SOURCE REDUCTION AND RECYCLING ELEMENT AND HOUSEHOLD HAZARDOUS WASTE ELEMENT

SOLANO COUNTY

FINAL DRAFT
MAY, 1992

Cal/EPA

California
Environmental
Protection
Agency

*Integrated
Waste
Management
Board*

*8800 Cal Center Drive
Sacramento, CA 95826
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Pete Wilson
Governor

James M. Strock
*Secretary for
Environmental
Protection*

June 18, 1997

Catherine McCarthy
Unincorporated Solano County
601 Texas Street
Fairfield, CA 94533

RE: Board Approval of the Unincorporated Solano County's Source Reduction and Recycling Element

Dear Ms. McCarthy:

This letter is notification that on May 28, 1997, the California Integrated Waste Management Board (Board) voted to upgrade the status of the Unincorporated Solano County's (County) final Source Reduction and Recycling Element (SRRE) from "Conditional" to "Approval". The Board determined that the County's SRRE, as corrected, substantially complied with all statutory and regulatory requirements. A copy of the Agenda Item and Board Resolution approving your SRRE is attached.

The County will need to submit a 1996 Annual Report to the Board no later than August 1, 1997. The Report should discuss progress in SRRE program implementation and changes in the City's waste stream or diversion programs, as required by California Code of Regulations Section 18794.0 - 18794.6. The Report should include data for 1996 on your jurisdiction's progress toward the 25% disposal reduction goal. A copy of the Board's Model Annual Report, including forms and a user's guide, may be obtained upon request.

In closing, we would like to congratulate you on the approval of your SRRE. We look forward to working with you as your jurisdiction implements its programs. Should you have any questions about these written findings, please contact Kaoru Cruz of the Office of Local Assistance at (916) 255-2391 or Elsie Brenneman of the Waste Characterization and Analysis Branch at (916) 255-2898.

Sincerely,

J. Van Kleeck

Judith J. Friedman, Deputy Director
Diversion, Planning, and Local Assistance Division

Attachments: Agenda Item #19
Resolution No. 97- 161 Approval of the SRRE

cc: Harry Engelbright
Solano County Local Task Force
Department of Environmental Management
601 Texas Street
Fairfield, CA 94533

California Integrated Waste Management Board

LOCAL ASSISTANCE AND PLANNING COMMITTEE

May 14, 1997

AGENDA ITEM 19

ITEM: CONSIDERATION OF STAFF RECOMMENDATION ON THE ADEQUACY OF THE PREVIOUSLY CONDITIONALLY APPROVED SOURCE REDUCTION AND RECYCLING ELEMENT FOR UNINCORPORATED SOLANO COUNTY

STAFF COMMENTS:

On May 23, 1995 the Board voted to conditionally approve the final Source Reduction and Recycling Element for Unincorporated Solano County. The Board's decision was based on jurisdiction diversion projections that fell short of the mandated levels, but were high enough for a conditional approval.

The jurisdiction has submitted additional information regarding its 1995 diversion projections, and has requested that the Board reconsider its SRRE. The additional information consisted of more up-to-date 1995 projections based on actual disposal amounts from the Disposal Reporting System. Board staff has determined that the request has been adequately documented. As shown in the following table, the updated projections are consistent with the 25% goal for 1995 and the 50% goal for 2000. Because there are no other outstanding issues with the SRRE, Board staff recommends that the Board approve the SRRE.

Solano County	Base-Year			1995 SRRE Projections			2000 SRRE Projections		
	Dis.	Div.	Gen.	Dis.	Div.	Gen.	Dis.	Div.	Gen.
Prior Board Conditionally Approved Tons	14,065	547	14,612	14,587	4,505	19,092	9,384	9,623	19,00
Updated Tons				10,376	4,199	14,575			
Conditionally Approved Diversion rates	3.7%			23.6%			50.6%		
Updated Diversion rates				**28.8%**					

ATTACHMENTS:

Resolution No. 97-161

APPROVALS:

Prepared by: Elsie Brenneman c/s for EB Phone: 255-2898

Reviewed by: Catherine Cardozo c/s for CC Phone: 255-2396

Reviewed by: Patrick J. Schiavo PJS for PJS Phone: 255-2656

Reviewed by: Judith J. Friedman JJF Phone: 255-2302

Legal Review: EB Date/Time: 5/1/97

CALIFORNIA INTEGRATED WASTE MANAGEMENT BOARD
RESOLUTION NO. 97-161

APPROVAL OF THE PREVIOUSLY CONDITIONALLY APPROVED SOURCE REDUCTION AND RECYCLING ELEMENT FOR UNINCORPORATED SOLANO COUNTY

WHEREAS, the jurisdiction previously submitted a Source Reduction and Recycling Element, and at the May 23, 1995 Board meeting, the SRRE was conditionally approved; and

WHEREAS, that conditional approval was based on diversion projections below the diversion goals set forth in Public Resources Code (PRC) Section 41780 of 25 percent by 1995 and 50 percent by 2000; and

WHEREAS, the jurisdiction has submitted additional information; and

WHEREAS, based on review of the additional information, Board staff found that the SRRE is now consistent with the diversion goals of 25 percent by 1995 and 50 percent by 2000 and Board staff recommends approval of the SRRE; and

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves the Source Reduction and Recycling Element for Unincorporated Solano County.

CERTIFICATION

The undersigned Executive Director of the California Integrated Waste Management Board does hereby certify that the foregoing is a full, true and correct copy of a resolution duly and regularly adopted at a meeting of the California Integrated Waste Management Board held on May 28, 1997.

Dated: MAY 29 1997

Ralph E. Chandler
Executive Director

SOURCE REDUCTION AND RECYCLING ELEMENT AND HOUSEHOLD HAZARDOUS WASTE ELEMENT

SOLANO COUNTY

FINAL DRAFT
MAY, 1992

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UNINCORPORATED AREAS OF SOLANO COUNTY

INTRODUCTION

The Integrated Waste Management Act of 1989 (AB 939) mandated that each City and County in the State of California develop a Source Reduction and Recycling Element (SRRE) for inclusion in the County Integrated Waste Management Plan. This SRRE was prepared for Solano County in accordance with California Integrated Waste Management Board (CIWMB) regulations by a team of consultants including 3E Engineering, Environmental Consulting and Technology, and Gainer and Associates. The SRRE, however, must be adopted by Solano County in order to be accepted by the CIWMB. The SRRE, therefore, is written in a "the County will..." format, rather than as a set of recommendations from the consultant team.

The Integrated Waste Management Act is a comprehensive law which will cause many changes to California's solid waste management system. AB 939 creates a waste management hierarchy in which landfilling is the least desirable form of solid waste management. The best form of solid waste management is source reduction (including reuse), followed by recycling and composting, and then transformation (combustion). This hierarchy reflects a desire to minimize the one time use of natural resources in our economic system.

The law requires that each local jurisdiction in the State must divert from disposal 25% of its waste stream by January 1, 1995 (short term) and 50% by January 1, 2000 (medium term) or risk fines of up to $10,000 per day. The CIWMB may grant extensions of up to one year for meeting the diversion objective if adverse market conditions beyond the control of the jurisdiction can be demonstrated.

WASTE CHARACTERIZATION

The CIWMB defines waste generation as the sum of waste disposed and waste diverted. Disposal includes landfilling and transformation (burning) in CIWMB permitted facilities. After 1995, transformation can count as diversion under certain circumstances. Diversion includes source reduction, recycling, and composting. The current distribution of the unincorporated county's wastes into these groups is presented in Figure ES-1. The diversion rate equals the total diversion divided by the total generation.

The unincorporated county disposed of approximately 14,100 tons of solid waste in calendar year 1990. Of the waste disposed through the franchised garbage haulers, 6,045 was

residential waste, 1,766 was commercial waste, and 1,927 was industrial waste. 4,336 tons were self-hauled by Solano County residents to landfills in Solano County, Napa County, or Yolo County. Drilling mud is not included in this inventory in accordance with PRC Section 41781 (b)(2). About 30,000 tons per year of drilling mud from Solano County are disposed at a disposal site in Orland. Distribution of disposed waste into the four waste sectors is presented in Figure ES-2.

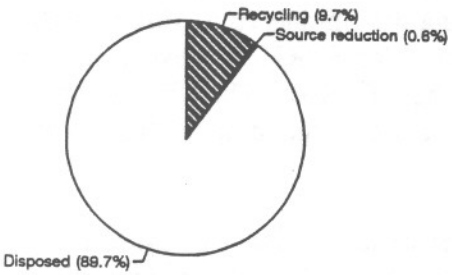

FIGURE ES-1 Distribution of Generated Waste

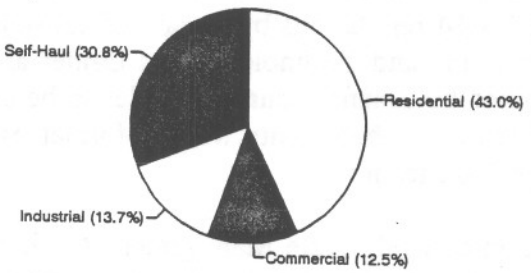

FIGURE ES-2 Distribution of Disposed Waste by Sector

The CIWMB has defined 36 waste types divided into eight categories. The disposed quantities in each of the eight categories are presented in Figure ES-3.

Existing diversion (sometimes referred to as the baseline diversion percentage) is equal to about 10.3% of the entire solid waste stream. This diversion occurs through a number of channels, including programs sponsored by the State, a charity or other non-profit group, or the landfill operator. Some diversion occurs through the free market (for example, cardboard from large grocery stores) and by individual decisions (for example, the choice to use cloth diapers rather than disposable diapers). The amount of waste currently diverted is presented in Figure ES-4.

The State mandated diversion rates of 25% in 1995 and 50% in 2000 will be based on the refuse generation rates in 1995 and 2000. Continued monitoring of refuse disposed and diverted is needed to meet the requirement for annual documentation of progress toward these goals.

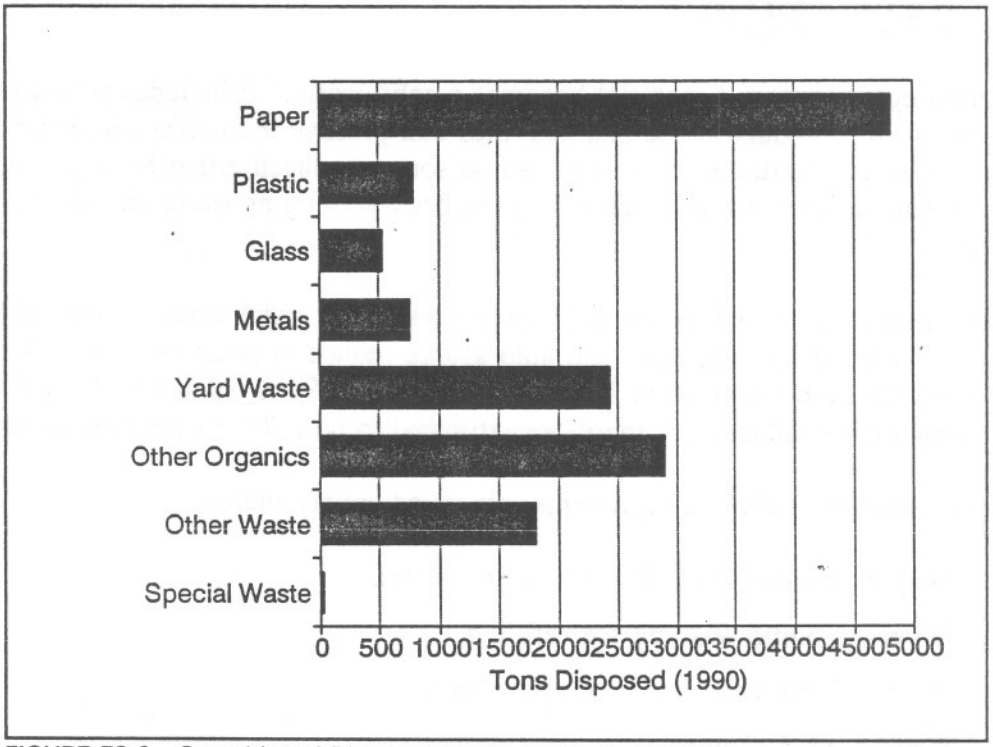

FIGURE ES-3 Quantities of Disposed Waste by Waste Category

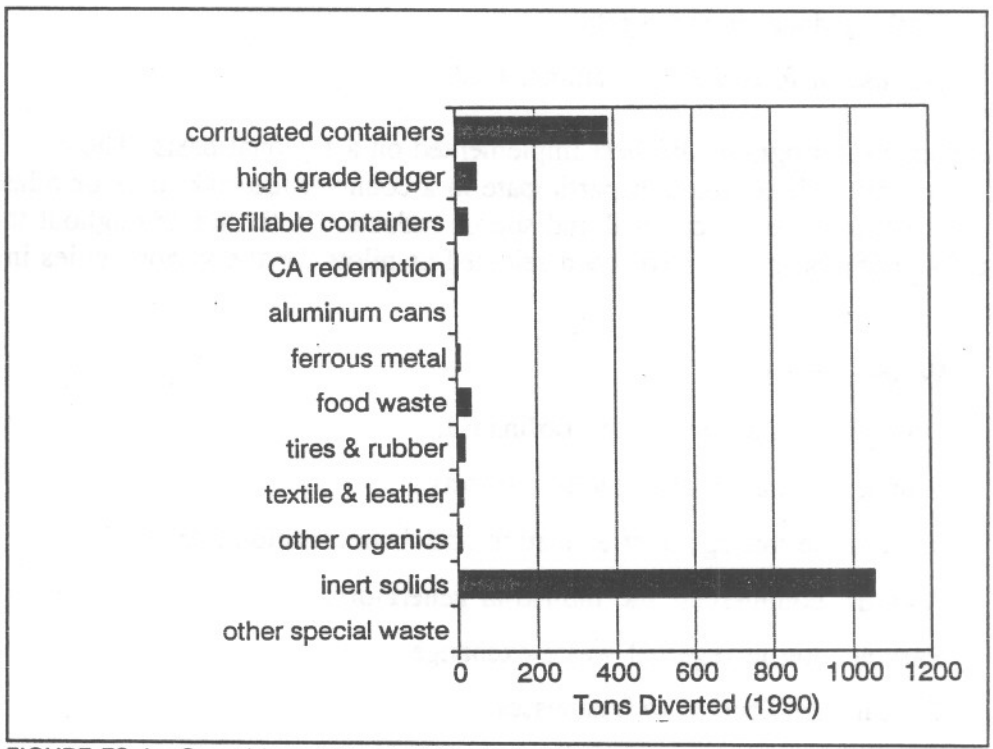

FIGURE ES-4 Quantities of Diverted Waste by Waste Type

SOURCE REDUCTION

Source reduction occurs before a material becomes a solid waste. It includes activities that reduce the amount of a product in use and activities that prolong the useful life of a product. For example, paper and plastic grocery bags can be source reduced either by not using them or by reusing them. Source reduction also includes back yard composting and the on-site use of plant debris as mulch.

Source reduction currently accounts for 0.6% diversion of the waste stream. The SRRE estimates that 1.2% diversion will occur through source reduction prior to January 1, 1995, and another 1.5% additional will occur between January 1, 1995 and January 1, 2001. Total diversion through source reduction is therefore estimated to be 2.7% in the year 2000.

Existing source reduction activities in the unincorporated county include:

- Diaper services to avoid disposable diapers.
- Beverage bottle washing for refilling.
- Recovery and resale of used appliances.
- Double-sided copying.
- Clothing donated and resold.
- The use of food waste as animal feed.

Many source reduction programs are best implemented on a regional basis. The unincorporated county will continue to participate in a county-wide task force or other organization that coordinates educational and source reduction activities throughout the county. The following programs have been selected as pilots for the various cities in Solano County:

- Waste surveys.
- Drought-resistant landscape ordinance.
- School curriculum and student projects.
- Yard waste management education and demonstration site.
- Awards, commercial and industrial generators.
- Participation in regional waste exchange.
- Technical assistance to businesses.

In addition to full-scale versions of these programs, the unincorporated county will implement the following source reduction programs:

- Surcharge at disposal facilities in the unincorporated county.
- In-house source reduction at County offices.
- Quantity-based hauling fees.

Source reduction is often the least expensive form of diversion. However, proving that source reduction actually has occurred and quantifying it often is difficult or expensive. For this reason, the selected source reduction activities are projected to divert only three percent of the waste stream from disposal. Significantly greater diversion by source reduction may actually occur as a result of the implementation of the SRRE, and may be counted for compliance if it can be proven to have occurred.

RECYCLING

Recycling refers to the use of waste materials as raw material in the production of new items. Waste used in this way is often referred to as a secondary material, or a secondary feedstock.

Recycling currently amounts to about 9.7% of the waste stream. The SRRE estimates that 12.5% additional diversion will occur through recycling prior to January 1, 1995, and another 19.1% will occur between January 1, 1995 and January 1, 2000. Total diversion through recycling is therefore estimated to be 31.6% in the year 2000.

Existing recycling activities in the unincorporated county include two buy-back center (pursuant to AB 2020), salvaging activities at landfills, and commercial recycling.

The congested areas of the unincorporated county are expected to phase in curbside recycling collection program from 1992 through 1996 as a cooperative effort with nearby cities as they implement their programs. The unincorporated county will also expand the drop-off and buy-back centers to service the sparsely populated areas and to collect materials that are not collected in the curbside programs.

Diversion programs selected for the short term planning period are structured to focus on materials for which markets and end uses are expected to be stable, or for which markets and end uses are local. Initially, a glut of secondary materials is expected due to the implementation of programs throughout California. In order to avoid rejection of collected materials in a buyer's market due to minor contamination, the recommendations focus on collection of source separated or minimally processed materials for the short-term planning period. Collection of extensively commingled recyclables with capital intensive centralized

processing is deferred until the medium-term planning period, when market stimulation programs should dissipate the buyer's market.

Recycling programs selected for the residential sector include:

- Single- and multi-family curbside collection for the congested areas, phased in from 1992 to 1996 in cooperation with nearby cities.
- Multi-family collection, phased in from 1992 to 1996, in cooperation with nearby cities.
- Expansion of materials at drop-off centers and buy-back centers (1992).
- Expansion of materials collected single- and multi-family collection (1996).

Initially, materials collected at the curbside will be processed at intermediate processing facilities (IPF) each consisting of a manual sorting line. The IPF's will be operated through programs in nearby cities. Expansion of the curbside programs in 1996 will be aimed at including more materials. This may require more mixing of recyclables and, hence, a more complex processing facility. The expansion of drop-off and buy-back centers in the short term will be aimed at the collection of materials not collected at curbside.

Programs selected for the commercial/industrial sector:

- Modify zoning and building codes to stress recyclability (1992).
- Encourage and assist commercial and industrial generators to recycle (1992).
- Expand County office recycling and procurement (1992).

Programs selected for the self-haul sector:

- Expand landfill salvaging and recycling (1992).

A high level of participation is necessary in order to achieve the 50% diversion objective. If high participation does not occur voluntarily, mandatory participation is a contingency measure.

COMPOSTING

Composting is defined by the CIWMB as the controlled biological decomposition of wastes. The CIWMB considers mulching (the spreading of undecomposed material on soil) to be recycling. Since feedstocks, processes, and markets for mulch are similar to those for

compost, both processes are discussed in the Composting Component of unincorporated county's SRRE. The feedstocks include yard waste, wood waste, and food waste. The first two materials can also be used as boiler fuel. This option is rejected in the SRRE because the CIWMB does not count combustion as a diversion credit, pursuant to existing State legislation.

Composting currently does not account for any diversion of the waste stream. The SRRE estimates that 3.8% diversion will occur through composting and mulching prior to January 1, 1995, and another 14.6% will occur between January 1, 1995 and January 1, 2001. Total diversion through composting is therefore estimated to be 18.4% in the year 2000.

New composting programs include yard waste, food waste, and wood waste collection, processing, and marketing. These wastes compose an estimated 31% of the unincorporated county disposed waste stream (17% yard waste, 9% wood waste, 5% food waste).

The collection of yard waste and food waste on a separate curbside collection route can be expensive. A relatively inexpensive way of collecting yard waste is in special bags which would be collected concurrently with mixed refuse. A pilot program to evaluate this relatively new technology is included in the SRRE's of most cities in Solano County. The pilot programs throughout the county for yard waste collection are scheduled for the short term and the pilot programs for food waste collection are scheduled for the medium term. In the event that the bag system does not perform well, separate collection of yard waste will be necessary. The unincorporated county will participate in yard waste collection programs established in nearby cities after they have been proven to be effective.

In the early phases of the composting program, only brushy yard waste and wood waste will be chipped, screened, and marketed as a mulch. In the short term, green yard waste may also be collected at drop off centers. Curbside collection of yard waste in the unincorporated areas will be postponed until 1996. In 1996, pilot food waste collection and processing systems will be implemented by the cities. Full scale implementation in both the cities and unincorporated areas is scheduled for 1998. The advantage of the mulching operation in the short term is that it has lower cost, is easier to permit, and produces a product which can likely be used as daily cover at a landfill if other end uses do not exist. Postponing curbside collection until 1996 will minimize costs and encourage backyard composting.

SPECIAL WASTES

Special wastes are nonhazardous wastes requiring special collection or disposal procedures. They include sewage sludge, asbestos, tires, dead animals, and drilling mud. There is no sewage sludge in the unincorporated county. The primary purpose of the special waste

component is to ensure that special wastes are handled in an environmentally sound way. Usually, their diversion from disposal is of secondary importance.

Drilling mud from natural gas well drilling operations composes a major part (about 70%) of the waste from the unincorporated county. In accordance with PRC 41781 (b)(2), it is not counted as solid waste in the waste generation study. It is an inert waste for which no diversion program was in effect as of January 1, 1990. Aqua Clear Farms is a potential disposal site for drilling mud in Solano County and is expected to be permitted in late 1991. There may be ways of recycling or source reducing some of the mud, but they are currently unproven and need to be evaluated. This evaluation should be done as the permitting process proceeds.

There is a market for used tires in Solano County which will be promoted and developed. The diversion accomplished from these programs is relatively minor. Asbestos will continue to be disposed safely at the B&J Landfill and the Potrero Hills Landfill, or other permitted facilities. Dead animals are handled by the Solano County Animal Shelter. A small public information effort will supplement the existing spaying and neutering program.

EDUCATION AND PUBLIC INFORMATION

Most programs selected for implementation include an education and public information activity. Residents and businesses will need to be informed of curbside collection practices, rate increases, back yard composting practices, new ordinances, the availability of compost and mulch, and the importance of their participation in all programs. Businesses and institutions will be provided with instructions on how to reduce or recycle their wastes.

Educational media will include a telephone hotline, printed brochures, video tapes, a resource conservation directory, and personal contact through compost demonstration, neighborhood block leaders, information booths at public events, and school curricula. The unincorporated county will also utilize news media to publicize events and programs and to promote an awareness of solid waste issues.

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).

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 (see Figure ES-5). 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.

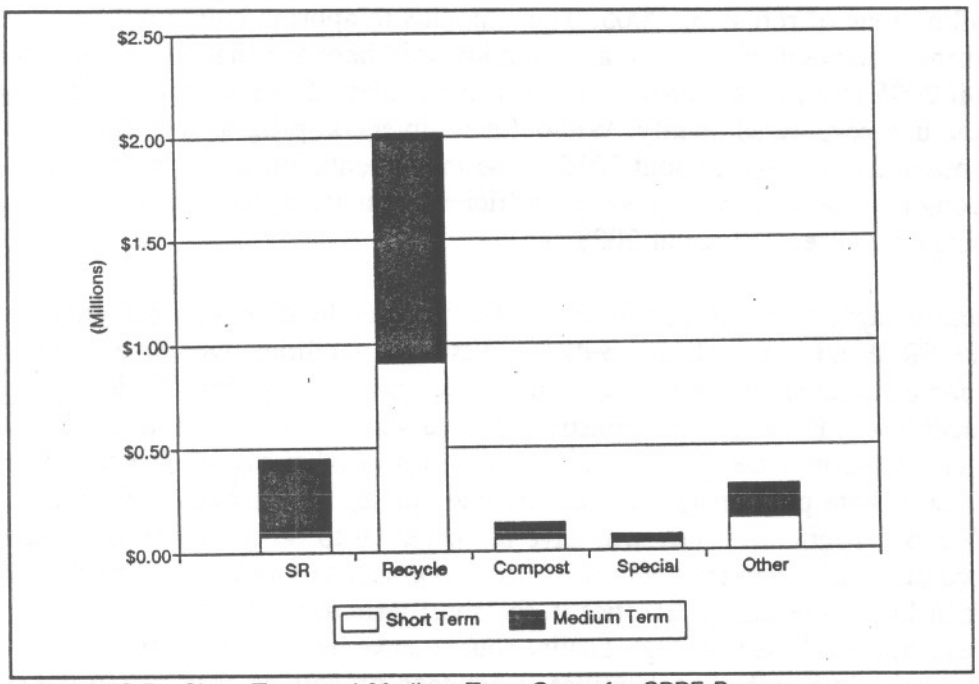

FIGURE ES-5 Short Term and Medium Term Costs for SRRE Programs

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.

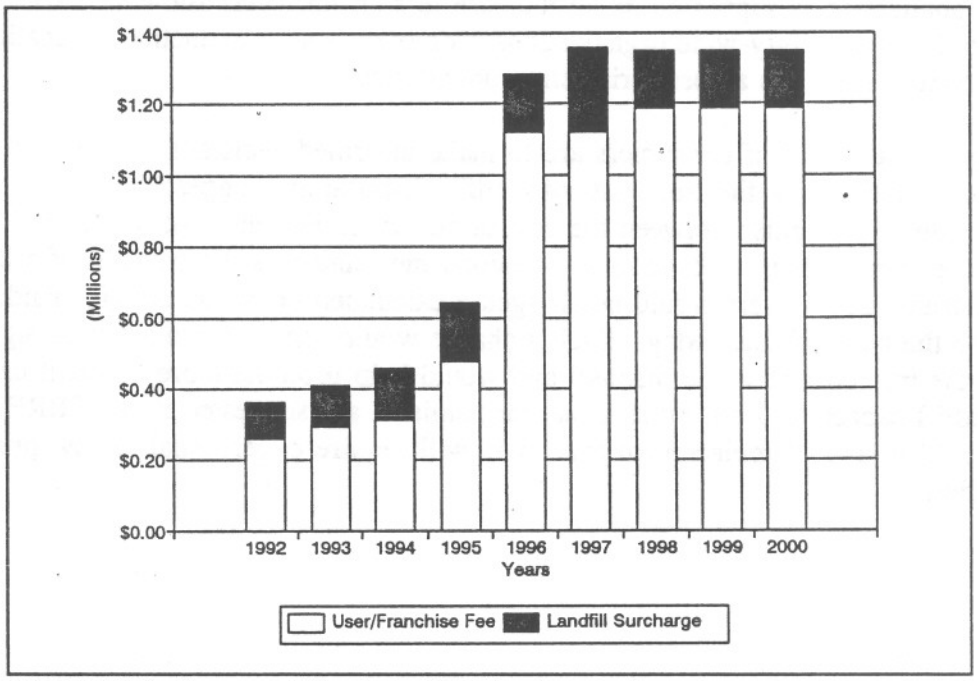

FIGURE ES-6 Sources of Funds for SRRE Implementation

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 I SUMMARY
WASTE CHARACTERIZATION

The CIWMB defines waste generation as the sum of waste disposed and waste diverted. Disposal includes landfilling and transformation (burning) in CIWMB permitted facilities. After 1995, transformation can count as diversion under certain circumstances. Diversion includes source reduction, recycling, and composting. The diversion rate equals the total diversion divided by the total generation.

The unincorporated county disposed of approximately 14,100 tons of solid waste in calendar year 1990. Of the waste disposed through the franchised garbage haulers, 6,045 was residential waste, 1,766 was commercial waste, and 1,927 was industrial waste. 4,336 tons were self-hauled by Solano County residents to landfills in Solano County, Napa County, or Yolo County. Drilling mud is not included in this inventory in accordance with PRC Section 41781 (b)(2). About 30,000 tons per year of drilling mud from Solano County are disposed at a disposal site in Orland.
Existing diversion (sometimes referred to as the baseline diversion percentage) is equal to about 10.3% of the entire solid waste stream. This diversion occurs through a number of channels, including programs sponsored by the State, a charity or other non-profit group, or the landfill operator. Some diversion occurs through the free market (for example, cardboard from large grocery stores) and by individual decisions (for example, the choice to use cloth diapers rather than disposable diapers).

The State mandated diversion rates of 25% in 1995 and 50% in 2000 will be based on the refuse generation rates in 1995 and 2000. Continued monitoring of refuse disposed and diverted is needed to meet the requirement for annual documentation of progress toward these goals.

CHAPTER I
WASTE CHARACTERIZATION COMPONENT

A. GOALS AND METHODOLOGY

This waste generation study (WGS) was conducted to promote the following three goals:

- Establish a WGS methodology.
- Determine current waste generation and diversion rates.
- Estimate potential diversion rates.

The first goal is to establish a methodology or system of reporting that will enable Solano County (throughout this chapter, "Solano County" refers to the unincorporated sections of Solano County or the County government unless otherwise stated) to quantify its waste diversion rate in accordance with Assembly Bill 939 and CIWMB regulations. In the future, Solano County will file annual reports on its progress toward the mandated waste diversion objectives of 25% by 1995 and of 50% by 2000. The system of reporting the quantity of diverted and disposed refuse that is presented here will serve as the basis for the required future documentation.

The second goal is to determine the current waste generation rate and the current waste diversion rate in the unincorporated county. The diversion rate in the future can be compared to the current diversion rate to track progress toward the mandated diversion objectives. The current generation rate was determined through surveys and interviews of waste haulers, landfill operators, and businesses that recycle, or that reduce the production of refuse.
The current generation rate may be useful in determining the effect of source reduction programs using a "top-down" approach. This approach is explained in Chapter II. It consists of using the current waste generation rate to project the generation rate in the future. The quantity of source reduced refuse in the future is equal to the difference between the projected generation rate and the sum of the measured disposal rate, the measured recycling rate, and the measured composting rate. The achievement of this objective requires no knowledge of the composition of the waste stream.

The third goal of the waste generation study is to provide data that will assist in developing order of magnitude estimates of the quantities of materials that can or cannot be diverted through source reduction, recycling, or composting programs. It is a premise of this SRRE that waste diversion programs should be selected primarily on the basis of the availability of end uses for recycled materials and on the premise that source reduction should be practiced

wherever it is practical. The concentration of the material in the waste stream is of lesser importance. For example, polyvinyl chloride (PVC) and low density polyethylene (LDPE) often occur in higher concentrations in the waste stream than do products made from high density polyethylene (HDPE) and polyethylene terephthalate (PET). Nevertheless HDPE and PET are often targeted for recycling while PVC and LDPE are not. This is due to the relative ease of marketing HDPE and PET.

A quantitative field analysis (QFA) was not used to characterize the disposed waste from Solano County for three reasons. First, the accepted methodology for a QFA yields an accuracy that is, for some materials, only a rough estimate of the actual quantity of that material in the waste stream.

The second reason is that diversion rates depend on factors other than the composition of the waste stream. These other factors, such as public participation rates, are estimated based on the experience gained through recycling programs in other jurisdictions in California and in other states. Improving the accuracy of a waste characterization study may do little to improve the overall accuracy with which a diversion rate can be predicted because of greater inaccuracies in other factors that enter the calculation.

The third reason for not doing a QFA in this study is that the success of waste diversion programs depends on many factors. Solano County has chosen to estimate the composition of its refuse by using data generated by QFA's done in other areas because the accuracy of those data is sufficient for the design of diversion programs and because increased accuracy would add little or nothing to the likelihood that selected programs will succeed. The success of selected programs will be determined through on-going monitoring.

B. CURRENT WASTE GENERATION

B.1. DISPOSED QUANTITIES

The refuse in the congested areas in the unincorporated parts of Solano County is collected by the refuse hauler that serves the nearest city. Generally, service is not mandatory and parts of the county are not served by a franchised waste hauler. Refuse haulers that serve the unincorporated county include Vacaville Sanitary Service, Dixon Sanitary Service, Solano Garbage Company, Rio Vista Sanitation Service, and Vallejo Garbage Service. Refuse from the unincorporated areas is disposed at B&J Landfill, Rio Vista Landfill, Potrero Hills Landfill, and American Canyon Landfill. The quantity of refuse delivered to each landfill is shown in Table I-1.

The quantity of residential, commercial, and industrial refuse was reported by franchised waste haulers. The data were from the haulers weight records. The haulers disaggregated the data by jurisdiction according to their recorded weights or according to the number of accounts in each jurisdiction served. Similarly disaggregation among residential, commercial, and industrial sectors was in accordance with weight records. Generally, refuse for the three sectors is delivered in particular vehicles. That is, residential refuse is hauled in rear load vehicles; commercial refuse is hauled in front load vehicles; industrial refuse is hauled in debris boxes. The quantity of self-haul refuse was reported either by the franchised haulers or by landfill operators. In most cases, the self-haul refuse delivered to a landfill was apportioned among jurisdictions using the landfill. Apportionment was done either on the basis of the number of residences served by the landfill or on the basis of the relative quantity of other waste delivered to the landfills by each jurisdiction.

The Yolo County Department of Public Works reported that 8,000 tons of refuse from Dixon, Vacaville, and unincorporated areas of Solano County were disposed in Yolo County in 1990. The total quantity was apportioned among those jurisdictions. Solano County's share is share is 1600 tons.

Some types of waste were quantified in this study through reports or interviews with handlers of those wastes. These wastes required special consideration because of potential hazards or other handling difficulties they cause. They include asbestos, dead animals, and drilling mud. The quantity of dead animals was reported by the Solano County Animal Shelter. Special wastes are discussed in more detail in Chapter V.

Sewage sludge is not generated by the unincorporated parts of Solano County. Septic tank pumpings are disposed into the influent to wastewater treatment plants that serve incorporated cities. In this study, the resulting sludge is taken to be a waste generated in the city served by the treatment plant.

The quantity of drilling mud was reported by the Solano County Department of Environmental Management. Currently, drilling mud is disposed in a landfill in Orland, California. Drilling mud is an inert waste for which no diversion program was in effect as of January, 1990. In accordance with PRC Section 41781 (b) (2), it is not counted as solid waste in this element. Special wastes are discussed in more detail in Chapter V.

Sources of information on the quantities and on the composition of all disposed and diverted wastes are given in Table I-8.

The volume of disposed refuse can be estimated by dividing the weight (in tons) by a density of 0.6 tons per cubic yard (*Caterpillar Performance Handbook*, by Caterpillar, Inc. Peoria,

1987, page 731). The 14,100 tons of disposed waste from the unincorporated county occupy an estimated 23,500 cubic yards of space.

No marine wastes have been identified in unincorporated Solano County.

B.2. DIVERTED QUANTITIES

About 10.3% of the generated solid waste in Solano County is diverted from disposal through source reduction and recycling activities that were identified in this study. Most of the diverted waste is concrete and asphalt (see Table I-4).

SOURCE REDUCTION

Waste types that have been counted as source reduced waste include:

- Disposable diapers (other organic waste).
- Used clothing (textiles).
- Reused wine and beer bottles (refillable containers).
- The use of food waste as animal feed.
- Photocopy paper used on two sides (high grade ledger).

Several source reduction activities could not be quantified in this study because of the scarcity of data or because they were not intended by the legislature to be counted. These activities include:

- Digestion and dewatering of sewage sludge.
- Repair of motor vehicles, buildings, roads, etc.
- Birth control.
- Use of plastic in containers and durable goods.
- Use of electronic media to replace printed matter.
- Coating of metal and wood to inhibit corrosion and decay.
- Onsite uncontrolled decay of vegetation.
- Mass transit, bicycles, and walking to reduce production of auto waste.

Source reduction activities that were quantified are discussed in the Existing Conditions section of Chapter II. The method of quantification is summarized in Table I-8. They

amount to less than one percent of the solid waste generated by Solano County (see Table I-2).

RECYCLING

Waste types that are currently recycled include:

- Corrugated containers.
- Newspaper.
- High grade ledger.
- PET plastic.
- Glass containers.
- Aluminum cans.
- Ferrous metal.
- Tires and rubber.
- Concrete and asphalt.
- Other special waste (dead animals).

Recycling activities that were quantified are discussed in more detail in the Existing Conditions section of Chapter III.

About 9.7% of the waste from Solano County is diverted through recycling (see Table I-3). Sources of information on the quantity of recycled materials are summarized in Table I-8.

B.3. REFUSE COMPOSITION

METHODOLOGY

No direct data are available on the composition of the disposed waste stream in unincorporated Solano County. Preexisting solid waste generation studies were used to estimate the composition of the refuse. This methodology is allowed by Section 18724(c) of the CIWMB regulations.

Preexisting studies were selected from available studies on the basis of certain criteria identified in CIWMB regulation or workshops as adequate indicators of the composition of the waste stream. Parameters such as total population and total employment or number of businesses were not used because they are indicators of the quantity of waste generated rather than of the composition of the waste. Data from *Projections 90* (Association of Bay Area Governments, 1989) were used to compare demographic parameters.

A study of the residential refuse in Palo Alto (EMCON Associates, 1991) was selected to estimate the composition of the residential waste in Solano County on the basis of the following three parameters.

1. Climate - The growing seasons and types of vegetation are similar.
2. Income - The average annual household income in the unincorporated area of Solano County is $41,200. In Palo Alto, it is $59,100. The effect of the difference in incomes on the refuse composition is expected to be small because the cost of living in Solano County is less than in Palo Alto. The congested areas of the unincorporated county are predominantly suburban neighborhoods.
3. Household Size - The average household size in Solano County is 2.89 people per household. In Palo Alto, it is 2.31 people per household.

The composition of the commercial refuse in Yorba Linda was used to estimate that in the unincorporated county because the ratio of the employment in the retail sector to the total employment in the commercial sector is similar. This ratio was used as an indicator of the composition of the commercial waste stream because waste from the retail sector is expected to differ from that of the rest of the commercial sector (e.g., government and business offices) in several important aspects. Generally, the concentration of cardboard, bottles, tin cans, and food waste is higher in the retail sector than in the remainder of the commercial sector. The concentration of high grade ledger is lower in retail waste than in waste from other commercial establishments. In Solano County the ratio is 1.0 retail jobs per commercial job; and in Yorba Linda it is about 0.8 retail jobs per commercial job.

