



Establishing a Waste Reduction Program At Work

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Introduction

NEED AND PURPOSE FOR THIS TRAINING PROGRAM

In the State of California, local governments are responsible for diverting from disposal 50% of the waste generated by the year 2,000. In order for California's state and local governments to achieve waste reduction mandates, they must rely on the full commitment and involvement of business and industry to Reduce, Reuse, Recycle and Buy-Recycled.

With modest budgets, limited technical expertise, and often limited staff time, businesses and governmental agencies throughout California are conscientiously trying to update their workplace operations to conserve resources and reduce costs.

To keep up with the growing constant innovation in systems for reducing waste and reusing and recycling materials, waste reduction coordinators must learn a new specialization in integrated waste management. Time away from the daily requirements of the job for professional development and training is especially important in a field that is as rapidly changing as integrated waste management.

The California Integrated Waste Management Board offers this training program to assist waste reduction coordinators to plan, implement, evaluate and maintain waste reduction programs by increasing their knowledge of waste reduction issues and by providing specific operational information.

Benefits of Waste Reduction

Many participants in this training program may already be assisting organizations and businesses with the planning and implementation of waste reduction programs. This may not be new information. But there will be times when you will have to relay information to people in businesses who, in turn, will have to relay the information to others in their organizations including the benefits and reasons for undertaking these activities. This may include a wide variety of people in businesses. It can include management, administrative staff, custodial staff, and purchasing staff, among others. The responsibilities for these types of activities fall in many different places depending on the type of business.

The term WASTE REDUCTION, as used in this training is referring to the COMBINED EFFORTS OF WASTE PREVENTION, REUSE, RECYCLING, AND COMPOSTING PRACTICES. Waste Reduction is an overall comprehensive approach that includes all of those activities.

Many organizations have been content to establish and maintain a trash removal system. However, times have changed and so has waste management. In many areas of the country companies are seeing a dramatic increase in the complexity and costs of managing their waste. At the same time public concern over the effects of all this waste has grown significantly.

In California, over 45 million tons of garbage are produced each year, nearly 60 percent originates from the commercial and industrial sectors. As California's population grows, so does the strain on our waste infrastructure. It has become imperative for us to be less wasteful so that we may conserve precious natural resources, landfill space, and the quality of life we seek for ourselves and our children. Your city or county is required to reduce by 50 percent the amount of waste sent to landfills by the year 2000. They are developing strategies to reduce, reuse, and recycle solid waste, and they need your help to make it happen.

Why should businesses care to get involved? Simply put, reducing your waste lowers your operating and disposal expenses, and it saves resources.

Business Benefits:

A. Produces more efficient operations and reduces costs - the more traditional use of the word "waste" means inefficient use of resources. A waste audit is an opportunity for an overall review of operations for efficiency. Your business will purchase, use and throw away less due to more efficient materials management. Waste reduction can help reduce expenditures on raw materials, office supplies, equipment, and other purchases. Other potential economic advantages include lower solid waste service costs and potential revenue for high-value recyclable materials.

B. Enhances public image - saving energy and natural resources by reducing and recycling waste demonstrates strong business sense in an environmentally-conscious society. These efforts can increase customer loyalty. There are opportunities to network with other businesses and consumers about waste reduction efforts through the CIWMB's Waste Reduction Awards Program (WRAP) and the EPA's "WasteWise" program.

C. Increasing employee morale - incorporating environmentally sound practices into your business operations enables employees to participate in your money- and resource-saving program.

Environmental Benefits:

Waste reduction can help protect the environment, too. Waste reduction slows the depletion of natural resources, helps reduce pollution associated with the extraction of raw materials and the manufacture of products, and conserves valuable landfill space.

When recycled, your business' "waste" materials become feedstock materials for the manufacture of new products.

Case Study:

The California Integrated Waste Management Board, the sponsoring agency for this training, has undertaken a comprehensive waste prevention initiative in their office headquarters. There are approximately 380 employees in a leased facility approximately 10 miles from downtown Sacramento. The CIWMB formed an in-house committee to develop and implement a waste prevention program to reduce waste at the CIWMB and serve as a model for other public and private sector office settings. Highlights from the first nine months of the program include: (the full report is available from the CIWMB)

- White office paper was reduced 25 percent by:
 - discouraging avoidable or excess copying and printing,
 - encouraging communications via electronic mail,
 - encouraging two-sided copying and printing,
 - making two-sided printing an automatic computer feature,
 - reducing the size of documents,
 - streamlining document review processes,
 - turning one-sided paper into scratch pads, and
 - reducing mailing lists.
- Their efforts are estimated to produce annual savings of:
 - 364 cases (3640 reams or 1.8 million sheets) of white paper,
 - \$16,724 in reduced postage costs,
 - \$68,370 in photocopying costs,
 - \$5,500 in reduced printing costs, and
 - \$10,151 in reduced purchasing costs
- Food waste has been reduced by using 15 worm composting boxes at the CIWMB's office and cafeteria.

Target Store, a national retailer and charter member of EPA's WasteWise Program, has taken the following environmental initiatives since 1993.

Case Study: TARGET STORES

Since 1993, Target has taken the following environmental initiatives:

- **Processing all domestic purchase orders electronically; saving 40 tons of paper annually.**
- **Using 40% post-consumer recycled content in paper bags, and 24% in plastic bags.**
- **Reusing plastic security holders for compact discs and tapes.**
- **Using and requiring vendors to use specified pallets, eliminating purchase of 20,000 to 30,000 new pallets.**
- **Using reusable corrugated boxes for internal distribution.**
- **Using bulk, concentrated cleaning supplies, reducing product and packaging waste.**

Boston Park Plaza Hotel is another excellent example. Not only did the hotel save money, but hotel executives estimate having generated more than \$750,000 in new business due to clients's desires to support this environmentally conscious establishment.

Many of these efforts were employee initiatives, as we will discuss later, there is both top-down and bottom-up involvement.

Case Study: BOSTON PARK PLAZA HOTEL

These are some examples of the over 90 initiatives in source reduction, recycling, reuse, and water & energy conservation:

- **The installation of shampoo & liquid soap pump dispensers in each guest room resulted in the elimination of 2 million miniature plastic bottles per year.**
- **The hotel banned the use of disposable napkins, utensils, and cups.**
- **A survey of hotel guests revealed that 81% never use a shower cap, 89% never use a shoeshine kit - now they are available only by request.**
- **Through working with suppliers they now have food delivered in reusable containers and cleaning fluids in 15 gallon drums.**
- **Stained linen tablecloths are made into aprons or donated.**

Also, buy recycled products, from hotel stationery to carpeting made of recycled plastic soda bottles, are purchased.

