,474
15	1,215	\$45	\$304	\$1,474
16	1,215	\$45	\$304	\$1,474
17	1,215	\$45	\$304	\$1,474
18	1,215	\$45	\$304	\$1,474
19	1,215	\$45	\$304	\$1,474
20	1,215	\$45	\$304	\$1,474

TABLE X-3  
 UNINCORPORATED SOLANO COUNTY REVENUE  
 REQUIRED FOR CONTINGENCY PROGRAM  
 (in thousands of 1991 dollars)

Year	Total County Revenue Require	Share of County Costs	Unincorporated Planning Costs	Unincorporated Total Cost
1	\$286	\$18	\$15	\$33
2	\$1,298	\$83	\$10	\$93
3	\$1,474	\$94	\$5	\$99
4	\$1,474	\$94	\$5	\$99
5	\$1,474	\$94	\$5	\$99
6	\$1,474	\$94	\$5	\$99
7	\$1,474	\$94	\$5	\$99
8	\$1,474	\$94	\$5	\$99
9	\$1,474	\$94	\$5	\$99
10	\$1,474	\$94	\$5	\$99
11	\$1,474	\$94	\$5	\$99
12	\$1,474	\$94	\$5	\$99
13	\$1,474	\$94	\$5	\$99
14	\$1,474	\$94	\$5	\$99
15	\$1,474	\$94	\$5	\$99
16	\$1,474	\$94	\$5	\$99
17	\$1,474	\$94	\$5	\$99
18	\$1,474	\$94	\$5	\$99
19	\$1,474	\$94	\$5	\$99
20	\$1,474	\$94	\$5	\$99



# Solano County Household Hazardous Waste Program

**Figure VII-1  
Implementation Schedule**

Months from Commencement of Implementation

0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	
<i>Hire County Coordinator</i>																
	<i>Formation of County and Local Task Forces</i>															
	<i>Hire Consulting Engineer</i>															
	<i>Select Site for Centralized Facility</i>															
		<i>Acquire Facility Permit</i>														
					<i>Final Engineering and Design</i>											
									<i>Designation of Site for First Local Event</i>							
				<i>Negotiate and Sign Service Agreement</i>												
									<i>Facility Construction</i>							
									<i>Procurement of Equipment and Supplies</i>							
										<i>Staff Training</i>						
		<i>Prepare and Distribute Educational Material</i>														
											<i>Notify Residents of First Collection Event</i>					
											<i>Program Operation</i>					
											<i>Monitoring and Evaluation</i>					