The composition of the industrial waste stream was estimated by averaging the composition of the industrial waste streams from five cities in California (see Table I-8). Many possible demographic parameters that might characterize the industrial sector in a city are not deemed to be indicators of the waste stream from that sector. This may be a result of the CIWMB definition of industrial waste which includes all waste placed in debris boxes. Large retailers and other commercial waste generators may be included in previous studies attempting to characterize industrial waste. In addition, industries that produce very different products may all produce waste streams with similar concentrations of office paper, cardboard, and wooden pallets because those wastes are common to a wide variety of industrial activities. The production of large quantities of certain recyclable materials such as scrap metal is not reflected in the waste stream of the industries that produce those materials because the materials are never thrown away. Therefore, an average of the composition of the industrial waste streams from several cities is considered to provide an indication of the concentration of Solano County's industrial waste stream that is accurate enough to achieve the goals listed at the beginning of this chapter.

The composition of the waste stream from the self-haul sector is predicted by the average composition from three preexisting studies. The studies are listed in Table I-8. An average value was used because the composition of the self-haul waste from a single city tends to vary significantly over time. This decreases the accuracy of a quantitative field analysis, unless it occurs over a very extended period. Accuracy can be increased by increasing the number of samples analyzed. Averaging the results from several studies allows a greater number of samples to be considered and is likely to increase the accuracy of the estimation. In addition, demographic indicators of the composition of self-haul waste are not reliable. The three pre-existing studies chosen for averaging represent a range of self-haul generators in a similar economic and climatic region.

COMPOSITION

The estimated composition of the waste stream in Solano County is shown in Table I-5. The five major components of the residential waste stream are newspaper, mixed paper, "other" paper, yard waste, and food waste. The compostable materials, yard waste and food waste, are about one fourth of the residential waste. The mixed paper and "other" paper may be compostable and may be partly recyclable, but it is not generally sought either as a feedstock for composting or as an easily marketed recyclable material. Newspaper is readily recyclable although the price paid for it has fluctuated dramatically.

Half of the estimated commercial waste stream consists of cardboard, mixed paper, yard waste, and food waste. The industrial and self-haul refuse have high concentrations of wood waste which can be burned as fuel or used as a soil amendment.

Asbestos produced in the unincorporated areas of Solano County would not be counted in a quantitative field analysis. The quantity was estimated through the Solano County Hazardous Waste Management Plan (see Table I-8 and the Special Waste Chapter of this document).

Drilling mud is not included in Table I-5 because Section 41781 (b)(2) of the Public Resources Code indicates it is not to be counted as solid waste. It is an inert material that is not recycled. About 30,000 tons of drilling mud are produced annually in unincorporated Solano County. If drilling mud were included in this inventory, it would compose about 70% of the solid waste in the unincorporated county. It would then be impossible for Solano County to achieve a 25% diversion rate unless drilling were curtailed or unless technology and a regulatory framework were developed to allow it to be recycled. In Chapter V (Special Wastes) of this SRRE, a plan for the management of drilling mud in Solano County is discussed. Since drilling mud is such a large fraction of the waste generated in the unincorporated county, the County intends to deal with it as a distinct material (i.e., distinct from the rest of the waste stream). Any recycling or source reduction of drilling mud will not be counted toward the achievement of the 25% and 50% diversion objectives, and drilling mud will not be counted as a generated waste in the calculation of the diversion rate.

Household hazardous waste (HHW) is discussed in detail in a separate element. Generally, the results of a quantitative field analysis are not to be relied upon to indicate the amount of HHW generated in a community. Field analyses are statistically inaccurate in predicting the concentration of small percentage components of the disposed waste stream. Furthermore, HHW is often disposed in ways that make it inaccessible to those conducting a QFA (e.g., disposal of oil and antifreeze into storm drains).

C. PROJECTIONS OF WASTE QUANTITIES

The quantity of waste to be disposed and diverted in Solano County in the absence of new diversion programs is projected in Table I-6. The projection is based on the following assumptions and estimations.

- The population and number of jobs rise at a rate projected by ABAG.
- The generation of refuse per person in the residential sector and the generation per job in the commercial and industrial sectors remain constant. This is a neutral assumption reasonable for a fifteen year projection. At present, per capita generation rates in the United States are rising.
- The overall diversion rate for each waste type remains constant.

The quantity of waste estimated to be disposed and diverted in Solano County in the presence of the diversion programs selected in this element is projected in Table I-7 (this table is not included in this draft). The diversion rates used in Table I-7 are estimated to result from the implementation of planned diversion programs.

These projections have been prepared as required by the CIWMB. The total tonnage projections for each year are reasonable. The tonnage by material type projections are not reliable due to the following factors:

- The growth rate in Solano County is substantial during the planning period.
- Purchasing and packaging preferences of the public cannot be estimated accurately in advance.
- Changes in technology and economic factors (material costs) will alter the relative costs of products and therefore purchase and disposal practices, in ways that cannot be foreseen.

D. SOLID WASTE GENERATION ANALYSIS

A list of the quantities of materials currently diverted from disposal, and the quantities of materials currently disposed is provided in Table I-4.

Almost all of the waste types established by the CIWMB can be diverted from disposal through programs described in this element. Most materials that are difficult or impossible to recycle or to compost can be source reduced through moderate changes in habits and lifestyles. Examples include paper cups (other paper) which can be conserved through the use of glasses and ceramic mugs, and appliances and home furnishings (other plastic, rubber, non-recyclable glass and other organics) which can be repaired and sold in thrift shops.

The diversion of asbestos through new diversion programs is impractical. Asbestos will gradually decline as a component of the waste stream because its use has been prohibited in many applications in which it was formerly used. The asbestos that is retired from use must be disposed because it is a hazardous and inert material. The methods by which all other waste types can be diverted are summarized in Table I-9.

Solano County intends to promote the diversion of all waste types in its waste stream (as indicated in Table I-9), except asbestos and wastes that occur in negligible amounts. However, the diversion of some waste types may not be specifically quantified in future studies. All waste types for which diversion can be quantified through a reasonable degree of effort will be counted toward the diversion goals of 25% and 50%. This could include any of the waste types listed in Table I-9 except asbestos.

The quantity of some types of source reduced waste is nearly impossible to determine. Solano County intends to use a top-down approach to measuring source reduction to the extent that the method is permitted by the CIWMB. The diversion of all waste types listed in Table I-4 would then be counted toward meeting the statutory diversion mandates. The top-down method of measurement would not determine the quantity of each individual type of waste that is diverted.

Solano County also intends to use a bottom-up measurement approach. This method will determine a quantity of each individual type of waste that is source reduced, but it is likely to greatly undercount source reduction.

E. FUTURE WASTE GENERATION STUDIES

E.1. GUIDELINES AND REGULATORY REQUIREMENTS

The Solano County Integrated Waste Management Plan, of which this SRRE is a part, will be submitted to the CIWMB by January 1, 1994. This date was chosen on the basis that the County has more than eight years of remaining landfill capacity (PRC, Section 41791).

Each year after 1994, the SRRE for the unincorporated county and the County Integrated Waste Management Plan will be reviewed by the County and an annual report will be submitted to the CIWMB (CIWMB Regulations Sections 18771 and 18787). The annual reviews are to be used to assess the progress toward the diversion objectives and will address the issue of changes in the quantity and composition of the waste stream. The need for further program monitoring and updating of the waste generation study will be considered. Some form of annual review will be performed by Solano County commencing in 1992.

Prior to the third anniversary of the approval of the Solano County Integrated Waste Management Plan (i.e., in 1997 unless an earlier revision is found to be necessary in the annual reviews), the Local Task Force will review the Solano County Integrated Waste Management Plan to ensure that it is consistent with the diversion goals. The Task Force and the government of Solano County will determine if a revision of the Plan is needed and which, if any, aspects of the Plan are to be revised. The revised Plan will be submitted to the CIWMB within five years of the previously-approved Plan (i.e., by January 1, 1999 unless a previous revision has been approved by the CIWMB).

E.2. FUTURE STUDIES

In preparation for the annual reports and for the revision of the Solano County Integrated Waste Management Plan, the unincorporated county will implement an on-going program of selectively-targeted waste studies. The studies will build upon the system of reporting procedures that is outlined in Table I-8, and the reporting and monitoring sections of other chapters within this document.

The studies will include any or all of the following:

- Disposal quantity studies.
- Monitoring of studies from other jurisdictions.
- Recycling studies.
- Source reduction studies.

- Household hazardous waste studies.
- Field studies.

Most of the studies can be done by a single full-time employee for all jurisdictions in Solano County. This individual may also be involved in performing waste surveys, public information tasks, or technical evaluations of various diversion programs. If the unincorporated county does the studies independently, the staffing requirement would be about 20% of a full time equivalent.

If a quantitative field analysis (QFA) is determined to be needed, it would cost about $75,000. This figure is based on the premise that the County would contribute to QFA's performed for other jurisdictions at each of the landfills used by the county. Each QFA would entail field work by a sorting crew during one week in each of the four seasons, and one month of preparatory work and data analysis by a consultant. This amount is budgeted as a contingency expense in 1997. Solano County intends to minimize the need for a QFA by implementing a monitoring program that will adequately document progress toward the mandated diversion goals and that will identify, through other studies, the weaknesses and strengths of its diversion programs.

A description of each type of study is provided in Appendix A.

TABLE I-1: QUANTITY OF DISPOSED WASTE
(Tons in 1990)

	Residential	Commercial	Industrial	Self-Haul	Total	Percentage of Total
B&J Landfill (a)						
Winter	679	217	217	43	1,156	8%
Spring	825	263	263	53	1,404	10%
Summer	819	262	262	52	1,395	10%
Fall	706	225	225	45	1,201	9%
Total at B&J LF	3,029	967	967	193	5,156	37%
Rio Vista Landfill(b)						
Winter	15	43	22	8	88	1%
Spring	18	51	42	4	115	1%
Summer	17	47	50	4	118	1%
Fall	17	46	66	5	134	1%
Total at RVLF	67	187	180	21	455	3%
Potrero Hills Landfill (c)						
Winter	482	153	195	285	1,115	8%
Spring	482	153	195	326	1,156	8%
Summer	482	153	195	318	1,148	8%
Fall	482	153	195	313	1,143	8%
Total at PHLF	1,928	612	780	1,242	4,562	32%
American Canyon Landfill (d)						
Winter	223	0	0	255	478	3%
Spring	277	0	0	320	597	4%
Summer	272	0	0	385	657	5%
Fall	249	0	0	320	569	4%
Total at ACLF	1,021	0	0	1,280	2,301	16%
Yolo County				1,600	1,600	11%
Total	6,045	1,766	1,927	4,336	14,074	100%
% of Total	43%	13%	14%	31%	100%	

Notes: (a) The non-self haul waste at B & J Landfill is hauled by Vacaville Sanitary Service.

(b) The non-self haul waste at Rio Vista Landfill is hauled by Rio Vista Sanitation Service.

(c) The non-self haul waste at Portrero Hills Landfill is hauled by Solano Garbage Company from unincorporated areas near Fairfield and Suisun City.

(d) The non-self haul waste at American Canyon Landfill in Napa County is hauled by Vallejo Garbage Service.

TABLE 1-2: SOURCE REDUCTION QUANTITIES
(Tons in 1990)

WASTE TYPE	RESID. TONS	COMM. TONS	INDUST. TONS	SELF HAUL	TOTAL TONS	PERCENT DIVERTED (a)
PAPER	0.0	1.4	0.0	0.0	1.4	0.0
corrugated containers	0.0	0.0	0.0	0.0	0.0	0.0
mixed paper	0.0	0.0	0.0	0.0	0.0	0.0
newspaper	0.0	0.0	0.0	0.0	0.0	0.0
high grade ledger	0.0	1.4	0.0	0.0	1.4	0.0
other	0.0	0.0	0.0	0.0	0.0	0.0
PLASTIC	0.0	0.0	0.0	0.0	0.0	0.0
HDPE	0.0	0.0	0.0	0.0	0.0	0.0
PET	0.0	0.0	0.0	0.0	0.0	0.0
film	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0
GLASS	1.2	29.1	0.0	0.0	30.3	0.2
refillable containers	1.2	29.1	0.0	0.0	30.3	0.2
CA redemption	0.0	0.0	0.0	0.0	0.0	0.0
other recyclable	0.0	0.0	0.0	0.0	0.0	0.0
other non-recyclable	0.0	0.0	0.0	0.0	0.0	0.0
METAL	0.0	0.0	0.0	0.0	0.0	0.0
aluminum cans	0.0	0.0	0.0	0.0	0.0	0.0
bi-metal	0.0	0.0	0.0	0.0	0.0	0.0
ferrous metal & cans	0.0	0.0	0.0	0.0	0.0	0.0
non-ferrous metals	0.0	0.0	0.0	0.0	0.0	0.0
white goods	0.0	0.0	0.0	0.0	0.0	0.0
other	0.0	0.0	0.0	0.0	0.0	0.0
YARD WASTE	0.0	0.0	0.0	0.0	0.0	0.0
OTHER ORGANICS	20.0	0.0	36.0	0.0	56.0	0.4
food waste	0.0	0.0	36.0	0.0	36.0	0.2
tires & rubber	0.0	0.0	0.0	0.0	0.0	0.0
wood waste	0.0	0.0	0.0	0.0	0.0	0.0
crop residue	0.0	0.0	0.0	0.0	0.0	0.0
manure	0.0	0.0	0.0	0.0	0.0	0.0
textiles & leather	12.5	0.0	0.0	0.0	12.5	0.1
other	7.5	0.0	0.0	0.0	7.5	0.1
OTHER WASTE	0.0	0.0	0.0	0.0	0.0	0.0
inert solids	0.0	0.0	0.0	0.0	0.0	0.0
HHW & containers	0.0	0.0	0.0	0.0	0.0	0.0
SPECIAL WASTE	0.0	0.0	0.0	0.0	0.0	0.0
ash	0.0	0.0	0.0	0.0	0.0	0.0
sewage sludge	0.0	0.0	0.0	0.0	0.0	0.0
industrial sludge	0.0	0.0	0.0	0.0	0.0	0.0
asbestos	0.0	0.0	0.0	0.0	0.0	0.0
auto shredder waste	0.0	0.0	0.0	0.0	0.0	0.0
auto bodies	0.0	0.0	0.0	0.0	0.0	0.0
other	0.0	0.0	0.0	0.0	0.0	0.0
Totals	21.2	30.5	36.0	0.0	87.7	0.6

(a) Percent Diverted is the contribution of each waste type to the total quantity of diverted materials.

TABLE 1-3: RECYCLING QUANTITIES
(Tons in 1990)

MATERIAL	RESID. TONS	COMM. TONS	INDUST. TONS	SELF HAUL	TOTAL TONS	PERCENT DIVERTED (a)
PAPER	0.0	91.0	344.0	0.4	435.4	2.8
corrugated containers	0.0	91.0	294.0	0.0	385.0	2.5
mixed paper	0.0	0.0	0.0	0.0	0.0	0.0
newspaper	0.0	0.0	0.0	0.4	0.4	0.0
high grade ledger	0.0	0.0	50.0	0.0	50.0	0.3
other	0.0	0.0	0.0	0.0	0.0	0.0
PLASTIC	0.3	0.0	0.0	0.0	0.3	0.0
HDPE	0.0	0.0	0.0	0.0	0.0	0.0
PET	0.3	0.0	0.0	0.0	0.3	0.0
film	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0
GLASS	2.5	0.0	0.0	0.0	2.5	0.0
refillable containers	0.0	0.0	0.0	0.0	0.0	0.0
CA redemption	2.5	0.0	0.0	0.0	2.5	0.0
other recyclable	0.0	0.0	0.0	0.0	0.0	0.0
other non-recyclable	0.0	0.0	0.0	0.0	0.0	0.0
METAL	2.2	0.0	0.0	8.7	10.9	0.1
aluminum cans	2.2	0.0	0.0	0.0	2.2	0.0
bi-metal	0.0	0.0	0.0	0.0	0.0	0.0
ferrous metal & cans	0.0	0.0	0.0	8.7	8.7	0.1
non-ferrous metals	0.0	0.0	0.0	0.0	0.0	0.0
white goods	0.0	0.0	0.0	0.0	0.0	0.0
other	0.0	0.0	0.0	0.0	0.0	0.0
YARD WASTE	0.0	0.0	0.0	0.0	0.0	0.0
OTHER ORGANICS	0.0	18.0	0.0	0.0	18.0	0.1
food waste	0.0	0.0	0.0	0.0	0.0	0.0
tires & rubber	0.0	18.0	0.0	0.0	18.0	0.1
wood waste	0.0	0.0	0.0	0.0	0.0	0.0
crop residue	0.0	0.0	0.0	0.0	0.0	0.0
manure	0.0	0.0	0.0	0.0	0.0	0.0
textiles & leather	0.0	0.0	0.0	0.0	0.0	0.0
other	0.0	0.0	0.0	0.0	0.0	0.0
OTHER WASTE	0.0	0.0	0.0	1,056.0	1,056.0	6.7
inert solids	0.0	0.0	0.0	1,056.0	1,056.0	6.7
HHW & containers	0.0	0.0	0.0	0.0	0.0	0.0
SPECIAL WASTE	0.0	1.3	0.0	0.0	1.3	0.0
ash	0.0	0.0	0.0	0.0	0.0	0.0
sewage sludge	0.0	0.0	0.0	0.0	0.0	0.0
industrial sludge	0.0	0.0	0.0	0.0	0.0	0.0
asbestos	0.0	0.0	0.0	0.0	0.0	0.0
auto shredder waste	0.0	0.0	0.0	0.0	0.0	0.0
auto bodies	0.0	0.0	0.0	0.0	0.0	0.0
other	0.0	1.3	0.0	0.0	1.3	0.0
Totals	5.0	110.3	344.0	1,065.1	1,524.4	9.7

(a) Percent Diverted is the contribution of each waste type to the total quantity of diverted materials.

TABLE I-4: GENERATION AND DIVERSION RATE (1990)

WASTE TYPE	DISPOSED TPY (a)	DIVERTED TPY (b)	GENERATED TPY	PERCENT OF TOTAL WASTE STREAM	PERCENT OF WASTE TYPE DIVERTED
PAPER	4,818	437	5,254	2.8	8
corrugated containers	1,055	385	1,440	2.5	27
mixed paper	1,281	0	1,281	0.0	0
newspaper	1,157	0	1,158	0.0	0
high grade ledger	350	51	401	0.3	13
other	975	0	975	0.0	0
PLASTIC	790	0	790	0.0	0
HDPE	45	0	45	0.0	0
PET	38	0	38	0.0	1
film	293	0	293	0.0	0
Other	415	0	415	0.0	0
GLASS	535	33	568	0.2	6
refillable containers	195	30	226	0.2	13
CA redemption	163	3	165	0.0	2
other recyclable	76	0	76	0.0	0
other non-recyclable	101	0	101	0.0	0
METAL	763	11	774	0.1	1
aluminum cans	38	2	40	0.0	6
bi-metal	0	0	0	0.0	0
ferrous metal & cans	520	9	529	0.1	2
non-ferrous metals	146	0	146	0.0	0
white goods (c)	59	0	59	0.0	0
other	0	0	0	0.0	0
YARD WASTE	2,431	0	2,431	0.0	0
OTHER ORGANICS	2,895	74	2,969	0.5	2
food waste	663	36	699	0.2	5
tires & rubber	235	18	253	0.1	7
wood waste	1,204	0	1,204	0.0	0
crop residue	2	0	2	0.0	0
manure	0	0	0	0.0	0
textiles & leather	433	13	446	0.1	3
other	358	8	365	0.0	2
OTHER WASTE	1,811	1,056	2,867	6.7	37
inert solids	1,743	1,056	2,799	6.7	38
HHW & containers	68	0	68	0.0	0
SPECIAL WASTE	32	1	33	0.0	4
ash	0	0	0	0.0	0
sewage sludge	0	0	0	0.0	0
industrial sludge	0	0	0	0.0	0
asbestos	19	0	19	0.0	0
auto shredder waste	0	0	0	0.0	0
auto bodies	0	0	0	0.0	0
other	12	1	14	0.0	10
Totals	14,074	1,612	15,686	10.3	

(a) From Table I-5.
(b) From Tables I-2 and I-3.
(c) In 1990, white goods were diverted in a small and unquantified amount.

TABLE I-5: QUANTITY AND COMPOSITION OF DISPOSED WASTE

	RESIDENTIAL		COMMERCIAL		INDUSTRIAL		SELFHAUL		TOTAL	
WASTE TYPE	mass fraction	tons/year	mass fraction	tons/year	mass fraction	tons/year	mass fraction	tons/year	mass fraction	tons/year
PAPER	0.494	2,986	0.446	788	0.396	763	0.065	281	0.342	4,818
corrugated containers	0.044	266	0.185	327	0.186	358	0.024	104	0.075	1,055
mixed paper	0.146	883	0.092	162	0.098	189	0.011	47	0.091	1,281
newspaper	0.171	1,034	0.046	81	0.013	25	0.004	17	0.082	1,157
high grade ledger	0.028	169	0.019	34	0.056	108	0.009	39	0.025	350
other	0.105	635	0.104	184	0.043	83	0.017	73	0.069	975
PLASTIC	0.055	332	0.068	120	0.092	177	0.037	160	0.056	790
HDPE	0.000	0	0.007	12	0.010	19	0.003	13	0.003	45
PET	0.004	24	0.003	5	0.002	4	0.001	4	0.003	38
film	0.026	157	0.032	57	0.023	44	0.008	35	0.021	293
Other	0.025	151	0.026	46	0.057	110	0.025	108	0.029	415
GLASS	0.068	411	0.034	60	0.031	60	0.001	4	0.038	535
refillable containers	0.032	193	0.000	0	0.001	2	0.000	0	0.014	195
CA redemption	0.022	133	0.009	16	0.005	10	0.001	4	0.012	163
other recyclable	0.006	36	0.018	32	0.004	8	0.000	0	0.005	76
other non-recyclable	0.008	48	0.007	12	0.021	40	0.000	0	0.007	101
METAL	0.040	242	0.022	39	0.080	154	0.076	328	0.054	763
aluminum cans	0.005	30	0.002	4	0.002	4	0.000	0	0.003	38
bi-metal	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
ferrous metal & cans	0.016	97	0.019	34	0.068	131	0.060	259	0.037	520
non-ferrous metals	0.013	79	0.001	2	0.007	13	0.012	52	0.010	146
white goods	0.006	36	0.000	0	0.003	6	0.004	17	0.004	59
other	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
YARD WASTE	0.198	1,197	0.129	228	0.063	121	0.204	885	0.173	2,431
										0
OTHER ORGANICS	0.137	828	0.291	514	0.219	422	0.261	1,131	0.206	2,895
food waste	0.067	405	0.128	226	0.010	19	0.003	13	0.047	663
tires & rubber	0.035	212	0.004	7	0.004	8	0.002	9	0.017	235
wood waste	0.020	121	0.031	55	0.164	316	0.164	712	0.086	1,204
crop residue	0.000	0	0.001	2	0.000	0	0.000	0	0.000	2
manure	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
textiles & leather	0.015	91	0.004	7	0.024	46	0.067	289	0.031	433
other	0.000	0	0.123	217	0.017	33	0.025	108	0.025	358
OTHER WASTE	0.008	48	0.012	21	0.115	222	0.350	1,520	0.129	1,811
inert solids	0.004	24	0.008	14	0.114	220	0.342	1,485	0.124	1,743
HHW & containers	0.004	24	0.004	7	0.001	2	0.008	35	0.005	68
SPECIAL WASTE	0.000	0	0.001	2	0.001	2	0.006	28	0.002	32
ash	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
sewage sludge	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
industrial sludge	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
asbestos	0.000	0	0.000	0	0.000	0	0.004	19	0.001	19
auto shredder waste	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
auto bodies	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
other	0.000	0	0.001	2	0.001	2	0.002	9	0.001	12
Totals	1.000	6,045	1.003	1,771	0.997	1,921	1.000	4,336	1.000	14,074

Note: Totals differ slightly from Table I-1 due to rounding.

TABLE I-5b: QUANTITY AND COMPOSITION OF GENERATED WASTE

	RESIDENTIAL		COMMERCIAL		INDUSTRIAL		SELFHAUL		TOTAL	
WASTE TYPE	mass fraction	tons/year	mass fraction	tons/year	mass fraction	tons/year	mass fraction	tons/year	mass fraction	tons/year
PAPER	0.492	2,986	0.460	880	0.481	1,107	0.052	281	0.335	5,254
corrugated containers	0.044	266	0.218	418	0.284	652	0.019	104	0.092	1,440
mixed paper	0.145	883	0.085	162	0.082	189	0.009	47	0.082	1,281
newspaper	0.170	1,034	0.042	81	0.011	25	0.003	18	0.074	1,158
high grade ledger	0.028	169	0.018	35	0.069	158	0.007	39	0.026	401
other	0.105	635	0.096	184	0.036	83	0.014	73	0.062	975
PLASTIC	0.055	333	0.063	120	0.077	177	0.030	160	0.050	790
HDPE	0.000	0	0.006	12	0.008	19	0.002	13	0.003	45
PET	0.004	24	0.003	5	0.002	4	0.001	4	0.002	38
film	0.026	157	0.030	57	0.019	44	0.006	35	0.019	293
Other	0.025	151	0.024	46	0.048	110	0.020	108	0.026	415
GLASS	0.068	415	0.047	89	0.026	60	0.001	4	0.036	568
refillable containers	0.032	195	0.015	29	0.001	2	0.000	0	0.014	226
CA redemption	0.022	135	0.008	16	0.004	10	0.001	4	0.011	165
other recyclable	0.006	36	0.017	32	0.003	8	0.000	0	0.005	76
other non-recyclable	0.008	48	0.006	12	0.018	40	0.000	0	0.006	101
METAL	0.040	244	0.020	39	0.067	154	0.062	337	0.049	774
aluminum cans	0.005	32	0.002	4	0.002	4	0.000	0	0.003	40
bi-metal	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
ferrous metal & cans	0.016	97	0.018	34	0.057	131	0.050	268	0.034	529
non-ferrous metals	0.013	79	0.001	2	0.006	13	0.010	52	0.009	146
white goods	0.006	36	0.000	0	0.003	6	0.003	17	0.004	59
other	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
YARD WASTE	0.197	1,197	0.119	228	0.053	121	0.164	885	0.155	2,431
OTHER ORGANICS	0.140	848	0.278	532	0.199	458	0.209	1,131	0.189	2,969
food waste	0.067	405	0.118	226	0.024	55	0.002	13	0.045	699
tires & rubber	0.035	212	0.013	25	0.003	8	0.002	9	0.016	253
wood waste	0.020	121	0.029	55	0.137	316	0.132	712	0.077	1,204
crop residue	0.000	0	0.001	2	0.000	0	0.000	0	0.000	2
manure	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
textiles & leather	0.017	103	0.004	7	0.020	46	0.054	289	0.028	446
other	0.001	8	0.114	217	0.014	33	0.020	108	0.023	365
OTHER WASTE	0.008	48	0.011	21	0.096	222	0.477	2,576	0.183	2,867
inert solids	0.004	24	0.007	14	0.095	220	0.470	2,541	0.178	2,799
HHW & containers	0.004	24	0.004	7	0.001	2	0.006	35	0.004	68
SPECIAL WASTE	0.000	0	0.002	3	0.001	2	0.005	28	0.002	33
ash	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
sewage sludge	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
industrial sludge	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
asbestos	0.000	0	0.000	0	0.000	0	0.004	19	0.001	19
auto shredder waste	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
auto bodies	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0
other	0.000	0	0.002	3	0.001	2	0.002	9	0.001	14
Totals	1.000	6,071	1.000	1,912	1.000	2,301	1.000	5,401	1.000	15,686

Note: Totals vary slightly due to rounding.

TABLE I-6: WASTE GENERATION PROJECTIONS WITHOUT SRRE

	initial disposal rate	initial diversion rate	1990 disposed amount	1990 diverted amount	1990 generation	1991 disposed amount	1991 diverted amount	1991 generation	1992 disposed amount	1992 diverted amount	1992 generation
PAPER	0.307	0.028	4,817	437	5,254	5,063	459	5,522	5,322	483	5,804
corrugated containers	0.067	0.025	1,055	385	1,440	1,108	405	1,513	1,165	425	1,590
mixed paper	0.082	0.000	1,281	0	1,281	1,347	0	1,347	1,416	0	1,416
newspaper	0.074	0.000	1,157	0	1,158	1,216	0	1,217	1,278	0	1,279
high grade ledger	0.022	0.003	350	51	401	367	54	421	386	57	443
other	0.062	0.000	975	0	975	1,024	0	1,024	1,077	0	1,077
PLASTIC	0.050	0.000	790	0	790	830	0	830	872	0	873
HDPE	0.003	0.000	45	0	45	47	0	47	49	0	49
PET	0.002	0.000	38	0	38	40	0	40	42	0	42
film	0.019	0.000	293	0	293	307	0	307	323	0	322
Other	0.026	0.000	415	0	415	436	0	436	458	0	458
GLASS	0.034	0.002	535	33	568	562	34	597	591	36	627
refillable containers	0.012	0.002	195	30	226	205	32	237	216	33	249
CA redemption	0.010	0.000	163	2	165	171	3	174	180	3	183
other recyclable	0.005	0.000	76	0	76	80	0	80	84	0	84
other non-recyclable	0.006	0.000	101	0	101	106	0	106	112	0	112
METAL	0.049	0.001	763	11	774	802	11	813	843	12	855
aluminum cans	0.002	0.000	38	2	40	40	2	42	42	2	44
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.033	0.001	520	9	529	547	9	556	575	10	584
non-ferrous metals	0.009	0.000	146	0	146	153	0	153	161	0	161
white goods	0.004	0.000	59	0	59	62	0	62	66	0	66
other	0.000	0.000	0	0	0	0	0	0	0	0	0
YARD WASTE	0.155	0.000	2,431	0	2,431	2,555	0	2,555	2,686	0	2,686
OTHER ORGANICS	0.185	0.005	2,895	74	2,969	3,042	78	3,120	3,198	82	3,280
food waste	0.042	0.002	663	36	699	697	38	735	733	40	773
tires & rubber	0.015	0.001	235	18	253	247	19	266	260	20	279
wood waste	0.077	0.000	1,204	0	1,204	1,265	0	1,265	1,330	0	1,330
crop residue	0.000	0.000	2	0	2	2	0	2	2	0	2
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.028	0.001	433	12	446	455	13	468	479	14	493
other	0.023	0.000	358	7	365	376	8	384	395	8	404
OTHER WASTE	0.115	0.067	1,811	1,056	2,867	1,903	1,110	3,013	2,000	1,167	3,167
inert solids	0.111	0.067	1,743	1,056	2,799	1,832	1,110	2,941	1,926	1,167	3,093
HHW & containers	0.004	0.000	68	0	68	71	0	71	75	0	75
SPECIAL WASTE	0.002	0.000	32	1	33	33	1	34	35	1	36
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	19	0	19	20	0	20	21	0	21
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	12	1	14	13	1	14	14	1	15
Totals	0.897	0.103	14,073	1,612	15,685	14,790	1,694	16,484	15,547	1,781	17,328

Note: The diversion quantities given for material types in this table are rough estimateds for regulatory purposes only. All other test and tables in this document supercede this table. Data in this table is not suitable for planning or facility design purposes.

TABLE I-6 (CONTINUED)

	initial disposal rate	initial diversion rate	1993 disposed amount	1993 diverted amount	1993 generation	1994 disposed amount	1994 diverted amount	1994 generation	1995 disposed amount	1995 diverted amount	1995 generation
PAPER	0.307	0.028	5,596	507	6,104	5,886	534	6,420	6,193	562	6,755
corrugated containers	0.067	0.025	1,225	447	1,672	1,289	470	1,759	1,356	495	1,851
mixed paper	0.082	0.000	1,488	0	1,488	1,566	0	1,566	1,647	0	1,647
newspaper	0.074	0.000	1,344	0	1,345	1,414	0	1,414	1,488	1	1,488
high grade ledger	0.022	0.003	406	60	466	427	63	490	449	66	515
other	0.062	0.000	1,132	0	1,132	1,191	0	1,191	1,253	0	1,253
PLASTIC	0.050	0.000	917	0	918	965	0	965	1,015	0	1,015
HDPE	0.003	0.000	52	0	52	54	0	54	57	0	57
PET	0.002	0.000	44	0	44	46	0	46	48	0	49
film	0.019	0.000	340	0	340	357	0	357	376	0	376
Other	0.026	0.000	482	0	482	507	0	507	533	0	533
GLASS	0.034	0.002	622	38	660	654	40	694	688	42	730
refillable containers	0.012	0.002	227	35	262	239	37	276	251	39	290
CA redemption	0.006	0.003	189	3	192	199	3	202	209	3	213
other recyclable	0.005	0.000	88	0	88	93	0	93	97	0	97
other non-recyclable	0.006	0.000	118	0	118	124	0	124	130	0	130
METAL	0.049	0.001	886	13	899	932	13	945	981	14	995
aluminum cans	0.002	0.000	44	3	46	46	3	49	48	3	51
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.033	0.001	604	10	615	636	11	646	669	11	680
non-ferrous metals	0.009	0.000	169	0	169	178	0	178	187	0	187
white goods	0.004	0.000	69	0	69	72	0	72	76	0	76
other	0.000	0.000	0	0	0	0	0	0	0	0	0
YARD WASTE	0.155	0.000	2,824	0	2,824	2,970	0	2,970	3,125	0	3,125
OTHER ORGANICS	0.185	0.005	3,363	86	3,449	3,537	90	3,628	3,722	95	3,817
food waste	0.042	0.002	770	42	812	810	44	854	853	46	899
tires & rubber	0.015	0.001	273	21	294	287	22	309	302	23	325
wood waste	0.077	0.000	1,399	0	1,399	1,471	0	1,471	1,548	0	1,548
crop residue	0.000	0.000	2	0	2	2	0	2	2	0	2
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.028	0.001	503	15	518	529	15	545	557	16	573
other	0.023	0.000	416	9	424	437	9	446	460	10	470
OTHER WASTE	0.115	0.067	2,103	1,227	3,330	2,212	1,290	3,503	2,328	1,358	3,685
inert solids	0.111	0.067	2,025	1,227	3,251	2,130	1,290	3,420	2,241	1,358	3,598
HHW & containers	0.004	0.000	79	0	79	83	0	83	87	0	87
SPECIAL WASTE	0.002	0.000	37	2	38	38	2	40	41	2	42
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	22	0	22	23	0	23	24	0	24
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	14	2	16	15	2	17	16	2	18
Totals	0.897	0.103	16,348	1,873	18,221	17,196	1,970	19,166	18,093	2,072	20,165

TABLE I-6 (CONTINUED)

	initial disposal rate	initial diversion rate	1996 disposed amount	1996 diverted amount	1996 generation	1997 disposed amount	1997 diverted amount	1997 generation	1998 disposed amount	1998 diverted amount	1998 generation
PAPER	0.307	0.028	6,183	561	6,743	6,175	560	6,735	6,170	559	6,729
corrugated containers	0.067	0.025	1,354	494	1,848	1,352	493	1,845	1,351	493	1,844
mixed paper	0.082	0.000	1,645	0	1,645	1,642	0	1,642	1,641	0	1,641
newspaper	0.074	0.000	1,485	1	1,486	1,483	1	1,484	1,482	1	1,483
high grade ledger	0.022	0.003	449	66	515	448	66	514	448	66	514
other	0.062	0.000	1,251	0	1,251	1,249	0	1,249	1,248	0	1,248
PLASTIC	0.050	0.000	1,013	0	1,014	1,012	0	1,012	1,011	0	1,012
HDPE	0.003	0.000	57	0	57	57	0	57	57	0	57
PET	0.002	0.000	48	0	49	48	0	49	48	0	49
film	0.019	0.000	375	0	375	375	0	375	375	0	375
Other	0.026	0.000	532	0	532	532	0	532	531	0	531
GLASS	0.034	0.002	687	42	729	686	42	728	685	42	727
refillable containers	0.012	0.002	251	39	290	250	39	289	250	39	289
CA redemption	0.006	0.003	209	3	212	209	3	212	209	3	212
other recyclable	0.005	0.000	97	0	97	97	0	97	97	0	97
other non-recyclable	0.006	0.000	130	0	130	130	0	130	130	0	130
METAL	0.049	0.001	979	14	993	978	14	992	977	14	991
aluminum cans	0.002	0.000	48	3	51	48	3	51	48	3	51
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.033	0.001	668	11	679	667	11	678	666	11	677
non-ferrous metals	0.009	0.000	187	0	187	187	0	187	187	0	187
white goods	0.004	0.000	76	0	76	76	0	76	76	0	76
other	0.000	0.000	0	0	0	0	0	0	0	0	0
YARD WASTE	0.155	0.000	3,120	0	3,120	3,116	0	3,116	3,114	0	3,114
OTHER ORGANICS	0.185	0.005	3,716	95	3,811	3,711	95	3,806	3,708	95	3,803
food waste	0.042	0.002	851	46	897	850	46	896	849	46	895
tires & rubber	0.015	0.001	302	23	325	301	23	324	301	23	324
wood waste	0.077	0.000	1,545	0	1,545	1,543	0	1,543	1,542	0	1,542
crop residue	0.000	0.000	2	0	2	2	0	2	2	0	2
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.028	0.001	556	16	572	555	16	571	555	16	571
other	0.023	0.000	459	10	469	459	10	468	458	10	468
OTHER WASTE	0.115	0.067	2,324	1,355	3,679	2,321	1,354	3,675	2,319	1,352	3,671
inert solids	0.111	0.067	2,237	1,355	3,592	2,234	1,354	3,588	2,232	1,352	3,584
HHW & containers	0.004	0.000	87	0	87	87	0	87	87	0	87
SPECIAL WASTE	0.002	0.000	40	2	42	40	2	42	40	2	42
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	24	0	24	24	0	24	24	0	24
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	16	2	17	16	2	17	16	2	17
Totals	0.897	0.103	18,062	2,069	20,131	18,040	2,066	20,106	18,024	2,065	20,089