\$750,000 IN NEW BUSINESS

IWM Hierarchy and Key Terms

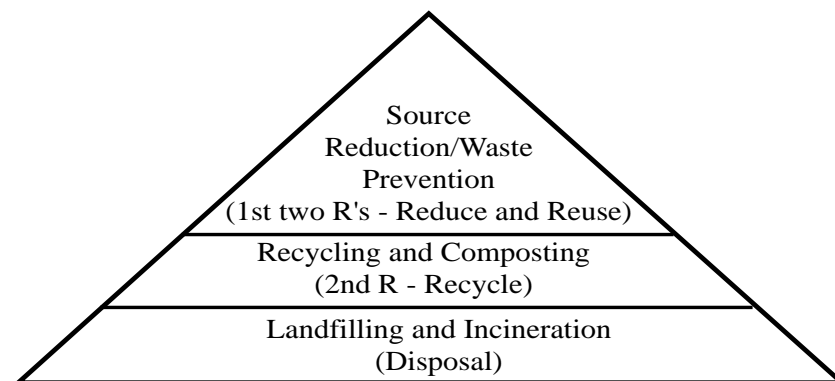
Principles of the Integrated Waste Management Hierarchy

The original Earth Day-era mantra of “Reduce-Reuse-Recycle” as a guiding principle for personal and societal resource conservation has evolved into the “Hierarchy of integrated waste management practices.”

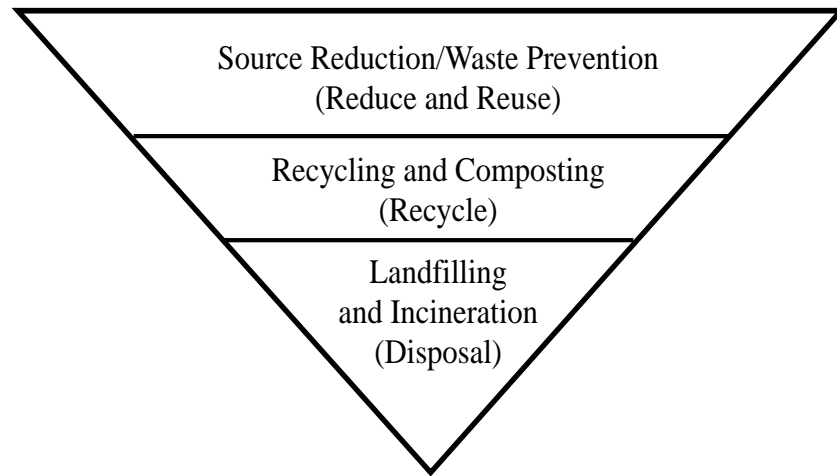
A waste reduction system based on this hierarchy will first make every effort to reduce the generation of wastes, through changes in the way materials are extracted, transformed into goods, marketed, purchased, used, and discarded. Materials that are generated as wastes or by-products of these activities, and that cannot be reused, will be recycled or composted. Only the unrecyclable and uncompostable residues will be incinerated or buried in a landfill.

The hierarchy can be conceptualized as a pyramid with three levels: source reduction is on top, recycling and composting in the middle; and incineration and landfill on the bottom. Notice, however, that the top level, source reduction, is the smallest: this reflects the unfortunate fact that, while source reduction and recycling are the preferred methods of dealing with materials, we still actually treat the majority of materials through the methods of last resort: landfilling and incineration. The goal, then, is to achieve a transition not only in what is preferred, but in how materials are actually treated. Conceptually, to invert the pyramid, keeping source reduction on top, but now with the point of the pyramid down, signifying that the majority of materials are handled in the preferred manner.

Current Status of Integrated Waste Management:



Desired Goal for Integrated Waste Management:



It is likely that in your organization, the most readily achievable goal, albeit a second choice, is to increase recycling and composting. Recycling reduces our dependence on extracted natural resources, both renewable and non-renewable. It conserves energy, materials, and reduces pollution, when compared to production of products using virgin raw materials. Recycling can quickly divert large volumes of materials and reduce disposal costs. It's a short-term, achievable goal, giving your program some quick success.

Recycling is, however, limited. Recycled materials must still be processed, transported, remanufactured, and re-sold, each step requiring some expenditure of energy, and some production of pollutants. Furthermore, recycling can be used to justify our continued high level of consumption and waste of materials, to the extent that it engenders the attitude that "it's okay to produce, buy, or discard this, as long as I can recycle it." Recycling is important, and it is the right thing to do, but it is not the first priority method of dealing with materials.

When recycling efforts are implemented in your business or organization, it is important to realize that recycling doesn't end with the collection of materials in bins at your desk or workplace. Collection is only the beginning. The reprocessing of these materials into new products and the purchase of these new products by consumers and businesses like yours are the essential last steps in closing the loop of recycling. When you buy goods with recycled content, your purchases help to create a demand for materials collected in recycling programs. Business purchases of recycled content products are extremely important to develop and maintain markets for the increasing quantity of materials that will be diverted from landfill disposal.

RECYCLING IS MUCH MORE THAN JUST COLLECTION!

THE SEVEN STEP RECYCLING LOOP

1. **POINT OF PURCHASE:** A consumer buys a product that is either used only once and/or has recyclable packaging.
2. **COLLECTION:** The consumer does something to make sure that these materials enter a recycling collection system: at a drop-off center, at the shopping center, at the curb, or at a community buy-back recycling center.
3. **PROCESSING:** Materials are processed prior to sale to an end-user.
4. **TRANSPORT:** Materials are transported to an end-use buyer - this may be a short trip by truck, further by rail, or even overseas to the Pacific Rim.
5. **MANUFACTURE:** The materials are made back into new products.
6. **DISTRIBUTION:** Recycled products re-enter an intricate distribution system to wholesalers, retailers, etc.
7. **PURCHASE:** A consumer purchases the new product and the cycle begins again.

Source: Gainer & Associates (1991)

For businesses, the concept of the hierarchy can be explained as “materials flow reduction.” A new way of looking at a businesses operation and how they undertake a waste reduction program. When making the decision to undertake a waste reduction program, you are actually developing a whole different way of looking at your workplace.

Since reduce, reuse, and recycle is the preferred priority order for materials treatment, it's important to think creatively and analytically first about what can be done to accomplish a reduction in materials needed; and then to consider next what can be done to reuse the materials that have been used once. The point is that too often we only consider recycling systems rather than reducing and reusing systems.

Think about materials that come in as raw materials, supplies, or packaging...as opposed to thinking about waste reduction as only trash going out. Your organization has in some way paid for all of the materials that are in your garbage dumpster. It's important to look at an organization's purchasing practices as well as their disposal practices to see if materials can be moved “upstream” in a business into the waste prevention and reuse categories instead of focusing on recycling as the first and only treatment of materials.

The Good, Better, Best Game!

Directions: To reorder the activities described below according to the Integrated Waste Management Hierarchy, draw a line from the item description on the left to the Good, Better, Best column on the right.