TABLE I-6 (CONTINUED)

	initial disposal rate	initial diversion rate	1999 disposed amount	1999 diverted amount	1999 generation	2000 disposed amount	2000 diverted amount	2000 generation	2001 disposed amount	2001 diverted amount	2001 generation
PAPER	0.307	0.028	6,167	559	6,727	6,167	559	6,727	6,180	560	6,741
corrugated containers	0.067	0.025	1,350	493	1,843	1,350	493	1,843	1,353	494	1,847
mixed paper	0.082	0.000	1,640	0	1,640	1,640	0	1,640	1,644	0	1,644
newspaper	0.074	0.000	1,482	1	1,482	1,482	1	1,482	1,485	1	1,485
high grade ledger	0.022	0.003	448	66	513	448	66	513	448	66	514
other	0.062	0.000	1,248	0	1,248	1,248	0	1,248	1,250	0	1,250
PLASTIC	0.050	0.000	1,011	0	1,011	1,011	0	1,011	1,013	0	1,013
HDPE	0.003	0.000	57	0	57	57	0	57	57	0	57
PET	0.002	0.000	48	0	49	48	0	49	48	0	49
film	0.019	0.000	375	0	375	375	0	375	375	0	375
Other	0.026	0.000	531	0	531	531	0	531	532	0	532
GLASS	0.034	0.002	685	42	727	685	42	727	687	42	729
refillable containers	0.012	0.002	250	39	289	250	39	289	251	39	290
CA redemption	0.006	0.003	208	3	212	208	3	212	209	3	212
other recyclable	0.005	0.000	97	0	97	97	0	97	97	0	97
other non-recyclable	0.006	0.000	130	0	130	130	0	130	130	0	130
METAL	0.049	0.001	977	14	991	977	14	991	979	14	993
aluminum cans	0.002	0.000	48	3	51	48	3	51	48	3	51
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.033	0.001	666	11	677	666	11	677	668	11	679
non-ferrous metals	0.009	0.000	186	0	186	186	0	186	187	0	187
white goods	0.004	0.000	76	0	76	76	0	76	76	0	76
other	0.000	0.000	0	0	0	0	0	0	0	0	0
YARD WASTE	0.155	0.000	3,112	0	3,112	3,112	0	3,112	3,119	0	3,119
OTHER ORGANICS	0.185	0.005	3,706	95	3,801	3,706	95	3,801	3,714	95	3,809
food waste	0.042	0.002	849	46	895	849	46	895	851	46	897
tires & rubber	0.015	0.001	301	23	324	301	23	324	301	23	325
wood waste	0.077	0.000	1,541	0	1,541	1,541	0	1,541	1,545	0	1,545
crop residue	0.000	0.000	2	0	2	2	0	2	2	0	2
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.028	0.001	555	16	571	555	16	571	556	16	572
other	0.023	0.000	458	10	468	458	10	468	459	10	469
OTHER WASTE	0.115	0.067	2,318	1,352	3,670	2,318	1,352	3,670	2,323	1,355	3,678
inert solids	0.111	0.067	2,231	1,352	3,583	2,231	1,352	3,583	2,236	1,355	3,591
HHW & containers	0.004	0.000	87	0	87	87	0	87	87	0	87
SPECIAL WASTE	0.002	0.000	40	2	42	40	2	42	40	2	42
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	24	0	24	24	0	24	24	0	24
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	16	2	17	16	2	17	16	2	17
Totals	0.897	0.103	18,017	2,064	20,081	18,017	2,064	20,081	18,055	2,068	20,123

TABLE I-6 (CONTINUED)

	initial disposal rate	initial diversion rate	2002 disposed amount	2002 diverted amount	2002 generation	2003 disposed amount	2003 diverted amount	2003 generation	2004 disposed amount	2004 diverted amount	2004 generation
PAPER	0.307	0.028	6,194	562	6,755	6,208	563	6,771	6,223	564	6,787
corrugated containers	0.067	0.025	1,356	495	1,851	1,359	496	1,855	1,362	497	1,860
mixed paper	0.082	0.000	1,647	0	1,647	1,651	0	1,651	1,655	0	1,65
newspaper	0.074	0.000	1,488	1	1,488	1,491	1	1,492	1,495	1	1,49
high grade ledger	0.022	0.003	449	66	516	450	66	517	452	66	518
other	0.062	0.000	1,253	0	1,253	1,256	0	1,256	1,259	0	1,259
PLASTIC	0.050	0.000	1,015	0	1,016	1,017	0	1,018	1,020	0	1,02
HDPE	0.003	0.000	57	0	57	57	0	57	58	0	58
PET	0.002	0.000	48	0	49	49	0	49	49	0	49
film	0.019	0.000	376	0	376	377	0	377	378	0	37
Other	0.026	0.000	533	0	533	535	0	535	536	0	53
GLASS	0.034	0.002	688	42	730	690	42	732	691	42	734
refillable containers	0.012	0.002	251	39	290	252	39	291	252	39	29
CA redemption	0.006	0.003	209	3	213	210	3	213	210	3	21
other recyclable	0.005	0.000	97	0	97	98	0	98	98	0	98
other non-recyclable	0.006	0.000	130	0	130	130	0	130	131	0	131
METAL	0.049	0.001	981	14	995	983	14	997	985	14	1,00
aluminum cans	0.002	0.000	48	3	51	48	3	51	49	3	51
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.033	0.001	669	11	680	671	11	682	672	11	68
non-ferrous metals	0.009	0.000	187	0	187	188	0	188	188	0	18
white goods	0.004	0.000	76	0	76	76	0	76	77	0	77
other	0.000	0.000	0	0	0	0	0	0	0	0	0
YARD WASTE	0.155	0.000	3,126	0	3,126	3,133	0	3,133	3,140	0	3,14
OTHER ORGANICS	0.185	0.005	3,722	95	3,817	3,731	95	3,826	3,740	96	3,835
food waste	0.042	0.002	853	46	899	855	46	901	857	47	90
tires & rubber	0.015	0.001	302	23	325	303	23	326	304	23	32
wood waste	0.077	0.000	1,548	0	1,548	1,551	0	1,551	1,555	0	1,555
crop residue	0.000	0.000	2	0	2	2	0	2	2	0	2
manure	0.000	0.000	0	0	0	0	0	0	0	0	
textiles & leather	0.028	0.001	557	16	573	558	16	574	560	16	57
other	0.023	0.000	460	10	470	461	10	471	462	10	472
OTHER WASTE	0.115	0.067	2,328	1,358	3,686	2,333	1,361	3,694	2,339	1,364	3,70
inert solids	0.111	0.067	2,241	1,358	3,599	2,246	1,361	3,607	2,251	1,364	3,61
HHW & containers	0.004	0.000	87	0	87	87	0	87	87	0	87
SPECIAL WASTE	0.002	0.000	41	2	42	41	2	42	41	2	4
ash	0.000	0.000	0	0	0	0	0	0	0	0	
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	24	0	24	24	0	24	25	0	2
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	16	2	18	16	2	18	16	2	18
Totals	0.897	0.103	18,094	2,073	20,167	18,136	2,077	20,213	18,179	2,082	20,26

TABLE I-6 (CONTINUED)

	2005				
	initial disposal rate	initial diversion rate	disposed amount	diverted amount	generation
PAPER	0.307	0.028	6,238	566	6,804
corrugated containers	0.067	0.025	1,366	499	1,864
mixed paper	0.082	0.000	1,659	0	1,659
newspaper	0.074	0.000	1,498	1	1,499
high grade ledger	0.022	0.003	453	67	519
other	0.062	0.000	1,262	0	1,262
PLASTIC	0.050	0.000	1,022	0	1,023
HDPE	0.003	0.000	58	0	58
PET	0.002	0.000	49	0	49
film	0.019	0.000	379	0	379
Other	0.026	0.000	537	0	537
GLASS	0.034	0.002	693	42	735
refillable containers	0.012	0.002	253	39	292
CA redemption	0.006	0.003	211	3	214
other recyclable	0.005	0.000	98	0	98
other non-recyclable	0.006	0.000	131	0	131
METAL	0.049	0.001	988	14	1,002
aluminum cans	0.002	0.000	49	3	52
bi-metal	0.000	0.000	0	0	0
ferrous metal & cans	0.033	0.001	674	11	685
non-ferrous metals	0.009	0.000	189	0	189
white goods	0.004	0.000	77	0	77
other	0.000	0.000	0	0	0
YARD WASTE	0.155	0.000	3,148	0	3,148
OTHER ORGANICS	0.185	0.005	3,749	96	3,845
food waste	0.042	0.002	859	47	905
tires & rubber	0.015	0.001	304	23	328
wood waste	0.077	0.000	1,559	0	1,559
crop residue	0.000	0.000	2	0	2
manure	0.000	0.000	0	0	0
textiles & leather	0.028	0.001	561	16	577
other	0.023	0.000	463	10	473
OTHER WASTE	0.115	0.067	2,345	1,367	3,712
inert solids	0.111	0.067	2,257	1,367	3,624
HHW & containers	0.004	0.000	88	0	88
SPECIAL WASTE	0.002	0.000	41	2	42
ash	0.000	0.000	0	0	0
sewage sludge	0.000	0.000	0	0	0
industrial sludge	0.000	0.000	0	0	0
asbestos	0.001	0.000	25	0	25
auto shredder waste	0.000	0.000	0	0	0
auto bodies	0.000	0.000	0	0	0
other	0.001	0.000	16	2	18
Totals	0.897	0.103	18,224	2,087	20,311

TABLE I-7: WASTE GENERATION PROJECTIONS WITH SRRE

	initial disposal rate	initial diversion rate	1990 disposed amount	1990 diverted amount	1990 generation	1991 disposed amount	1991 diverted amount	1991 generation	1992 disposed amount	1992 diverted amount	1992 generation
PAPER	0.307	0.028	4,817	437	5,254	5,063	459	5,522	5,322	483	5,804
corrugated containers	0.067	0.025	1,055	385	1,440	1,108	405	1,513	1,165	425	1,590
mixed paper	0.082	0.000	1,281	0	1,281	1,347	0	1,347	1,416	0	1,416
newspaper	0.074	0.000	1,157	0	1,158	1,216	0	1,217	1,278	0	1,279
high grade ledger	0.022	0.003	350	51	401	367	54	421	386	57	443
other	0.062	0.000	975	0	975	1,024	0	1,024	1,077	0	1,077
PLASTIC	0.050	0.000	790	0	790	830	0	830	872	0	873
HDPE	0.003	0.000	45	0	45	47	0	47	49	0	49
PET	0.002	0.000	38	0	38	40	0	40	42	0	42
film	0.019	0.000	293	0	293	307	0	307	323	0	323
Other	0.026	0.000	415	0	415	436	0	436	458	0	458
GLASS	0.034	0.002	535	33	568	562	34	597	591	36	627
refillable containers	0.012	0.002	195	30	226	205	32	237	216	33	249
CA redemption	0.010	0.000	163	2	165	171	3	174	180	3	183
other recyclable	0.005	0.000	76	0	76	80	0	80	84	0	84
other non-recyclable	0.006	0.000	101	0	101	106	0	106	112	0	112
METAL	0.049	0.001	763	11	774	802	11	813	843	12	855
aluminum cans	0.002	0.000	38	2	40	40	2	42	42	2	44
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.033	0.001	520	9	529	547	9	556	575	10	584
non-ferrous metals	0.009	0.000	146	0	146	153	0	153	161	0	161
white goods	0.004	0.000	59	0	59	62	0	62	66	0	66
other	0.000	0.000	0	0	0	0	0	0	0	0	0
YARD WASTE	0.155	0.000	2,431	0	2,431	2,555	0	2,555	2,686	0	2,686
OTHER ORGANICS	0.185	0.005	2,895	74	2,969	3,042	78	3,120	3,198	82	3,280
food waste	0.042	0.002	663	36	699	697	38	735	733	40	772
tires & rubber	0.015	0.001	235	18	253	247	19	266	260	20	279
wood waste	0.077	0.000	1,204	0	1,204	1,265	0	1,265	1,330	0	1,330
crop residue	0.000	0.000	2	0	2	2	0	2	2	0	2
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.028	0.001	433	12	446	455	13	468	479	14	492
other	0.023	0.000	358	7	365	376	8	384	395	8	404
OTHER WASTE	0.115	0.067	1,811	1,056	2,867	1,903	1,110	3,013	2,000	1,167	3,167
inert solids	0.111	0.067	1,743	1,056	2,799	1,832	1,110	2,941	1,926	1,167	3,092
HHW & containers	0.004	0.000	68	0	68	71	0	71	75	0	75
SPECIAL WASTE	0.002	0.000	32	1	33	33	1	34	35	1	36
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	19	0	19	20	0	20	21	0	21
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	12	1	14	13	1	14	14	1	15
Totals	0.897	0.103	14,073	1,612	15,685	14,790	1,694	16,484	15,547	1,781	17,328

Note: The diversion quantities given for material types in this table are rough estimateds for regulatory purposes only. All other test and tables in this document supercede this table. Data in this table is not suitable for planning or facility design purposes.

TABLE I-7 (CONTINUED)

	short term disposal rate	short term diversion rate	1993 disposed amount	1993 diverted amount	1993 generation	1994 disposed amount	1994 diverted amount	1994 generation	1995 disposed amount	1995 diverted amount	1995 generation
PAPER	0.234	0.101	4,264	1,840	6,104	4,485	1,935	6,420	4,719	2,036	6,755
corrugated containers	0.040	0.051	736	936	1,672	774	985	1,759	815	1,036	1,851
mixed paper	0.078	0.004	1,414	74	1,488	1,487	78	1,566	1,565	82	1,647
newspaper	0.038	0.035	701	644	1,345	737	677	1,414	776	713	1,488
high grade ledger	0.015	0.010	281	185	466	295	195	490	311	205	515
other	0.062	0.000	1,132	0	1,132	1,191	0	1,191	1,253	0	1,253
PLASTIC	0.049	0.002	886	32	918	932	33	965	980	35	1,015
HDPE	0.003	0.000	47	5	52	50	5	54	52	5	57
PET	0.002	0.001	29	15	44	30	16	46	32	17	49
film	0.019	0.000	340	0	340	357	0	357	376	0	376
Other	0.026	0.001	470	12	482	495	12	507	520	13	533
GLASS	0.020	0.016	366	294	660	385	309	694	405	325	730
refillable containers	0.009	0.005	163	99	262	172	104	276	180	110	290
CA redemption	0.003	0.007	61	131	192	65	137	202	68	145	213
other recyclable	0.001	0.004	24	64	88	25	67	93	27	71	97
other non-recyclable	0.006	0.000	118	0	118	124	0	124	130	0	130
METAL	0.039	0.010	719	180	899	756	189	945	796	199	995
aluminum cans	0.001	0.001	25	21	46	26	22	49	28	23	51
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.026	0.008	477	138	615	501	145	646	528	153	680
non-ferrous metals	0.009	0.000	169	0	169	178	0	178	187	0	187
white goods	0.003	0.001	48	21	69	50	22	72	53	23	76
other	0.000	0.000	0	0	0	0	0	0	0	0	0
YARD WASTE	0.127	0.028	2,319	505	2,824	2,440	531	2,970	2,567	558	3,125
OTHER ORGANICS	0.163	0.027	2,961	488	3,449	3,115	513	3,628	3,277	540	3,817
food waste	0.042	0.002	770	42	812	810	44	854	853	46	899
tires & rubber	0.014	0.002	249	45	294	261	48	309	275	50	325
wood waste	0.056	0.021	1,021	378	1,399	1,074	397	1,471	1,130	418	1,548
crop residue	0.000	0.000	2	0	2	2	0	2	2	0	2
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.028	0.001	503	15	518	529	15	545	557	16	573
other	0.023	0.000	416	9	424	437	9	446	460	10	470
OTHER WASTE	0.090	0.093	1,636	1,694	3,330	1,721	1,781	3,503	1,811	1,874	3,685
inert solids	0.085	0.093	1,558	1,694	3,251	1,639	1,781	3,420	1,724	1,874	3,598
HHW & containers	0.004	0.000	79	0	79	83	0	83	87	0	87
SPECIAL WASTE	0.002	0.000	37	2	38	38	2	40	41	2	42
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	22	0	22	23	0	23	24	0	24
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	14	2	16	15	2	17	16	2	18
Totals	0.724	0.276	16,348	1,873	18,221	17,196	1,970	19,166	18,093	2,072	20,165

TABLE I-7 (CONTINUED)

	short term disposal rate	short term diversion rate	1996 disposed amount	1996 diverted amount	1996 generation	1997 disposed amount	1997 diverted amount	1997 generation	1998 disposed amount	1998 diverted amount	1998 generation
PAPER	0.234	0.101	4,711	2,033	6,743	4,705	2,030	6,735	4,701	2,028	6,729
corrugated containers	0.040	0.051	813	1,034	1,848	812	1,033	1,845	812	1,032	1,844
mixed paper	0.078	0.004	1,562	82	1,645	1,560	82	1,642	1,559	82	1,641
newspaper	0.038	0.035	774	712	1,486	773	711	1,484	773	710	1,48
high grade ledger	0.015	0.010	310	205	515	310	204	514	309	204	514
other	0.062	0.000	1,251	0	1,251	1,249	0	1,249	1,248	0	1,248
PLASTIC	0.049	0.002	979	35	1,014	977	35	1,012	977	35	1,01
HDPE	0.003	0.000	52	5	57	52	5	57	52	5	57
PET	0.002	0.001	32	17	49	32	17	49	32	17	49
film	0.019	0.000	375	0	375	375	0	375	375	0	37
Other	0.026	0.001	520	13	532	519	13	532	518	13	53
GLASS	0.020	0.016	404	324	729	404	324	728	404	324	727
refillable containers	0.009	0.005	180	109	290	180	109	289	180	109	28
CA redemption	0.003	0.007	68	144	212	68	144	212	68	144	21
other recyclable	0.001	0.004	27	71	97	27	70	97	27	70	97
other non-recyclable	0.006	0.000	130	0	130	130	0	130	130	0	130
METAL	0.039	0.010	794	199	993	793	199	992	793	198	99
aluminum cans	0.001	0.001	28	23	51	28	23	51	28	23	51
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.026	0.008	527	152	679	526	152	678	526	152	67
non-ferrous metals	0.009	0.000	187	0	187	187	0	187	187	0	18
white goods	0.003	0.001	53	23	76	53	23	76	53	23	76
other	0.000	0.000	0	0	0	0	0	0	0	0	0
YARD WASTE	0.127	0.028	2,563	558	3,120	2,559	557	3,116	2,557	556	3,11
OTHER ORGANICS	0.163	0.027	3,272	539	3,811	3,267	538	3,806	3,265	538	3,803
food waste	0.042	0.002	851	46	897	850	46	896	849	46	89
tires & rubber	0.014	0.002	275	50	325	274	50	324	274	50	32
wood waste	0.056	0.021	1,128	417	1,545	1,127	417	1,543	1,126	416	1,542
crop residue	0.000	0.000	2	0	2	2	0	2	2	0	2
manure	0.000	0.000	0	0	0	0	0	0	0	0	
textiles & leather	0.028	0.001	556	16	572	555	16	571	555	16	57
other	0.023	0.000	459	10	469	459	10	468	458	10	468
OTHER WASTE	0.090	0.093	1,808	1,871	3,679	1,806	1,869	3,675	1,804	1,867	3,67
inert solids	0.085	0.093	1,721	1,871	3,592	1,719	1,869	3,588	1,717	1,867	3,58
HHW & containers	0.004	0.000	87	0	87	87	0	87	87	0	8
SPECIAL WASTE	0.002	0.000	40	2	42	40	2	42	40	2	4
ash	0.000	0.000	0	0	0	0	0	0	0	0	
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	24	0	24	24	0	24	24	0	2
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	16	2	17	16	2	17	16	2	17
Totals	0.724	0.276	14,571	5,560	20,131	14,553	5,553	20,106	14,540	5,549	20,08

TABLE I-7 (CONTINUED)

	medium term disposal rate	medium term diversion rate	1999 disposed amount	1999 diverted amount	1999 generation	2000 disposed amount	2000 diverted amount	2000 generation	2001 disposed amount	2001 diverted amount	2001 generation
PAPER	0.161	0.174	3,228	3,498	6,727	3,228	3,498	6,727	3,235	3,506	6,741
corrugated containers	0.027	0.065	541	1,302	1,843	541	1,302	1,843	542	1,305	1,847
mixed paper	0.034	0.047	688	952	1,640	688	952	1,640	689	954	1,644
newspaper	0.025	0.049	507	975	1,482	507	975	1,482	508	977	1,485
high grade ledger	0.012	0.013	244	269	513	244	269	513	244	270	514
other	0.062	0.000	1,248	0	1,248	1,248	0	1,248	1,250	0	1,250
PLASTIC	0.046	0.004	928	84	1,011	928	84	1,011	930	84	1,013
HDPE	0.001	0.001	29	28	57	29	28	57	29	28	57
PET	0.001	0.001	24	25	49	24	25	49	24	25	49
film	0.019	0.000	375	0	375	375	0	375	375	0	375
Other	0.025	0.002	500	31	531	500	31	531	501	31	532
GLASS	0.008	0.028	164	563	727	164	563	727	164	564	729
refillable containers	0.000	0.014	0	289	289	0	289	289	0	289	290
CA redemption	0.000	0.010	8	204	212	8	204	212	8	204	212
other recyclable	0.001	0.004	27	70	97	27	70	97	27	71	97
other non-recyclable	0.006	0.000	130	0	130	130	0	130	130	0	130
METAL	0.027	0.022	547	444	991	547	444	991	548	445	993
aluminum cans	0.001	0.001	21	30	51	21	30	51	21	30	51
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.014	0.019	286	391	677	286	391	677	287	392	679
non-ferrous metals	0.009	0.000	186	0	186	186	0	186	187	0	187
white goods	0.003	0.001	53	23	76	53	23	76	53	23	76
other	0.000	0.000	0	0	0	0	0	0	0	0	0
YARD WASTE	0.009	0.146	176	2,936	3,112	176	2,936	3,112	177	2,942	3,119
OTHER ORGANICS	0.125	0.064	2,507	1,294	3,801	2,507	1,294	3,801	2,512	1,297	3,809
food waste	0.020	0.025	401	494	895	401	494	895	402	495	897
tires & rubber	0.014	0.002	274	50	324	274	50	324	275	50	325
wood waste	0.041	0.036	817	725	1,541	817	725	1,541	818	726	1,545
crop residue	0.000	0.000	2	0	2	2	0	2	2	0	2
manure	0.000	0.000	0	0	0	0	0	0	0	0	0
textiles & leather	0.028	0.001	555	16	571	555	16	571	556	16	572
other	0.023	0.000	458	10	468	458	10	468	459	10	469
OTHER WASTE	0.090	0.093	1,803	1,867	3,670	1,803	1,867	3,670	1,807	1,870	3,678
inert solids	0.085	0.093	1,717	1,867	3,583	1,717	1,867	3,583	1,720	1,870	3,591
HHW & containers	0.004	0.000	87	0	87	87	0	87	87	0	87
SPECIAL WASTE	0.002	0.000	40	2	42	40	2	42	40	2	42
ash	0.000	0.000	0	0	0	0	0	0	0	0	0
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	24	0	24	24	0	24	24	0	24
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	0
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	16	2	17	16	2	17	16	2	17
Totals	0.468	0.532	9,394	10,687	20,081	9,394	10,687	20,081	9,413	10,710	20,123

TABLE I-7 (CONTINUED)

	medium term disposal rate	medium term diversion rate	2002 disposed amount	2002 diverted amount	2002 generation	2003 disposed amount	2003 diverted amount	2003 generation	2004 disposed amount	2004 diverted amount	2004 generation
PAPER	0.161	0.174	3,242	3,513	6,755	3,249	3,521	6,771	3,257	3,530	6,787
corrugated containers	0.027	0.065	543	1,308	1,851	545	1,311	1,855	546	1,314	1,860
mixed paper	0.034	0.047	691	957	1,647	692	959	1,651	694	961	1,65
newspaper	0.025	0.049	509	979	1,488	511	981	1,492	512	983	1,49
high grade ledger	0.012	0.013	245	271	516	246	271	517	246	272	518
other	0.062	0.000	1,253	0	1,253	1,256	0	1,256	1,259	0	1,259
PLASTIC	0.046	0.004	932	84	1,016	934	84	1,018	936	84	1,02
HDPE	0.001	0.001	29	28	57	29	28	57	29	28	58
PET	0.001	0.001	24	25	49	24	25	49	24	25	49
film	0.019	0.000	376	0	376	377	0	377	378	0	37
Other	0.025	0.002	502	31	533	504	31	535	505	31	53
GLASS	0.008	0.028	165	565	730	165	567	732	166	568	734
refillable containers	0.000	0.014	0	290	290	0	291	291	0	291	29
CA redemption	0.000	0.010	8	205	213	8	205	213	8	206	21
other recyclable	0.001	0.004	27	71	97	27	71	98	27	71	98
other non-recyclable	0.006	0.000	130	0	130	130	0	130	131	0	131
METAL	0.027	0.022	549	446	995	550	447	997	551	448	1,00
aluminum cans	0.001	0.001	21	30	51	21	30	51	21	30	51
bi-metal	0.000	0.000	0	0	0	0	0	0	0	0	0
ferrous metal & cans	0.014	0.019	287	393	680	288	394	682	288	395	68
non-ferrous metals	0.009	0.000	187	0	187	188	0	188	188	0	18
white goods	0.003	0.001	53	23	76	53	23	76	53	23	77
other	0.000	0.000	0	0	0	0	0	0	0	0	0
YARD WASTE	0.009	0.146	177	2,948	3,126	178	2,955	3,133	178	2,962	3,14
OTHER ORGANICS	0.125	0.064	2,518	1,300	3,817	2,523	1,303	3,826	2,529	1,306	3,835
food waste	0.020	0.025	403	496	899	404	497	901	405	499	90
tires & rubber	0.014	0.002	275	50	325	276	50	326	276	50	32
wood waste	0.041	0.036	820	728	1,548	822	729	1,551	824	731	1,55
crop residue	0.000	0.000	2	0	2	2	0	2	2	0	2
manure	0.000	0.000	0	0	0	0	0	0	0	0	
textiles & leather	0.028	0.001	557	16	573	558	16	574	560	16	57
other	0.023	0.000	460	10	470	461	10	471	462	10	47
OTHER WASTE	0.090	0.093	1,811	1,875	3,686	1,815	1,879	3,694	1,820	1,883	3,70
inert solids	0.085	0.093	1,724	1,875	3,599	1,728	1,879	3,607	1,732	1,883	3,61
HHW & containers	0.004	0.000	87	0	87	87	0	87	87	0	8
SPECIAL WASTE	0.002	0.000	41	2	42	41	2	42	41	2	4
ash	0.000	0.000	0	0	0	0	0	0	0	0	
sewage sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
industrial sludge	0.000	0.000	0	0	0	0	0	0	0	0	0
asbestos	0.001	0.000	24	0	24	24	0	24	25	0	2
auto shredder waste	0.000	0.000	0	0	0	0	0	0	0	0	
auto bodies	0.000	0.000	0	0	0	0	0	0	0	0	0
other	0.001	0.000	16	2	18	16	2	18	16	2	18
Totals	0.468	0.532	9,434	10,733	20,167	9,455	10,758	20,213	9,478	10,783	20,26

TABLE I-7 (CONTINUED)

	medium term disposal rate	medium term diversion rate	2005 disposed amount	2005 diverted amount	2005 generation
PAPER	0.161	0.174	3,265	3,539	6,804
corrugated containers	0.027	0.065	547	1,317	1,864
mixed paper	0.034	0.047	696	963	1,659
newspaper	0.025	0.049	513	986	1,499
high grade ledger	0.012	0.013	247	272	519
other	0.062	0.000	1,262	0	1,262
PLASTIC	0.046	0.004	938	85	1,023
HDPE	0.001	0.001	29	28	58
PET	0.001	0.001	24	25	49
film	0.019	0.000	379	0	379
Other	0.025	0.002	506	31	537
GLASS	0.008	0.028	166	569	735
refillable containers	0.000	0.014	0	292	292
CA redemption	0.000	0.010	8	206	214
other recyclable	0.001	0.004	27	71	98
other non-recyclable	0.006	0.000	131	0	131
METAL	0.027	0.022	553	449	1,002
aluminum cans	0.001	0.001	22	30	52
bi-metal	0.000	0.000	0	0	0
ferrous metal & cans	0.014	0.019	289	396	685
non-ferrous metals	0.009	0.000	189	0	189
white goods	0.003	0.001	54	23	77
other	0.000	0.000	0	0	0
YARD WASTE	0.009	0.146	179	2,969	3,148
OTHER ORGANICS	0.125	0.064	2,536	1,309	3,845
food waste	0.020	0.025	406	500	905
tires & rubber	0.014	0.002	277	50	328
wood waste	0.041	0.036	826	733	1,559
crop residue	0.000	0.000	2	0	2
manure	0.000	0.000	0	0	0
textiles & leather	0.028	0.001	561	16	577
other	0.023	0.000	463	10	473
OTHER WASTE	0.090	0.093	1,824	1,888	3,712
inert solids	0.085	0.093	1,736	1,888	3,624
HHW & containers	0.004	0.000	88	0	88
SPECIAL WASTE	0.002	0.000	41	2	42
ash	0.000	0.000	0	0	0
sewage sludge	0.000	0.000	0	0	0
industrial sludge	0.000	0.000	0	0	0
asbestos	0.001	0.000	25	0	25
auto shredder waste	0.000	0.000	0	0	0
auto bodies	0.000	0.000	0	0	0
other	0.001	0.000	16	2	18
Totals	0.468	0.532	9,501	10,810	20,311

TABLE I-8: SYSTEM OF REPORTING

Description of Data	Source of Information
Disposal	
Quantity of refuse disposed by VSS, RVSS, SGC, and VGS in each quarter of 1990. Reported by Sector. See Table I-1.	Vacaville Sanitary Service, Rio Vista Sanitation Service, Solano Garbage Company, and Vallejo Garbage Service, respectively.
Quantity of self haul refuse disposed at:	
B&J Landfill	B&J Drop Box
Rio Vista Landfill	Rio Vista Sanitation Service
Portrero Hills Landfill	Portrero Hills Landfill Waste Record and Solano Garbage Company
American Canyon Landfill	Vallejo Garbage Service
Yolo County Landfills	Yolo County Department of Public Works
Composition of disposed residential refuse	EMCON Associates, Draft SRRE prepared for the City of City of Palo Alto, California, 1991
Composition of disposed commercial refuse	RSI, Draft Waste Generation Study Prepared for the City of Yorba Linda, California, 1991
Composition of disposed self-haul refuse Data from three jurisdictions was averaged.	Cal Recovery Systems,Waste Characterization Study for Berkeley, California, 1989 Cal Recovery Systems, Source Reduction and Recycling Element (Preliminary Draft) (City of Sunnyvale), 1991. EMCON Associates, Draft SRRE prepared for the City of City of Palo Alto, California, 1991
Composition of disposed industrial refuse The data from this study and the four studies listed above were averaged.	Cal Recovery Systems, Waste Quantity and Composition Analysis for the Cities of Palo Alto, Mountain View, and Sunnyvale, California, 1989

TABLE I-8 (CONTINUED)

Source Reduction Quantities	
High Grade Ledger Diversion rate was projected based on diverison rate determined through interviews	Seven copy shops and City offices in Solano County using double-sided photocopiers
Refillable Containers Total quantity apportioned by population	Interviews with Encore! bottle washing facility, and beer distributors in Solano County
Textiles and Leather Data reported on County-wide basis and apportioned by population	Goodwill Industries and Value Center
Other Organics County-wide data apportioned by population	Four diaper laundering services

Note: Most source reduction information in this table was collected on County-wide or regional basis and apportioned to the population of the area served. Generally, surveys and interviews did not include all potential source reduction activities, but were intended to provide a basis for reasonable order-of-magnitude estimates.

Recycling Quantities	
PET California Redemption Glass Aluminum Cans	20/20 Centers
Ferrous Metal and Cans	American Canyon Landfill Recovery
Newspaper Ferrous Metal	Portrero Hills Landfill recovery
OCC	Grocery Stores
OCC High Grade Ledger	American Home Foods
Dead Animals	Solano County Animal Shelter
Tires Data reported on regional basis and apportioned by population	Gro Strait Industries

TABLE I-8 (CONTINUED)

Concrete and Asphalt Data reported for sections of Solano County and apportioned throughout the reported sections of the County by population	Syar Industries and Potrero Hills Landfill
Special Waste	
Quantity of Asbestos.	Brown, Vence, and Associates, Solano County Hazardous Waste Plan, 1989
Number of dead animals handled. Total quantity was apportioned among jurisdictions according to population.	Solano County Animal Shelter
Quantity of Drilling Mud	Aqua Clear Farms and Solano County Department of Environmental Mgmt.
Household Hazardous Waste	
Quantity of various types of Household Hazardous Waste generated in Solano County.	Brown, Vence, and Associates, Solano County Hazardous Waste Management Plan, 1989

TABLE I-9: DIVERSION ALTERNATIVES

WASTE TYPE	Source Reduction	Recycling	Composting	Transformation
PAPER				
corrugated containers	X	X	(X)	(X)
mixed paper	X	X	(X)	(X)
newspaper	X	X	(X)	(X)
high grade ledger	X	X	(X)	(X)
other	X	X	(X)	(X)
PLASTIC				
HDPE	X	X		(X)
PET	X	X		(X)
film	X	X		(X)
Other	X	(X)		(X)
GLASS				
refillable containers	X	X		
Calif. redemption	X	X		
other recyclable	X	X		
other non-recyclable	X			
METAL				
aluminum cans	X	X		
bi-metal	(X)	(X)		
ferrous metal & cans	X	X		
non-ferrous metals	X	X		
white goods	X	X		
other				
YARD WASTE	X	X	X	(X)
OTHER ORGANICS				
food waste	X	(X)	X	(X)
tires & rubber	X	X		(X)
wood waste	X	X	(X)	(X)
crop residue	(X)	(X)	(X)	(X)
manure	X	(X)	(X)	(X)
textiles & leather	X	(X)		(X)
other	X	(X)	(X)	(X)
OTHER WASTE				
inert solids	X	X		
HHW & containers	X	X		(X)
SPECIAL WASTE				
ash	(X)	(X)		
sewage sludge	(e)	(e)	(e)	(e)
industrial sludge	(e)	(e)	(e)	(e)
asbestos				
auto shredder waste	(e)			(X)
auto bodies	(e)	X		
other	X	X	(X)	(X)

(a) A diversion method is considered an alternative if it is currently practiced in the United States. Alternatives are indicated by an "X".
(b) An "X" in parentheses, "(X)", indicates that the alternative is not planned for implementation.
(c) Recycling includes mulching and other soil amendment techniques which are not composting.
(d) Some waste types include both materials that are amenable to a diversion method and those which are not. For example, some industrial sludge can only be source reduced or disposed. Other industrial sludge can be recycled, composted, or transformed.

CHAPTER II SUMMARY
SOURCE REDUCTION

Source reduction occurs before a material becomes a solid waste. It includes activities that reduce the amount of a product in use and activities that prolong the useful life of a product. For example, paper and plastic grocery bags can be source reduced either by not using them or by reusing them. Source reduction also includes back yard composting and the on-site use of plant debris as mulch.

Source reduction currently accounts for 0.6% diversion of the waste stream. The SRRE estimates that 1.2% diversion will occur through source reduction prior to January 1, 1995, and another 1.5% additional will occur between January 1, 1995 and January 1, 2001. Total diversion through source reduction is therefore estimated to be 2.7% in the year 2000.

Existing source reduction activities in the unincorporated county include:

- Diaper services to avoid disposable diapers.
- Beverage bottle washing for refilling.
- Recovery and resale of used appliances.
- Double-sided copying.
- Clothing donated and resold.
- The use of food waste as animal feed.

Many source reduction programs are best implemented on a regional basis. The unincorporated county will continue to participate in a county-wide task force or other organization that coordinates educational and source reduction activities throughout the county. The following programs have been selected as pilots for the various cities in Solano County:

- Waste surveys.
- Drought-resistant landscape ordinance.
- School curriculum and student projects.
- Yard waste management education and demonstration site.
- Awards, commercial and industrial generators.
- Participation in regional waste exchange.
- Technical assistance to businesses.

In addition to full-scale versions of these programs, the unincorporated county will implement the following source reduction programs:

- Surcharge at disposal facilities in the unincorporated county.
- In-house source reduction at County offices.
- Quantity-based hauling fees.

Source reduction is often the least expensive form of diversion. However, proving that source reduction actually has occurred and quantifying it often is difficult or expensive. For this reason, the selected source reduction activities are projected to divert only three percent of the waste stream from disposal. Significantly greater diversion by source reduction may actually occur as a result of the implementation of the SRRE, and may be counted for compliance if it can be proven to have occurred.

CHAPTER II
SOURCE REDUCTION COMPONENT

INTRODUCTION

Source reduction precedes waste production and addresses how products are designed, manufactured, and used so as to reduce the quantity of waste produced. Waste which is source reduced under the AB 939 regulations is waste which was not produced, but would have been in the absence of diversion programs implemented to discourage their production.

Wastes can be source reduced by increasing the longevity of a product, by using fewer materials in producing products, or by using fewer products. In other words, the amount of waste produced is a function of how much we consume, and how long each consumed product lasts before it is "used up". All successful source reduction programs either create greater efficiency of material use (less consumption) or increase reuse and repair of used items.

A. GOALS AND OBJECTIVES

As identified in California Assembly Bill 939 (AB 939), Source Reduction means any action which causes a net reduction in the generation of solid waste. Through source reduction, the need to collect wastes for landfilling, burning, composting, or recycling can be reduced. The goals of the source reduction programs are to:

- Reduce use of non-recyclable materials.
- Replace disposable materials and products with reusable materials and products.
- Encourage reuse of packaging and products.
- Reduce the amount of yard waste generated.
- Encourage purchase of repairable products.
- Increase efficiency of use of materials during manufacturing and during product use.
- Offer increased opportunities for local businesses.

The objectives of the source reduction programs are to :

- Reduce the total waste stream by 1.5% in the short term.
- Reduce the total waste stream by 3.0% in the medium term.
- Reduce the use non-recyclable materials.
- Replace disposable materials and products with reusable materials and products.
- Reduce packaging.
- Reduce the amount of yard wastes generated.
- Purchase repairable products.
- Increase the efficiency of the use of paper, cardboard, glass, metal, and other materials by reducing wastes from non-residential generators' production.

B. TARGETED WASTE TYPES AND CATEGORIES

Decreases in the generation of waste materials can be accomplished through extending the useful life of affected materials, products, or packaging. Readily decomposable organic waste can also be reduced at its source through more efficient food and landscaping materials management.

The waste materials targeted for reduction, beginning with the materials of the highest priority based on estimated weight of waste to be avoided, are:

- Yard waste, primarily residential.
- Plastic, paper, glass, and metal materials as components of packaging.
- Plastic, paper, glass, wood, and metal as components of products.
- Food waste, including restaurants and grocery stores.

C. EXISTING CONDITIONS

A number of businesses are using material-efficient practices, including copy shops, bars and restaurants, repair shops, thrift shops, and other used merchandise dealers. Estimates were made for current tons avoided through source reduction activities for the following materials:

- Diapers services to avoid disposable diapers.
- Beverage bottle washing for refilling.

- Recovery and resale of used appliances.
- Double-sided copying.
- The use of food waste as animal feed.
- Clothing donated and resold.

Transfers of used goods from one owner to another were included in the tons source reduced only if the goods were donated rather than sold. For example, a two-year-old refrigerator sold to a used appliance dealer is not considered source reduction. The reconditioning and sale of a donated older refrigerator is considered source reduction.

Four diaper laundering services serve Solano County. Telephone conversations with three of those firms indicate that about 1,623,000 diapers from Solano County are washed each year. Each displaced disposable diaper weighs about 0.1 pound, and the unincorporated county has approximately 6.4% of the county's population. The weight is allocated to the jurisdictions in Solano County according to their populations.

The operator of a wine-bottle washing plant estimated that 200 tons of re-used wine bottles are used in Solano County annually. Interviews with beer distributors indicate that 487 tons of beer bottles are re-used annually. These quantities were allocated among the jurisdictions in Solano County according to their populations.

Estimates of the weight of used clothing that are sold in the unincorporated county were obtained by contacting the Goodwill warehouse in Oakland (which keeps records for its outlets in each county) and Value Center in Vallejo. Outlets that pay for used furniture, appliances, and clothes were not contacted because it is inappropriate to count as "waste" material anything that the original owner sells for more than a token sum of money. The quantities from Goodwill and Value Center were apportioned among the jurisdictions in Solano County according to their populations.

An estimate of the amount of paper saved by double-sided copying was made by interviewing seven copy shops and three local government offices in Solano County. The paper saved through double-sided copying was projected according to the population of each jurisdiction.

Data for many of these source reduction activities is in the hands of a private sector firms who may not be willing to share information, or who do not keep records needed to quantify source reduction. The data presented is based on a combination of available information and assumptions. The estimated tons of waste currently avoided through source reduction measures are listed by material type and waste generation sector in Table I-2. Source reduction by existing program is presented in Table II-1. The unincorporated county is

already avoiding an estimated 88 tons of waste per year, or about 0.6% of the total 1990 waste stream. The existing activities will continue into the short and medium term.

D. DESCRIPTION OF FEASIBLE DIVERSION ACTIVITIES AND ALTERNATIVES

There are four strategies for achieving source reduction. Education, economic incentives/disincentives, investment in equipment, and regulation. These four approaches are listed below in order of priority for implementation. The education program is listed first because all approaches to source reduction must contain an educational component in order to communicate desired behavior changes to waste generators.

D. 1. EDUCATION THROUGH TECHNICAL ASSISTANCE AND/OR PROMOTIONS

Education is the cornerstone of an effective source reduction program. Any other approach, such as incentives, free equipment, or even a regulatory approach, will require supplementary education in order to succeed. Listed below are the various types of educational programs for stimulating source reduction.

WASTE SURVEYS

A waste survey is a systematic accounting of the materials input and product/waste output that identifies procedures with potential for source reduction or recycling. The survey identifies quantities of raw materials used as well as mixed waste quantities and composition. Waste surveys are currently carried out by Solano Garbage Company. They can also be performed by Solano County staff, shared Solano County staff, trade groups, consultants, or nonprofit organizations. A comprehensive waste survey and implementation oriented follow-up, can be performed for only a limited number of businesses each year. In order to efficiently combine services, waste surveyors visiting business could help identify not only source reduction opportunities, but also recycling and composting opportunities for those wastes that cannot be eliminated through source reduction. More information regarding waste surveys can be found in Appendix B, Waste Surveys.

The targeted waste generators will make their biggest reductions (often as a result of simple house-keeping changes) shortly after their survey. However, the process of changing practices in many different types of businesses may take as long as a decade. The tons avoided through waste survey work may not taper off for many years.

TECHNICAL ASSISTANCE TO ORGANIZATIONS AND BUSINESSES

In addition to providing waste surveys to individual firms or institutions, the general approach of the waste survey can be shared with a much wider audience. The concept of materials management in order to reduce waste and the steps to source reduce and also recycle waste can be communicated through a telephone hot-line, literature, public speaking to various groups, or by trade groups and nonprofit organizations to their own members. Going a step beyond general information, fact sheets can be prepared for certain types of waste generators such as restaurants and bars, printers, specific types of retailers, or office settings. In southeastern Iowa, for example, the Iowa Waste Reduction Center (IWRC) produced a 15 minute video on waste management for automobile dealerships, resulting in 160 on-site reviews. The IWRC also provided a number of on-site reviews for farm equipment manufacturers to reduce solvents, painting wastes, and metal finishing rinse waters.

Another way to assist businesses and institutions in source reduction efforts is to refer them to waste exchange information centers. A waste exchange operation can consist of a computer database to match waste generators with others who can use the unwanted materials from the waste generators, or even a warehouse for storing currently unwanted materials. The State of California Department of Health Services currently operates a waste exchange clearinghouse called the California Waste Exchange. (Department of Health Services, Toxic Substances Control Division, Alternative Technology Section, P.O. Box 942732, Sacramento CA 94234-7320). This state-operated waste exchange produces the "Directory of Industrial Recyclers" and the "California Waste Exchange Newsletter/Catalog." It serves primarily hazardous waste generators.

A new state-wide waste exchange, the California Exchange and Reuse Program, is being developed by the California Integrated Waste Management Board. More information is available by calling 1-800-553-2962. In the San Francisco Bay Area, a consultant has assisted the City and County of San Francisco in researching the need for a local waste exchange. The consultant's conclusion is that state-wide waste exchanges will suffice, if expanded, but that technical assistance to achieve source reduction must be offered locally. The various counties in the Bay Area can each become experts regarding source reduction for particular industries, and share their waste survey and source reduction approaches with one another.

Assistance to industrial waste generators should recognize the interest of these waste generators to source reduce hazardous wastes prior to focusing their resources on source reducing nonhazardous solid waste. There are three reasons for industrial waste generators to address hazardous source reduction prior to, or concurrently with, nonhazardous solid waste, as follows:

- The regulatory pressure to change generation and handling practices for hazardous waste is currently greater than for nonhazardous solid waste.
- The costs to store, transport, and dispose of hazardous waste are usually much greater than the costs to store, transport, and dispose of nonhazardous waste.
- The amount of administrative time firms have available to address waste management issues is limited and therefore must be directed to these firms' most pressing waste management issues.

COMPOSTING AT SITE OF GENERATION (UPSTREAM YARD WASTE MANAGEMENT EDUCATION)

A significant percentage of the waste stream in the unincorporated county is yard waste such as grass clippings, weeds, leaves, or brush. Much of this organic material can be avoided or handled on the same land parcels where it is grown, thereby decreasing collection costs and the costs associated with disposal or centralized composting. Backyard composting offers great promise for diverting waste from collection and disposal. Food waste can also be handled by a carefully managed backyard composting system. A small percent of unincorporated county residents are already managing their own compost piles. Significant increases in backyard composting will require a thorough education campaign.

In Alameda County, the Waste Management Authority is investing $159,000 to establish four backyard composting demonstration sites and offer free workshops to teach residents how to manage their own compost piles. These demonstration sites and the accompanying educational workshops can be turned over to the municipalities in which the demonstration sites are located for future operation by the cities. In Solano County, the City of Benicia is currently sponsoring composting workshops that are implemented by Pacific Rim Recycling.

OTHER SOURCE REDUCTION STRATEGIES FOR YARD WASTE

There are four methods, other than composting, to reduce the need for yard waste collection, including:

1. Leaving grass clippings on the lawn, rather than collecting and disposing of them. Special mulching mowers are available and some standard mowers accept special blades or discharge chutes that convert them into mulching mowers.
2. Using uncomposted yard wastes as a mulch to spread on the soil surface around the base of trees or bushes, or in flower or vegetable gardens. Such mulch can modify soil temperature and moisture and control weeds and soil erosion.
3. Switching to drought-resistant vegetation in order to reduce the production of foliage.

4. Operation of small chippers to handle brush on-site. Gasoline-powered chipper/shredders can be used on a neighborhood by neighborhood basis. Such a program can substantially reduce the amount of brush requiring curbside collection.

Each of these source reduction opportunities for yard wastes can be implemented by residential and nonresidential yard waste generators if proper education programs are implemented.

SCHOOL PROGRAMS

The school system in Solano County provides an excellent opportunity to reach residents with educational messages. Public schools in Dixon and Benicia have on-going curricula covering source reduction, recycling, and other environmental issues. Roughly 85% of the county population falls into one of the following three groups: students, parents of students, teachers and administrators (Solano County Office of Education, January 24. 1990). The Solano County Office of the Superintendent of Schools can play an important role in coordinating educational efforts for source reduction and other waste management topics in school curricula. The implementation of source reduction programs for school wastes and the curriculum to communicate these concepts to students could be tied together through student participation in demonstration programs. The efficiency of school programs can be maximized through cooperative efforts, including:

- The use of materials already produced and tried out elsewhere in Solano County or in the U.S. For example Minnesota, through its Waste Education Coalition, has developed a K-6 waste education curriculum tailored to Minnesota's needs. These educational materials, along with others from around the country, will help Solano County efficiently develop its own education program.
- Cooperation among Solano County school districts in sharing their materials and approaches.
- Combination of source reduction curricula and student projects with analogous curricula and projects for recycling and composting. As an example, a school program could involve setting up a controlled yard and food waste compost pile on the school grounds to be managed by biology classes.

MODEL BUSINESS PROGRAM

Awards for the source reduction of wastes can offer three benefits in promoting source reduction: recognition of firms that have already been source reducing solid waste through wise material management, an incentive for more firms to catch the eye of the public and be identified with new "environmentally friendly" initiatives, and the ability to reach the public

with a clear examples of source reduction programs. Some examples of potential award recipients are:

- A dry cleaner could be offered an award for taking back hangers for reuse and for filtering and reusing its dry cleaning solvents.
- A packaging store reusing polystyrene packing peanuts or shredded paper.
- A local copy shop choosing copy machines with user-friendly two-sided copying functions when investing in new machines.

These awards could be publicized with an announcement in local papers, and the firms could be given a certificate or sticker to post in a prominent place for customers to see.

Another approach is to invest in an information campaign to communicate the concept of source reduction to residents. An example is the "Precycle" Campaign launched by the City of Berkeley. A poster and media events were used to suggest to residents that they reduce their waste as a step ahead of recycling their waste.

MODEL PROGRAMS AT COUNTY OFFICES

There are many source reduction opportunities within office settings, most of which can be implemented by Solano County. After learning first-hand about source reduction by implementing a program in-house, the County could then publicize its source reduction efforts and assist others in implementing the same programs. For example, thorough source reduction program for county operations was implemented by Itasca County, Minnesota with the help of the Minnesota Office of Waste Management. The waste materials targeted for source reduction included:

- Office paper reduced through two-sided copying.
- Drinking cups avoided through the use of ceramic mugs.
- Junk mail avoided by writing to direct mail marketers from whom materials had been received.
- Using discarded one-sided copies as scratch paper.
- Buying cleaning solutions and other products in reusable containers.
- Replacing paper towels with hand towels in rest rooms.
- Air filters used in the garage for county vehicles reduced through cleaning rather than replacing the filters.
- Linking garage sales with "cleanup days". Many cities have several days each year when free collection of household items is offered. In the unincorporated

county, the county could promote garage sales to occur the weekend before these "cleanup days" in order to reduce the disposal of reusable or repairable items. Items not sold but reusable or repairable might be collected by charitable organizations after the garage sale period is over, but prior to collection for disposal.

D.2. ECONOMIC INCENTIVES AND DISINCENTIVES

LOCAL WASTE DISPOSAL FEE MODIFICATIONS

A disposal fee modification would take the form of an increased tipping fee for waste arriving at landfills in Solano County. The increased tipping fees would be borne by haulers and then passed onto waste generators in their hauling fees. AB 939 offers the local enforcement agency, the Solano County Department of Environmental Management, Technical Services Division, the right to impose its own surcharge on tipping fees at solid waste management facilities (1989 AB 939, section 41902). Additional fees to pay for solid waste management planning and program implementation can also be charged directly to residents by municipalities or by their contracted waste haulers (1989 AB 939, section 41902).

Before tipping fees or hauling fees are significantly increased through surcharges, an education program for haulers and waste generators would be needed in order to mitigate rate shock and possible illegal dumping. Any surcharges at the landfill must not produce revenues in excess of the funding requirements for local solid waste planning and program implementation (AB 939, section 41901). Surcharges must also be linked with the quantity of waste received rather than charging each gate entrant the same surcharge.

QUANTITY-BASED USER FEES

When waste generators pay higher waste hauling costs for greater quantities of waste hauled, there is an incentive to decrease the amount of waste set out for pick-up. As with surcharges at disposal facilities, revenues generated from local hauling fees cannot exceed the funding requirements for local waste planning and program implementation. There are a number of ways to charge customers based on the quantity of waste set-out for pick-up, including:

- Greater cost for larger containers or greater cost for more containers. This may require hauling crews to record the number of bags or cans set out by each household.
- Require the use of county-designated bags with disposal costs built into the bag purchase price. Collection fees are charged to all customers at a fixed rate since the collection truck must stop for collection at least once per week regardless of how much or little waste is produced.

- Weighing the waste set out for pick-up with a scale, in combination with a written or computerized system to log waste quantities set out by individual households.

The first method, charging residents based on the number of containers they set out is in use many places. The system may involve subscribing for one, two, or three can service, or counting of the number of cans set out by the collection crews. This second approach is more difficult to administer, but better implements the concept of metered service.

Some local examples are the City of Benicia and the City of Berkeley. In Benicia, the first set-out container costs residents $9.70 for collection service, and the second container of the same size costs $5.00 for service. Residents in the City of Berkeley pay the same amount for each additional 32-gallon set-out container. For the City's three hauling districts, households pay an average of $10.60 per month for each 32-gallon container serviced weekly for mixed waste pick-up. Since the program was instituted in 1978, the amount of mixed waste set out for pick-up has declined, although much of this decrease is a result of waste diversion into the City's curbside recycling program. Steeper rate structures (i.e., those that charge relatively higher amounts for each additional set-out container) will offer waste generators greater source reduction incentives than flat rates.

The second method, charging residents by the bag, can be done by selling waste bags for a fee and requiring that mixed waste be set out for pick-up using one of these designated bags. Residents could buy a trash bag bearing the label "For residential solid waste pick-up in Solano County." The bags could be available at a variety of grocers, hardware stores, and other retailers in the community. For example, using $1.00 as an arbitrary price per bag, a resident who set out one bag of solid waste for collection would be paying $1.00 for that week, while a resident setting out two bags would be paying $2.00. This system has been used successfully for many years in some communities.

The third system, weighing the waste set-out containers and charging residents by the pound, has never been implemented on a full scale. A pilot project was conducted in Seattle; and a new system is planned for the City of Farmington, Minnesota beginning in April, 1991. In Farmington, the weights of waste set out will not be used to determine hauling bills until January, 1992 after the weighing systems bugs have been worked out. This type of quantity-based pricing for waste hauling offers the most tangible link between waste quantities picked up and the price paid for hauling service, although such systems have not yet had a chance to develop a track record regarding feasibility and cost. A possible side-effect of weight-based hauling fees is switching from a heavy material to a light-weight material, for example switching from glass packaging to plastic packaging. Such a switch may or may not be desirable because of relative harms of different waste materials when composted, combusted, or landfilled.

Changing from fixed fees for unlimited pickup, or from a system where fees are collected through taxes, can involve a significant change in billing methods as well as an attitude change on the part of the residents. For most cities, there is already a computer database for billing, whether for waste or water, which can be adapted to reflect differences among households. As for resistance among residents regarding the loss of unlimited set-out privileges, working with the press and preparing mailers will help customers understand the reasons for the change. Making sure there are convenient opportunities for customers to reduce and recycle waste is essential, as is enforcing penalties for illegal dumping.

Quantity-based fees can be a burden for some fixed- or low-income customers. Establishing special rates for low-income citizens, or building "lifeline" components into the rates (such as PG&E has done for gas and electric service) will mitigate the impact. Some residents will reduce their mixed waste hauling service needs substantially through careful buying and recycling. In conjunction with selecting a quantity-based rate system, there is almost certainly a need for a service level smaller than a full can or standard bag size.

LOANS, GRANTS, AND LOAN GUARANTEES

Providing money to private sector or nonprofit parties may allow investment in equipment or educational materials that will result in the source reduction of solid waste. For example, a local convenience store could perform a pilot program to sell reusable drinking cups and encourage customers to wash them and keep them in their cars for refilling. The cost of the drinking cups and the educational campaign for customers could be covered through a small loan, grant, or loan guarantee. The money could also be used by a manufacturer for the following source reduction investments:

- Design changes in products to offer longer product life.
- New production line equipment that reduces production waste.
- New packaging equipment to decrease the amount of packaging materials used per item.
- New packaging line equipment to allow for a redesigned refillable package.

A loan or grant program could be used in conjunction with waste survey and technical assistance programs which would identify opportunities for waste-reducing investments. Such a program would start out small by looking for a few waste generators at a time.

DEPOSITS, REFUNDS, AND REBATES

The source reduction objective of applying a deposit or refund to a product or its packaging is to claim back the product or packaging for reuse. For example, a food retailer might serve food in reusable containers with deposits. These containers would then be returned, washed, and reused.

An example of washable containers is the sale of beer in refillable bottles. Unfortunately, the current trend in beer retailing is to move away from this container type, and liquor stores are devoting nearly all of their cooler space to single-use aluminum or glass containers. Although refillable beer bottles are not common in liquor stores, they are still used by many bars. The tons of glass waste avoided, as reported in Chapter I, reflect this practice of using refillables by local bars and restaurants. An Anheuser-Busch bottler in Fairfield operates a washing line to receive and refill beer bottles. The location of this plant in the middle of the county creates an opportunity to increase the use of refillables in the unincorporated county.

REDUCED BUSINESS LICENSE FEES

Reduced business operating license fees could be offered to waste generators who perform some type of source reduction function. Examples of applicable programs include employee education programs for in-house source reduction, the preparation of a solid waste generation plan, or participation in a source reduction workshop sponsored by Solano County. However, reducing fees would result in a direct loss of revenue for Solano County.

D.3. PUBLIC SECTOR INVESTMENT PROGRAMS

WASTE EXCHANGE DATABASE

There are a number of waste generators producing waste materials that could be used by other local parties. The missing ingredient to match these waste generators with the appropriate material reusers is information. By investing in a local waste exchange computer database, these material matches could be made to avoid unnecessary waste. A waste exchange database implemented on a larger scale is preferable, in order to increase the types of materials available and the potential users for these materials.

WASTE EXCHANGE WAREHOUSE

Although a county-level waste exchange database may not be able to achieve the critical mass of participation necessary for success, a waste exchange warehouse with donated waste materials for a specific purpose can work well. This type of source reduction through use of unwanted paints and building materials has been tried successfully in New York City with the New York Materials for the Arts. Similar programs are operating in Boston (RECYCLE, Boston Children's Museum) and in San Diego (the San Diego Materials Bank).

BACK YARD COMPOSTING BINS

Providing free or subsidized composting bins would probably offer high back yard composting participation rates. If bins are given out, they should be accompanied by an education program and a place to call with questions, otherwise bins will end up being used as storage containers. If the unincorporated county decided to provide or subsidize compost bins to residents, some portion of the bin cost should be contributed by the residents

receiving the bins. Even a $5.00 or $10.00 contribution by the resident will help to decrease the cost of distributing bins.

SALE OF CLOTH REUSABLE GROCERY BAGS

Reusable cloth grocery bags are a small way residents can reduce waste every time they shop. The County could make canvas grocery bags available for sale in local grocery stores, printed with the County's Local Task Force logo and a few words about source reduction of waste, with or without the name and logo of the grocer.

D.4. REGULATORY PROGRAMS

LOCAL PROCUREMENT POLICIES

Policies or ordinances can be designed to encourage, or require, the following attributes for products or packaging purchase by Solano County:

- Durability.
- Recyclability.
- Reusability.
- Recycled material content.

Both product durability and packaging reusability are examples of source reduction.

LAND-USE REQUIREMENTS

Through zoning regulations and the permitting process for new construction, cities have an opportunity to guide their business community toward source reduction opportunities. For example, builders or management firms for planned shopping malls could be required to seek repair shops or used merchandise retailers before being granted a construction permit or a local operating license. Developers are often not supportive of businesses which reuse or repair because of the public perception that they will be unattractive.

SOURCE REDUCTION AND RECYCLING PLANNING AND REPORTING REQUIREMENTS

The procedure for producing a source reduction plan is much the same as a waste survey. A waste plan is prepared by the affected firm. The plan represents greater detail and a longer commitment over time than a waste survey performed by an outside party. Large waste producers (large in relation to the community wastestream) in the commercial and industrial sectors could be required to develop in-house source reduction and recycling plans to target materials from production, packaging, and operational aspects of their businesses. Given the diversity of business types and the range of wastes they generate, it is difficult to specify what changes in practices could be implemented without a careful analysis of each operation,

which is beyond the scope of this SRRE. Businesses could be required to target materials for both source reduction and recycling, and implement programs designed to meet the goals established in this report. The implementing agency would provide a model format for businesses to follow, and would provide staff assistance to businesses in developing their plans. Source reduction plans can be a very effective tool in gaining cooperation from local firms in analyzing their waste stream for the purposes of reduction, recycling, and composting. Preparing a waste plan would require performing a waste survey, as discussed previously.

BANS ON PRODUCTS AND PACKAGING

Where local residents feel strongly about environmental issues related to packaging and no steps are being taken on a state or federal level, some cities have set forth their own packaging requirements. For example, the cities of Minneapolis and St. Paul have passed ordinances requiring all food packaging to be refillable, recyclable, or degradable.

E. EVALUATION OF ACTIVITIES AND PROGRAMS

The criteria for evaluation are listed in Table II-2. Each alternative is rated according to criteria specified in CCR Section 18733.3. Alternatives are rated "high", "medium", and "low". They are used to compare programs to each other. High means good in comparison to other programs, and low mean poor in comparison to other programs. Below, the alternatives are evaluated to in the light of factors considered to be most important.

EDUCATION THROUGH TECHNICAL ASSISTANCE AND/OR PROMOTIONS

All of the source reduction activities have in common the need to work cooperatively with other cities and Solano county in order to avoid unnecessary and costly duplication of work. Educational activities to promote source reduction are all appropriate for implementation at the local level, and the cost to the unincorporated county can be low if planning is shared with others. Significant quantities of solid waste can be diverted over time.

Sale of Cloth Reusable Grocery Bags

Offering canvas grocery bags for sale by local grocers is a highly visible and tangible example of source reduction. This source reduction activity is attractive for many of the same reasons that an awards program is attractive, it has high educational value, it fits with local interests, and it can be implemented quickly.

In-house programs at County offices

Businesses and institutions in the unincorporated county generate a large quantity of high grade ledger paper. They are an appropriate target for a source reduction education campaign. Solano County will be most helpful to others if it has attempted its own in-house

source reduction campaign. Although a successful program can require significant attention from assigned Solano County staff, this source reduction approach will both give the County good information about what it can expect from other local waste generators and personally involve County employees at all levels. The personal involvement of all Solano County employees or volunteers can result in greater top down commitment for other source reduction programs. The educational value and long term low cost of this source reduction measure make it desirable for implementation.

Composting at Site of Generation (Upstream Yard Waste Management Education)
Backyard composting ranks high as a possible source reduction activity for the County because of the potential to avoid significant quantities of waste. Composting is described in more detail in Chapter IV.

Other Source Reduction Strategies for Yard Waste
As with backyard composting programs, the tons of waste to be avoided through other at-home yard waste management practices is great. Moreover, the cost for these education programs is relatively small. Information about mulching, planting, and chipping/shredding can be disseminated as part of an educational program on backyard composting. Such a campaign should be conducted before Solano County invests in chippers/shredders for use by residents.

Waste Surveys
Costs associated with waste surveys include the cost to train a waste surveyor and the cost for the surveyor to make site visits and write-ups as appropriate. These costs can be minimized by working with other cities, state agencies, or other groups. If done efficiently, waste surveys offer significant medium term potential (and beyond) for source reduction for little cost. They can also offer cost-saving ideas to businesses, and help educate Solano County staff in what the local waste stream contains and what can be done to abate and manage this waste stream. For these reasons, waste surveys rank high among possible programs to foster source reduction.

Technical Assistance to Organizations and Businesses
Technical assistance to organizations and businesses can take the form of waste surveys, or can be the simple sharing of information with targeted businesses types of similar waste generation characteristics. It is a high priority for the same reasons that waste surveys are a high priority. Where specialized knowledge is not available locally to offer assistance to a particular business, contact lists of other resources around the state or the nation should be maintained and provided. For industrial waste generators, technical assistance in the reduction and recycling of nonhazardous waste should be combined with assistance in minimizing the generation of hazardous waste.

School Programs

This educational activity to promote source reduction is best addressed through cooperation with other cities and the school districts. The ability to use existing communication channels (i.e., the schools) makes curricula and pilot project programs for schools a very high priority. The City of Benicia already has a good start in trying out a waste-education school curriculum, and other Cities are beginning programs as well. Moreover, the demographic make-up of Solano County is characterized by many children of school-age and many adult employees of the school system. These local conditions make school programs desirable for implementation.

Model Business Program

Awards programs for source reducers are low-cost to the unincorporated county, and will take advantage of existing communication channels by presenting information to the local news media and other local information distribution opportunities. Awards programs have a low cost, a high educational value, a proven track record, seem to fit with local interests, and can be implemented quickly. Awards programs are therefore among the top priorities for promoting source reduction.

ECONOMIC INCENTIVES AND DISINCENTIVES

Local Waste Disposal Fee Modifications and Quantity-based Local User Fees

Increased tipping fees and quantity-based hauling fees are unambiguous messages to waste generators that increasing quantities of waste generated is not in their favor from a hauling and disposal cost perspective. The communication networks are in place for billing waste generators, although a quantity-based collections pricing scheme can require significant alterations in billing practices. Although these programs are "sticks" rather than "carrots" in terms of motivating waste generators to reduce waste, they remain a high priority because of the fit with local conditions and the no-cost or revenue-producing potential for these programs. Unfortunately, decreases in waste generation rates as a result of landfill tipping fee surcharges and add-ons to waste collection fees cannot be easily projected. Responses by waste generators to increased fees depend on a number of factors, including existing recycling options, local mindset, method of instituting increased fees, and assumed elasticities for response to changing prices. Since it is difficult or impossible to identify the quantity of waste that is source reduced due to a change in user fees, no diversion estimates have been made for this activity.

Loans, Grants, and Loan Guarantees

Financial incentives in the form of "carrots" (loans and grants) to source reduce solid waste can offer some creative local source reduction examples. If funds are made available to waste generators through grants and/or loans, these funds should be sought from future programs established by the State of California.

Deposits, Refunds, and Rebates
These programs would require an accompanying education campaign.

Reduced Business License Fees
Since the business fees in the unincorporated county are small, changes in fees are likely to result in little or no effect on waste generating behavior.

PUBLIC SECTOR INVESTMENT PROGRAMS

Backyard Composting Bins
Although yard waste composting is a significant part of a successful source reduction program, the cost of distributing backyard composting bins to residents is high. Before a bin distribution program is undertaken, Solano County needs more information about which types of bins are easiest to use and most effective for Solano County's weather conditions and waste composition

Waste Exchange Database
A locally operated waste exchange does not offer great diversion potential and would be less effective compared to participating in a state-wide waste exchange.

Waste Exchange Warehouse
A waste exchange warehouse is likely to be unsuccessful if implemented locally for the same reasons a waste exchange clearinghouse would be unsuccessful (less than critical mass of participants). There may be a role for selected nonprofit groups to establish their own calls for materials, for example, a theater group requesting furniture, interior walls, paints, and fabrics.

REGULATORY PROGRAMS

Local Ordinances and Bans on Products and Packaging
Because of the arid local climate and need to conserve water and the high growth rate in terms of new housing starts, a program to limit high-water-use planting is an appropriate first measure for local source reduction regulation.

Other ordinances (e.g., county-wide bans on certain types of packaging) are inappropriate at this time. Such programs are better done by big cities or by the State of California or federal government. While a countywide ban can be a political and legal quagmire, an ordinance affecting purchasing by County government can send a message to local residents and businesses for little or no cost.

Land-use Requirements
Land-use requirements can be difficult to implement because mandates for certain types of businesses may not coincide with local markets for these businesses. Rather than requiring particular types of businesses through land-use requirements, the County should work towards creating a demand for these business through its public education efforts.

Source Reduction and Recycling Planning and Reporting Requirements
Local businesses should be given an opportunity to work out their own source reduction and recycling programs before being required to do so by the County. Source reduction planning and reporting should only be required if the results of technical assistance and private sector initiative are unsatisfactory.

F. SELECTED PROGRAMS

The number of appropriate source reduction activities for the unincorporated county, and the limited resources for implementation, suggest that jurisdictions in Solano County should work together to minimize costs and increase effectiveness. Each city in Solano County can take a leadership role in conducting pilot projects for those activities which are best suited locally. After one to two years of program development and implementation, other jurisdictions can follow and begin their own regular programs based on the results of the pilot projects. A list of pilot programs and ongoing programs is in Table II-3.

The unincorporated county will not undertake any pilot programs. It will, however, be the only jurisdiction to levy a disposal surcharge at landfills because it is the only jurisdiction with the authority to do so. The County will be involved in the coordination of pilot programs and will be heavily involved in the implementation of full-scale programs carried out on a county-wide basis.

None of the selected programs require the construction or expansion of facilities. Those programs which require methods for handling and disposal of materials and which produce materials having an end-use are noted in the discussion. In general, handling and disposal of waste, and finding end-uses are not applicable to source reduction programs.

Source reduction programs for the unincorporated county will result in avoiding about 1.2% of the community's waste stream in the short term. In the medium term, source reduction programs will amount to 2.7% of the waste stream. Over 90% of this quantity is avoided yard waste generation. Less than 10% of the projected reduction is through reuse and improved business practices.

These estimates are considered to be verifiable through future monitoring. Actual diversion through source reduction may be much more than what is estimated here. Much source reduction is difficult or impossible to measure.

Following are selected source reduction programs.

SURCHARGE AT DISPOSAL FACILITIES

This program is selected to communicate to all disposers of refuse, including self-haulers, that diversion activities must be pursued and that unnecessary disposal should be avoided. In particular, the surcharge is selected to encourage alternatives to the disposal of self-hauled yard waste and wood waste that can be converted to mulch or compost. Alternative drop-off sites for these wastes will be developed as described in the Composting Component.

The program will raise revenues for other programs. It is to be implemented by Solano County, within whose jurisdiction the Potrero Hills and the B&J Landfills are located.

The quantity of material source reduced through this program would be very difficult to measure. For regulatory purposes, the targeted diversion through source reduction is zero tons per year (0% of the waste stream). Some material may be diverted from disposal through recycling or composting as a result of this program. Diversion through those methods is included in the appropriate components. The source reduced material would not have an end use.

DROUGHT-RESISTANT LANDSCAPE ORDINANCE

This program is selected because it will help to reduce the production of yard waste and because it coincides with local plans to reduce water consumption.

The quantity of waste diverted through this program would be difficult to measure. For regulatory and reporting purposes, the targeted diversion is zero tons per year (0% of the waste stream). End uses are not applicable.

IN-HOUSE SOURCE REDUCTION AT COUNTY OFFICES

This program is selected because it is relatively easy for the County to control programs within its own offices and because it is important for the County to set a good example for the rest of the community. This program will promote the objectives of replacing disposable materials such as coffee cups with reusable materials, of purchasing repairable products, and of increasing the efficiency of the use of paper and other materials.

Diverted quantities are expected to be very difficult to measure or negligible in achieving the mandated diversion objectives. For regulatory purposes, the targeted diversion is zero tons per year (0% of the waste stream).

SCHOOL CURRICULUM AND STUDENT PROJECTS

This program is selected because of its educational value. That is, it is consistent with local priorities to promote education. It will promote the objectives to reduce packaging, increase the efficiency of material use, and reduce the use of non-recyclable materials.

Diverted quantities are expected to be difficult to measure or negligible. For regulatory purposes, the targeted diversion rate is zero tons per year (0% of the waste stream).

WASTE SURVEYS

Waste surveys are selected because they can help to increase the efficiency with which materials are use.

In the short-term, about nine tons per year (0.06% of the waste stream) is targeted for diversion through the program. In the medium-term, about 22 tons per year (0.14% of the waste stream) are targeted for diversion. Most of the diverted material is expected to be various types of paper.

QUANTITY-BASED HAULING FEES

This program is selected to send a price signal to waste generators encouraging them to reduce the amount of waste they dispose. This program can be a strong inducement to recycle as well as to source reduce. It can improve participation rates in curbside collection programs and other recycling programs because it provides an incentive to minimize mixed refuse set out for collection.

The quantity of waste to be diverted via source reduction in this program is difficult to quantify. For regulatory purposes, the targeted diversion is zero tons per year (0% of the waste stream).

UPSTREAM YARD WASTE MANAGEMENT EDUCATION AND DEMONSTRATION SITE

This program includes backyard composting and other methods of significantly reducing the quantity of disposed yard waste. It is selected for this reason.

The estimated quantity material diverted through this program is 170 tons per year (1.08% of the waste stream) in the short-term and 380 tons per year (2.43% of the waste stream) in the medium-term.

The end use for the compost produced through backyard composting would be gardens at residences. The material would be handled through manual labor and simple tools such as rakes, shovels, and wheel barrows. Compost bins may or may not be used as warranted by individual circumstances.

AWARDS FOR COMMERCIAL AND INDUSTRIAL GENERATORS

Awards are selected because of their educational value and because they provide positive recognition of community-spirited businesses. They are consistent with local policies.

The quantity of waste diverted through this program is difficult to measure. For regulatory purposes, the targeted quantity is zero tons per year (0% of the waste stream).

PARTICIPATION IN A REGIONAL WASTE EXCHANGE

This program is selected because of its potential for promoting the re-use of materials and because it can provide economic benefits that exceed the cost of the program.

The quantity of waste diverted through this program is measurable but could vary significantly. For regulatory purposes, the targeted waste diversion is zero tons per year (0% of the waste stream). End uses for exchanged materials depend on what materials are exchanged. The end use will generally correspond with the originally-intended use of the material.

TECHNICAL ASSISTANCE TO BUSINESSES

This program is selected because of its potential effectiveness in increasing the efficiency of usage of materials such as high grade paper. It will also promote recycling in businesses, so it is consistent with local plans.

The quantity of waste diverted through this program is estimated to be nine tons per year (0.06% of the waste stream) in the short-term and 21 tons per year (0.14% of the waste stream) in the medium-term.

G. PROGRAM IMPLEMENTATION

As mentioned in Section F (Selected Programs) of this chapter, the unincorporated county can decrease its costs and increase its effectiveness by working cooperatively with other jurisdictions. In addition to listing the selected source reduction pilot activities for the jurisdictions in the County, Table II-3 identifies the start-up years and parties responsible for implementation by activity. Estimated costs for implementing these programs are given in Table II-4. The total cost is about $55,000 per year for the unincorporated county.

Permanent source reduction program implementation dates and costs are presented in Table II-4. A 25% contingency allotment is included in this estimate. Source of revenue are specified in Table II-6. User fees are the contingency funding source.

H. MONITORING AND FEEDBACK

H.1. ANNUAL MONITORING

One approach to measuring the waste avoided through source reduction programs is called the "bottom-up" approach. Waste avoided through individual source reduction programs is measured. A detailed description of the bottom up method of measurement for each selected source reduction activity is in Appendix C.

The "top-down" approach of measuring waste generation rates county-wide is essential to gauge large changes over time in a community's degree of wastefulness. A top-down measurement approach should be implemented by each jurisdiction for its own information. In order to account for increases in population and the number of jobs, the unincorporated county should sum its waste going to recycling, composting, burning, and landfilling facilities from residential waste generators and from nonresidential waste generators to derive two numbers: annual tons of residential waste per capita, and annual tons of nonresidential waste per job. If those numbers decline over time, source reduction activities are succeeding.

Successful source reduction relies on significant changes in the "throw-away" behavior of residents. Since changes in resident and business attitudes towards waste generation will likely precede behavior changes, and tons abated, it is important to know how these attitudes are changing. Therefore, in addition to measuring the results of each source reduction activity, attitudes, levels of understanding, and opinions about source reduction should be tracked through annual surveys.

All three methods will be used annually to monitor the effectiveness of source reduction programs

H.2. REPORTING

All information will be reported annually to Solano County, or obtained by the County in an annual attitude or behavior survey. In some cases, reporting data will be a condition of getting a business license or franchise agreement renewal or extension. County of Solano employees will be responsible for performing monitoring functions, including information gathering, compiling, and report writing, unless a regional arrangement for these services is made.

Operators of solid waste disposal facilities will be required to report the following information for Solano County generated waste:

- Weight and origin of material received, marketed, and disposed.
- Any change in tipping fees charged.
- Any special events which would effect tonnages disposed, such as a large demolition job or residential spring cleanup, and their estimated "special event tonnage" over and above normal tonnage.

H.3. REMEDIAL MEASURES

The quantity of waste diverted by source reduction each year will be compared with the quantity of waste projected to be diverted that year by source reduction. If program success cannot be determined with an annual assessment of tons avoided, an increased frequency of accounting for tons can be implemented. For example, if yard waste handled by residents on their own property cannot be estimated with an annual survey, this estimation could be done during peak yard waste generation seasons each year, with some additional survey work by those parties handling yard waste.