- | | | |
|----|---|------------------------|
| 1) | Use office paper that is already printed on one-side in the copier or printer for drafts or cut up for notepads Send messages via e-mail and store final copies on disk Recycle office paper after one use | Good Better Best |
| 2) | Build birdhouses from damaged wooden pallets Chip wooden pallets for use as mulch or in compost Use a durable plastic pallet | Good Better Best |
| 3) | Use a computer fax modem to send documents electronically Put thermal fax paper in the mixed paper bin Use a plain paper fax machine and print on both sides of paper | Good Better Best |
| 4) | Recycle polystyrene foam packaging “peanuts” Request minimal packaging from product suppliers or work with suppliers to use alternative packaging (air-filled bags) Save packaging peanuts to repack outgoing shipments | Good Better Best |
| 5) | Keep mailing lists that you are on current Have junk mail collected as mixed paper Write to the Direct Marketing Association and request that your business be eliminated from mailing lists | Good Better Best |
| 6) | Take old equipment to a salvage/scrap yard Donate unwanted equipment to nonprofit organizations Rent infrequently used equipment or invest in equipment that is durable and repairable | Good Better Best |

Source: Gainer & Associates Waste Prevention Public Education Model

Here are some of the more commonly used terms and their definitions:

Waste Prevention/Source Reduction - Many people in business readily understand the term waste prevention as any activity that reduces, avoids, or eliminates waste at its source. Source reduction focuses on preventing waste rather than managing it after generation, as with recycling. It is simply another term for waste prevention.

Waste prevention is becoming an integral part of the total quality approach to managing material resources. By controlling the quantities and type of waste you generate and dispose, you help offset the continued increases in the cost of doing business. Cost control is part of any successful business.

Example: Pacific Bell prints and mails 140 million invoices to customers annually. In 1994, they switched to printing two-sided bills, reducing their paper usage by 27%, or 1,010 tons of paper a year. The company saved \$11.5 million a year of its annual \$53 million postage costs through this waste prevention program.

There are a number of waste prevention ideas listed and described in the CIWMB's Guide for California Businesses in Appendix A. Some of these ideas include:

- Ordering supplies in bulk to reduce excess packaging
- Request that deliveries be shipped in returnable containers
- Make double-sided copies whenever possible
- Use voice or electronic mail
- Eliminate unnecessary forms
- Consider using cloth roll towels, hot air dryers, large paper rolls in rest rooms or buy smaller/lighter sized paper towels
- Buy company mugs; stop providing disposable cups

Reuse - The use of something more than once in its current form, (i.e., without breaking it down into a raw material).

Example: Lawrence Livermore National Laboratory has a large scale moving box reuse program which could be designed to fit within the limitations of any size business. They have 10,000 employees, and as of the writing of this document 25% of personnel was moving around to new space or filling in empty space. They developed a program in which the used moving boxes are sent via their internal transportation system to a central warehouse area (they are bundled with tape or string) and then other departments may obtain them for free. It cost them almost nothing to implement but saves the department in need from purchasing new boxes. Issues to consider include needing a place (out of the weather) to store the boxes and a way to get them there. Awareness and continual reminders have been important to the success of their program. They have an employee newsletter, electronic bulletin boards and a waste reduction hotline.

They also have a donation program which is responsible for donating \$5 million worth of computer equipment and supplies to schools in one fiscal year. The schools come out and collect the materials themselves. Besides computers, they donate books, binders, pencils, lab supplies, and safety glasses, among other things. In addition to the waste reduction benefits, this has also contributed to employee morale and good community public relations.

Additional ideas include:

- Donating items such as building supplies and food to charities and other nonprofit organizations. Some donations programs specialize in food donations.
- Set up an area for employees to exchange used items.
- Use reusable boxes and mail bags for shipping supplies to branch offices, stores, and warehouses.

Recycling - The process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste, and returning them to the economic mainstream in the form of raw material for new products.

We are all familiar with recycling efforts in businesses and at home but there are some innovative efforts being done by businesses with non-traditional materials.

Example: An example of a business recycling non-traditional materials is Herman Miller. This company which manufactures office furniture was generating 800,000 pounds of scrap fabric annually and disposing of it in a landfill. Now the material is shipped to North Carolina, shredded, and made into insulation for car-roof linings and dashboards - saving Miller \$50,000 in dumping fees.

Getting Started

GROUP ACTIVITY: WHO'S HELPFUL?

1. The person (job title) in your organization who you think will be the most positive and helpful in a waste reduction program.
2. The person who will be the least enthusiastic.
3. The most important person to make it a success.

All human endeavor, whether it's sending an astronaut to the moon, marketing a better mouse-trap, or starting a waste reduction program at work, depends upon **interactions between individuals**. It's the people within those roles that will make it happen.

Every part of the program, from obtaining management and employee support, organizing a team, and gathering information, to designing and implementing a waste reduction plan, will depend upon the individuals involved and the interactions among them. And clearly, we will need to involve people from every level and department in the organization to be successful.

For example, if the CEO of a company decides that waste reduction is an important company goal, but the employees involved in front-line operations are not interested or motivated, the waste reduction program will be limited to, at best, the specific detailed measures which are mandated from the top. There won't be the creativity and commitment necessary to generate new ideas, and the innovations that are introduced may not succeed.

If the program is initiated by enthusiastic front line employees but receives little support from management, it won't have the resources to reach its full potential. The enthusiasm of the dedicated few may keep it going, but it won't become internalized as a successful program.

If both the top management support and front-line enthusiasm are present but middle managers are not committed, the program may be frustrated by bureaucratic inertia.

As we discuss the elements of a successful program today, it will be helpful to visualize how you will apply them in your workplace, working with the unique individuals there. The best assets you have are the people on the "most positive" list: with their help, you can work around or maybe even recruit the ones on your "least positive" list!

Getting Started

It's worth putting some extra time and effort in at the beginning to get your waste reduction program off to a good start. Some of the specifics will vary with the size and style of your organization, but there are some basic steps to success.

GETTING STARTED

- **Secure organizational support and commitment. Seek top-down management support and bottom-up employee involvement.**
- **Organize a waste reduction task force.**
- **Identify a team leader, the waste reduction coordinator.**
- **Establish a policy statement.**
- **Communicate, involve, motivate.**

Bottom-up and Top-down Support

Any successful innovation in an organization requires support from both the “top-down” and the “bottom-up.” Nowhere is this more true than in waste reduction.

The ultimate goal in recruiting organizational support is to make waste reduction part of the “corporate culture.” This means not only that specific waste reduction procedures (such as double-side copying or recycling) are accepted as part of company operations, it also means that reducing waste is considered to be important and valuable. Employees feel confident bringing waste reduction ideas to managers, and managers know they have top-level support to devote company resources to waste reduction programs.

Encouraging Top Management to Support Waste Reduction Efforts: CIWMB Fact Sheet

Preparation is essential when seeking the support of top management. The formality of the presentation will depend on the size of the company, the corporate culture, and the individual style of the manager. The handout discusses the importance of reaching the important decision-makers and clearly presenting the case for waste reduction. It isn’t necessary to have all the answers, and it’s unwise to pretend that you know things you don’t. Remember to listen as well as speak, and to ask for ideas and guidance. Respond to concerns objectively. Top managers usually have a lot of savvy about running their businesses, and a comment which seems negative to your waste reduction ideas may actually be valuable insight into obstacles that must be overcome.

Try to relate the waste reduction program to other successful innovations within the company. For example, when discussing the formation of a waste reduction team, you might refer to an inter-departmental safety committee that has been responsible for reducing on the job accidents. Or, you might speak of the successful adoption of a new computer system as an example of the employees ability to accept changes that benefit the company. This strategy helps to position waste reduction as a positive part of internal operations, not an alien or irrelevant outside idea.

Have some specific action items in mind for which you’d like permission. Examples might include: to set up a committee, gather information, conduct a pilot project, draft a policy statement. Be prepared to be flexible and to accept ideas. Try to leave the meeting with a clear mandate to proceed on at least some elements of your waste reduction program.

Be sure to request staff time to work on the program. Show that you understand the value of this time. A commitment of staff time demonstrates real support.

Motivating Employees to Change Old Habits: CIWMB Fact Sheet

The most important item on the fact sheet is on the back: “Involve Employees.” The very best time to recruit interest and “buy-in” is during information-gathering. People love to be asked for their ideas and opinions. If you show genuine interest in their jobs and truly listen to what they say, even the most cynical and disinterested employees may become allies. This may be most true of people in front-line positions, near the “bottom” of the management hierarchy. These people often have the most useful information and ideas, and are least often asked for their input. Asked for information and ideas, these workers often become very enthusiastic and committed.

Recognize the contributions of individual or groups of employees wherever possible, both formally and informally. For example, make a point of saying “George in Receiving had a great idea for re-using polystyrene peanuts,” or “Polly, the Front Office receptionist, has been showing all the other clerical staff how to double-side copy.” This not only recognizes the individuals involved, but lends credibility to the program for other employees: these ideas are coming from within, not being imposed upon them.

The handout outlines ideas for selling the waste reduction message within the company. These techniques are especially valuable in a larger company. The tone of the message will depend partly on the company’s style. Often, “lower” level employees respond most enthusiastically to the environmental benefits of the program, while management is motivated more by cost savings. Don’t overdo this assumption, however. A more balanced approach showing that waste reduction is good for the environment and is good business may be most effective. The program must be perceived as an integral part of the company’s operations, not as a “public service” project which may be temporary.

New employees represent an important window of opportunity. They are impressionable and will accept the waste reduction program as part of the company’s operations, not a new innovation. They have the current manual on policies and procedures of the company, and in many companies, they are even tested on it. As they rise through the company they carry with them the understanding that waste reduction is company policy.

Waste Reduction Team

An in-house waste reduction team or task force is a group of employees who are responsible for planning, implementing, and maintaining the program. The team approach helps to coordinate different departments, provides a structure for communication, and spreads the work load among more people. It also avoids potential personality issues such as animosity toward individuals or between departments. Thus, the program is not, “Jill in Purchasing’s idea- she’s always making more work for me” or “those turkeys in the Computer Department who don’t know what it’s like down here on the shop floor.”

The size of the team will vary with the size of the organization, but should include the key functional areas to make the program a success. The team leader or waste reduction coordinator will serve as the primary point of contact with management and among team members. (S)he should have strong leadership and planning skills and be enthusiastic about waste reduction.

Initial tasks for the waste reduction team will include:

WASTE REDUCTION TEAM: INITIAL TASKS

- **Set initial goals and objectives.**
- **Assign tasks.**
- **Establish schedules.**
- **Establish method for reporting progress.**
- **Create communication plan for informing employees and management.**
- **Draft a policy statement.**

Go into the first meeting with ideas and come out with specific, short-term goals: for example, to recruit top management support or to start information gathering. Establish the basic structure for the team. Don't try to do too much in the very first meeting- keep the tasks clear and achievable.

Policy Statement

Formulating an institutional policy statement may help the task force to build a sense of shared vision. Its adoption by top management demonstrates support and commitment. The policy statement becomes an important communication tool throughout the organization.

It's a good idea to draft the policy statement early in the process of developing the waste reduction program. Otherwise, it may come to seem irrelevant once progress is underway. Depending on how it is to be used, the policy statement may be a dynamic document which can be changed as the program evolves, or it may be a formal statement which can become part of the company's mission statement, be printed in reports to shareholders, and displayed to customers.

Developing the policy statement can be a creative process which brings the team together in consensus, or it can be a ruinous time waster that leads the group astray in Quibble Land. Often it is wise for one or two people to draft the policy statement, to be polished and ratified by the group. Once top management has approved the policy statement, it should be circulated throughout the company and included in appropriate documents such as employee manuals.

Information Gathering

Knowledge is power. Often, the process of gathering information provides the impetus for change. This is because the individuals involved in the process develop a personal stake in the subject. The sense of discovery is powerful: people often find that by looking at the operation of their business in a new way, they see important things (including potential cost savings) which were right under their noses but were overlooked.

Information gathering is ongoing as the waste reduction program develops, but its essential role at the beginning can not be cut short. Good information is prerequisite to an effective program. It includes

- **quantitative** data regarding types and amounts of waste generated, associated costs, and amount and costs of purchasing materials.
- **qualitative** information regarding organizational dynamics and communications.

Quantitative information tells us how much of what stuff we're dealing with; qualitative information tells us how we're dealing with it, and maybe some idea why we do it that way. For example:

“Purchasing records show that we use six cases per year of copy paper in our main office (quantitative). A sort through the paper discarded in the office recycling bins shows that 85% of copies made are on just one side of the page (also quantitative). The office copier has a duplex copy function, but most employees don't know how to use it (qualitative). However, one top manager has issued a directive to her employees asking that memos be no longer than two pages and be printed front and back on one sheet (qualitative).”

Information gathering is not an end in itself. It is part of the larger process which leads to effective action to reduce waste. It is important to keep our ultimate goal in mind as we think about the information we want and the methods we plan to use to acquire the information. Put another way, **“The answers we get depend upon the questions we ask.”**

If the questions are too narrow and contain too many assumptions, the answers won't tell us much we don't already know. For example, if the only question we ask is, “what size container do we need to hold computer paper for recycling?” we're assuming that computer paper is the only material of importance, that recycling is the only reduction option, and that container size is the only important issue in a recycling collection program. We may be able to answer this question easily, but the answer won't give us what we need to look at all of our options and design a really effective program.

If the questions are too broad or unfocused, the answers won't include the specifics we need to make good decisions. For example, the question, “how can we get everybody in the company to use less of everything?” doesn't lead us to any useful answers.

So, keeping our ultimate goal in mind: reduce, reuse and recycle: how do we go about gathering the information we need? How do we ask questions which will yield useful answers?

A useful way to look at waste issues is to take a **systems approach**. The final discards that show up in the dumpster are one part of the picture, but there are many other parts.

The physical layout of the facility, the work routines of various staff people, the way waste services are priced by the disposal company: all these elements are part of the system.

One way to look at waste from a systems approach is to think in terms of **materials flow**. This means tracking materials from the point where they enter the facility right through to the point where they leave it. At some point along this flow, the material becomes waste. It wasn't waste when it entered the facility- no one purchased garbage!