If actual diversion falls short of the projection, the following actions will be taken in the order described:

1. Total tonnage diverted by all programs in that year will be compared with total tonnage projected to be diverted by all programs. If total actual diversion equals or exceeds projected diversion no further action is necessary.
2. Additional educational and informational actions will be taken if it appears that the tonnage shortfall is the result of low participation or awareness.
3. If educational programs are not successful in decreasing waste generation rates for commercial and industrial waste generators, source reduction plans should be required from all waste generators producing more than a specified quantity of solid waste per year.
4. If necessary, additional programs beyond those described in this document will be investigated, designed, budgeted, and implemented.

TABLE II-I: SOURCE REDUCTION BY PROGRAM

Waste Type	Quantity (tpy)	Programs
High Grade Ledger	1.4	Copy shops and City offices using double-sided photocopiers in Solano County
Refillable Containers:		Bottle washing facilities (interviews)
Wine Bottles	1.2	
Beer Bottles	29.1	
Food Waste	36	Food Manufacturers
Textiles and Leather	12.5	Thrift Shops
Other Organics	7.5	Diaper laundering services
Total Source Reduction:	87.7	

Note: Most information in this table was collected on a county-wide or regional basis and apportioned to the population of the area served. Generally, surveys and interviews did not include all potential source reduction activities, but were intended to provide a basis for reasonable order-of-magnitude estimates.

TABLE II-2: RATINGS OF SOURCE REDUCTION ACTIVITIES

Activity	Effective-ness	Hazard	Flexibility	Consequences on Waste	Feasibility	Need for Facilities	Institution Barriers	Local Conditions	Cost	End Uses	Educational Value	Development Potential	Track Record
Education													
Subsidize canvas grocery bags	Low	High	High	Med	High	High	High	High	Med-High	NA	High	Low	High-Low
In-house source reduction at City offices	Low	High	High	High	High	High	High	High	High	NA	High	Low	High-Low
Upstream yard waste mngmt education	Med	High	High	High	High	High	High	High	Med	High	High	Med	Med-Low
Awards, commerc/industrl. generators	Low	High	High	High	High	High	High	High	High	NA	High	Med	Med
Partic. in regional waste exchange	Low	High	High	High	High	High	Med-High	Low-High	High	Med	Low-Med	Med	Med
School curric. & student projects	Low	High	Med	High	High	High	Med	High	High	NA	High	Low	High
Technical assistance to businesses	Low	High	Med	High	High	High	Med-High	Med-High	Med	NA	Med-High	Med-High	High
Technical assistance to comm./ind.	Low	High	Med	High	High	High	Med-High	Med-High	Med	NA	Med-High	Med-High	High
Incentives/Disincentives													
Surcharge at disposal facilities	Low	High	High	High	High	High	Med	Med-High	High	NA	Low-Med	Low	High
Quantity-based hauling fees, residential	Low	High	High	High	High	High	Med-High	High	High	NA	High	Low	High
Loans, Grants, & Loan Guarantees	Low	High	High	High	High	High	Low	Low	Low	NA	Low-Med	Med	Med
Deposits, Refunds, & Rebates	Low	High	High	High	High	High	Low	Low	Med	NA	Med-High	Low	High
Reduced Business Lic. fees	Low	High	High	High	High	High	Low	Low	Med	NA	Med	Low	Low
Providing the Tools													
Back yard compost bins	Med	High	High	High	High	High	Med	Med	Low	High	High	Low	High
Local waste exchange database	Low	High	High	High	High	High	Med	Med	Low	Med	Low	Low	Low
Local waste exchange warehouse	Low	High	High	High	High	Med	Med	Med	Low	Med	Med	Low	Med
Regulations													
Drought-resistant landscp ordinance	Low	High	Med	High	High	High	Med-High	High	High	NA	Med-High	Med	Low
Other local ordinances	Low	High	Med	High	High	High	Low	Low	High	NA	Med-High	Low	Low
Land-use requirements	Low	High	Med	High	High	Med	Med	High	High	NA	Low-High	Med	Low
Source reduction planning requirements	Low	High	Med	High	High	High	Low	Med	High	NA	Med-High	Med	Low
Bans	Med	High	Med	High	High	High	Low	Low	Med	NA	High	Low	Med

Notes: A range (e.g. med-high) indicates that the rating changes from the short-term (to 1995) to the medium-term.
Feasibility refers to the ability to implement programs in both the short-term and medium-term.
See Appendix C for an explanation of criteria
In the rating system, "high" means "favorable to selection". For example, a low-cost program gets a "high rating". A program with minimal hazards is rated "high".
"NA" indicates the criterion is not applicable to the program.

TABLE II-3: PILOT SOURCE REDUCTION PROGRAMS FOR SOLANO COUNTY

Pilot Programs	Jursidiction Responsible	Implementation Period
Waste Surveys	Fairfield & Vallejo	1992-93
Drought-resistant landscape ordinance	Benicia	Current
School curriculum & student projects	Suisun City & Dixon	1992-93
Yard waste management education & demo site	Vacaville & Rio Vista	1992-93
Awards, commercial & industrial generators	Benicia & Suisun City	1992-93
Participation in regional waste exchange	Vacaville & Fairfield	1992-93
Technical assistance to businesses	Vacaville & Benicia	1992-93

TABLE II-4: SOURCE REDUCTION PROGRAM COSTS (a)

Programs	Start-up Year	Start-up Costs	Staff(b) EPI	Staff(b) Other	Annualized Start-up Costs(c)	Other Annual Costs(d)	Total Annual Costs(e)
Surcharge at Disposal Facilities	1992	0	0	0.10	0	5,457	6,821
Drought-Resistant Landscape Ordinances	1992	0	0.01	0.02	0	1,983	2,479
In-House Source Reduction at County Offices	1993	0	0	0.04	0	1,985	2,481
School Curriculum & Student Projects	1993	0	0	0.06	0	4,177	5,221
Waste Surveys	1994	0	0	0.04	0	2,385	2,981
Quantity-Based Hauling Fees	1994	0	0.03	0.05	0	3,969	4,962
Upstream Yard Waste Management Education/Demo Site	1994	0	0.17	0.04	0	12,969	16,212
Awards, Commercial & Industrial Generators	1994	0	0	0.04	0	2,485	3,106
Participation in Regional Waste Exchange	1994	0	0	0.03	0	1,888	2,361
Technical Assistance to Businesses	1995	0	0.08	0.04	0	6,854	8,567

Notes: (a) Annual Costs in 1991 Dollars
(b) Staffing requirements are expressed as full-time equivalents
(c) Facility costs are amortized over 20 years at 12% and equipment costs are amortized over 5 years at 10%
All capital costs have been increased by 15% before amortization to include estimated financing expenses.
(d) Other annual costs include staff costs at $49,616 per FTE,other operating costs, and materials costs.
(e) Total Annual costs include a 25% mark-up for contingencies.

TABLE II-5 IMPLEMENTATION SCHEDULE FOR SOURCE REDUCTION PROGRAMS

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
Surcharge at Disposal Facilities	DEM and LEA	1992-
Design Rate Structure	DEM, Planning	Feb, 1992
Public Information Campaign	DEM, Planning and County Waste Haulers	April, 1992
Implement New Fees	County Waste Haulers	June, 1992
Drought-Resistant Landscape Ordinance	DEM	1992-
Research and Draft Ordinance	DEM, Planning	Jan, 1992
Public Notification and Hearings	DEM and Public	March, 1992
Adopt Ordinance	Board of Supervisors	June, 1992
EPI	DEM and County Waste Haulers	Sep, 1992
Monitoring and Evaluation	DEM	Jan, 1993-
In-House Source Reduction at City Offices	DEM	1993-
Draft Work Plan	DEM and CGS	Jan, 1993
Inter-Departmental Review	All County Departments	March, 1993
Purchase and Distribute Tools	CGS	May, 1993
Distribute Education Material	All County Departments	May, 1993
Monitoring and Evaluation	DEM and CGS	June, 1993
Waste Surveys	DEM	1994-
Select Targets and Methodology	DEM & County Waste Haulers	Jan, 1994
Select Implementing Agents	DEM	March, 1994
Develop and Implement Waste Surveys	DEM, County Waste Haulers & Contractors	April, 1994-
Develop and Implement EPI	"	April, 1994
Monitoring and Evaluation	"	
Quantity-Based Residential Collection Fees	DEM	1994-
Assess and Develop Fee Structure	DEM	March, 1994
Public Notification and Hearings	DEM and Public	May-June, 1994
Distribute Public Information and Receive Feedback	DEM	June, 1994
Implement New Fee Structure	DEM	Sept, 1994-

TABLE II-5 (CONTINUED)

Upstream Yard Waste Management Education/Demo Site	DEM	1994-
Evaluate Pilot Program and Develop Work Plan	DEM and CCE	Jan, 1994
Prepare Educational Materials	DEM and CCE	March, 1994
Distribute or Sell Tools and EPI Materials	DEM and CCE	April, 1994
Monitoring and Evaluation	DEM and CCE	June, 1994
Awards, Commercial & Industrial Generators	DEM	1994-
Select Implementing Agent (Committee, Chamber of Commerce)	DEM	Jan, 1994
Develop and Publicize Guidelines and Selection Criteria	Implementing Committee	June, 1994
Grant Awards	Implementing Committee	Annually
Participation in Regional Waste Exchange	DEM	1994-
Research Available Programs	DEM and CGS	Jan, 1994
Publicize and Assess Options	DEM, CGS, and C/I Sectors	Feb, 1994
Participate in Exchange	Private Businesses	Feb, 1994-
School Curriculum & Student Projects	DEM	1993-
Assess Available Curricula	DEM, County Board of Education, Local School Board & Public	Jan, 1993
Select Curricula and Purchase Materials	"	April, 1993
Teacher Training	County School Board	Summer, 1993
Implement Curricula	County School Board	Sept, 1993
Technical Assistance to Businesses	DEM	1995-
Assess County In-House Source Red. Program	DEM, CGS	Jan, 1995
Develop Work Plan	DEM	March, 1995
Select Implementing Agents	DEM	April, 1995
Implement Program	DEM & Private Businesses	June, 1995

Abbreviations: DEM = Department of Environmental Management
LEA = Local Enforcement Agency

TABLE II-6: SOURCES OF PROGRAM FUNDING

	User Fee	Franchise Fee	Landfill Surcharge	Sales Tax	Waste Importation Fee
SOURCE REDUCTION PROGRAMS					
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		

CHAPTER III SUMMARY
RECYCLING

Recycling refers to the use of waste materials as raw material in the production of new items. Waste used in this way is often referred to as a secondary material, or a secondary feedstock.

Recycling currently amounts to about 9.7% of the waste stream. The SRRE estimates that 12.5% additional diversion will occur through recycling prior to January 1, 1995, and another 19.1% will occur between January 1, 1995 and January 1, 2000. Total diversion through recycling is therefore estimated to be 31.6% in the year 2000.

Existing recycling activities in the unincorporated county include two buy-back center (pursuant to AB 2020), salvaging activities at landfills, and commercial recycling.

The congested areas of the unincorporated county are expected to phase in curbside recycling collection program from 1992 through 1996 as a cooperative effort with nearby cities as they implement their programs. The unincorporated county will also expand the drop-off and buy-back centers to service the sparsely populated areas and to collect materials that are not collected in the curbside programs.

Diversion programs selected for the short term planning period are structured to focus on materials for which markets and end uses are expected to be stable, or for which markets and end uses are local. Initially, a glut of secondary materials is expected due to the implementation of programs throughout California. In order to avoid rejection of collected materials in a buyer's market due to minor contamination, the recommendations focus on collection of source separated or minimally processed materials for the short-term planning period. Collection of extensively commingled recyclables with capital intensive centralized processing is deferred until the medium-term planning period, when market stimulation programs should dissipate the buyer's market.

Recycling programs selected for the residential sector include:

- Single- and multi-family curbside collection for the congested areas, phased in from 1992 to 1996 in cooperation with nearby cities.
- Multi-family collection, phased in from 1992 to 1996, in cooperation with nearby cities.
- Expansion of materials at drop-off centers and buy-back centers (1992).
- Expansion of materials collected single- and multi-family collection (1996).

Initially, materials collected at the curbside will be processed at intermediate processing facilities (IPF) each consisting of a manual sorting line. The IPF's will be operated through programs in nearby cities. Expansion of the curbside programs in 1996 will be aimed at including more materials. This may require more mixing of recyclables and, hence, a more complex processing facility. The expansion of drop-off and buy-back centers in the short term will be aimed at the collection of materials not collected at curbside.

Programs selected for the commercial/industrial sector:

- Modify zoning and building codes to stress recyclability (1992).
- Encourage and assist commercial and industrial generators to recycle (1992).
- Expand County office recycling and procurement (1992).

Programs selected for the self-haul sector:

- Expand landfill salvaging and recycling (1992).

A high level of participation is necessary in order to achieve the 50% diversion objective. If high participation does not occur voluntarily, mandatory participation is a contingency measure.

CHAPTER III
RECYCLING COMPONENT

INTRODUCTION

The Recycling Component describes the unincorporated county's existing and planned recycling efforts, and ways to further develop recycling programs. The chapter is written in accordance with Assembly Bill 939 (AB 939) and the regulations established by the California Integrated Waste Management Board (CIWMB).

Recycling is more than the separation and collection of post-consumer materials. These are only the first steps in a loop. Post-consumer materials must also be reprocessed or remanufactured, and only when the materials are reused is the loop complete. Recycling is maturing as a waste management option, with increasingly sophisticated and proven collection and processing equipment, better understood benefits and cost parameters, and the sudden embracing of recycling by the well-capitalized, rapidly-centralizing waste hauling industry. Although prices for secondary materials remain unstable and in some cases very weak, more and more people are accepting the feasibility and importance of recycling, while institutional changes necessary to enable high levels of recycling are proceeding.

Current recycling activities in the unincorporated county divert some materials from the residential, commercial, and industrial sectors. Other recycling activities are being planned or developed. A high recycling rate can be achieved by maximizing participation in these programs, and by planning and implementing programs that will recover other materials from other sources. New programs will build upon pre-existing programs when possible.

A. GOALS AND OBJECTIVES

A.1. GOALS

The unincorporated county's recycling program goal is to conserve natural resources including materials and landfill space in ways that are:

- Cost-effective.
- Environmentally sound.
- Safe.
- Conducive to community development and social goals such as the promotion of gainful employment and the promotion of community service organizations.

- Educational and that provide opportunities for citizen participation.
- A source of community pride.

A.2. OBJECTIVES

The short-term (prior to January 1, 1995) objectives of the unincorporated county recycling component are:

- Achieve a recycling rate of 22% of the total waste stream.
- Establish recycling programs that allow 90% of the residents in congested areas of the unincorporated county to participate.
- Establish a recycled products procurement program by industry within the unincorporated areas of Solano County.
- Apply for State Recycling Market Development Zone Designation achieved.
- Promote, as appropriate, linkages between commercial and industrial generators of secondary materials and local end users.

The medium-term (prior to January 1, 2000) objectives are to:

- Achieve a recycling rate of 32% of the total waste stream.
- As appropriate, support the establishment, maintenance, and growth of industrial facilities that use or process secondary materials within Solano County.

B. TARGETED WASTE TYPES AND CATEGORIES

Targeted waste types for recycling have been identified from the results of the solid waste generation study and a survey of available markets. The targeted waste types have been selected on the basis of three factors:

1. Quantity of the waste type in the waste stream.
2. The marketability of the waste type as a secondary material.
3. Type and cost of program required to recycle the material.

In the residential sector, the following waste materials are targeted for recycling

- newspaper
- mixed paper
- corrugated cardboard
- HDPE and PET plastic
- polystyrene
- glass
- aluminum cans
- tin cans
- white goods.

In the commercial and industrial sectors, the following waste materials are targeted:

- newspaper
- high-grade office paper
- mixed paper
- corrugated cardboard
- wood waste
- glass
- aluminum cans
- tin cans
- white goods
- inert solids (concrete and asphalt).
- gypsum board
- HDPE, PET, and other plastic

In the self-haul sector, the following waste materials are targeted:

- white goods
- inert solids (concrete and asphalt)

- wood waste

The wood that is to be recycled will be used as mulch. Mulch is discussed in the Composting Component of this SRRE because the feedstock, processing, and markets are similar to those for composting.

C. EXISTING CONDITIONS DESCRIPTION

C.1. CURRENT ACTIVITIES

Existing recycling activities in the unincorporated county are summarized in Table III-1. They include two buy-back centers (pursuant to AB 2020), salvaging activities at landfills, and commercial recycling.

Syar Industries in Vallejo recycles concrete from several counties in the San Francisco Bay area.

The Solano County Animal Shelter sends dead animals to a rendering plant where they are recycled into bone meal and tallow. Quantities of recycled dead animals were allotted according to population figures.

Potrero Hills Landfill recycles asphalt, concrete, newspaper, and ferrous metal.

A number of businesses recycle cardboard and office paper. Independent hauling services deliver the high grade paper and cardboard to paper processors.

American Canyon landfill salvages some ferrous metals from self-hauled garbage.

Gro-Strait Industries recycles used automobile tires in support straps for trees. The unincorporated county's share of the tires recovered from the entire county is 18 tons.

None of the existing programs are scheduled to be terminated in the short term or in the medium term.

D. DESCRIPTION OF DIVERSION ACTIVITIES AND PROGRAMS

Recycling activities can be grouped into three broad categories: collection, processing, and policies. A general description of each category follows.

D.1. COLLECTION ACTIVITIES

There are four general types of collection programs:

- Drop-off and buy-back centers.
- Single-family residential curbside collection.
- Multi-family residential collection.
- Commercial and industrial collection.

Within each of these types of collection there can be different degrees of separation of materials. The degree of source separation has implications for both the cost of collection and the type of processing required.

DROP-OFF AND BUY-BACK ACTIVITIES

Drop-off and buy-back centers are a well-known and common type of residential collection system. Residents separate recyclables from their refuse at home, and deposit newspaper, glass, cans, and other materials into containers located at staffed or unstaffed sites. They may or may not receive payment for these materials. When the containers are full, they are transferred from the site to a processing facility, to a centralized storage location, or directly to end users.

These types of collection systems are generally composed of one or more of the following activities:

- Temporary drop-off collection.
- Mobile drop-off collection.
- Unstaffed drop-off depots.
- Staffed drop-off recycling centers.
- Staffed buy-back recycling centers.

Each type of collection is advantageous under certain conditions, and communities commonly employ more than one activity within the overall program. For example, a community may operate a buy-back recycling center, several unstaffed drop-off depots, and a mobile system to service outlying areas.

SINGLE-FAMILY CURBSIDE COLLECTION ACTIVITIES

Residential curbside collection is usually done by a franchisee because the fixed costs of this type of collection are high. An exception is the collection of some materials such as newspaper and aluminum cans by individuals or groups engaged in fund raising. The most common items included in curbside collection programs are glass and metal beverage containers, and newspaper. Depending upon local waste generation characteristics, home collection programs for these three items can divert 8 to 12% of the waste coming from the homes. If additional materials such as corrugated cardboard, plastic containers, and mixed paper are added to the collection, 20 to 30% of the waste from the homes serviced can be diverted.

Collection activities can be classified according to the degree of separation of materials done by the waste generator. In this section, four degrees of source separation are discussed. They are:

- Complete source separation of each type of collected recyclable material.
- Partial commingling of recyclables.
- Full commingling of recyclables.
- No source separation (i.e., collection of mixed refuse "as is").

Complete Source Separation

Materials are separated by the residents by waste type and placed in separate containers. The materials are placed in separate containers or compartments in the collection vehicle. The number of compartments in the vehicle limits the number of waste types that can be collected. Processing requirements at an intermediate processing facility (IPF) are minimized in this system. They are usually limited to baling, crushing, and other simple processes that render the materials more easily transported and marketed. The IPF is also used as a storage site.

Partial Commingling

Recyclable materials are separated by the residents and placed in two or more containers for pick-up. More than one type of material can be put into each container. The use of two or three containers is common. Materials placed in each container are selected to be easily separated from each other either at an IPF or by the collection crew at the curb. Leaving materials commingled on the collection vehicle allows the collection of more types of

material in a given number of compartments. The processing (by the collection crew or at an IPF) adds to the cost of this system, but it can help to ensure the purity of the product by not relying on the residents to always put materials into the correct container. Commingling of materials can lead to contamination such as glass that gets inside of aluminum cans. Also broken glass is difficult to separate by color.

One example of a partially-commingled system is a two-container system. Newspaper, cardboard, and mixed paper are put into one container. Tin cans, plastic containers, and glass bottles and jars are put into another container.

Full Commingling
All recyclable materials are placed into a single container (the "ungarbage can"). All sorting takes place at an intermediate processing facility. The greater degree of mixing in this system adds to the cost of processing and increases the likelihood of contamination. It requires relatively little effort by waste generators and can help to improve participation rates. It allows the collection of all recyclable material and only a single compartment in the collection vehicle.

Few programs in North America collect totally commingled recyclables. The Rabanco program in southern Seattle, a pilot program in Los Angeles, and the Cupertino "ungarbage can" program are examples of the system.

No Source Separation ("As Is" Collection)
The collection of mixed refuse (or "as is" collection) does not require a new collection program. The existing refuse collection system continues unchanged. The system necessitates extensive processing at a materials recovery facility (MRF) to separate the recyclable refuse from the non-recyclable refuse. In this SRRE, the distinction between a MRF and an IPF is that a MRF has a residue that must be disposed. For this reason, a MRF requires a CIWMB permit while an IPF does not require a CIWMB permit. If a facility has two processing lines; one of which leaves a residue to be disposed and one of which leaves no residue, then the facility is a MRF and requires a CIWMB permit.

MULTI-FAMILY COLLECTION ACTIVITIES

Smaller apartment buildings (four units or fewer) and condominiums that have separate garbage cans for each unit may be easily integrated into a curbside program serving single-family residences. There are approximately 400 multi-family units (i.e., units with five or more dwellings) in the unincorporated county.

Larger apartment buildings and condominium complexes that have centralized garbage storage facilities generally require centralized recycling storage and separate or modified collection systems. Perhaps the biggest constraint on apartment and condominium recycling

is space for the storage of materials within individual units and for the central containers. In buildings with garbage chutes, finding a suitable, accessible location for recycling containers may be a problem. Fortunately, few or no buildings with garbage chutes exist in Solano County. In addition, many apartment and condominium managers hesitate to devote valuable parking lot space to recycling bins.

Several different recycling collection systems are now in use in apartment buildings and condominiums. The most common systems are collection of materials placed in wheeled carts with a front loader or residential curbside vehicle. All successful programs deal with individual buildings and complexes on a case-by-case basis, working with the building manager to design the system.

The four sorting category variants discussed above also apply to multi-family collection activities.

COMMERCIAL AND INDUSTRIAL COLLECTION ACTIVITIES

The four collection classifications discussed for single-family collection (i.e., complete separation, partial commingling, full commingling, and no source separation) also apply to commercial and industrial collection.

Completely separated recyclables from the commercial/industrial sector are already collected by independent haulers or franchised refuse collectors in many areas. Cardboard and office paper of various types are usually the targeted materials. Materials are often marketed directly to a broker or end user. Intermediate processing is sometimes practiced.

Partial and full commingling of recyclables in the commercial and industrial sector are options that can be implemented in coordination with the curbside collection of recyclables from single-family and multi-family dwellings. These systems can be useful in promoting the participation of businesses that do not generate a sufficient quantity of recyclable material to economically justify the complete separation of the recyclables. Restaurants, for example, could put cardboard and clean metal and plastic food containers into a recycling bin for collection. Few restaurants find it worthwhile to sort and bale cardboard as many supermarkets do.

In the commercial/industrial sector, the "as is" (no source separation) system can be made more feasible by selecting loads of mixed refuse to be processed or to be rejected and sent directly to disposal. Mixed refuse from office buildings often has a high content of recyclable paper that justifies the cost of processing. Mixed refuse from restaurants is generally a mixture of food waste, cardboard, and food containers that is more expensive to process.

D.2. PROCESSING ACTIVITIES

Historically, private sector material processors have focused their capacity on a targeted group of recyclables, such as scrap metal or waste paper, rather than on a broad cross section of recyclable materials. As pressure has increased on the waste disposal industry to divert more material through recycling, many facilities have integrated material recovery into their operations. These fall into three types of categories:

- Salvage at transfer and disposal facilities.
- Recovery of source separated materials at recycling centers, known as Intermediate Processing Facilities (IPFs).
- Recovery of recyclable materials from the waste stream at Materials Recovery Facilities (MRFs).

SALVAGE AT SOLID WASTE FACILITIES

A certain amount of recycling is practiced at many landfills and transfer stations. The types of materials that are commonly reclaimed largely depend upon the availability of markets for the materials. Generally, these materials include: scrap metals, white goods, cardboard, wood waste, furniture, and concrete and asphalt. A significant fraction of the waste stream can be diverted from disposal by recovering these materials which often have a low resale value.

INTERMEDIATE PROCESSING FACILITIES (IPFs)

An IPF serves as a transfer and processing point for source separated recyclable materials. The materials may be completely source separated, partially commingled recyclables, or fully commingled recyclables. An IPF requires no permit from the CIWMB because it does not produce a residue that requires disposal. Commingled recyclables may be sorted by hand, on conveyors, or in sophisticated process sequences. IPFs may be as simple as a recycling drop-off yard where some sorting, crushing, or baling takes place, or as complicated as a full scale factory for mechanical separation of mixed recyclables. The sorting required at this facility is dependent on the collection program which delivers materials.

MATERIAL RECOVERY FACILITIES (MRFs)

A MRF serves as a transfer and processing point for mixed wastes which contain recyclable materials. Materials of value are "recovered" from the waste stream rather than processed after source separation. MRFs typically are more mechanically complex than IPFs. MRFs can often perform intermediate processing of source separated recyclables as well as recovery of valuable materials from the waste stream. That is, a MRF may include within it the functions of an IPF. A MRF is typically more expensive to build and operate than is an IPF

designed for the same throughput rate. However, a MRF does not require a separate collection system as an IPF generally does.

The distinction between an IPF and a MRF is critical from a permitting perspective. IPFs do not require a CIWMB facilities permit since they do not produce a residual requiring landfilling. MRFs require a facilities permit since they always have a residual waste stream.

D.3. POLICIES

The following is a list of policies that can be implemented to promote recycling:

- Future multi-family developments that include in their design adequate storage space, both within units and at central locations, for recycled materials. This is a very important way of promoting sensible planning and design, and changing attitudes and actions of builders and architects.
- Bans on selected non-recyclable materials.
- Ordinances requiring mandatory participation in recycling programs, or penalizing disposal of recyclable materials.
- Revised zoning, building code, and standard specifications that promote recycling or procurement of recycled materials.
- Market development policies.

Market development options include:

- Participation in the CIWMB's Recycling Market Development Zone program.
- Use of public education and information programs to promote the use of products using recycled materials.
- Local procurement ordinances.
- Encouragement of competition among solid waste service providers.

MARKET DEVELOPMENT ZONE PROGRAM

Senate Bill 1322 (1989) established a Recycling Market Development Zone program for the State of California. With a combination of state and local incentives, Zones act as beacons to industries that use post-consumer materials as the feedstock in their manufacturing processes. The Zone program will provide communities with economic development opportunities such as increased employment, an increased tax base, and a diversified economic base. Zones are places where recycling businesses know they can successfully locate, stay, or expand.

Incentives Solano County could consider as part of a Market Development Zone program:

- Relaxation or suspension of local building codes, zoning laws, and general plans.
- Elimination or reduction of fees for applications, permits, and services.
- Streamlining the permit process.
- Provisions for expanding infrastructure to serve recycling businesses.
- Provisions for increasing the amounts of recycled feedstock available for industry and/or providing industry with a steady supply of consistent quality feedstock.
- Developing inter-industry linkages between businesses.

PROCUREMENT ORDINANCES

Using local procurement ordinances, Solano County can specify that one or more of the following criteria be considered in the selection of products and packaging: durability, recyclability, reusability, and recycled material content. Additionally, Solano County could specify that any business or organization holding a contract with it must have a recycling program in place and provide products or materials according to the above criteria. Solano County could also adopt purchasing preferences for recycled products or products with an established percentage of recycled material content.

COMPETITION AMONG SOLID WASTE SERVICE PROVIDERS

The waste management industry has often viewed large scale recycling programs as unrealistic and unprofitable. This is understandable when low landfill tipping and transfer fees exist, recycling markets are weak, and institutional inertia discourages innovation. AB 939, however, creates a major incentive for large waste management providers to diversify their operations into recycling services. It also creates opportunities for small businesses previously operating in the margins of the waste management industry.

There is also increased interest from the general public and nonprofit sector to participate in both the decision-making process and the activities of integrated waste management. This could change the traditional relationship of the public and private sectors by calling for more frequent financial review of, and public involvement in, waste management programs.

Waste stream control will be a major issue in coming years. Most franchise agreements between jurisdictions and private service providers do not adequately address issues surrounding control of the waste stream, or do not address them at all. For example, some agreements state that collectors have the right to select a disposal location without regard to

cost, while others contain legally ambiguous language regarding the 'exclusive nature' of the franchise.

The very short timeline mandated by AB 939 for the planning, design and implementation of programs has not given jurisdictions adequate time to thoroughly evaluate impending changes in their waste management system: many California jurisdictions are signing long-term contracts with service providers for collection, processing, and marketing of recyclables without analyzing whether these agreements are in their best interests. Under these time pressures, increased competition and public sector involvement are not always perceived as positive resources for addressing solid waste management issues.

Policies directed at increasing competition, especially in the commercial and industrial sector, may greatly reduce future cost increases for solid waste collection and disposal services. Policies of this nature have created large financial savings in some parts of the United States where solid waste system changes have already occurred.

E. EVALUATION OF ACTIVITIES AND PROGRAMS

E.1. EVALUATION OF ACTIVITIES

The following criteria were used in evaluating recycling activities and variants:

- Effectiveness in diverting waste from disposal.
- Hazards.
- Flexibility in accommodating changing conditions.
- Consequences on the waste stream.
- Feasibility of short-term and medium-term implementation.
- Consistency with local plans.
- Facility requirements.
- Institutional Barriers.
- Costs.
- Marketability or availability of end uses of diverted materials.
- Involvement of waste generators.

Descriptions of the criteria are presented in Appendix C. Evaluation of the activities and variants utilizing these criteria is presented in Table III-2.

E.2. EVALUATION OF PROGRAMS

A recycling program is a combination of activities. Programs can be structured around either of two principles; maximizing source separation or maximizing collection simplicity. The following evaluation progresses from maximum source separation (complex collection, minimal processing) to minimal source separation (simple collection, complex processing).

Maximizing source separation has the following advantages:

- Effectively lowers contamination levels in the collected materials.
- Saves sorting and processing costs.
- Involves the resident more fully in the recycling program.

The disadvantages of the completely source separated approach are:

- Limits number of materials that can be collected.
- May discourage participation by residents unwilling to provide the effort and space needed for segregation.
- Requires that several household separation containers be provided by program sponsors or householders. The number of set-out containers, however, may be significantly less than the number of "sorts" required. For example, bundled newspaper or cardboard may be set out in the same container as loose mixed waste paper.
- Slow collection because operators must pick up multiple containers.

Advantages of commingling materials to simplify collection include:

- Increases participant convenience.
- Increases program flexibility by accommodating changes to the mix of materials.
- Requires fewer household containers, which may reduce program costs.
- Increases collection efficiency.
- Discourages scavenging.

Disadvantages include:

- Requires various levels of intermediate processing capability, depending on the degree of commingling on the truck and the number of materials collected.
- Results in higher levels of unrecyclable material at the processing facility, since less sorting occurs in the household and at the truck.

In any program, contamination may be a problem, and needs to be considered. Complete source separation generally produces a purer and more marketable final product than commingled programs. However, careful processing by manual sorting can help to remove contaminants that may show up in any type of program. Processing facilities currently find that 15% to 30% of the collected glass containers end up as a mixed-color fraction, primarily due to breakage. Finding markets for mixed-color cullet is a significant problem. Cullet is either disposed of as residue or is sold as an aggregate to the asphalt industry for less than $10 per ton (a fourth of the price paid by container plants for color-separated glass). Furthermore, glasphalt is a final use of the material, precluding future recycling.

When aluminum cans are mixed with other containers, the potential for contamination increases. Broken glass chips often stick to cans or end up inside them. Light plastic containers may remain with the cans during an air separation process. Bi-metal beverage cans can sneak through magnetic separation devices.

Contamination also causes serious safety, production, and quality problems, such as the following:

- Plastics in an aluminum can delacquer the furnace, which upsets the delicate thermal balance needed to remove the paint from the cans.
- Lead contained in aluminum can shipments causes problems with forming the metal sheet into cans.
- Aluminum cans processed at MRFs and shipped to smelters are often contaminated with glass, plastic, and dirt. Glass and dirt mixed in with cans does not melt, and are incorporated into the final product, often raising the silicon content above specification.
- Ceramics in loads of glass can not be removed mechanically. Often pieces of broken ceramics are contained in loads of glass, making detection impossible at the glass plant until the contaminated material has gone into the furnace.

Few programs in North America collect totally commingled recyclables. The Rabanco program in Southern Seattle, a pilot program in Los Angeles, and the Cupertino "ungarbage can" program are examples of this approach.

The advantages of this approach include:

- Maximizes recyclable collection efficiency (no separation at the truck).
- Allows use of existing packer trucks.
- Nearly eliminates sorting requirements at the household level.

Disadvantages of the fully commingling recyclables approach include:

- Requires extensive sorting capability at a processing center.
- Increases contamination levels substantially, lowering marketability.
- Severely reduces the involvement of the generator and "education factor" related to waste management and the overall need to reduce waste.

The simplest collection system is the current system of mixing recyclables and non-recyclables in a single refuse container. Collection as is would require all materials to pass through a MRF. This approach is rarely used in the residential sector, although one southern California company is currently investing in such a system.

Each of the various modes of collection necessitates a different set of practices on the part of generators to prepare materials, a different set of processes to convert materials into commodities, and different program economics. These modes represent a continuum, rather that a static set of practices. In general, the more highly separated materials are at the point of generation, the less costly their processing. It should be noted that the true cost of providing service to the residential sector is difficult to determine with accuracy, since most service providers do not distinguish clearly between the costs of different programs that they provide. Some programs may be subsidized by commercial sector collection, for example. When these "hidden" costs are fully accounted for, the completely source separated system is in general a less expensive option. In the San Francisco Bay Area, net costs of completely source separated curbside collection systems range from $0.75 to $1.75 per household per month. For commingled recyclable collection and processing, the costs are in the range of $1.50 to $4.00 per household per month.

Processing facilities are an evolving technology, and many improvements in their processing capabilities are likely to be achieved in the next decade. The number of new IPFs and MRFs across the country is expected to double in the next two years alone, with the average

size getting 82% larger (MRF Handbook, 1990). The rush to build capital-intensive facilities which may allow little flexibility in future planning and system modifications does not take into account the many developments and improvements that will occur in the coming years. Industrial secondary material users are concerned about absorbing ever-increasing quantities of recycled materials from companies that might not understand the need for high quality materials.

MRFs are highly variable in their size, design, and function, but they share certain qualities: they are expensive to build and operate, with total capital costs per daily input ton of $10,000 to $40,000. The average capital cost per ton of daily capacity for current and planned MRFs is approximately $21,000 (Glenn, 1990). The economies of scale typically assumed for larger facilities are not present in existing MRFs. Facilities designed for 100 tons per day have a capital cost of approximately $18,000 per ton of daily capacity, while the costs of 100+ ton per day facilities are approximately $22,000 (Ibid.). Operating costs, before revenues from sale of materials, and without considering capital costs, are on the order of $20 to $60 per ton.

The potential liabilities of increasing the size and mechanization of facilities include:

- Decreased flexibility to explore other waste handling options.
- Elimination of involvement of both waste generators and some non-profit or small business parties currently involved in the waste management system.
- The financing of capital intensive facilities is based on a model of guaranteed flow of materials from local governments. A reduction in the amount of material throughput results in costly slack time for the facility, and increases the cost per diverted ton.
- As landfill fees and garbage collection costs go up, there will be increased pressure on waste generators to find alternative haulers of materials who will not charge for the service. The saleable materials going into the facility will be of diminished quality and value. There will be less income from the sale of material. This will either increase the cost of services, or increase the need for flow control (i.e., a guarantee by the government that a certain amount of waste will be available for processing or that competitors will be prevented from collecting materials.
- Flow control, by allowing only a single franchisee to collect recyclables, decreases recycling opportunities for community groups and businesses.

E.3. END USES AND MARKETS

A critical criteria in evaluating programs is the marketability of the materials collected in the programs. Collection of materials which cannot be marketed, and which then must be landfilled instead, increases net program costs and undermines public confidence in the programs. The following discussion of existing markets for recyclable materials is intended to assist Solano County in evaluating programs, and developing details of selected programs. Market development activities intended to expand existing markets are discussed in Appendix E.

Recyclable materials for which local or stable markets exist are: aluminum cans, tin cans and scrap metals (including white goods), glass, PET plastic, HDPE and LDPE plastic, polystyrene plastic, old newspapers (ONP), old cardboard (OCC), high grade paper, mixed paper, inert solids, and tires.

ALUMINUM CANS

Aluminum cans command the highest per ton price of any recyclable material. Aluminum can markets are an example of successful conversion of a waste material into a resource material. This transition has occurred over the last 10-15 years as aluminum manufacturers have realized the economic benefits of this practice. The benefit resulted from increasing strict environmental regulation of bauxite mining (aluminum ore), energy and other operating cost savings available to those using scrap rather than virgin materials, and public relations benefits of developing a recycling infrastructure. Markets for aluminum cans are extensive in the United States and abroad.

TIN CANS AND SCRAP METALS

Tin cans are usually steel cans with a thin coating of tin. The percentage of tin is small, but can cause contamination in steelmaking. Detinning is often used to reclaim tin and to improve the quality of the scrap for steel production. Detinning facilities have expanded capacity in recent years. No capacity bottlenecks are expected.

Steel and other scrap metal markets are cyclical in nature. Demand for these materials has diminished in the United States as production facilities have moved outside the country. Nonetheless, a well established infrastructure for steel and scrap metal exists. Although prices may be very low at times (possibly below transport costs), scrap metals are likely to be marketable at all times in the future.

Local brokers for these materials include Atlas Metals in Fairfield; Levin, Aaron, and Lakeside Metals in Oakland; and Fry's Metals in Hayward.

GLASS

Glass is a highly recyclable material. New glass can be made with very high percentage secondary material content (glass as a secondary material is known as "cullet"). Industry sources indicates that new glass can contain as much as 80%-90% cullet, while only approximately 25% of glass content at present is cullet. Significant plant modifications are not needed to increase use of cullet. Use of cullet reduces energy and water requirements during manufacturing and saves operating costs. Demand for cullet is therefore likely to increase over time.

Owens-Brockaway (a division of Owens-Illinois) operates glass manufacturing facilities in Oakland and Tracy. Other small glass manufacturers exist in the Bay Area, including Anchor Glass in Hayward.

Mixed color cullet is not readily marketable at present. This is a result of the special operating procedures needed to maintain color quality control when the source material color content varies significantly. Mixed color cullet is currently worth approximately 25% of the value of clear cullet (also known as flint). Alternate mixed color cullet markets are glasphalt, foamed insulation, and construction aggregate. These alternate markets are not well developed.

Collection of clear glass only in curbside programs will increase the value and marketability of glass in the short-term. Green and brown glass could still be recycled through redemption centers. Alternatively, color sorting of glass may be necessary. Unless this sorting is done near the source, some percentage of the glass collected will need to marketed as mixed color cullet due to breakage and color mixing in loading and unloading.

PET PLASTIC

Markets for beverage containers made of Polyethylene Teraphthalate (PET) are strong at present. Over 160 million pounds were recycled in 1988. FDA restrictions on the use of recycled materials in new food containers are being reviewed at present, and are likely to be modified to allow more recycling of this material. Current markets are for fiberfill used in sleeping bags, pillows, and so on. Purchasers of PET exist in Oakland and Sacramento. No manufacturers of products from PET exist in the western United States, but it is likely that a facility will be sited in the west in the next few years.

HDPE AND LDPE PLASTIC

High-density polyethylene (HDPE) is a commonly used material in food product packaging and sanitary and storm water piping systems. The most common HDPE food package is the one-gallon milk jug. HDPE is also used for other types of food containers, shampoo bottles, cleansers, etc. Milk jugs are currently being recycled in many places in the United States.

The HDPE secondary market is relatively new, but is expected to grow considerably due to the strength properties of HDPE. Products which can be made from recycled HDPE include plastic lumber, containers, drums, buckets, and pipes. The market for reuse in new food packaging is likely to develop slowly.

A major west coast processor of HDPE is located near Portland, Oregon. This facility primarily manufactures containers such as laundry detergent, shampoo and conditioner, and antifreeze containers. Several plastic lumber manufacturers with facilities in the Midwest are actively investigating California as a site for a west coast plastic lumber plant.

Low-density polyethylene (LDPE) is also commonly used in packaging, usually as a film plastic of some type. Garbage bags, food wrapping, grocery bags, covers over clothes which have been dry cleaned, and so forth,are made from LDPE. It is also used to coat wires and cables, and sometimes to produce rigid products like flexible lids for food storage containers.

Some local markets are Bay Polymers in Fremont and Tech Polymers in Berkeley. Dow Chemical and Sealed Air Corporation have reportedly formed a joint venture to recycle LDPE. A plant is being established in Hayward.

POLYSTYRENE PLASTIC

Polystyrene comes in many forms. Expanded polystyrene foam (EPS), often referred to as styrofoam, is the most common. This material is used, for example, in single serve cups and packaging "peanuts", as well as in the construction industry. Rigid extruded polystyrene is also commonly used. This material is sometimes called "food grade" polystyrene. Products include trays in cafeterias and fast food restaurants, plastic silverware, and various food containers such as some for yogurt and cottage cheese.

Polystyrene is a material which has received tremendous public attention in the last few years as a symbol of wastefulness. The manufacturers of polystyrene resins have formed the National Polystyrene Recycling Corporation to offset public criticism by providing markets for this material. NPRC facilities are being constructed around the country. The Bay Area facility is located in Hayward and is expected to come on line within a few months.

Other local markets for polystyrene include Free-flow Packaging Corporation in Redwood City and Bay Polymers in Fremont. An industry source indicates that a company in Fairfield is investigating the economics of serving as a polystyrene broker for the Solano County vicinity.

OLD NEWSPAPERS (ONP)

Newspaper markets have been very volatile in recent years as large quantities of ONP were collected in the eastern United States. This caused a temporary excess supply of newspaper

that exceeded the capacity of then existing de-inking facilities. ONP demand is increasing, however, as newspaper recycled content legislation is passed, new de-inking facilities come on line, and overseas markets adjust to the larger volumes available on a consistent basis.

ONP is marketable through many brokers. It may be shipped overseas through the Port of Oakland, and possibly, Benicia.

Other uses for ONP include cellulose fiber insulation manufacture, hydromulch for landscape development or erosion control, animal bedding, and packing material. United Fibers, located in Benicia, produces several of these products from ONP.

OLD CORRUGATED CARDBOARD (OCC)

The market for OCC is currently strong, but may decline temporarily as collection of this material expands rapidly. Such declines are likely to be temporary or cyclical, rather than sustained, due to the high fiber strength of OCC.

More than half the OCC currently collected in California is reportedly consumed by mills within the State. Many brokers for this material exist. Jefferson Smurfit, Weyerhauser, and Dal El Papers in Burlingame, California handle large quantities of OCC.

HIGH GRADE PAPER

High grade paper includes many long-fiber, high strength, grades of paper. White and colored ledger paper, computer paper, and cardstock, are some of the most common grades. This material is a substitute for virgin pulp. Consequently, its value fluctuates as pulp prices fluctuate. Pulp markets vary with the state of the economy. Paper, however, is a basic material in our economy, and therefore demand for virgin and high-quality secondary pulp are not likely to decline dramatically or to stay low for long.

MIXED WASTE PAPER

Mixed waste paper includes many grades of shorter-fiber, lower strength, paper, including high recycled content papers or boxboards. Common uses of mixed waste paper are boxboard (shoe and cereal boxes, etc.), roofing felt, and other construction paper.

Mixed waste paper is a large component of the waste stream, but is of low relative value. Markets for it are volatile, and dependent on overseas manufacturers. Most of these overseas markets are in the Pacific Rim or Mexico, making overseas markets more stable for west coast generators than for other parts of the country. Local users of mixed waste paper are Louisiana Pacific in Antioch and Oroville, and the Newark group paperboard mill in Stockton. The Oroville facility is reportedly expecting to be able to process a steady supply of phone books once equipment upgrades in progress are complete.

Several strategies can be pursued to ensure that mixed waste paper is marketed consistently, rather than landfilled or stockpiled, if it is collected. Long term contracts at below market prices may be obtainable. The loss of revenue in the short-term may be more than offset by gains in revenue and peace of mind when market gluts occur. Mixtures of OCC and mixed waste paper are more marketable due to the fiber content of OCC. Such mixtures may not bring resale value greater than that for mixed waste paper, but may, potentially, be used to obtain long-term contracts. If mixed paper and OCC are collected commingled, such arrangements may eliminate the need for sorting operations and their expenses.

Mixed waste paper has a fuel value that is approximately equivalent to that of wood. Mixed waste paper combustion will not count towards diversion goals in the short-term, but back-up contracts for combustion if fiber markets fail may be worthwhile to arrange.

INERT SOLIDS

Asphalt and concrete can be recycled or reused. Recycling markets are developing as the quality of the material is recognized in the marketplace. Both Syar Industries and Potrero Hills Landfill recycle these materials, and are likely to continue so long as paving and grading demand is sustained.

Reuse of asphalt and concrete without recycling is an often overlooked market. Gravel or dirt access roads on private property, in some rural areas, or in utility easements (along flood control channels, etc.) can be resurfaced periodically with smaller particle size asphalt and concrete which is segregated during construction. The resurfacing is not smooth in some cases, but provides a better surface than would exist without reuse, and at minimal cost. In Solano County, reused asphalt and reused concrete are used for internal access roads at the B&J Landfill and at the Potrero Hills Landfill.

TIRES

At present, whole tires are exported or sold domestically for use on vehicles, in playgrounds, for incineration for energy production, and for specialty products such as floor mats and tree straps. Rubberized asphalt is reportedly a superior product, but is not a current market due to its higher cost.

The Oxford Energy Corporation transformation facility in Westley is capable of accepting large quantities of tires. This use is not countable as diversion in the short-term. The facility's medium-term needs may be limited as tire diversion programs are implemented in many communities. Again, long-term contracts at below market prices are one way to potentially stabilize this market.

GRO Strait Products in Benicia manufactures a specialty product from tires. The product is used to hold newly planted trees upright until their roots establish.

E.4. PUBLIC VS PRIVATE OWNERSHIP

Public ownership generally gives a greater degree of control to public agencies than does private ownership. This is beneficial when the public agency is legally responsible for ensuring that a program is implemented. On the other hand, public ownership requires a commitment of time and personnel that many public agencies are reluctant to make, especially when there are privately owned alternatives. Solano County intends to utilize private parties to own and operate most facilities planned in its SRRE.

F. SELECTED PROGRAMS

Based on the evaluation of activities and programs, the following activities with a source separation focus have been selected for implementation in the unincorporated county. The diversion estimates for the planned programs is presented in Table III-3.

In the residential sector:

- Phase in single-family curbside collection in the congested areas in 1992 through 1996 with the cooperation of nearby cities.
- Phase in multi-family collection, from 1992 through 1996. This will be done in cooperation with nearby cities.
- Expand number of materials at drop-off centers and buy-backs, 1992.
- Expand number of materials in single- and multi-family collection in 1996 in cooperation with the nearby cities' expansion timeline. Develop a complex IPF or MRF, 1996.

In the commercial/industrial sector:

- Modify zoning and building codes to stress recyclability, 1992.
- Encourage and assist commercial and industrial generators to recycle, 1992.
- Expand unincorporated county office recycling and procurement, 1992.
- Provide one or more collection vehicles, through a contractor or franchisee, to collect mixed recyclables from the commercial and industrial sector, 1992. Process at an IPF. This will be done in cooperation with nearby cities.

- If needed to achieve recycling objectives, process selected loads of mixed commercial and industrial refuse at a MRF, 1996. This will be done in cooperation with nearby cities.

In the self-haul sector:

- Expand landfill salvaging and recycling, 1992.

This selection:

- Results in adequate waste diversion.
- Probably provides higher revenues per ton than the commingled alternatives.
- Minimizes the possibility that collected materials might need to be landfilled due to contamination.
- Offers the greatest flexibility to adapt to changing conditions.

F.1. RESIDENTIAL RECYCLING

The residential sector will receive the greatest emphasis in the unincorporated county's short-term recycling strategy. This is because residential waste is a high percentage of the waste stream. The curbside collection option is selected for implementation for the unincorporated county. It has high waste reduction potential and can provide uniform and efficient service to all residents in congested areas.

SINGLE FAMILY CURBSIDE COLLECTION

The curbside collection program will be the main focus in the short-term planning period. The program will be phased in from 1992 to 1996, so that each congested area begins curbside collection simultaneously with or after its respective nearby city. The program will provide weekly curbside collection for all residences served by a garbage franchisee. Weekly recycling collection results in greater waste reduction than does less frequent collection. A survey of U.S. recycling programs showed citizen participation rates 35% higher for weekly collection than for biweekly programs, and 151% higher than for monthly programs. Weekly collection does not cost twice as much as a biweekly program. Weekly collection costs about 25% more than biweekly collection on an annual basis.

Each household will receive a 14 gallon plastic tub, which will hold glass containers, aluminum and tin cans, plastic beverage containers, polystyrene, and mixed paper. Citizens will bundle newspapers and cardboard.

All targeted materials may not be included in the program initially, or in the short-term. Some may be phased in over time.

MULTI FAMILY CURBSIDE COLLECTION

A multi-family collection program has been selected for several reasons. First, multi-family residents generate recyclable materials that are similar in type to single-family generators. Collection of these materials from single family residences only is not equitable. Second, the most common method of collection from multi-family residences (wheeled carts) is compatible with collection trucks now available for single-family service. Combining multi-family service with single-family service will maximize use of equipment. Third, provision of uniform residential sector service will likely increase participation over time and minimize the confusion which might result from providing service only to single-family residences.

The selected multi-family program is identical to the single family program except that the set-out container type may vary. As stated previously, wheeled carts are likely to be used in most instances for multi-family collection. The sorting requirements at the residence, however, will be the same regardless of type of residence. The multi-program will be phased in as the single family program is phased in.

EXPANSION OF BUY-BACKS AND DROP-OFF CENTERS

Drop-off centers are an appropriate option for Solano County residents living in the less populated portions of the County. In these more sparsely populated areas, traveling distances are too great to justify a curbside program. Within the unincorporated county, possible areas for drop-off facilities include Bird's Landing, the Argyl Park Recreation Area, Denverton, Allendale, and strategic locations such as crossroads.

Appropriate bin locations will be researched by County staff, and where private property is involved, permission will be sought. When appropriate bin locations are identified, either the franchised recycler, or if there is none willing, a recycler chosen from a list of those providing such services (such as Pacific Rim), will be contacted, and arrangements made for placing and servicing containers. At least cardboard, newsprint, and glass will be collected at each site. In addition, recyclers may choose to collect any other materials. Recyclers will be required to report on types, volumes, frequency of pick up, and problems associated with each placement. In the event that a placement does not generate sufficient volumes of materials to cover costs plus an agreed upon profit margin, the County may provide subsidies to the recyclers on a per ton basis.

Unstaffed facilities may experience problems of dumping of mixed wastes, scavenging of materials, and high contamination levels. To some extent, these problems can be mitigated through public education, clear signs at the site, frequent servicing of bins, access during

certain hours, and cooperation with law enforcement agencies for increasing patrols around sites.

Alternatively, one of the drop-off sites could be developed into a full service buy-back. There are several options for ownership and operation of the program. It may be owned and/or operated by the County, or a private or non-profit entity. The program operator will report costs and tonnages.

The buy-back will target materials from the residential and commercial waste streams, focusing primarily on aluminum, PET plastic, glass, newsprint, and cardboard. In addition, the program will recover a small amount of high grade ledger, HDPE plastic, and tin cans.

Materials bought and accepted as donations will be closely monitored for cleanliness and purity. Therefore, the program will have a very low residue level, requiring no special means of handling and disposal. Handling of the recyclables themselves will be accompanied either at an existing facility, or at a facility developed in conjunction with this program. Since materials will be highly source separated, handling will be greatly simplified, and consist of grading, baling, stacking, and shipping.

VOLUME-BASED CHARGES

Instituting volume-based charges for solid waste services will encourage waste generators to recycle. This will be done in the medium-term, or sooner, but only after the other residential sector programs are fully established. Many communities have found these incentives highly effective in increasing recycling participation rates. Quantity-based hauling fees are discussed in Chapter II.

F.2. COMMERCIAL AND INDUSTRIAL RECYCLING PROGRAM

About one half of the solid waste generated in the unincorporated county comes from commercial and industrial sources and from the self haul sector. The collection of commercial and industrial recyclables in nearby cities can easily be extended in to some areas of the unincorporated county.

Solano County will promote recycling through the modification of zoning and building codes. It will set an example by aggressively recycling waste materials generated in the County's offices and operations. The County will also carry out source reduction and education programs that include recycling. These include waste surveys and recycling manuals that are discussed in Chapter II (Source Reduction) and Chapter VI (Education and Public Information). Businesses will be encouraged to completely source separate recyclable materials such as office paper and cardboard and to arrange with private haulers to have the material collected.

Since experience has shown that completely separating recyclable materials is difficult or impractical for many businesses, Solano County will arrange for one or more collection vehicles to collect partially or fully commingled recyclables from businesses. The vehicles may collect fully separated recyclables on some routes. Cardboard and office paper will be the major materials collected. Metal, glass, and plastic may also be included. The material will be processed at an IPF. Waste surveys will be an important part of this activity. The surveys will determine which materials are to be collected from individual businesses so as to maximize collection efficiency. Collection routes will be selected in cooperation with the haulers of commercial and industrial recyclables in nearby cities.

In the medium term, the need and potential for increased recycling in the commercial and industrial sectors will be assessed. If it is found to be necessary, mixed refuse will be collected and processed at a MRF that services nearby incorporated cities. Not all commercial and industrial waste will be processed at the MRF. Mixed waste from offices will be processed, but waste from restaurants will probably not be processed unless it is separated at the source into two containers. One container will be rich in recyclables and the other container will hold food waste and other non-recyclables. This is the only planned use of a MRF in the unincorporated county. Mixed refuse from the residential sector is not expected to be rich enough in recyclables after curbside recycling is implemented to justify processing at a MRF.

F.3. SELF-HAUL SECTOR RECYCLING

Through the solid waste and land use permits issued for landfills in the county, Solano County will promote the diversion of specific materials for diversion at landfills. Materials to be diverted include white goods, wood waste, concrete, and asphalt.

F.4. POLICIES

Policies will be adopted and implemented by Solano County requiring the purchase of recycled products as required by law (Assembly Bill 4 and the CIWMB regulations). This activity is a necessary corollary to the development of markets for the materials Solano County will collect in its recycling programs.

Solano County will pay careful attention to language used in contracts and franchise agreements in regard to recycling. The right to add to or amend the County Code in regard to recycling, and to adopt or amend ordinances concerning the curbside collection of recyclables will be retained by Solano County. Such additions or amendments may include, but are not limited to, changes in the rates, definitions, materials recycled, and reporting and collection requirements.

Solano County will change paper purchase standards to include recycled xerographic and computer paper, stationery, business cards, envelopes, and will also purchase recycled plastic park benches and tables, plastic parking bumpers, recycled concrete, and street paving materials.

Zoning and building codes will be modified by Solano County to stress recyclability. Building code amendments would require recycling collection areas to be set aside in all new construction. Land use and development requirements would involve establishing incentives and disincentives that promote recycling. Regulations for commercial and residential developments would require descriptions of programs to be implemented to encourage materials separation and recycling. Future developments will include in their design adequate storage space, both within units and central, for recycled materials. This is a very important way of promoting sensible planning and design, and changing attitudes and actions of builders and architects. Solano County will give serious consideration to utilizing its land use and building permit authority for directing planning towards these ends. If unfavorable conditions beyond the control of the County occur, Solano County will apply for an extension as permitted by PRC Section 41820 and/or apply for a modification of the diversion requirements as permitted by PRC Section 41785.

G. PROGRAM IMPLEMENTATION

The proposed implementation schedule for planned programs is outlined in Table III-4. Parties responsible for implementation are provided in the table. New staff are required to implement these programs, as presented in Table III-5. About 0.6 of a full-time equivalent (FTE) is required for program implementation.

Implementation details are best decided during program implementation, rather than in this document. Some initial principles of implementation, however, have been assumed in the cost estimates for recycling programs.

Key principles are:

- All collection equipment will be capable of servicing as many types of customers as possible. For example, curbside collection trucks may also service small restaurants which produce cans, bottles, and newspaper.
- County sponsored source separated recyclables collection service in the commercial/industrial sector will be offered initially only to those customers who can replace one refuse collection stop with one recyclables collection stop. This will stimulate generators of waste to alter their service arrangements in ways which promote cost-effective collection. This may

include sharing refuse containers, increasing the site of enclosures to accommodate less frequent collection of larger bins, and so forth.

G.1. COST ESTIMATES

Solano County will incur costs for these programs in the following areas:

- Contract fees for cooperation of collection of household recyclables, including amortized start-up capital costs.
- Contract fees for transportation of materials to processing or transfer facilities.
- Contract fees for processing and marketing of collected materials.
- Outreach, education, and promotion, including the development of markets and the support of private sector recycling efforts.
- Administration of the program.

Start up costs are one-time costs to initiate the program. These include:

- Planning costs for activities such as market assessments, waste stream assessments, re-routing collection vehicles, planning any new facilities, and negotiating contracts.
- Initial publicity costs to develop, print, and distribute information.
- Capital costs if additional collection and/or processing equipment is needed.

It is difficult to determine specific costs of programs run privately. It cannot be determined at this point how much of the recyclables stream will be handled through Solano County programs, and how much will be handled via private arrangements between generators and private processors, brokers, and end users. The planning level estimated costs of the County's selected program are presented in Table III-5. The main source of revenues will be user fees (i.e., refuse collection fees).

G.2. RECYCLING AS COMMUNITY DEVELOPMENT

Recycling has the potential to be far more than a waste management method, it can also be a tool for economic and community development. Recycling has its historical roots in the scrap industry, an industry traditionally dominated by immigrant groups and poor people. Collecting and selling waste materials has been a means for many to earn a living.

Flow control and anti-scavenging ordinances are meant to ensure the flow of materials directly into recycling programs and to avoid circuitous routing of materials through scavengers and dealers. Though these measures may improve the economics of recycling programs, they may be detrimental to the economics of scavengers and small scrap dealers.

Anti-scavenging ordinances must be sensitive to this. To protect the morale of participants and for the sake of program economics, Solano County must control scavenging. An anti-scavenging ordinance will be passed to make it illegal to remove materials from recycling containers. Scavenging for unauthorized persons from other sources will not be discouraged.

As the stakes increase, small recyclers will be increasingly vulnerable to competition from vertically and horizontally integrated waste companies. Implementation activities will attempt to include small recyclers in the new waste management system. To the greatest extent possible, small businesses and community-based non-profits will be included in the development of new programs. The non-profit sector is motivated not by profit, but by a desire to improve the communities in which they operate. Non-profits have a long history of involvement in recycling and give as much back to the community as they take from it.

New recycling programs will be designed to fill some of the same social roles as their predecessor programs. This may be accomplished in several ways:

- Designing programs to stress local employment in preference to imports. These jobs may be in production of new products, and in collection or processing services.
- Developing local markets. Recycling programs produce raw materials. To the greatest extent possible, these materials will be used locally, both for the sake of developing and strengthening markets for materials, and for creation of a diversity of new positions in all stages of recycling processes.
- Creating income opportunities for low-income residents. Workers should have opportunities to advance to positions of higher responsibility, interest, and pay.
- Designing recycling activities and centers as community focal points. Recycling centers and programs can foster civic pride through common development in a tangible environmental activity. Drop-off and buy-back centers can become meeting places for members of the community. They can cycle wealth back into the community by using resale revenues to support eligible community groups, activities, and non-profit organizations.

H. PROGRAM MONITORING AND FEEDBACK

H.1. ANNUAL MONITORING

The monitoring program will compare actually diverted tonnage by waste type and program with projected diversion by waste type and program, on an annual basis. If total tonnage diverted in any year is equal to or greater than projected diversion, the program will be considered a success. Solano County will use targeted waste characterization studies to monitor recycling programs or another method approved by the CIWMB.

H.2. REPORTING

All information will be reported quarterly to the County by franchised or licensed collectors. Reporting data will be required, and will be a condition of getting a business license or franchise agreement renewal or extension. County employees will be responsible for performing monitoring functions, including information gathering, compiling, and report writing, unless a regional or inter-jurisdictional arrangement for these services is made.

Franchised or licensed collectors will be required to report:

- Number of collections per day, calculated monthly for each route.
- Average weight of each set-out, calculated monthly for each route.
- Percent of generators to whom service is available who participate.
- On-route and off-route time, calculated monthly for each route.
- Average time required to make a pickup, and average travel time between pickups, for all routes of a type (residential single-family, etc.) combined.

Operators of solid waste processing facilities will be required to report:

- Monthly data on total tonnage of material received, marketed, and disposed by material type and origin.
- Monthly data on resale revenues received, by waste type and origin.
- Monthly tipping fees, if any, paid for disposal of residuals.

H.3. REMEDIAL MEASURES

The quantity of waste diverted by all programs each year will be compared with the tonnage projected to be diverted by all programs. If actual diversion falls short of the projection, the following actions will be taken in the order described:

- Additional educational and informational actions will be taken if it appears that the tonnage shortfall is the result of low participation.
- Additional waste types will be added to the program (will be collected) if participation appears to be adequate.
- Mandatory participation in the program, or penalties for disposal of recyclable materials included in the program, will be implemented. Public opinion polls in other communities indicate that citizens are willing to accept a mandatory recycling program if it is convenient, equitable to all citizens and extensively promoted. Mandatory programs that are properly designed, promoted, and operated generally achieve higher participation and recovery rates than voluntary programs. Higher participation rates also generate a lower cost per ton recycled.
- If necessary, additional programs beyond those described in this document will be investigated, designed, budgeted, and implemented.

TABLE III-1: CURRENT RECYCLING BY PROGRAM

Programs	Quantity (tpy)	Waste Type
20/20 Centers	0.3	PET
	2.5	Cal. Redemption Glass
	2.2	Aluminum Cans
American Canyon Landfill Salvage	7.8	Ferrous Metal and Cans
Portrero Hills Landfill Salvage	0.4	Newspaper
	0.9	Ferrous Metal
Grocery Stores	91	OCC
American Home Foods	294	OCC
	50	High Grade Ledger
Gro-Strait (a):	18	Tires
Syar Industries and Potrero Hills Landfill	1,056	Inert Solids
Solano County Animal Shelter	1.3	Dead Animals
Total Recycling:	1,524	

(a) Unincorporated Solano County's share of 300 tons used in Solano County.

TABLE III-2: RATINGS OF RECYCLING ACTIVITIES

	Single Family Curbside Collection			Multiple Family Curbside Collection			Commercial/Industrial Collection			
Criteria	Fully Source Separated	Partially Commingled	Fully Commingled	Fully Source Separated	Partially Commingled	Fully Commingled	Separated Recyclables	"As Is"(a)	Drop-Off Recyling Centers	Buy-Back Recycling Centers
1. Effectiveness in waste diversion	Medium	Med-High	High	Medium	Medium	Med-High	Medium	High	Low-Med	Low-Med
2. Hazards created	Medium	Medium	Medium	Medium	Medium	Medium	High	High	Med-High	Med-High
3. Flexibility	Medium	Medium	Low	Medium	Medium	Low	High	Medium	High	High
4. Consequences	High	High	High	High	High	High	High	High	High	High
5. Feasibility	Medium	Medium	Low	Medium	Medium	Low	High	Medium	High	High
6. Consistency with local plans	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	High	High
7. Facility requirements	Medium	Medium	Low	Medium	Medium	Low	High	Medium	Medium	Medium
8. Institutional barriers	Medium	High	Medium	Medium	Medium	Medium	Medium	Medium	High	High
9. Costs	Low-Med	Low-Med	Low	Low-Med	Low-Med	Low	Med-High	Medium	High	High
10. End uses	High	Med-High	Medium	High	Med-High	Medium	High	High	Med-High	High
11. Involvement of waste generators	High	High	Medium	High	High	Medium	High	High	High	High

(a) "As Is" means fully commingled refuse

TABLE III-2 (CONTINUED)

Criteria	Mobile Buy-Back	Intermediate Processing Centers	Mechanized Material Recovery Operations	Salvage at Solid Waste Facilities	Policy Alternatives: Building Code	Bans	Collection Ordinance	Market Development
1. Effectiveness in waste diversion	Medium	High	High	Low-Med	Medium	Medium	High	Medium
2. Hazards created	High	Medium	Medium	Medium	High	High	High	High
3. Flexibility	High	Medium	Medium	High	Medium	Low	Medium	Low-High
4. Consequences	High	High	High	High	High	High	High	High
5. Feasibility	Medium	Medium	Low	High	Low	Medium	High	High
6. Consistency with local plans	High	Medium	Medium	High	Low	Low	Low	High
7. Facility requirements	Low-Med	Medium	Low	High	Low	High	High	Low-High
8. Institutional Barriers	Medium	Medium	Low-Med	High	Medium	Low	Medium	Med-High
9. Costs	High	Medium	Low-Med	Medium	Low-High	Low-Med	High	Low-Med
10. End uses	High	Medium	Low-Med	Medium	High	High	High	High
11. Involvement of waste generators	High	High	Low	High	High	Medium	High	High

TABLE III-3: DIVERSION ESTIMATES FOR PLANNED RECYCLING PROGRAMS

	AL	Glass	Tin	PET	HDPE	Poly-styrene	ONP	OCC	Mixed Paper	HG Paper	White Goods	Inert Solids	Tires	Tons Divert.	% Total Diversion
Current Diversion															
Residential	2.2	2.5		0.3										5	0.03
Commercial and Industrial			8.7				0.4	385.0		50.0		1,056.0	18.0	1518	9.68
Total Current	2.2	2.5	8.7	0.3	0	0	0.4	385	0	50	0	1056	18	1523.1	9.71
Additional Short-Term															
SF and MF Resid. Curbside (a)	12	182	58	12			414							677	4.32
Expand Drop Off/Buy Back (b)	0	0	10	0	0	2	103	27	44	17	4	2	21	230	1.47
Comm/Ind Recycling (c)	4	38	42	1	4	8	37	395	20	91				641	4.09
Salvage at MSW Facil. (d)											14	400	0	414	2.64
Total Short Term	16	220	110	13	4	10	554	421	64	108	18	402	21	1962	12.51
Total Current and Short-Term	19	223	119	13	4	10	554	806	64	158	14	1458	39	3485	22.22
% Capture of Material Type	46%	50%	22%	36%	10%	17%	48%	56%	5%	39%	24%	52%	15%		
Additional Medium-Term															
Expand Comm/Ind Recycling (e)															
New Processing Facility (f)	2	30	170	5	18	8	0	158	239				0	630	4.02
Expand Resid. Curbside (g)	3	55	17	1	0	6	207	53	442	51				835	5.32
Total Medium Term	5	85	187	6	18	14	207	211	680	51	0	0	0	1465	9.34
Total Current and New Programs	24	307	306	20	22	24	762	1017	744	209	18	1458	39	4950	31.56%
% Capture of Material Type	60%	70%	58%	54%	50%	43%	66%	71%	58%	52%	30%	52%	15%	32%	

TABLE III-3 (CONTINUED)

(a) Assumes the following capture rates: AL, 40%; Glass, 50%;, Tin, 60%; PET, 50%, HDPE, 30%; ONP, 50%.

(b) Assumes 10% increase over existing diversion or 10% diversion if there is no existing diversion.

(c) Assumes 10-70% diversion through educational and technical assistance programs (waste surveys, etc.), and through pick-up by franchised and private haulers

(d) Assumes 10 - 50% capture from landfill diversion

(e) Tonnages reflected in New Processing Facility

(f) Assumes 20-70% capture of input materials from comm/ind wastestream

(g) Assumes 10% increase over previous diversion and additional material capture of up to 50%. All materials taken to processing facility

Note: The diversion estimates are targets based on the estimated total fraction of each waste tupe to be removed.

TABLE III-4 IMPLEMENTATION SCHEDULE FOR RECYCLING PROGRAMS

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
Establish Single and Multi-Family Curbside Coll.	DEM	1992-
Adopt Ordinance and Appropriate Funds	County Board of Supervisors	Jan, 92
Hire and Train Recycling Staff	DEM	March, 92
Negotiate with Service Providers and Cities	DEM, Cities, Service Provider	May-June, 92
Publicize Program	DEM and Service Provider	July, 92
Appropriate Funds	County Board of Supervisors	Aug, 92
Purchase Containers	Franchised Sanitary Services	Sep, 92
Implement Program	Franchised Sanitary Services	Oct, 92
Monitor Program	DEM	Oct, 92 -
Commercial/Industrial Recycling	DEM	1992-
Technical Assistance	DEM	Oct, 92
Purchase Storage Containers	Private Contractor	Oct, 92
Publicize Program	DEM	Sep, 92
Implement Program	Private Contractor	Nov, 92
Monitor Program	DEM	Dec, 92 -
Expand Existing Buy Back and Drop Off Centers	DEM	1992-
Identify Groups and Locations	DEM, Private/Nonprofit Contractors	June, 92
Purchase and Install Bins	Private/Nonprofit Contractor	July, 92
Implement Program	Private/Nonprofit Contractor	Aug, 92
Monitor Program	DEM	Sept, 92
Salvage at MSW Facility	DEM	1992-
Negotiate with Facility Operators	DEM and LEA	April, 92
Revise Use and Solid Waste Permits	DEM and LEA	May, 92
Identify Materials and Publicize	DEM	May, 92
Implement Program	Facility Operator	Aug, 92
Monitor Program	DEM and LEA	Sept, 92

TABLE III-4 (CONTINUED)

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
New Processing Facility	DEM	1995-
Initial Study	DEM, Cities, LEA	1995
Select Contractor	DEM, Cities, LEA	1995
Construct Facility	Contractor	1995
Operate Facility	Facility Operator	1996
Monitor Operations	DEM, Cities, LEA	1996
Expand Commercial/Industrial Recycling	DEM	1996-
Mandatory Recycling Ordinance	County Board of Supervisors	Jan, 96
Publicize Program	DEM	Feb-March, 96
Technical Assistance	DEM	April, 96
Monitor Program	DEM	April, 96
Expand Residential Curbside	DEM	1996-
Mandate Collection & Appropriate Funds	County Board of Superivsors	Jan, 96
Negotiate with Franchisee	DEM	Feb-March, 96
Purchase Containers	Franchised Sanitary Services	April, 96
Publicize Program	DEM and Service Provider	April-May, 96
Implement Program	Franchised Sanitary Services	June, 96
Monitor Program	DEM	June, 96-
County Policies and Market Development	DEM	1992-
Plan for Market Development Zones	DEM & County LTF	1992
Modify Zoning Ordinance and Building Code	County Board of Supervisors	1992
Local Procurement Ordinance	County Board of Supervisors	1992

Abbreviatio DEM = Department of Environmental Management
LEA = Local Enforcement Agency
LTF = Local Task Force

Note: The time frames listed are the earliest possible beginning dates. Programs may begin later, depending upon which jurisdiction the unincorporated county cooperates with for that program.

TABLE III-5: COST ESTIMATES FOR PLANNED RECYCLING PROGRAMS (a)

Activity	Start-up Year	Start-up Costs(b)	Staff(c) EPI	Staff(c) Other	Annualized Start-up Costs(d)	Other Annual Costs(e)	Total Annual Costs(f)
Establish Residential Curbside	1992 (g)	0	0.02	0.10	0	146,554	183,192
Commercial/Industrial Recycling	1992 (g)	9,500	0.00	0.05	2,882	34,401	46,604
Expand Drop Off/Buy Back	1992	5,000	0.01	0.20	1,517	15,179	20,870
Salvage at MSW Facility	1992	0	0.00	0.04	0	7,985	9,981
New Processing Facility	1995 (g)	134,615	0.00	0.04	20,725	71,985	115,888
Expand Commercial/Industrial Recycling (h)	1996 (g)	0	0.00	0.05	0	2,481	3,101
Expand Residential Curbside	1996 (g)	0	0.03	0.05	0	179,169	223,962

Notes: (a) Annual Costs in 1991 Dollars

(b) Start up costs include estimated consultant hours or equivalent

(c) Staffing requirements are expressed as full-time equivalents

(d) Facility costs are amortized over 20 years at 12% while equipment costs are amortized over 5 years at 10%.
All capital costs have been increased by 15% before amortization to include estimated financing expenses.

(e) Other annual costs include staff costs at $49,616 per FTE, other operating costs, materials costs and contract costs.

(f) Total Annual cost included 25% mark-up for contingencies.

(g) Program will be initiated in cooperation with programs in nearby cities.

(h) Some costs are included in the costs of the New Processing Facility.

TABLE III-6: SOURCES OF PROGRAM FUNDING

	User Fee	Franchise Fee	Landfill Surcharge	Sales Tax	Waste Importation Fee
RECYCLING PROGRAMS					
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			

CHAPTER IV SUMMARY
COMPOSTING

Composting is defined by the CIWMB as the controlled biological decomposition of wastes. The CIWMB considers mulching (the spreading of undecomposed material on soil) to be recycling. Since feedstocks, processes, and markets for mulch are similar to those for compost, both processes are discussed in the Composting Component of unincorporated county's SRRE. The feedstocks include yard waste, wood waste, and food waste. The first two materials can also be used as boiler fuel. This option is rejected in the SRRE because the CIWMB does not count combustion as a diversion credit, pursuant to existing State legislation.

Composting currently does not account for any diversion of the waste stream. The SRRE estimates that 3.8% diversion will occur through composting and mulching prior to January 1, 1995, and another 14.6% will occur between January 1, 1995 and January 1, 2001. Total diversion through composting is therefore estimated to be 18.4% in the year 2000.

New composting programs include yard waste, food waste, and wood waste collection, processing, and marketing. These wastes compose an estimated 31% of the unincorporated county disposed waste stream (17% yard waste, 9% wood waste, 5% food waste).

The collection of yard waste and food waste on a separate curbside collection route can be expensive. A relatively inexpensive way of collecting yard waste is in special bags which would be collected concurrently with mixed refuse. A pilot program to evaluate this relatively new technology is included in the SRRE's of most cities in Solano County. The pilot programs throughout the county for yard waste collection are scheduled for the short term and the pilot programs for food waste collection are scheduled for the medium term. In the event that the bag system does not perform well, separate collection of yard waste will be necessary. The unincorporated county will participate in yard waste collection programs established in nearby cities after they have been proven to be effective.

In the early phases of the composting program, only brushy yard waste and wood waste will be chipped, screened, and marketed as a mulch. In the short term, green yard waste may also be collected at drop off centers. Curbside collection of yard waste in the unincorporated areas will be postponed until 1996. In 1996, pilot food waste collection and processing systems will be implemented by the cities. Full scale implementation in both the cities and unincorporated areas is scheduled for 1998. The advantage of the mulching operation in the short term is that it has lower cost, is easier to permit, and produces a product which can likely be used as daily cover at a landfill if other end uses do not exist. Postponing curbside collection until 1996 will minimize costs and encourage backyard composting.

CHAPTER IV
COMPOSTING COMPONENT

INTRODUCTION

This component describes existing and planned composting efforts in the unincorporated county, and ways in which the unincorporated county can develop composting programs. Composting goals and objectives are described, new programs are evaluated and selected, and systems for implementation, monitoring, and program evaluation are outlined. The component is written in accordance with Assembly Bill 939 (AB 939) and the regulations promulgated by the California Integrated Waste Management Board (CIWMB).

The diversion of refuse through composting has both benefits and costs. Benefits include:

- Prolonged life of landfills.
- Production of a useful soil amendment.
- Avoided costs of refuse collection and disposal.
- A more stable landfill due to the exclusion of degradable refuse.