This point where material is magically transformed from desirable stuff into trash is the **waste generation point**. When we examine the flow of the material through the entire facility, we are looking at it both before and after it passes the waste generation point. There will be very different systems in place to handle it on each side of this great divide. And we will be designing different waste reduction programs for each side too. In general, the programs we design for materials after the generation point are recycling programs. The programs we design for materials before the generation point are reduction programs.

What are some examples of generation points? That magic moment when material is transformed into waste?

Let's look at one of these examples from the materials flow perspective: the soft drink can. It entered the facility when the Coke vendor stocked the vending machine in an employee break room. An employee bought it, emptied it, and tossed it into a trash can: the generation point. The trash can is emptied by a contracted janitorial service employee into a wheeled barrel, which is taken out to a loading dock and emptied into a dumpster. The dumpster is emptied by a disposal company. You can see that even this simple example involves a lot of steps.

Let's say we're designing a waste reduction program to target this material, soft drink cans. If we start before the generation point, what might we do?

After the generation point?

In each case, the information we have on the systems in place is going to be important: the Coke vendor, the employee purchasing the product, the contracted maintenance staff, the trash hauler, the space on the loading dock.

Here's another example: the tissue paper inside a shoebox. (This is an actual case history, from Mervyn's Department Stores.) The waste generation point for this material is often when the customer tries on the shoe and throws the tissue paper on the floor. For most of the material flow, the paper is invisible, since it doesn't serve any function from the point of view of the store staff. Its cost is included in the cost of the shoes, so the purchasing department doesn't deal with it. Unlike the boxes, it doesn't have information on it which is useful to the stocking and sales clerks. It isn't even visible until the customer opens the box! So the waste generation point, when the customer throws it on the floor and the clerk has to pick it up and throw it away, is the first time the store staff sees it. In this case, the waste reduction method went all the way to the very beginning of the materials flow. The solution?

We've been talking about the kinds of information we need in order to understand waste from a systems approach. Next we'll look at some specific methods of obtaining this information through what is called **Solid Waste Assessment**.

Solid Waste Assessment

A waste assessment is done to show how and where waste is generated, the composition of the waste, and what currently happens to it. The information gathered can be very valuable for planning a comprehensive waste reduction program.

Different methods for assessing waste are useful for gathering different kinds of information. It is generally most effective to combine two or more methods. For example,

“We wanted to quantify the waste coming from our employee cafeteria. Our **facility walk-through** showed us that nearly all of the cardboard was being separated for recycling, so we relied on **hauler records** to determine the cardboard volume. Since we could see that most of the waste in the trash cans in the cafeteria dining room was paper cups and plates, we checked **purchasing records** to learn how many of these items were used. Finally, we conducted a **waste sort** on the kitchen trash to identify the quantity of various recyclable containers such as tin cans, plastic jugs, and glass jars.”

The facility walk-through is usually the first step in an assessment, as it gives an overview of the entire materials flow and helps to identify potential opportunities for waste reduction. These potential opportunities suggest the kinds of further information needed. For example, in the scenario above, the walk-through showed that the trash in the dining room and in the kitchen was very different. Each offered different waste reduction opportunities (for example, replacing disposable dinnerware with reusables, and recycling additional materials from the kitchen) and different strategies for waste assessment were then used for each.

Timing is an important consideration for your waste assessment: time of the work day; time of the week (before or after garbage collection); and even time of the year (peak work periods generate more materials).

Don't forget the entire facility. Ask for a building layout map or floor plan to help guide you through the facility. You can mark where materials come in through receiving, note — even color code — where different types of materials are generated (i.e. organics in the cafeteria or paper at the photocopier machine) or contained, and show the flow of materials all the way through the back door to the garbage dumpster. A walk-through can include some of the following areas:

- | | |
|-----------------------------------|----------------------------------|
| * Office and administration areas | * Work stations |
| * Break rooms/cafeterias | * Classrooms |
| * Rest rooms | * Public waiting areas |
| * Locker rooms | * Conference rooms |
| * Copy and printing areas | * Stock rooms |
| * Materials storage areas | * Shipping/receiving areas |
| * Parts assembly areas | * Garages/machine service areas |
| * Mail rooms | * Manufacturing/production areas |
| * Food prep/service areas | * Service departments |
| * Custodial/maintenance areas | * Data processing areas |
| * Recreational areas | * Laundry rooms |
| * Guest rooms | * Closets |
| * Warehouses | * Research and development areas |
| * Grounds/landscaping operations | |

Look for products that have become unusable as a result of damage and poor handling. For example, you may find bags or boxes that have been torn open by forklifts, or supplies in the storage room that have been opened or leaked.

As you examine trash receptacles, keep your eyes open for the following:

- **Materials with waste prevention, reduction, or reuse potential:**

| | |
|---------------------|---|
| Disposable products | Shipping containers |
| Copier paper | Individual copies of magazines/newspapers |
| Junk mail | Wood |
| File folders | Food |
| Toner cartridges | Pallets |
| Fax cover sheets | Packaging |

- **Materials that could be recycled:**

| | |
|----------------------|--------|
| Corrugated cardboard | Metals |
| Plastics | Paper |
| Glass | |

- **Materials that could be composted:**

| | |
|------------|------|
| Yard waste | Food |
|------------|------|

Purchasing records provide information from the very beginning of the materials flow. They are useful for quantifying materials which are handled entirely within the facility: that is, they enter the facility only through purchase, and leave it only as discards. Examples include packaging, food service disposables such as paper cups (in an operation where most food and drink is consumed on-site) or computer paper (where reports are used entirely in-house).

To be usable, records must be in a form which can be reviewed fairly easily: ideally, a printout showing totals of consistent items. This method may be more trouble than it is worth if you have to hunt through separate invoices for a large variety of different products which are packaged in different ways. Purchasing records can be helpful later in measuring success.

Production records are usually thought of in terms of manufacturing, but they are found in other types of businesses too. Often they are part of cost control systems, which offer excellent opportunities to integrate the waste reduction program into the company. For example, many restaurants maintain records on food that is discarded because of mistakes or over-production. These records are used to control excess food costs due to sloppiness or employee theft, but they may also serve as the basis for a food bank donation program. Production records are also useful for projecting quantities of wastes directly tied to level of production. In a business with a variable operating level this can be very useful. For example, if we determine that one pound of scrap plastic is generated for every widget produced, we can determine the amount of scrap plastic generated in a given day, week, or year by examining the widget production records.

Hauler records provide information from the very end of the materials flow, as materials leave the facility either as trash or recyclables. Note that the numbers we get from trash hauler records are totals for all materials. This is the “bottom line” when all components of the waste are quantified. Hauler numbers for recyclables represent only the portion of those materials which have been separated from the trash: if this number is subtracted from the total quantity generated, the difference shows the room for improvement in the recycling program. Hauler records will be discussed in detail later.

Waste sorts are often the first thing people think of when planning a waste assessment: “dumpster diving.” Waste sorts are very useful for making sure that no component of the waste stream is overlooked and because the waste material generated is actually handled.

A waste sort conducted at the generation point often yields information that leads to waste reduction ideas. This is because the material is directly associated with the activity that produces it. Sometimes waste sorts of this type are done by asking employees to sort material as it is generated. This way, the sort becomes a way to experiment with separation for recycling. While this process can be timesaving and effective at getting employees involved, it tends to focus attention on recycling more than waste prevention.

A facility-wide waste sort works best in a smaller operation, as it is difficult to get an accurate sample in a large and complex facility. This type of waste sort gives a “snapshot” look at all components of the waste at the very end of the materials flow. Waste sorts will be discussed in more detail later.

See sample floor plans on the following pages.

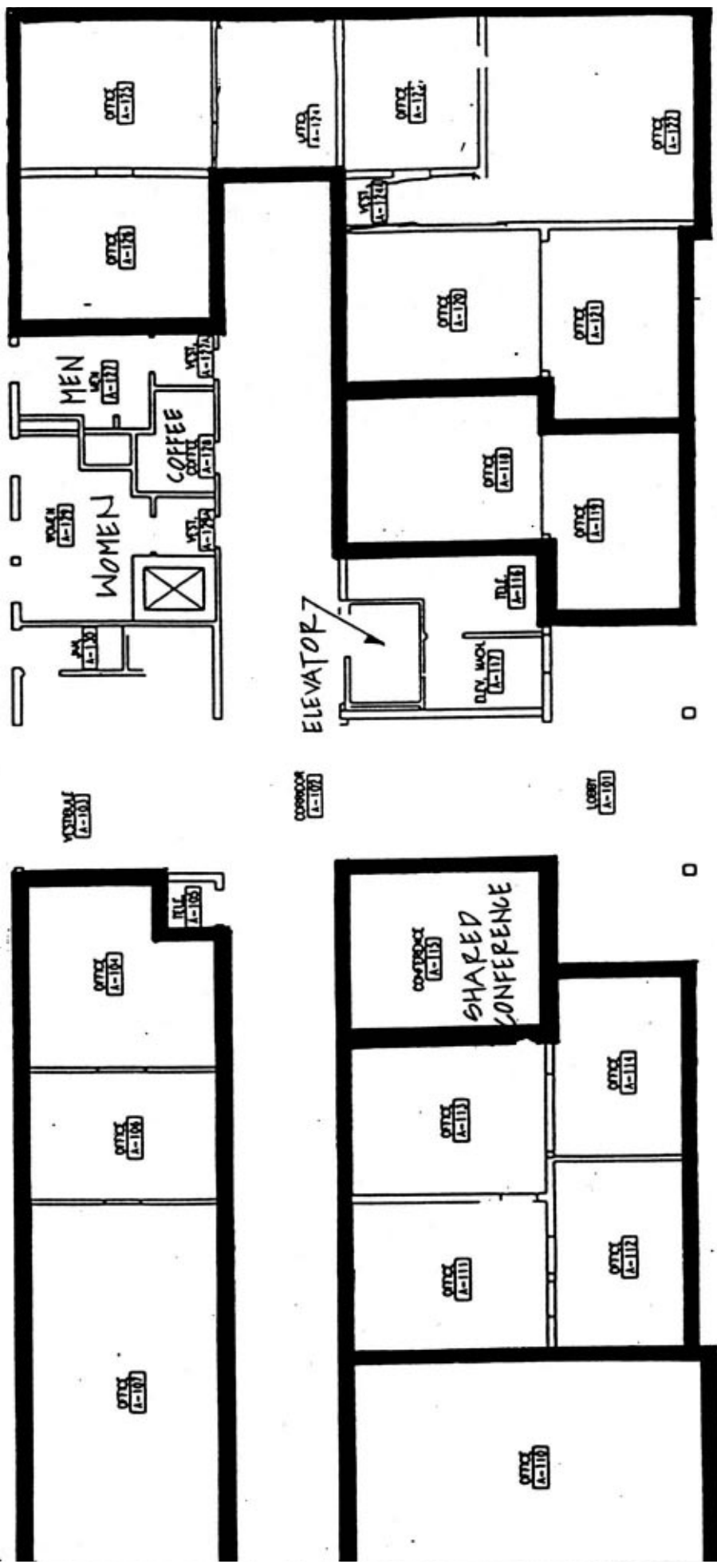
PARKING

ENTRY

INTERCOM

LOBBY
A-100

BUILDING 106 NORTH ENTRY (OPEN 8AM-5PM)