Costs include:

- Land and buildings for processing and storage.
- Equipment for collecting and processing the feedstock and for distributing the product.
- Energy, maintenance, labor, and other operating costs.
- Control of potential adverse environmental impacts such as odor, noise, dust, leachate, and disease vectors.

The most promising candidate materials for composting in the unincorporated county are yard waste, wood, and food waste. Wood and woody yard waste have competing uses as boiler fuel and mulch. Some of the non-woody yard waste can also be used as mulch. The use of waste as fuel is not considered to be an alternative in this study because the intent of AB 939 is to promote other uses in preference to burning.

Mulching is a recycling activity, but it is considered in this component rather than in the recycling component because programs for diverting material through mulching are similar to and related to composting programs.

A. GOALS AND OBJECTIVES

The unincorporated county's goals for composting and mulching are as follows:

- Plan, design, and implement new collection and processing systems for yard waste and wood waste.
- Work with other jurisdictions in Solano County to create programs that serve as much of the region as possible, in order to achieve economies of scale in collection and processing operations.
- Identify and stimulate markets for a variety of products derived from organic wastes including compost, mulch, and soil mixtures.
- Establish Solano County procurement policies for compost products, and encourage the use of compost and mulch by County departments.
- Develop markets for waste-derived soil amendments by encouraging or requiring their use in new landscaping and in land restoration projects.

The short-term objectives are to:

- Divert 3.8% by weight of the total waste stream generated in the unincorporated county.
- Divert 11% by weight of all yard waste generated in the unincorporated county.
- Divert 27% by weight of all wood waste generated in the unincorporated county.

The medium-term objectives are as follows:

- Increase the rate of diversion via composting by 14.6% to a total of 18.4% by weight of the unincorporated county's total waste stream.
- Increase the rate of diversion via composting by 70% to a total of 81% by weight of all yard waste generated in the unincorporated county.
- Phase-in food waste collection and composting systems in 1998.
- Through land-use permits, promote the use of compost and mulch products in landscaping for new construction by 1998.

B. TARGETED WASTE TYPES AND CATEGORIES

With a few exceptions, any organic waste type is a potential candidate for composting or mulching. Examples of materials that can be composted are sewage sludge, animal manure, yard waste, crop residues, paper mill sludge, waste paper, food waste, and various food processing wastes. The most feasible materials are yard waste, food waste, and wood waste.

Results from the waste characterization study completed as part of this plan indicate that in 1990, disposed yard waste amounted to 2,431 tons; food waste, 663 tons; and wood waste amounted to 1,204 tons.

- Yard waste, the largest waste category, is composed of several different materials: stumps and large branches, brush, leaves, grass, and garden wastes. It composes approximately 20% of the residential waste stream, 13% of the commercial waste stream, 6% of the industrial waste stream, and 20% of the self-haul waste taken to the landfill.
- Food waste composes an estimated 7% of the residential waste stream and 13% of the commercial waste stream.
- Wood waste includes pallets, scrap lumber, wooden furniture, toys, bowls, fencing, crates, and miscellaneous construction materials. It is about 3% of the unincorporated county's commercial waste, 14% of the industrial waste, and 14% of the self-haul waste.

The figures from the waste generation study are only estimates of the actual quantity of each waste type. The waste generation study shows that the diversion of compostable materials is crucial to the achievement of the State-mandated diversion objectives.

The following wastes are not targeted for composting in the unincorporated county.

- Animal manure presents collection and processing problems.
- Compostable industrial sludge is not available.
- Crop residue is generated in the unincorporated county, but it is not a "solid waste" for the purposes of this SRRE.
- Waste paper is available but presents special collection, processing, and marketing problems.
- Food processing waste has not been identified in significant quantities.
- Sewage sludge is not generated by the unincorporated county. Septic tank pumpings are disposed into the influent to wastewater treatment plants that

serve incorporated cities. In this study, the resulting sludge is taken to be a waste generated in the city served by the treatment plant.

C. EXISTING CONDITIONS

No commercial-scale composting facilities or programs are operating in the unincorporated county in 1991. No measurable amount of waste is currently being diverted through composting programs.

Backyard composting of leaves and grass by homeowners and other waste generators is considered a form of source reduction in the AB 939 regulations, and is addressed in Chapter II. An unknown amount of yard waste is composted or used as mulch at individual residences in the unincorporated county.

Soil vendors in Solano County process and blend a variety of organic materials such as mushroom compost, sawdust, manure, and rice hulls. The unincorporated county residents and businesses purchase some of the resulting product. The degree of processing varies depending on the feedstock and the intended market. Often, the product is uncomposted or only partially composted.

There are no local market development activities in the form of government procurement programs, economic development activities, or consumer incentives for compost and mulch products.

At the state level, two bills affecting markets for organic wastes were signed into law in 1989. Senate Bill 1322 establishes a comprehensive set of state programs designed to encourage source reduction of waste and market development for recycled materials. A compost market program will require the State Department of Transportation (Caltrans) to purchase compost products for their highway landscaping program. In addition, the State Departments of General Services, Forestry and Fire Protection, and Parks and Recreation are directed to identify and evaluate other uses for compost, including erosion control, public land restoration, landscaping, park and recreational maintenance projects, and highway noise barriers. The CIWMB is currently drafting specifications for compost products that will be purchased by state agencies.

Assembly Bill 4, the State Assistance for Recycling Markets Act of 1989, (STAR) requires state and local public agencies to give purchase preferences to compost products, and authorizes local agencies to determine the amount of the preference. It also requires contractors to certify percentages of recycled content in products either sold to the State or bought for the State. The CIWMB will coordinate a testing program for compost and

co-compost products based on the final use of the material and applicable state standards and regulations.

D. DESCRIPTION OF DIVERSION ALTERNATIVES

In this section, the options faced in selecting a compost program are summarized.

D.1. OVERVIEW

Compost systems consist of feedstocks, processes, and end uses.

The targeted feedstocks are discussed in Section B of this chapter (Targeted Waste Types and Categories). They include yard waste, wood waste, and food waste. It is discussed in more detail in the Special Waste Component (Chapter V) of this report.

Processes are discussed in the following sub-section. Each process includes the following operations.

- Collection.
- Pre-processing.
- Composting.
- Post-processing.

Potential end uses or products include

- Mulch.
- Soil blends.
- Partially-stabilized compost.
- Fully-cured compost.

Each of the products may have varying degrees of contamination and aesthetic appeal. For example, mulch used for the landscaping of yards may need to be composed of particular types of wood and be free of leaves and grass. Mulch used for some agricultural purposes could be a mixture of several materials and would not be selected on the basis of its aesthetic qualities.

How the product is marketed is affected by the selection of end uses and intended users. Mulch, soil blends, and compost can be sold in bulk or in bags. They can be picked up at the processing site by users or distributed through wholesalers and retailers. Marketing the product requires that advertising be aimed at selected users that may include:

- Local parks and schools.
- Landscapers.
- Greenhouses and nurseries.
- Farmers and ranchers.
- Local residents.
- Garden Suppliers.

D.2. PROCESSES

The unit operations required for a compost system include:

- Collection.
- Pre-processing.
- Composting.
- Post-processing.

Each operation can be accomplished using various methods. The various methods can then be combined in several ways to yield simple or complex systems.

Collection methods include drop-off and curbside collection. Both methods can be implemented on either a seasonal or a year-round basis. For, example, Christmas trees can be dropped off at a site for chipping by individuals and businesses or they can be collected at homes and businesses by collection crews. Brush and woody yard waste can be collected at selected times of the year when they are most likely to accumulate. Green waste (i.e., grass and leaves) is generated year round, but its generation is generally greatest in the spring, summer, and early autumn.

Curbside collection can be done using the following equipment and methods.

- Refuse cans or carts for wood waste, yard waste, and food waste.
- Plastic bags for food waste and green waste.

- Mechanical claws that pick up loosely packed material on the edge of the street.
- Manual collection of loose Christmas trees or other bulky material.

Pre-processing may include the following unit processes that are used to prepare the feedstock for composting:

- Size reduction (i.e., shredding, grinding, or chipping).
- Mixing to achieve porosity and a desired balance of nutrients and moisture.
- Screening, manual sorting, and other processes to remove unwanted materials.

Composting is the process in which biological degradation is enhanced through aeration, moisture control, temperature control, and the physical breakdown of particles. There are three types of composting systems:

- Turned windrow.
- Aerated static pile (or static windrow).
- In-vessel.

A windrow is an elongated pile. Oxygen can be supplied to the material in a windrow either by turning it, as in the turned windrow method, or by forcing air through it by means of a blower and of a duct located beneath the windrow, as in the aerated static pile method. The turned windrow method requires the use of heavy mechanical equipment, either a specially-designed compost turner or a front-end loader, to move the material. In a small-scale operation such as back yard composting, the mechanical equipment can be substituted by a rake and human labor. Turning a windrow also serves to mix material, to break up clumps of compacted material, and to shred material. This advantage alone is often sufficient reason to select the turned windrow method in preference to the static method.

In-vessel composting is done in a tank or other vessel. As in the aerated static pile method, air is forced through the mass of material. Both systems work well when sewage sludge is the feedstock. They control odor better than a turned windrow does. Sometimes, in-vessel composting is followed by composting in a windrow. Also, both the static pile method and the in-vessel method are followed by at least one stage of physically moving the material. This helps to break up lumps and to aerate material.

After the initial rapid stage of composting is complete, macrorganisms such as earthworms can thrive in the material. Earthworms mix material and form tunnels that promote aeration. They decrease the need for artificial mixing and aeration. This method is called

vermicomposting. Vermicomposting requires that certain conditions such as temperature, moisture content, and composition of the material be conducive to the survival of the worms. Otherwise the worms leave or die.

Post-processing can include the following operations that prepare the material for its end use.

- Curing (i.e., slow biological degradation).
- Drying.
- Blending with other materials.
- Size reduction to break up lumps.
- Screening to remove particles of undesirable size.
- Other operations to remove contaminants.

D.3. ALTERNATIVE SYSTEMS

Several alternative systems are outlined here. They are developed by combining the various feedstocks, processes, and end uses already described in this section. The alternatives are not all mutually exclusive.

SYSTEM 1: TREE MULCH

Christmas trees are shredded and screened to make mulch. Collection is by drop-off at the processing site or by collection from residents and businesses. Operation is seasonal. The product is distributed in bulk.

SYSTEM 2: WOOD MULCH

System 2 is similar to System 1 except that lumber and woody yard waste are the feedstocks and the operation is year round. Collection is by drop-off only.

SYSTEM 3: YARD WASTE COMPOST

Feedstocks include lumber and all yard waste. Collection is year round and includes both drop-off at the processing site and curbside collection. The material is shredded, mixed, composted, and screened. Products include mulch and compost. Materials can be mixed to produce soil blends. Distribution is in bulk or in bags.

SYSTEM 4: FOOD WASTE COMPOST

Food waste is added to the feedstocks of System 3. Processing, products, and the distribution method are as in System 3. However, a greater degree of control in the curbside collection operation and in the composting operation is required.

SYSTEM 5: WET WASTE COMPOST

"Wet" waste (i.e., a mixture of food waste, yard waste, wet paper and other putrescible matter) is collected from the curbside. It is shredded, mixed, composted, cured, and screened. Products include compost and soil blends. Distribution is in bulk or in bags.

SYSTEM 6: SLUDGE COMPOST

Sewage sludge is composted with yard waste. The yard waste is collected at curbside or by drop-off. The sludge is transported to the processing site from the sewage treatment plant. The yard waste is shredded. Materials are mixed, composted, cured, and screened. A separate stage of drying may be needed. The product is bagged or sold in bulk.

D.4. POLICY ALTERNATIVES

The following policies can be used to promote the success of a composting program.

ALTERNATIVE 1: COLLECTION ORDINANCE

Yard waste is banned, by a city ordinance, from inclusion with mixed refuse. In this alternative, yard waste is not collected unless it is segregated from other refuse and put in a designated container and/or place for collection. Enforcement consists of 1) informing residents of the policy; 2) leaving the refuse uncollected if it includes yard waste; and 3) on subsequent violations, separating the yard waste from the refuse and charging the resident for the service. The collection crews are crucial to the enforcement.

ALTERNATIVE 2: CITY PROCUREMENT

The County adopts practices that require or encourage the use of refuse-derived mulch and compost on County-owned land and in County-sponsored projects.

ALTERNATIVE 3: REVISION OF REGULATIONS

The County revises building codes, specifications, and other regulations to permit and to encourage the use of refuse-derived compost and mulch in new landscaping.

ALTERNATIVE 4: LANDFILL COVER

Mulch and compost can be used as landfill cover if the proper permits are obtained. The landfill operator and the County would implement this alternative.

E. EVALUATION OF ACTIVITIES AND PROGRAMS

The six system alternatives and four policy alternatives discussed in the preceding section are evaluated in this section. The following eleven criteria that are used to evaluate the alternatives are discussed in Appendix C:

- Effectiveness in diverting waste.
- Hazards created by the alternative.
- Ability to accommodate changing conditions.
- Consequences on the waste stream.
- Ease of implementation.
- Feasible time frame for implementation.
- Consistency with local plans and policies.
- Facility requirements.
- Institutional barriers.
- Cost effectiveness.
- Availability of end uses.
- Involvement of waste generators.

The availability of end uses and markets is a particularly important criterion in the selection of composting programs. It is discussed in Section E.3.

E.1. EVALUATION OF SYSTEMS

The six systems described in the preceding section are evaluated in this section. The evaluation is summarized in Table IV-1.

SYSTEM 1
Christmas tree mulching is easily implemented at a relatively low cost. It does not divert a substantial fraction of the waste stream from disposal, but it has few risks and provides a basis on which to add other systems.

SYSTEM 2
Mulching of wood and woody yard waste is also relatively easy to implement and has few risks. It targets waste types that make up more than five percent of the waste stream. It includes a simple processing system and a simple collection system.

SYSTEM 3
Yard waste composting includes curbside collection of yard waste. This is costly but helps to recover a substantial fraction of the waste stream. Much of the yard waste can be mulched. This system includes composting, but it also allows for mulching if difficulties

arise in the composting process. The amount of material to be composted is flexible. This flexibility is important in the early stages of market development.

SYSTEM 4

Food waste composting adds a potentially large amount of feedstock to the program. It requires better control of the composting process than do the previous systems. Food waste cannot be mulched, so the system lacks flexibility. The food waste contains moisture, nitrogen, and other nutrients that make it beneficial as an additive to other feedstocks such as wood that do not compost readily by themselves.

SYSTEM 5

Wet waste composting adds the need for additional pre-processing and results in some loss of control over the product. The composition of mixed wet waste cannot be controlled by the process operators, so the quality of the product and the variety of products produced may suffer. This system promotes the greatest possible diversion of waste through composting.

SYSTEM 6

Co-composting of sewage sludge and yard waste targets a substantial quantity of waste. The unincorporated county does not generate sewage sludge, so there is no need for this system.

All of the systems require substantial involvement by the generators of waste. All of the systems yield a product with a potentially large market. In some alternatives such as System 5 the market is substantially less flexible and less certain than in the other systems.

E.2. EVALUATION OF POLICY ALTERNATIVES

A summary of the evaluation of the four policy alternatives described in the preceding section is in Table IV-1.

ALTERNATIVE 1

A collection ordinance would help to ensure a high participation rate in any curbside collection program. However, an ordinance of this type could face objections from residents and would not be needed if people voluntarily participate in the curbside collection program.

ALTERNATIVE 2

Modification of county procurement practices would be effective in diverting waste that can be used as compost or mulch on county-owned land. The demand for the product may vary from year to year. The policy sets a good example and could be useful in advertising the product as well as in providing an immediate market for the product.

ALTERNATIVE 3
Revision of regulations could be very effective in promoting markets for mulch and compost. The effectiveness depends on the quality of the product and on the specific needs of landscapers.

ALTERNATIVE 4
Used as landfill cover as regulated by the State, mulch and compost could provide a very large outlet for the product of a compost or mulch operation. The use of mulch and compost as landfill cover requires little involvement by waste generators and may not make the best use of the product.

E.3. END USES AND MARKETS

Currently, there is a supply of organic soil conditioners in the unincorporated county (see the section on Existing Conditions in this chapter). They include mushroom compost, sawdust, manure, and rice hulls. Products from any solid waste composting program would either compete with these products or would be used in ways in which the existing products are not used.

The value associated with the diversion of waste material from disposal often is much greater than revenues collected through the sale of the product. A safe assumption is that mulch and compost from solid waste will generate no revenue.

A marketing effort can be considered successful if all of the product is removed from the processing site by residents, businesses, and government agencies that use the product because of its value as a soil amendment. If the product is not removed by these three entities, additional outlets or end users will be needed. The following three possibilities can be pursued:

- County ordinances and policies that encourage the use of the product.
- Use of the product as landfill cover.
- Use of the product on agricultural land.

The amount of product that can be absorbed through these measures is not known, but it could easily exceed the total amount of mulch and compost produced. Generally, the weight of landfill cover is about one fourth of the weight of landfilled waste. It is estimated that about 27% of the waste stream in the unincorporated county can be used to produce mulch or compost. The composting process causes a decrease in the weight and volume of the material being composted. A substantial fraction of the product could be used to cover refuse that is disposed. For instance, the B&J Landfill imports soil for daily and interim

cover. If proper permits were obtained in compliance with State regulations, the landfill may serve as a major user of compost and mulch. Permits would be required from the CIWMB and the local enforcement agency.

It is likely that the product from a composting program in the unincorporated county would have an end use. The end use may be one of low value. An ongoing effort to develop and market a product that can be of significant value to the user is part of a successful composting program.

F. SELECTED PROGRAMS

Systems 1 and 2 are selected for implementation in the congested areas of the unincorporated county in the short term. They will be phased in over a period of two years. The program will begin with mulching of Christmas trees. Yard waste will be collected at drop-off sites.

The implementation of curbside collection and yard waste composting (System 3) will be phased in over time as the cooperating incorporated cities implement the program. The unincorporated county will utilize the respective cities' pilot program to assess curbside collection equipment (including different types of bags), frequency of collection, and techniques. The possibility of picking up bagged yard waste on regular refuse collection routes will be evaluated because it offers the possibility of significantly reducing collection costs. The appropriate frequency of collection will also be assessed.

The three systems are estimated to divert about 3.8% of the waste stream of the unincorporated county in the short term (see Table IV-2). A site will be required with adequate area for receiving, processing, and storing material. A concrete floor will be used for composting, but covered areas are needed only for offices and equipment storage areas. Major equipment includes a shredder or grinder, a screen, and a front-end loader. Curbside collection will require a collection vehicle. The product will be sold or given away locally to residents, businesses, and government agencies. The unincorporated county will cooperate with the collectors and the cities in Solano County in sharing equipment and facilities.

Food waste collection (at curbside) and composting (System 4) will be phased in for the congested areas serviced by collectors servicing nearby incorporated areas. The unincorporated county will cooperate with the cities and will utilize information gathered from one-year pilot studies designed to solve collection and processing problems that are unique to food waste. This system promotes the diversion of food waste which cannot be diverted in any other way and which makes up a significant fraction of the waste stream.

Together, Systems 1 through 4 are expected to divert about 18% of the unincorporated county's waste stream by the year 2000 (see Table IV-2). The addition of food waste composting will require additional processing and storage space and new equipment but it will be of the same type that is used in the short term activities. Mixing can be done either with a mixer dedicated to that purpose or with a front-end loader. The markets may also be expanded but will remain local.

System 5 is not selected because wet waste presents special collection, processing, and marketing problems.

Systems 6 is not selected because the unincorporated county does not generate sewage sludge.

Policy alternatives 2 through 4 are selected to promote markets for the product. Policy alternative 1 (collection ordinance) is not selected because it may not be needed if people voluntarily participate in the curbside collection program. The ordinance could be reconsidered in the future if participation rates are lower than desired.

The processing systems and policies will be supplemented with education and public information activities that inform people of available drop-off sites, the curbside collection schedules, recommended practices for separating and preparing compostable waste for collection, etc. A marketing activity will also be undertaken to advertise the availability of mulch, soil blends, and compost and to inform people of the proper use of each product.

G. PROGRAM IMPLEMENTATION

Solano County, through the Department of Environmental Management, will have overall responsibility for the implementation of the composting program. The Department of Environmental Management will implement some aspects of the collection and processing systems and arrange with the haulers or other contractor that will serve the congested unincorporated areas for the implementation of other aspects. An implementation schedule that specifies the parties that will perform various tasks is in Table IV-4.

Education, public information, and advertising will be done either by the Department of Environmental Management or by the operator of the processing plant. Marketing can be done by a separate entity, but it is simplest to have marketing done by the plant operator as long as distribution consists of having users pick up the product at the processing site. This simple system is planned for implementation. The County Board of Supervisors and various departments will be responsible for the modification of regulations that promote markets for the product.

Program costs are summarized in Table IV-3. Annual costs are less than $20,000 per year until 1996 when curbside collection of yard waste begins. Curbside collection and composting is expected to add about $120,500 per year to the costs. The anticipated composting system is a turned windrow, and minimal processing is done. The greatest expenditure is on curbside collection. The cost can be decreased if yard waste is collected in bags that are picked up on the regularly-scheduled refuse collection routes. Another major cost increase is anticipated in 1998 when food waste is added to the program. Pilot studies will be designed to help minimize the costs.

Cooperation with the cities of Solano County is expected to ease implementation of the composting activities that include the curbside collection of material. The main source of revenues for the composting program will be user fees.

H. MONITORING AND FEEDBACK

H.1. ANNUAL MONITORING

The monitoring program will compare actual diverted tonnage with projected diversion on an annual basis. If the actual diversion exceeds or is equal to the projected diversion, the program will be considered a success.

H.2. REPORTING

Information will be reported to Solano County on a quarterly basis. The reporting of data will be required and will be a condition of getting a business license or franchise agreement renewal or extension. Solano County employees will be responsible for performing monitoring functions, including the gathering of information and the writing of reports, unless a regional arrangement for these services is made.

Private contractors involved in the composting program will report:

- Quantity of wood waste, yard waste, and food waste collected.
- Participation rate in curbside collection programs.
- Marginal time and costs involved in implementing the curbside collection program.
- Quantity of material received and processed at the processing facility.
- Quantity of each type of product produced and distributed.

- Quantity of residue from the processing facility.

H.3. REMEDIAL MEASURES

The following measures will be taken, as needed, if the quantity of material falls short of the projected diversion for the composting program or if the total diversion in the unincorporated county falls short of the required total diversion rate:

- Assess the reasons for the short fall.
- Increase the level of effort or redirect the effort in implementing selected parts of the program.
- Consider mandatory participation in curbside collection programs. Mandatory participation has been successful in improving the participation rates elsewhere.
- Consider the transformation of wood and other combustible material to help achieve the State-mandated diversion objective of 50%. After 1995, up to 10% of the waste stream may be considered to be diverted if it is burned.

TABLE IV-1: RATINGS OF COMPOSTING ACTIVITIES

	Alternative Systems						Policy Alternatives			
Criteria	Tree Mulch	Wood Mulch	Yard Waste Compost	Food Waste Compost	Wet Waste Compost	Sludge Compost	Collection Ordinance	County Procurement	Revisions of Regulations	Landfill Cover
1. Effectiveness in waste diversion	Low	Medium	High	Medium	High	Medium	High	Low-High	Low-High	High
2. Hazards created	High	High	Medium	Medium	Medium	Medium	Medium	High	High	High
3. Flexibility	High	High	Medium	High	Medium	Medium	Low	Medium	Low	High
4. Consequences on the waste stream	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium
5. Feasibility	High	High	High	High	High	High	High	High	High	High
6. Consistency with local plans	High	High	High	High	High	High	Low	Medium	Low	High
7. Facility requirements	High	Medium	Low	Low	Low	Low	High	High	High	High
8. Institutional barriers	High	High	High	High	High	Low	High	High	High	Medium
9. Costs	High	High	Low	Low	Low	High	Medium	Medium	Medium	Low
10. End uses or markets	High	High	High	Medium	Low	Medium	Medium	Medium	Medium	High
11. Involvement of waste generators	High	High	High	High	High	Medium	High	Medium	Medium	Low
Conclusion	Selected	Selected	Selected	Selected	Rejected	Rejected	Contingency	Selected	Selected	Selected

TABLE IV-2: DIVERSION ESTIMATES FOR PLANNED COMPOSTING PROGRAMS

	Beginning Year	Ending Year	Yard Waste	Wood Waste	Food Waste	Sludge	Tons Divert.	% Total Diversion
Short Term Programs								
Christmas Tree Collection & Chipping (a)	1992		22				22	0.14
Drop Off and Processing (b)	1993		243	325			568	3.62
Total Short Term			265	325	0	0	590	3.76
% of Waste Type			10.90%	26.99%	0.00%			
Additional Medium Term Programs								
Yard Waste Collection and Processing(c)	1996		1,702	241			1,942	12.38
Food Waste Collection and Composting (d)	1998				350		350	2.23
Total Medium Term			1,702	241	350	0	2,292	14.61
Total Short and Medium Term			1,967	566	350	0	2,882	18.37%
% of Waste Type			81%	47%	50%			

Notes: (a) Assumes 30% capture of residential Christmas trees.

(b) Assumes 10% capture of all yard waste and 30% capture of non-residential wood waste.

(c) Assumes 70% capture of all yard waste and 20% capture of all wood waste.

(d) Assumes 50% capture of all food waste.

TABLE IV-3: COST ESTIMATES FOR PLANNED COMPOSTING PROGRAMS (a)

Activity	Start-up Year	Start-up Costs(b)	Staff(c) EPI	Staff(c) Other	Annualized Start-up Costs(d)	Other Annual Costs(e)	Total Annual Costs(f)
Christmas Tree Collection and Chipping	1992	550	0.02	0.03	167	3,481	4,560
Drop-Off and Processing	1993	0	0.01	0.05	0	13,417	16,771
Yard Waste Collection and Processing	1996	222,019	0.03	0.10	67,361	152,085	274,307
Food Waste Collection and Composting	1998	40,192	0.00	0.10	12,194	30,082	52,845

Notes: (a) Annual Costs in 1991 Dollars

(b) Start up costs include estimated consultant hours or equivalent

(c) Staffing requirements are expressed as full-time equivalents

(d) Facility costs are amortized over 20 years at 12%, while equipment costs are amortized over 5 years at 10%. All capital costs have been increased by 15% before amortization to include estimated financing expenses.

(e) Other annual costs include staff costs at $49,616 per FTE, other operating costs and contract costs.

(f) Total Annual cost included 25% mark-up for contingencies.

TABLE IV-4: IMPLEMENTATION SCHEDULE FOR COMPOSTING PROGRAMS

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
Christmas Tree Collection and Chipping	DEM	1992-
Identify Groups and Locations	DEM	Sep, 92
Publicize Program	DEM and Collector	Oct-Nov, 92
Collect and Process Materials	Private/Nonprofit Collector	Dec, 92-Jan, 93
Monitor Program	DEM	Jan, 93-
Yard Waste Drop-off and Processing	DEM	1993-
Adopt Ordinance & appropriate Funds	County Board of Supervisors	March, 93
Hire and Train Staff	DEM	April, 93
Evaluate Market	DEM, LEA, and Cities	Apr-June, 93
Develop Procurement Specifications and Designate Specific Materials	DEM, LEA, and Cities	Jul-Sep, 93
Secure Site	DEM	Sept, 93
Negotiate With Service Providers	DEM	Oct,93-Jan,94
Publicize Program	DEM, Service Provider, and Cities	Jan-Mar, 94
Purchase Containers	Service Provider	Jan, 94
Collect Materials	Service Provider	Feb, 94-
Commence Operation of Facility	Service Provider	Feb, 94
Monitor Program	DEM and Cities	Feb, 94-
Single Family Curbside Collection	DEM	1996-
Negotiate with Service Providers	DEM and Cities	Jan-Feb, 96
Adopt Ordinance and Appropriate funds	County Board of Supervisors	March, 96
Publicize Program	Private Contractor	April, 96
Implement Program	Franchised Sanitary Service	May, 96
Monitor Program	DEM and Cities	May, 96-

TABLE IV-4 (CONTINUED)

Food Waste Collection and Composting	DEM	1998-
Negotiate with Franchisee	DEM	Feb-Mar, 98
Adopt Ordinance and Appropriate Funds	County Board of Supervisors	April, 98
Purchase Containers	Service Provider	May, 98
Publicize City-Wide Program	DEM and Service Provider	June-Sep, 98
Collect Materials	Service Provider	June, 98-
Monitor Program	DEM and Cities	June, 98-

Abbreviations: DEM = Department of Environmental Management
LEA = Local Enforcement Agency

Note: The time frames listed are the earliest possible beginning dates. Programs may begin later, depending upon which jurisdiction the unincorporated county cooperates with for that program.

TABLE IV-5: SOURCES OF PROGRAM FUNDING

	User Fee	Franchise Fee	Landfill Surcharge	Sales Tax	Waste Importation Fee
COMPOSTING PROGRAMS					
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			

CHAPTER V SUMMARY
SPECIAL WASTES

Special wastes are nonhazardous wastes requiring special collection or disposal procedures. They include sewage sludge, asbestos, tires, dead animals, and drilling mud. There is no sewage sludge in the unincorporated county. The primary purpose of the special waste component is to ensure that special wastes are handled in an environmentally sound way. Usually, their diversion from disposal is of secondary importance.

Drilling mud from natural gas well drilling operations composes a major part (about 70%) of the waste from the unincorporated county. In accordance with PRC 41781 (b)(2), it is not counted as solid waste in the waste generation study. It is an inert waste for which no diversion program was in effect as of January 1, 1990. Aqua Clear Farms is a potential disposal site for drilling mud in Solano County and is expected to be permitted in late 1991. There may be ways of recycling or source reducing some of the mud, but they are currently unproven and need to be evaluated. This evaluation should be done as the permitting process proceeds.

There is a market for used tires in Solano County which will be promoted and developed. The diversion accomplished from these programs is relatively minor. Asbestos will continue to be disposed safely at the B&J Landfill and the Potrero Hills Landfill, or other permitted facilities. Dead animals are handled by the Solano County Animal Shelter. A small public information effort will supplement the existing spaying and neutering program.

CHAPTER V
SPECIAL WASTE COMPONENT

A. GOALS AND OBJECTIVES

The goals of special waste programs are to divert waste from landfills and to continue to handle wastes that cannot be diverted in an environmentally safe and cost-effective way. The latter objective includes such activities as the dewatering and drying of sludge, the shredding of tires, the proper disposal of asbestos-containing waste, and the treatment of auto shredder residue to immobilize hazardous chemicals such as lead. Special waste programs also can include the channeling of certain wastes to appropriately designed and permitted landfills outside of Solano County or the state of California.

The following are the goals and objectives to be pursued through special waste programs in the unincorporated county.

1. Continue to divert all whole tires from disposal. Continue to recycle 18 tons of tires each year. Promote the source reduction of tires through education and public information programs linked to existing transportation and energy conservation programs.

2. Continue the safe disposal of asbestos.

3. Reduce the generation of unwanted pets through educational and public information activities that build on existing spaying and neutering programs in Solano County. Continue the recycling of dead animals that are not source reduced.

4. Evaluate and implement measures for the source reduction, recycling, and safe disposal of drilling mud.

In accordance with the California Public Resources Code (Section 41781 (a)(5)), sludge is not counted as a "generated solid waste". Septic tank pumpings are generated in the unincorporated county. They are disposed into the headworks of sewage treatment plants in the county. For this reason, septic tank pumpings are considered to be a liquid waste rather than a solid waste. Sludge is produced from the septic tank pumpings and from wastewater from some parts of the unincorporated county that are connected to sewer systems. This sludge is taken to be generated in the city or cities that are the main sources of wastewater treated by the treatment plants. The wastewater treatment plant operators and the cities served by the plants are in a better position to manage the recycling, composting, and disposal of the sludge than is the County. Therefore, there is no further discussion of sewage sludge in this SRRE.

Sludge from the treatment of the domestic water supply is not discussed in this SRRE because water in the unincorporated county is either supplied by wells and needs no filtration or it is supplied by a water utility that primarily serves an incorporated city. The treatment and disposal of the sludge is handled by the city or a private contractor selected by the city.

The first four goals listed above are not expected to divert more than a few tenths of a percent of the existing solid waste stream from disposal. Therefore, there are no quantifiable diversion objectives. The potential for diverting drilling mud from disposal is a matter that needs more evaluation. Depending on decisions by the CIWMB that have yet to be made and on developing technology and regulations, the diversion of drilling mud could amount to a large fraction of the unincorporated county's waste stream or it could amount to nothing.

B. TARGETED WASTE TYPES AND CATEGORIES

In AB 939 and AB 1820, the only special wastes that are specifically named are sewage sludge and asbestos. The CIWMB regulations expand the list to include ash, industrial sludge, auto shredder waste, auto bodies, and wastes specifically conditioned in a solid waste facilities permit. Examples of the last category of waste are dead animals and infected plants. Special wastes do not include hazardous wastes that must be disposed in Class I disposal sites.

The CIWMB regulations also refer to special wastes listed in Section 66740 of Title 22 of the California Code of Regulations. In addition to the wastes already mentioned, Section 66740 lists baghouse and scrubber wastes from air pollution control, catalyst from petroleum refining and chemical plant processes, cement kiln dust, tannery sludge, drilling mud from gas and oil wells, refractory from industrial furnaces, kilns and ovens, sand from sandblasting, sand from foundry casting, slag from coal gasification, sulfur dioxide scrubber waste from flue gas emission controls in the combustion of fossil fuels, and tailings from the extraction and processing of ores and minerals.

The special wastes discussed in this component are:

- asbestos
- automobile bodies and auto shredder residue
- tires
- dead animals
- drilling mud.

Certain special wastes are not included in the calculation of generated, disposed, or diverted waste in this document. Auto bodies are not counted because they are not usually disposed in landfills. They are routinely recycled as scrap-steel. The non-metallic residue for auto bodies is disposed and is, therefore, counted in the calculation of disposed refuse. A summary of the quantities of special waste generated in the unincorporated county is in Table V-I.

C. EXISTING CONDITIONS

C.1. ASBESTOS

The Solano County Hazardous Waste Management Plan (Brown, Vence, and Associates, 1989) states that in 1986 Solano County produced 725 tons of asbestos waste. Only 313 tons of that waste was from facilities other than Naval facilities. The 313 tons has been apportioned among the jurisdictions in Solano County according to their populations. The unincorporated county's share is 19 tons. The remaining 412 tons of asbestos-containing waste was allocated to Vallejo which is the site of the Mare Island Naval Reservation.

The B&J Landfill and the Potrero Hills Landfill are permitted to receive asbestos waste. The B&J Landfill is permitted by the CIWMB under Facilities Permit No. 48-AA-002 and by the Regional Water Quality Control Board under Board Order No. 89-178. The Potrero Hills Landfill is permitted by the CIWMB and Facilities Permit No. 48-AA-0075 and the Central Valley Regional Water Quality Control Board under Board Order No. 85-121. The handling of asbestos-containing waste is regulated by the California Department of Health Services (DHS). A manifest is required.

Until about 1970, asbestos was used extensively in ceiling and floor tiles and in insulation for a variety of products. Airborne asbestos particles can lodge in human lungs and are known to cause lung disease. Asbestos has been banned, by federal law, from many applications. Its presence in school buildings has been a major concern. It is being removed from public buildings and other applications. There is no alternative to disposal in landfills. As it is replaced with other materials, the generation of waste asbestos is expected to gradually decrease.

C.2. AUTOMOBILE BODIES AND AUTO SHREDDER RESIDUE

About 1.8 million to 2.0 million automobile bodies are shredded in California each year. Typically, an auto body is delivered to the shredding facility after having been stripped of its reusable parts by an auto dismantler. The typical auto body yields about one ton of steel and 0.3 ton of residue to be disposed. Since the steel is almost never disposed in landfills, it is

not considered to be a generated or diverted waste. The residue is treated with a polysilicate compound to immobilize lead. It can then be disposed in a Class III landfill.

No automobile shredders have been identified in Solano County in this study, and no landfill operators have reported auto shredder waste being disposed at the County's landfills. Since there are no auto shredders in Solano County, and no auto shredder waste is generated in Solano County, it will not be discussed further in this chapter.

C.3. TIRES

The management of waste tires in California is the subject of Assembly Bill 1843, which was enacted in 1990. The CIWMB is currently in the process of developing regulations and implementing the provisions of AB 1843. AB 1843 was written in order to:

- Set standards for sites that store tires.
- Provide for the permitting of dedicated tire-storage sites (monofills) at which tires are to be stored for later recycling or incineration.
- Provide for the funding of research and development and business development activities that promote the use of waste tires.

On a nationwide basis, about one waste tire is generated per person per year. This amounts to about 16 pounds of tire rubber per person per year. Based on the population of the unincorporated county, this amounts to about 170 tons of tire rubber per year.

Generally waste tires are generated and collected at tire dealers and automobile service stations at which new tires are sold and mounted. The tires are collected in loads that consist only of tires. They are delivered to a few waste tire handlers including, but not limited to, Oxford Tire Recycling of Northern California (OTR) and Tire Resources Industry (TRI).

From the loads of tires they receive, the waste tire handlers remove tires that can be reused. Some of the tires have sufficient remaining tread to be resold in their existing condition. There are at least two retailers of these used tires in Solano County. Estimates of the fraction of the tires that can be resold in their existing condition range up to 30%. Many of the used tires are exported.

Some used tires have insufficient tread to be reused in their existing condition but can be retreaded. Generally, in the United States, retreading is limited to tires for heavy equipment and special purpose tires such as snow tires. Some tires are reused in playgrounds, marinas, etc.

Gro Strait Products in Benicia manufactures tree straps from used tires.

Another potential use for tires is in rubberized asphalt for road pavement. The CIWMB is currently working with Caltrans on permitting of this application.

Tires that are not re-used or shredded and disposed are burned at a tire-fueled electric power plant in Westley California. This CIWMB-permitted plant is operated by OTR, which estimates that it handles about 40% of the tires from Solano County. The power plant in Westley receives a substantial portion of its fuel from an adjacent tire disposal site. As the supply of stored tires decreases, the need to find additional sources of new waste tires will increase, and OTR reports that it is always interested in finding new sources of tires. The State of California's position on the burning of tires is specified by AB 1843 to be evaluated.