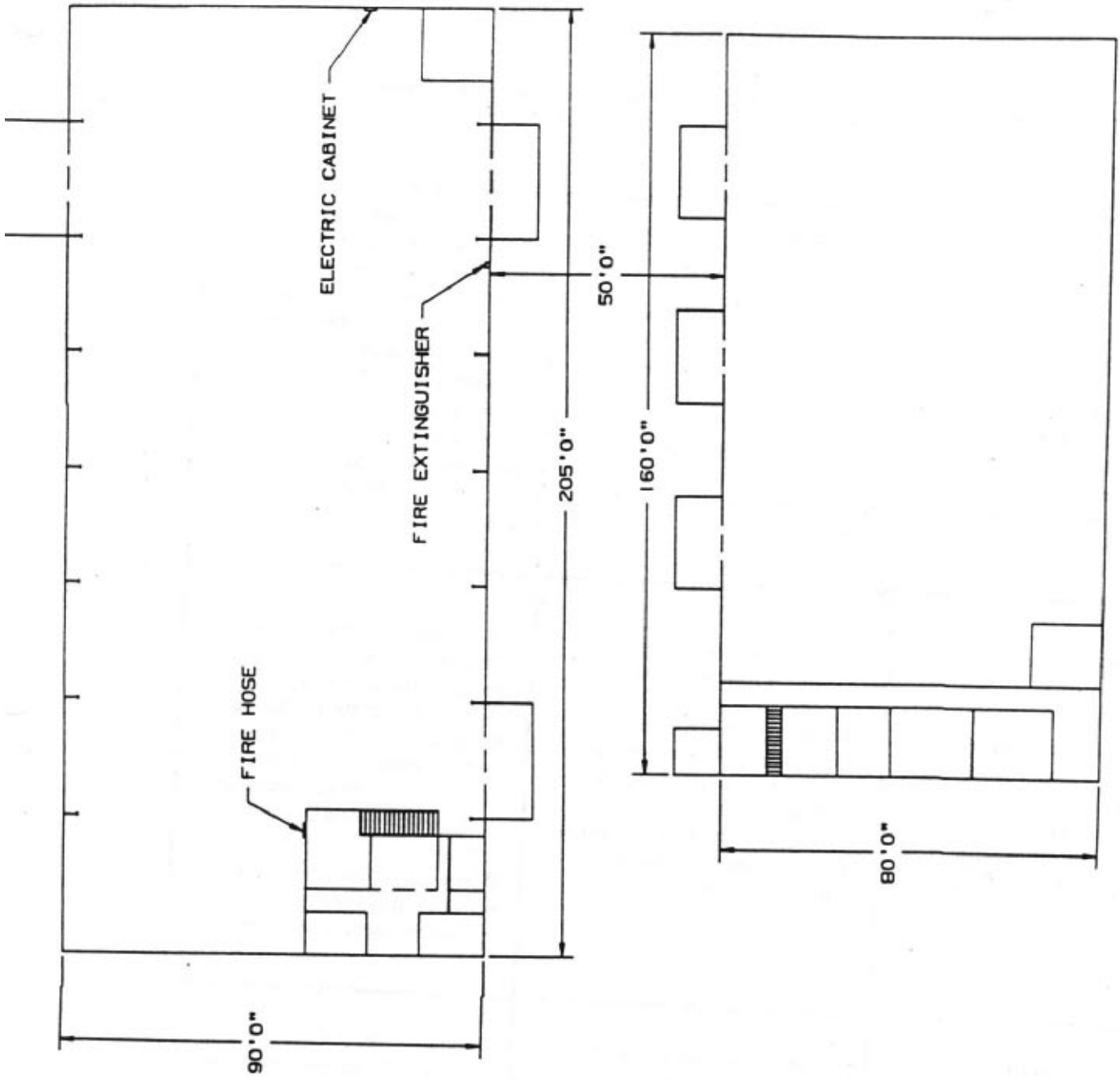


BUILDING 1016 SOUTH ENTRY

(OPEN 8AM - 5PM)

(LOCKED 5PM - 8AM)

BUILDING 1016 - FIRST FLOOR



Waste Assessment Methods

Different methods for assessing waste are useful for gathering different kinds of information. Use a combination of approaches to develop the information you need to design an effective waste reduction program.

| Method, Types of Information Gathered | Process | Tips |
|--|---|--|
| Facility Walk-through <ul style="list-style-type: none">• Systems information: overview of operations, facility layout, staff roles and concerns, materials flow• Types of waste materials generated• Generation points• Waste reduction ideas• Waste reduction techniques already in use• Both qualitative and quantitative information | <ul style="list-style-type: none">• Observe operations: how are materials handled?• Interview staff• Determine waste generation points• List types of waste generated• Assess waste quantities: visually and through staff interviews: e.g., “how many cans of this do you fill per day”; how many cases of this do you use each week?”• Identify any special, seasonal, or variable wastes | <ul style="list-style-type: none">• Ask lots of questions• Talk to staff people who handle materials throughout the operation. Solicit ideas. <u>Listen.</u>• Observe the entire operation from the perspective of waste produced• Take lots of notes• Think about what other assessment methods would be useful to quantify materials• Use floor plan |
| Purchasing Records <ul style="list-style-type: none">• Information from the beginning of the materials flow• Cost information: useful for determining benefits of waste prevention• Precise quantities for waste materials which are purchased and then discarded within the facility | <ul style="list-style-type: none">• Identify materials which can be quantified from purchasing records• Obtain records in the most useable form: for example, a printout of total purchases of each item for one year• Use conversion factors or weigh known quantities to translate purchasing numbers into waste quantities | <ul style="list-style-type: none">• This method is often very useful for packaging waste, which is generally discarded on-site• Even if some of the purchased material leaves the site before being discarded, the information on total quantities purchased and costs is useful for waste prevention ideas• Where cost information is sensitive, it may be excluded for estimating waste quantities |
| Production Records <ul style="list-style-type: none">• Precise quantities for materials tracked as part of production data• Opportunities for waste reduction tied directly to production expenses• Provides insight into materials flow• Numbers which can be adjusted for facilities with varying levels of operation | <ul style="list-style-type: none">• Identify materials which are already tracked in production data, e.g., edible food discarded in a restaurant; scrap material per unit in a manufacturing process• Look for less obvious or more anecdotal information: e.g. number of grass catcher bags filled each time lawn is mowed.• Obtain records in the most useable form: e.g., an average month of daily food discard records; yearly total of units manufactured; mowing schedule | <ul style="list-style-type: none">• Production records may exist in a variety of forms and for a variety of reasons- ask questions to find them!• Records are often instituted as a way of measuring and controlling expenses: look for ways to incorporate waste reduction into these systems |

| Method, Types of Information Gathered | Process | Tips |
|---|--|--|
| Hauler Records <ul style="list-style-type: none"> • Information from the end of the materials flow • Total volumes and sometimes weights of waste hauled • Volumes and sometimes weights of recyclables hauled • Waste disposal and recycling haul costs | <ul style="list-style-type: none"> • Obtain records from haulers, including frequency of collection, sizes of containers, weights when available, costs • If haulers cannot or will not provide information, check invoices • If entire container (rolloff or compactor) is being hauled, weight data may be available from hauler or landfill • Observe and interview staff to learn whether containers are full at each pickup • Estimate weight per yard: ask hauler, look at industry standards, or weigh samples | <ul style="list-style-type: none"> • Understanding the pricing structure will help in designing a cost-effective reduction program • Total volumes and weights give a "bottom line" when calculating the sum of various waste components which are each estimated • If more than one business shares a dumpster, hauler records are much less useful • A facility often has more than one hauler: remember recyclers, landscapers, contractors • Changing service levels and schedules often saves money even without waste reduction: incorporate such changes into your total reduction plan! |
| Waste Sort: specific functional area <ul style="list-style-type: none"> • Information about waste at the generation point • Types and quantities of waste materials produced by specific operations | <ul style="list-style-type: none"> • Decide on the categories you will sort: more detail is better, e.g., separate different grades of paper • Choose a representative sample: for smaller areas, all waste for one average day or week. For larger quantities, choose a sampling technique e.g., 20% of all trash bags • Weigh the total sample if possible • Separate and weigh the component categories: remember to subtract the weight of sorting containers! extrapolate totals | <ul style="list-style-type: none"> • When choosing categories, be sure to include any materials present in large quantities, and those you may be targeting for reduction or recycling • Involve staff at the generation point: to choose an average sample, and to help with the actual sort if possible • When extrapolating, remember to multiply by correct time periods, e.g., by number of <u>operating</u> days in a year not by 365! • Make sure all the components add up to the total; if there is a lot of liquid or small, difficult to separate material, note it under "other" |
| Waste Sort: facility-wide <ul style="list-style-type: none"> • Information from the end of the materials flow • Quantities of each type of waste produced in the entire facility | <ul style="list-style-type: none"> • Same as for specific functional area sort • Difficulty of choosing an accurate sample is compounded, especially in a large and complex facility | <ul style="list-style-type: none"> • Use total quantities determined from hauler records as a 'check' on total quantities extrapolated from facility-wide waste sort |

Source: Connie Cloak
C² Alternative Services (1995)

Understanding Hauler Records

Hauler pricing structures vary greatly and can be difficult to understand. The details (such as charge per yard or container rental fee, etc.) may not be shown anywhere on the invoice, so it's necessary to question the hauler carefully to learn how the charges are assessed. It is useful to know exactly how your service is priced as well as the total costs and quantity of waste being hauled. This is because your potential cost savings from waste reduction include reduced hauling costs. In order to determine the best way to save money, you need to understand how changes to your service schedule, container size, and weight of your trash may affect costs.