C.4. DEAD ANIMALS

The Solano County Animal Shelter sends about 14,300 dead animals per year to Koefran Industries in Sacramento for recycling into tallow and bone meal. The County pays about $6,000 per year to have the dead animals picked up at the shelter. About 11,300 of the animals are killed by Solano County. The others die of diseases, traffic accidents, etc. An undetermined number of animals are source reduced through the spaying and neutering of the would-be parents.

Dead animals can be disposed at the county's landfills. Some pets are buried in a pet cemetery in the unincorporated area of Solano County. B&J Landfill charges a fee of $150 per body for horses and cattle.

C.5. DRILLING MUD

Drilling mud is generated in Solano County from natural gas drilling activity. Forty-nine wells were drilled in 1990. Since 1983, the number of wells completed each year has ranged from 32 to 63. Drilling mud consists of a mixture of well cuttings (i.e., the dirt, rock, and other material removed from the ground) and bentonite slurry which is used to flush cuttings from the well. About 30,000 tons of drilling mud are generated per year in Solano County.

Until 1988, drilling mud was disposed at Aqua Clear Farms (ACF), a Class II disposal site in Solano County. ACF also accepted drilling mud from outside of Solano County. Aqua Clear Farms has not accepted drilling mud since 1988, but it is expected to be re-permitted in 1991. It is expected to begin accepting drilling mud in 1991 or 1992. Since 1988, drilling mud from Solano County has been disposed at a quarry operated by Valley Rock Products in Orland, Glen County, California. The Orland disposal site has been granted an exclusion from the CIWMB permitting process based on Section 18215 of Title 14 of the

Public Resources Code (PRC). It is an unclassified landfill. It is reportedly due to close in the near future and is kept open because of the absence of other suitable disposal sites in northern California.

The requirements for a new disposal site vary because Title 23 of the PRC classifies drilling mud as an inert waste, while Title 22 of the PRC classifies drilling mud as a special waste. There is a range of compositions of drilling mud that may justify classifying some mud as inert waste and other mud as special waste. For example, mud from oil wells tends to contain oil that would not be present in mud from gas wells.

Under certain conditions, drilling mud can be permanently disposed at the well site. It must be covered with a clay liner and sampled to determine the concentration of potential pollutants. Solano County has chosen to disallow the onsite disposal of drilling mud to ease the well permitting and monitoring processes and because most drilling in the county is done on agricultural land that would be degraded by the permanent presence of disposed drilling mud.

Under certain conditions, drilling mud from Solano County or a processed fraction of it might be suitable for use as a fill material or for other useful end uses. However, this possibility has not been ascertained.

In this SRRE, drilling mud is not counted in the inventory of generated solid waste used to determine the diversion rate. Counting it would increase the quantity of generated solid waste in the unincorporated county by a factor of about three. It would compose about 70% of the waste in the unincorporated county. If it were counted and if no means of diverting it were found, it would be impossible for the unincorporated county to achieve the 50% diversion goal mandated by the State. On the other hand, if it were counted and a means of diverting it were found, achieving the 50% diversion goal could be very easy.

The anticipated opening of Aqua Clear Farms in 1991 or 1992 will create the possibility of importing drilling mud from other counties. The County will evaluate the costs and benefits of accepting mud from other counties. The benefits may include income from importation fees. The costs include a shortened landfill life, truck traffic, and the need to ensure that the imported mud will not create unacceptable environmental problems.

D. DESCRIPTION OF DIVERSION ACTIVITIES AND PROGRAMS

The following diversion activities have been considered for implementation in the unincorporated county.

D.1. ASBESTOS

Asbestos must be removed from structures and equipment safely and disposed safely. The current disposal practices appear to be adequate and are supervised by the State of California.

There are no feasible alternatives for new activities for recycling or substantially reducing the generation of asbestos waste. The use of asbestos in many applications has already been limited by Federal law. Most asbestos that is currently being disposed was put into use years ago. As the already-installed asbestos is retired from use, the rate of asbestos waste generation will decline. No new programs are needed to accomplish this.

D.2. TIRES

Waste tire management activities include the following:

SHREDDING

Shredding reduces the volume of tires and makes them easier to manage in a landfill. It is a common practice, but it is not a diversion activity.

MARKET DEVELOPMENT

As is discussed earlier in this chapter, used tires are sold in Solano County in their existing condition (i.e. without being retreaded). These tires generally have 75% or more of their original tread. Other used tires are exported. The promotion of the sale of used tires in Solano county is a potential market development activity and would help "close the loop" on recycling by encouraging the consumption of recycled products.

Market development could be promoted by Solano County setting an example by using used tires on its own vehicles wherever possible. A second approach would be to include a discussion of the use of reused tires in EPI literature, curricula, and advertisements. Therefore, market development consists of two activities, a modification of procurement practices and an EPI activity.

SOURCE REDUCTION

The reduced use of tires would result in the decreased production of waste tires. This EPI activity would focus on the role of motor vehicles in the generation of waste. It would build

upon existing transportation programs, energy conservation programs, and the EPI activity described in the preceding section for auto shredder residue.

EDUCATION AND PUBLIC INFORMATION

Promotion and/or evaluation of diversion and incineration alternatives would be aimed at the commercial transporters and handlers of waste tires. Businesses that collect, process or transport tires would be informed of diversion and incineration options. Existing diversion options include the delivery of tires to Gro Strait Products in Benicia or to others who use tires for playground equipment, bumpers, etc. Specific available end users would be identified.

Incineration of tires is an existing option of which tire handlers would be informed. The extent to which this option would be promoted by the Solano County depends on policies and recommendations yet to be established by the State of California.

D.3. DEAD ANIMALS

The only proposed change in the current waste management system that is related to dead animals is that the EPI literature, curricula, and advertisements include a discussion of the role of the spaying and neutering the reduction of unwanted pets.

D.4. DRILLING MUD

Efforts are underway to permit a drilling mud disposal facility in Solano County at the Aqua Clear Farms site. The County could promote the investigation and pursuit of drilling mud diversion methods during the permitting and enforcement processes. One possibility would be to use the Aqua Clear Farms site as a processing site which would also be the disposal site for any non-recyclable fraction of the drilling mud. The technology to be used is not known. A first step would be for the County to perform a state-of-the-art review of drilling mud processing and reuse technology. Alternately, the County could require such a review and evaluation of any applicant for a disposal site permit.

E. EVALUATION OF ALTERNATIVES

The diversion alternatives that have been considered for local implementation are evaluated according to the criteria specified by the CIWMB. Those criteria are:

- effectiveness
- hazard

- flexibility
- consequences on the waste stream
- feasibility
- facility requirements
- consistency with local plans and policies
- institutional barriers
- cost
- availability of end uses
- involvement of waste generators.

A description of the criteria is in Appendix C.

Other waste management practices (i.e., those practices that do not involve diversion) are evaluated according to appropriate criteria. The evaluation is summarized in Table V-2.

E.1. ASBESTOS

As there are no feasible alternatives for asbestos diversion, no evaluation was conducted.

E.2. TIRES

The diversion alternatives are evaluated as follows.

EFFECTIVENESS
The market development and EPI activities would divert no more than a few tenths of a percent of the waste stream from disposal. Incineration and recycling could divert about one percent of the waste stream from disposal.

HAZARDS The use of pre-used tires is not expected to create any new hazards. Tires would still be removed from vehicles when the tread is reduced to a particular depth (typically, replacement of tires on most automobiles is recommended when the tread depth is about 0.25 inch).

The encouragement of a reduction in the use of automobiles would reduce hazards associated with their use.

The incineration of tires produces air pollution. Tire incinerators are regulated by regional and state authorities, and the hazards are considered to be acceptable and manageable. Hazards associated with tire recycling activities, such as the manufacture and use of rubberized asphalt should be addressed in the evaluations expected to be done by the State of California.

FLEXIBILITY

All of the alternatives except incineration are expected to be insignificantly affected by foreseeable economic, technological, and social changes. The development of recycling alternatives that would compete for a supply of tires could adversely affect the incineration option. However, this results in little or no risk to the County. Solano County does not intend to involve itself in the financing, planning, or operation of an incinerator or any other tire recycling operation. Solano County is to be involved only in the transfer of information.

CONSEQUENCES ON THE WASTE STREAM

None of the alternatives would have a significant impact on the remainder of the waste stream except that the burning of tires generates ash that must be disposed. Because the existing incinerator is outside of Solano County and the ash is disposed in an acceptable manner, this is not a problem for the County.

FEASIBILITY

All of the options can be implemented in the short term except that the monitoring of progress in tire recycling technology will extend into the medium term. New tire recycling activities would not be implemented in the short term and may never ever be implemented.

FACILITY REQUIREMENTS

New facilities would be required only if new tire recycling technology is implemented.

CONSISTENCY WITH LOCAL PLANS AND POLICIES

There are no local policies or plans that are inconsistent with any of the alternatives. The development of local markets for materials that would otherwise be waste material is consistent with Solano County's desire to incorporate market development into its source reduction and recycling element. A decrease in the use of automobiles is consistent with BAAQMD goals. Solano County has no policy regarding the combustion of tires outside of its jurisdiction. The State of California's policy regarding tire combustion is yet to be determined.

INSTITUTIONAL BARRIERS

Vendors of new tires might object to Solano County promoting the use of used tires. Some groups might oppose the incineration of tires because of environmental hazards or because

incineration diverts tires from other recycling activities. Depending on the results of yet-to-be-done evaluations, the CIWMB might take this position.

COST

The procurement of used tires is expected to save money for Solano County. The EPI activities would have minimal costs. The collection, transportation, and selling of tires would be done by private businesses. They would set prices to cover their costs. There is currently a separate fee for depositing tires at the landfills in Solano County that is sufficient to discourage many haulers from disposing tires there. Changes in State of California regulations governing the management of waste tires could result in increased costs. At the local level, this could have the effect of tire dealers charging a fee for keeping the tires they remove from vehicles. It is impossible to estimate the magnitude of any such fee.

END USES

Used tires are already sold locally and internationally. The tire procurement activity and the associated EPI activity is intended to promote the development of the local market. The incineration of tires is accomplished at Westley, California and is expected to continue there. Tires could also be shredded and burned in some industrial boilers (reportedly, OTR has plans to shred tires for this purpose). No potential users of shredded tires have been identified in the unincorporated county. If rubberized asphalt were to become commercially available and if it were approved for use for paving roads, there would be a market of undetermined magnitude in the unincorporated county. Tires are used locally for tree straps, playground equipment, bumpers, etc.

INVOLVEMENT OF WASTE GENERATORS

The EPI activity would heavily involve the generators of waste tires. The use of used tires would involve some, but probably not a large fraction of waste generators. The recycling and incineration of tires would involve the waste generators to a negligible degree.

E.3. DEAD ANIMALS

The proposed EPI is evaluated as follows:

EFFECTIVENESS

Spaying and neutering will have a negligible impact on the amount of waste to be disposed because most dead animals are recycled (through rendering) rather than disposed.

HAZARDS

There are no significant hazards involved in this source reduction activity.

CONSEQUENCES ON THE WASTE STREAM
There are no significant consequences of spaying and neutering on the generation of other types of waste.

FEASIBILITY
The EPI activities that encourage spaying and neutering as part of a waste reduction program could be implemented in the short term or in the medium term.

FACILITY REQUIREMENTS
No new facilities are needed.

CONSISTENCY WITH LOCAL PLANS AND POLICIES
The proposed activity is consistent with existing local policies.

INSTITUTIONAL BARRIERS
No institutions that oppose the sterilization of pets have been found in the unincorporated county.

COSTS
The cost of including a discussion of the spaying and neutering of pets in other EPI activities is minimal. If successful, the activity could result in a decrease in the cost of recycling (storing, transporting, and rendering) dead animals.

END USES
This criterion is not applicable.

INVOLVEMENT OF WASTE GENERATORS
The EPI activity would heavily involve waste generators.

E.4. DRILLING MUD

Very little is known of the potentially feasible technology for processing and using drilling mud. Since drilling mud composes about 70% of the waste in the unincorporated county, any feasible recycling strategy would probably be very effective in diverting material from disposal. The other criteria are not relevant to the evaluation of a proposed study. The study should include a discussion of the criteria.

F. SELECTED PROGRAMS

F.1. ASBESTOS

Current asbestos abatement activities will continue unchanged. No diversion is planned.

F.2. TIRES

Existing programs aimed at reducing the use of motor vehicles will be promoted to prolong the life of tires. This activity may be carried out as part of the county-wide education and public information program.

The use of used tires on Solano County's vehicles will be evaluated and the results will be made available to the public and to private businesses. The County will conduct this activity in conjunction with the vehicle purchasing and maintenance program designed to reduce auto shredder residue.

Haulers and collectors of used tires will be contacted and informed of tire incineration and tire recycling options. One option is the manufacture of rubber straps. In addition, haulers and collectors will be discouraged from disposing tires at landfills, and fees at the landfill can be adjusted to promote this goal. Tires that cannot be diverted will be shredded prior to disposal. The anticipated diversion of tires amounts to about 18 tons per year through recycling activities described in Chapter III of this SRRE (see Table III-1). This amounts to about 0.1% of the unincorporated county's waste.

F.3. DEAD ANIMALS

Educational literature, curricula, and advertisements will include a discussion of the importance of spaying and neutering pets. Diversion from selected programs will amount to 1.3 tons per year (less than 0.01% of the waste stream).

F.4. DRILLING MUD

Solano County, a drilling permittee, or a private contractor may perform a review and evaluation of options for the reuse and recycling of drilling mud. The results would be used in the evaluation of applications for drilling mud disposal permits and/or in the evaluation of drilling permits.

G. PROGRAM IMPLEMENTATION

Programs and activities selected for implementation are discussed in this section. Most activities involve education and the dissemination of information and monitoring of current and planned activities. Some evaluation of Solano County's procurement practices is planned as well. Table V-3 summarizes the cost of the planned activities, while Table V-4 delineates the implementation schedule.

G.1. ASBESTOS

No new activities are needed for the diversion or disposal of asbestos.

G.2. TIRES

The EPI activities will add marginally to the cost of the activities discussed in Chapter VIII of this report. The evaluation of the use of used tires on the County's vehicles will require two to three months of an analysts time. The ongoing monitoring will be a minor part of the solid waste staff's duties.

G.3. DEAD ANIMALS

The discussion of dead animals in EPI materials will be done at the county-wide level. It will add only marginally to the cost of EPI activities.

G.4. DRILLING MUD

The Solano County Department of Environmental Management will be responsible for evaluating diversion options. The study may be performed by that department, consultants, or businesses involved in generating or disposing drilling mud in the count. The cost of the evaluation would probably be on the order of $50,000. It will be performed in 1992 or 1993. Solano County has staff devoted to the permitting of drilling operations and to the permitting of a disposal site. Supervising the study would require about 0.1 FTE's for one year. If the study were done in-house, it may require on the order of 0.5 FTE.

H. PROGRAM MONITORING AND EVALUATION

Targeted solid waste characterization studies will be used to monitor programs. County of Solano staff will do the monitoring. If shortfalls occur, efforts to implement the programs will be increased or the programs will be reevaluated or, perhaps, abandoned.

H.1. ASBESTOS

The quantity and fate of asbestos generated within the jurisdiction is recorded by the California Department of Health Services. Those records will be collected on an on-going basis by Solano County to assist in the preparation of annual reports and to help identify any asbestos generation trends that may result in disposal problems. Solano County will remain alert to the remaining permitted disposal capacity in the county to ensure that asbestos generated in the unincorporated county can be disposed properly.

H.2. TIRES

If used tires are used on the County's vehicles, their performance can be monitored through interviews with the motor pool personnel. Their costs and useful life will be recorded so that their true benefits and costs can be quantified.

The Solano County solid waste staff will do the following on a continuing basis.

- Monitor programs and regulations developed pursuant to AB 1843.
- Monitor trends in the use of tires as fuel.
- Monitor progress on the manufacture and use of rubberized asphalt and the permitting of it for use on roads.

H.3. DEAD ANIMALS

The number of unwanted animals that are killed at the Solano County animal shelter will be monitored to discern the effects of the EPI activities aimed at the promotion of the spaying and neutering of pets.

H.4. DRILLING MUD

The County will require generators, haulers, and disposal site operators to report the quantity of drilling mud they generate or handle on an annual basis. The origin and fate of the drilling mud will be reported.

TABLE V-1: QUANTITY OF SPECIAL WASTES

Waste Type	Counted(a) (tpy)	Not Counted (tpy)
Ash	0 (b)	
Sewage Sludge		0 (c)
Domestic Water Treatment Sludge		0 (c)
Asbestos	19	
Auto-Shredder Waste		416 (d)
Auto Bodies		1,415 (e)
Tires	253	
Dead Animals	1.3 (f)	
Drilling Mud		30,000 (g)

(a) "Counted" waste is included in the determination of "generated" waste in this document.

(b) Ash was not detected in the quantitative field analysis that was used to estimate the composition of the Unincorporated County's residential refuse.

(c) Sludge is not counted as a generated solid waste in accordance with Section 41781 (b)(5) of the California Public Resources Code which is inoperative as of October 1, 1991.

(d) Auto shredder residue is not disposed in Solano County.

(e) Auto bodies are not counted as generated solid waste because they are normally not disposed in landfills.

(f) The quantity of dead animals disposed in landfills was counted as recycled. About 14,300 dead animals (21 tons) per year are handled by the Solano County Animal Shelter.

(g) Based on 1986 data and the number of wells drilled in the past few years. Drilling mud amounts to about 70% of the unincorporated couny's solid waste. It is not counted as a "generated waste" because to do so would distort the significance of diversion programs aimed at other solid waste.

TABLE V-2: RATINGS OF SPECIAL WASTE PROGRAMS

	Drilling Mud	Asbestos(a)	Auto Shredder Residue			Tires				Dead Animals	
Criteria			EPI	Procurement	Disposal Fee	Procurement	Market Development EPI	EPI	Recycling and Transformation EPI	Recycling	Source Reduction
1. Effectiveness in waste diversion	High		Low	Low	Low	Low	Low	Low	Low	Low	Low
2. Hazards	NA		High	Medium	Low	Medium	Medium	High	Medium	High	High
3. Flexibility	NA		High	Medium	High	High	High	High	Medium	High	High
4. Consequences on the waste stream	NA		High	High	Low	High	High	High	Medium	High	High
5. Feasibility	NA		High	High	High	High	High	High	Low-Med	High	High
6. Consistency with local plans	NA		High	Medium	Low	Low	High	High	High	High	High
7. Facility requirements	NA		High	High	High	High	High	High	Low-High	High	High
8. Institutional barriers	NA		High	Medium	Low	Medium	Medium	High	Medium	High	High
10. Costs	NA		High	High	Medium	High	High	High	Low	Low	High
11. End uses or markets	NA		High	High	High	High	High	High	High	High	High
12. Involvement of waste generators	High		High	Medium	Medium	Medium	Medium	High	Medium	Low	Low
Conclusion	Rejected	Continue Disposal	Rejected	Rejected	Rejected	Rejected	Rejected	Selected	Selected	Selected	Selected

(a) There are no alternatives to the current practice of disposing asbestos in landfills.

TABLE V-3: SPECIAL WASTE PROGRAM COSTS
(in 1991 dollars)

Activity	Start-up Year	Start-up Costs	Staff(a) EPI	Staff(a) Other	Annualized Start-up Costs(b)	Other Annual Costs(c)	Total Annual Costs(d)
Asbestos	1992	0	0	0.02	0	992	1,240
Tires	1992	0	0.01	0.02	0	1,488	1,861
Dead Animals	1993	0	0.01	0.01	0	992	1,240
Drilling Mud	1992	0	0.00	0.10	0	4,962	6,202

Notes: (a) Staffing requirements are expressed as full-time equivalents (FTEs).

(b) Facility costs are amortized over 20 years at 12% and equipment costs are amortized over 5 years at 10%.

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

(c) Other annual costs include staff costs at $49,616 per FTE and other operating costs.

(d) Total annual cost includes 25% mark-up for contingencies.

TABLE V-4: IMPLEMENTATION SCHEDULE FOR SPECIAL WASTE PROGRAMS

Program/Task	Supervising Agent/ Implementing Agent	Time Frame
Asbestos	DEM	1992-
Monitor Current Practices	DEM & LEA	1992-
Tires	DEM	1992-
Develop Input for EPI Literature, Curricula, and Advertisements	DEM	Jan, 1992
Develop Literature		
Dead Animals	DEM	1993-
Develop EPI Materials and Spaying and Neutering	DEM	Jan, 1993
Monitor Recycling and Spaying and Neutering Programs	DEM and County Animal Shelter	June, 1993
Drilling Mud	DEM	1992-
Evaluate Diversion Alternative	DEM, LEA, Consultant, Drillers	Jan, 1992
Implement Diversion Alternative	DEM, LEA, Drillers, Operator	to be determined
Monitor Disposal and Diversion	DEM	1992-

Abbreviations: DEM = Department of Environmental Management
LEA = Local Enforcement Agency

Note: The time frames listed are the earliest possible beginning dates. Programs may begin later, depending upon which jurisdiction the unincorporated county cooperates with for that program.

TABLE V-5: SOURCES OF PROGRAM FUNDING

	User Fee	Franchise Fee	Landfill Surcharge	Sales Tax	Waste Importation Fee
SPECIAL WASTE					
Sludge			X		
Asbestos			X		
Tires			X		
Dead Animals			X		
Drilling Mud			X		

CHAPTER VI SUMMARY
EDUCATION AND PUBLIC INFORMATION

Most programs selected for implementation include an education and public information activity. Residents and businesses will need to be informed of curbside collection practices, rate increases, back yard composting practices, new ordinances, the availability of compost and mulch, and the importance of their participation in all programs. Businesses and institutions will be provided with instructions on how to reduce or recycle their wastes.

Educational media will include a telephone hotline, printed brochures, video tapes, a resource conservation directory, and personal contact through compost demonstration, neighborhood block leaders, information booths at public events, and school curricula. The unincorporated county will also utilize news media to publicize events and programs and to promote an awareness of solid waste issues.

CHAPTER VI
EDUCATION AND PUBLIC INFORMATION COMPONENT

INTRODUCTION

An active and imaginative education and public information program is necessary throughout implementation of the Source Reduction and Recycling Element to increase public support and participation. Education and public information should stress the three R's: reduce, reuse, and recycle. New programs should utilize and build upon already existing community networks. They should persuasively explain the economic and environmental benefits of source reduction, composting, and recycling. For long-term effectiveness, public education campaigns should introduce timely, specific themes, carry a well-designed graphic image and a consistent, memorable slogan, and use a variety of channels to reach the public.

Citizens not only need to be convinced of the importance of source reduction, composting, and recycling, they need to know what is expected of them in practical terms and what these programs will cost. Residents and businesses need to know where and when they should take their recyclables and household hazardous waste materials, how to separate different materials, and how to purchase wisely to avoid unnecessary waste.

Finally, education will lead buyers to purchase durable, recyclable, and reusable items. Education programs point out the savings and environmental benefits of avoiding single-use, throwaway products. To achieve the goals of maximum source reduction, composting, and recycling and to extend the life of the landfill, source reduction, composting, and recycling values and activities must become fully integrated into all aspects of community life.

A. GOALS AND OBJECTIVES

The goals of the education and public information component are to achieve a high level of public understanding of the importance of source reduction, recycling, composting, and special and household hazardous wastes management activities and to achieve maximum public adoption of these habits. The following waste generators and populations are targeted for education and public information objectives by this plan:

- Residential
- Youth
- Commercial and Industrial

- Government

A.1. RESIDENTIAL

The short-term objectives of the unincorporated county education and public information program for residents are:

- By January 1994, 50% of the unincorporated county households will be aware of the County AB 939 Source Reduction, Recycling, Composting, Special and Household Hazardous Wastes programs and at least one specific activity related to these programs.
- By January 1995, 50% of the unincorporated county households will regularly participate in one or more of the County Source Reduction, Recycling, Composting, Special and Household Hazardous Wastes program activities.

The medium-term objectives of the unincorporated county education and public information program for residents are:

- By January 1998, 75% of the unincorporated county households, including new residents, will be aware of the County AB 939 Source Reduction, Recycling, Composting, Special and Household Hazardous Wastes programs and at least one specific activity related to these programs.
- By January 2000, 75% of the unincorporated county households, including new residents, will regularly participate in one or more of the County Source Reduction, Recycling, Composting, Special and Household Hazardous Wastes program activities.

A.2. YOUTH

The short-term objectives of the unincorporated county education and public information program for youths are:

- By September 1993, all the Solano County public schools will be provided with source reduction, recycling, composting, and special and household hazardous wastes curricula materials for classroom instruction.
- By September 1993, the Solano County Office of Education will be provided information for implementing source reduction, recycling, composting, and special and household hazardous wastes management systems in the schools.

- By September 1994, 50% of Solano County public schools will integrate source reduction, recycling, composting, and special and household hazardous wastes curriculum materials into classroom instruction.
- By September 1994, 50% of the Solano County public schools will have implemented source reduction, recycling, composting, and special and household hazardous wastes management systems.

The medium-term objectives of the unincorporated county education and public information program for youths are:

- By September 2000, all the Solano County public and private schools will integrate source reduction, recycling, composting, and special and household hazardous wastes curriculum materials into classroom instruction.
- By September 2000, all the Solano County public schools will have implemented source reduction, recycling, composting, and special and household hazardous waste management systems.

A.3. COMMERCIAL AND INDUSTRIAL

The short-term objectives of the unincorporated county education and public information program for commercial businesses and industries are:

- By January 1993, 50% of the unincorporated county businesses and industries will be provided with information for implementing source reduction, recycling, composting, and special and household hazardous wastes management systems as a regular part of their purchasing and waste-handling practices.
- By January 1995, 50% of the unincorporated county businesses and industries will have implemented source reduction, recycling, composting, and special and household hazardous wastes management systems as a regular part of their purchasing and waste-handling practices.

The medium-term objectives of the unincorporated county education and public information program for commercial businesses and industries are:

- By January 1997, all the unincorporated county businesses and industries will be provided with information for implementing source reduction, recycling, composting, and special and household hazardous wastes management as a regular part of their purchasing and waste-handling practices.

- By January 2000, all the unincorporated county businesses and industries will have implemented source reduction, recycling and composting, and special and household hazardous wastes management as a regular part of their purchasing and waste-handling practices.

A.4. GOVERNMENT

The short-term objectives of the education and public information program for government agencies within the unincorporated county are:

- By January 1993, 50% of the government agencies and departments within the County's jurisdiction will be provided with information for implementing source reduction, recycling, composting, and special and household hazardous wastes management as a regular part of their purchasing and waste-handling practices.
- By January 1995, 50% of the government agencies and departments within the County's jurisdiction will have implemented source reduction, recycling, composting, and special and household hazardous wastes management as a regular part of their purchasing and waste-handling practices.

The medium-term objectives of the education and public information program for government agencies within the unincorporated county are:

- By January 1998, all of the government agencies and departments within the County's jurisdiction will be provided with information for implementing source reduction, recycling, composting, and special and household hazardous wastes management as a regular part of their purchasing and waste-handling practices.
- By January, 2000, all of the government agencies and departments within the County's jurisdiction will have implemented source reduction, recycling, composting, and special and household hazardous wastes management as a regular part of their purchasing and waste-handling practices.

B. EXISTING PROGRAM DESCRIPTION

B.1. RESIDENTIAL

KUIC "QUICK 95" RADIO

KUIC's radio broadcasts are heard throughout Solano County, including the cities of Benicia, Dixon, Fairfield, Suisun, Rio Vista, Vallejo, and Vacaville. KUIC's news stories have focused on AB 939, recycling in general, and informing people of upcoming solid waste events and services in their communities.

THE DAILY REPUBLIC

The Daily Republic, which covers portions of the unincorporated Solano County, has worked with local Earth Day writers in publishing a regular environmental column with local "How, Why and Where" environmental tips. News related to environmental issues is regularly reported.

VALLEJO-TIMES HERALD

The Vallejo Times Herald has done some recycling stories in the past and has run a list of recyclers. Reporters cover and report on source reduction and recycling activities as they come up.

RIVER NEWS-HERALD

The *River News-Herald*, which serves Rio Vista and some of the unincorporated areas, has occasional articles on recycling.

BENICIA HERALD

The *Benicia Herald* has reported on the twice monthly household hazardous waste drop-off in Benicia, AB 939, the Solano County's Hazardous Waste Management Plan, and the financial plight of recycling centers. Environmental issues are regularly reported.

DIXON TRIBUNE

The Dixon Tribune serves Dixon and some of the unincorporated areas of Solano County. Articles have been published on the appropriateness of a mobile recycling program for the growing bedroom community. Other articles have been done on AB 939 and the landfill and the Tribune works regularly with the City Public Works Department on education issues. As deadlines approach, future stories will focus on the fact that AB 939 is "the law" and work to help people understand how to recycle and reach the AB 939 goals. The Tribune advertised the video the City of Dixon showed on Sonic Cable.

RIO VISTA SANITATION

Rio Vista Sanitation has no solid waste education or public information at this time.

VALLEJO GARBAGE SERVICE

Vallejo Garbage Service operates a multi-material buyback/drop-off center. Available at the buy-back center are a variety of hand-outs on various waste handling and reduction topics including, recycling, household hazardous waste management, composting and sources for recycled paper products. On occasion, they conduct tours of their operation for school classes.

VACAVILLE-DIXON SANITARY SERVICE

Vacaville Sanitary Service operates four multi-material buyback/drop-off centers and one mobile buyback truck in Vacaville and Dixon. Their public education consists of: 1) a general recycling brochure and two household hazardous waste brochures that are distributed at their reception counter and at presentations; 2) approximately 20 educational presentations per year to schools and clubs; 3) approximately four tours per year of their recycling yard and 4) approximately two garbage bill inserts per year with recycling messages. Their mobile buyback truck schedule is printed in the *Vacaville Reporter* and the *Dixon Tribune*.

ATLAS METAL AND IRON

Atlas Metal and Iron operates a multi-material buyback/donation center. Their education and promotion consists of being listed in the yellow pages, a small advertisement periodically placed in the local newspaper and, on occasion, flyer inserts in the local "Buyer's Guide," which is distributed to every home in Vacaville.

PLEASANT HILL BAYSHORE DISPOSAL, INC.

Pleasant Hill Bayshore Disposal's quarterly newsletter, *Dialogue*, has included recycling tips, a shopping guide, and articles on fluctuation in markets, such as the glass glut. This newsletter is distributed with billings.

PACIFIC RIM RECYCLING

Pacific Rim currently uses state entitlement monies for a program which benefits local charities by placing containers at churches, schools, and in retail parking lots. Pacific Rim sales staff make calls to schools and churches to set up recycling programs. The company plans to advertise the program and its locations. The two slogans to be used are "Recycle Beverage Containers for Kids" and "Don't throw it away-Recycle". The logo is described as a garbage can filled with beverage containers and money overflowing onto the ground.

Pacific Rim Recycling operates 400 newspaper drop-off sites in a number of San Francisco Bay Area counties. Their advertising program targets selected periodicals in those counties where they have drop-off sites. The company has 40 redemption centers and wants to place three to five mini-satellite recycling stations around redemption centers to feed each of the centers. The mini-satellite recycling stations take newspaper, glass, cans and plastic beverage containers.

SOLANO GARBAGE COMPANY

In the past, Solano Garbage has disseminated solid waste information and instruction to all segments of the population. The company plans to start-up a recycling hotline March 1, 1991 and is also planning to work towards cooperative education programs with other industry leaders such as Anheuser-Busch and Bank of America.

Solano Garbage Company routinely conducts presentations for community groups. It provides general information about waste services, AB 939, curbside programs and the Potrero Hills landfill. The company has kicked-off recycling programs in the past with education and public information.

Solano Garbage's education and public information program takes an approach that is customized and implemented through the mail, in person, or over the telephone. The company's customer base is divided into four sectors: 1) commercial businesses (restaurants, warehouses and offices); 2) institutions (schools, hospitals, prisons); 3) government; and 4) residents (single and multi-family). They provide recycling service for each sector. Solano Garbage Company also has a drop-off program for used motor oil.

GREATER VALLEJO RECREATION DISTRICT

The Greater Vallejo Recreation District, which covers a portion of the unincorporated area of Solano County, has no formal recycling program for the park and recreation areas under its stewardship. However, Park Rangers strongly encourage park users to recycle.

B.2. YOUTH

BENICIA UNIFIED SCHOOL DISTRICT

Schools in the Benicia Unified School District do some recycling education, but there is no set curriculum. Benicia Unified School District also has a successful recycling collection program that has been recognized by the City Council for Public Solid Waste Reduction. The district has already met 25% diversion goals and is working towards 29%.

RIVER DELTA UNIFIED SCHOOL DISTRICT

The River Delta Unified School District has nothing organized district-wide for recycling education and recycling activities at this time. The school district lies in three different counties (Solano, Sacramento, and Yolo) which makes it difficult to organize collection events. Individual schools have programs as follows:

White School, Rio Vista

Two kindergarten teachers at White School collect aluminum cans to pay for class field trips. The school custodian has contacted various recycling collectors to try to get something started at the school, but has been unsuccessful so far.

Riverview Elementary School, Rio Vista
Aluminum cans are recycled at the school, and the proceeds go into the Student Education Fund. Some classrooms recycle white paper on an individual basis.

There are currently two videos circulating through the classrooms which have waste and recycling components. One is entitled, "Save the Earth" and the other, "I Need the Earth." These videos feature celebrities acting as role models, and encourage kids to recycle.

Rio Vista High School
The school has three soda machines with recycling bins for aluminum cans located nearby. The school rewards the students by having an hour lunch for every 100 pounds of aluminum recycled. A thermometer on the wall rises as the number of cans collected grows. The Student Council meets, verifies the amount collected, and sets the lunch date. It includes a large screen T.V. and stereo system, music videos and free sodas.

Consumer education classes at the school include an "On Your Own" segment which teaches students how to live independently, including recycling at home. Biology classes feature a unit on Ecology which deals with the effect waste has on the environment, and encourages recycling practices.

FHA-HERO
FHA-HERO is a vocational youth organization run out of Rio Vista High School. The acronym stands for Future Homemakers of America-Home Economics Related Occupations. Their state project this year is on the environment, and there is an exhibit on display at the school that includes recycling information.

The FHA club instructor is researching getting recycling bins placed on the edge of the campus for the entire community to use. Proceeds go into the FHA program. There are currently no containers on campus.

VACAVILLE UNIFIED SCHOOL DISTRICT

The Vacaville Unified School District has adopted an environmental education policy that acknowledges that the school district is responsible for educating its students about the environment so as to prepare them to become responsible stewards. In response to this policy, they are in the process of revising their K-12 science and social studies curriculum to address environmental issues. The modified curriculum will be introduced in the 1992-1993 school year. Currently, there are individual teachers in some of the schools that have set up recycling systems in their classroom and have integrated these concepts into their lesson plans.

The school district is currently recycling used motor oil, aluminum, copper and lead scrap in their maintenance operation. The individual schools have varying degrees of in-house recycling programs. Each elementary school has a recycling program for at least newspaper and high grade paper which is serviced by Vacaville Sanitary Service.

VALLEJO UNIFIED SCHOOL DISTRICT

Vallejo City Unified School District has no formal environmental or recycling curriculum. Individual teachers in the various schools are incorporating key concepts into their lesson plans. Most of the schools have white paper recycle systems that are serviced by Vallejo Garbage Service.

DIXON UNIFIED SCHOOL DISTRICT

The County Board of Education reports that there is no set curriculum in the Dixon schools, but there have been periodic presentations in classrooms from local solid waste agencies. Within the Science and Social Studies Framework, some teachers have developed their own lesson plans and many have incorporated recycling. The Quest Programs in the middle schools also incorporate recycling issues.

Dixon High School

Dixon High School recycles newspaper and office/writing paper, with each classroom having its own collection box.

Anderson Elementary School

The principal of Anderson Elementary School has been contacted by a representative from the City of Dixon's Local Recycling Task Force to explore ways the city and the school can cooperate on waste management and education. The school has formed a Recycling Committee composed of teachers. The principal states that ecology issues have been displaced in the curriculum in recent years by drug, alcohol and tobacco use issues. Teachers are interested in environmental education, but much of the recycling taught in the early seventies has been squeezed out by other priorities. Nevertheless, the principal indicates that the school and teachers are interested in working with the city on recycling issues.

One of Anderson Elementary School's teachers is very interested in developing systems to help model and reinforce the reduce, reuse, recycle ethic at school. Currently she collects aluminum cans and recycles them for funds for her class. Anderson Elementary used to collect newsprint, but it discontinued the activity. The school also collected paper products in the past but found there was no market for them. If the city takes the initiative, the school will participate in programs.

With a large Hispanic population, both migrant and residential, the school has bilingual teachers and bilingual classes for 3rd, 4th and 5th grades. Targeting the migrant and Spanish-speaking children and their families is critical.

Silveyville Primary School
The second grade class collects cans, bottles and plastic beverage containers. CIWMB staff have given presentations to the students.

C.A. Jacobs Intermediate School
This school has no recycling programs at this time.

TRAVIS UNIFIED SCHOOL DISTRICT
The Travis Unified School District is currently revising its science and social studies curriculum to address environmental issues. Solid waste issues will be included. The school district plans to introduce the new curriculum in the 1992-1993 school year.

FAIRFIELD-SUISUN UNIFIED SCHOOL DISTRICT
ARMIJO HIGH SCHOOL
A white paper recycling program in the Fairfield-Suisun Unified School District started at Armijo High School and has expanded throughout the district. There is now white paper recycling at the school district office and in some of the schools. Armijo High School is exploring purchasing recycled paper and replacing styrofoam with aluminum. Although they would like to recycle aluminum food trays, there is difficulty in getting them clean and finding a markets for them. Staff states that the important thing is to keep the recycling vision alive, because the awareness is growing.

Earth Day 1990 activities included:

- K-12 Lesson Plan Distribution - Two-day lesson plans were developed for grades K-3, 4-6, 7-12 science and 7-12 social science, along with home survey lessons that students completed with their families at home. These lessons were endorsed by the California State Department of Education as well as the major national educational organizations. They were approved by the FSUSD and the VUSD administrations and were distributed to all school principals in both districts.
- Woodsy Owl School Visitations - Local schools had an opportunity to schedule environmental education visits by Woodsy. "Give a Hoot, Don't Pollute."
- Tree Planting Outreach - The Armijo High School Peace Club provided tree seedlings to citizens for $1.00 donations and approximately 500 trees were distributed. The Club provided an exhibit at the Solano Mall, hosted by