Every company's situation will be unique, but we will use some fictitious business examples to demonstrate the elements that are generally involved in pricing waste hauler service. Much of this also pertains to haulers of recyclables.

We'll use the same business for each example:

This is a small restaurant called the Hungry Hound. The hauler is ABC Sanitary. They have one 6-yard dumpster, which is picked up every Monday, Wednesday, and Friday.

The first example is the simplest: a flat monthly fee. (For example, this restaurant is part of a strip mall, and pays a fee to the mall management each month.) In this case, reducing waste may not automatically reduce costs, unless you can negotiate a changed fee with the mall management.

Charges may also be assessed by the weight or volume of the waste picked up. Generally, this means the volume by service level: that is, the size of the container multiplied by the number of times it is picked up. If the container is only partly filled, the cost will be the same even though the actual amount of waste is less. Reducing unneeded service can help save costs, and may be integrated into the waste reduction plan though it's not strictly speaking, actually reducing the waste.

Sometimes there is also a container rental fee: in this example, the fee is \$20.00 per month. (Other possibilities are that the use of the container is included at no extra charge, or that the company owns its containers. Dumpsters are rarely owned, but ownership is more common when the company has a compactor.)

In another case, there may be a charge for each "pull," that is, each time the container is picked up. This may or may not be tied to the container size: usually the pricing structure does include the amount of waste, but in certain circumstances such as a very remote location where the main cost to the hauler is the time and distance, the "pull" may be the same regardless of container size. (The total cost to a hauler for operating a standard garbage truck is approximately \$100 per hour.) In this example, the pull charge is \$12.00.

The first example is the simplest: a flat monthly fee. (For example, this restaurant is part of a strip mall, and pays a fee to the mall management each month.) In this case, reducing waste many not automatically reduce costs, unless you can negotiate a changed fee with the mall management.

WORKSHEET 1:

B Records Review: Waste Collection and Removal

| 2 Offsite Waste Removal | | | | | |
|--|--|--|--|--|--|
| A. Name of Waste Removal Company: <u>ABC Sanitary</u> Telephone Number: <u>555-1234</u> Contract Expires: <u>7/19/95</u> | | | | | |
| B. Removal Schedule Number of times <u>3</u> per (day/week/month/other) <u> </u> Day of week: <u>M W F</u> Time(s): <u>6:30 AM</u> Day of week: <u> </u> Time(s): <u> </u> | | | | | |
| C. Waste Removal Charge <i>(If charged as flat fee or part of rent)</i> <div style="display: flex; align-items: center; justify-content: space-between;"> <div> <u>\$175</u> Waste removal fee </div> <div style="text-align: center;"> x </div> <div> <u>12</u> Time periods per year (if applicable) </div> <div style="text-align: center;"> = </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <u>\$ 2,100</u> Annual Waste Removal Charge </div> </div> | | | | | |
| D. Waste Removal Charge (if charged by weight or volume) <div style="display: flex; align-items: center; justify-content: space-between;"> <div> <u> </u> per Waste removal charge </div> <div style="text-align: center;"> x </div> <div> <u> </u> Unit of weight or volume </div> <div style="text-align: center;"> = </div> <div> <u> </u> Units of waste removed annually </div> <div style="text-align: center;"> = </div> <div> <u> </u> Annual waste removal charge </div> </div> <p>If applicable, add:</p> <div style="display: flex; align-items: center; justify-content: space-between;"> <div> <u> </u> per Hauling container(s) rental fee </div> <div style="text-align: center;"> x </div> <div> <u> </u> Time period </div> <div style="text-align: center;"> = </div> <div> <u> </u> Time Periods per year </div> <div style="text-align: center;"> = </div> <div> <u> </u> Annual waste container rental cost </div> </div> <div style="display: flex; align-items: center; justify-content: space-between; margin-top: 10px;"> <div> <u> </u> Annual waste removal charge </div> <div style="text-align: center;"> + </div> <div> <u> </u> Annual waste container rental cost </div> <div style="text-align: center;"> = </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <u>\$ </u> Annual Waste Removal Charge </div> </div> | | | | | |
| E. Waste Removal Charge <i>(If charged per pull)</i> <div style="display: flex; align-items: center; justify-content: space-between;"> <div> <u> </u> Charge per pull </div> <div style="text-align: center;"> x </div> <div> <u> </u> Pulls per year </div> <div style="text-align: center;"> = </div> <div> <u> </u> Annual waste container rental cost </div> </div> <p>If applicable, add:</p> <div style="display: flex; align-items: center; justify-content: space-between;"> <div> <u> </u> per Hauling container(s) rental fee </div> <div style="text-align: center;"> x </div> <div> <u> </u> Time period </div> <div style="text-align: center;"> = </div> <div> <u> </u> Time Periods per year </div> <div style="text-align: center;"> = </div> <div> <u> </u> Annual waste container rental cost </div> </div> <div style="display: flex; align-items: center; justify-content: space-between; margin-top: 10px;"> <div> <u> </u> per Tipping fee </div> <div style="text-align: center;"> x </div> <div> <u> </u> Unit of weight or volume </div> <div style="text-align: center;"> = </div> <div> <u> </u> Units of waste removed annually </div> <div style="text-align: center;"> = </div> <div> <u> </u> Annual tipping fee </div> </div> <div style="display: flex; align-items: center; justify-content: space-between; margin-top: 10px;"> <div> <u> </u> Annual waste pulling charge </div> <div style="text-align: center;"> + </div> <div> <u> </u> Annual waste container rental cost </div> <div style="text-align: center;"> + </div> <div> <u> </u> Annual tipping fee per year </div> <div style="text-align: center;"> = </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <u>\$ </u> Annual Waste Removal Charge </div> </div> | | | | | |

Charges may also be assessed by the weight or volume of the waste picked up. Generally, this means the volume by service level: that is, the size of the container multiplied by the number of times it is picked up. If the container is only partly filled, the cost will be the same even though the actual amount of waste is less. Reducing unneeded service can help save costs, and may be integrated into the waste reduction plan though it's not strictly speaking, actually reducing the waste.

WORKSHEET 2:

B Records Review: Waste Collection and Removal

| 2 Offsite Waste Removal | | | | | |
|--|--|--|--|--|--|
| A. Name of Waste Removal Company: <u>ABC Sanitary</u> Telephone Number: <u>555-1234</u> Contract Expires: <u>7/19/95</u> | | | | | |
| B. Removal Schedule Number of times <u>3</u> per (day/week/month/other) <u>week</u> Day of week: <u>M W F</u> Time(s): <u>6:30 AM</u> Day of week: _____ Time(s): _____ | | | | | |
| C. Waste Removal Charge <i>(If charged as flat fee or part of rent)</i> <div style="display: flex; align-items: center; justify-content: space-between;"> <div> <u> </u> Waste removal fee </div> <div style="text-align: center;"> x </div> <div> <u> </u> Time periods per year (if applicable) </div> <div style="text-align: center;"> = </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> \$ <u> </u> Annual Waste Removal Charge </div> </div> | | | | | |
| D. Waste Removal Charge (if charged by weight or volume) <div style="display: flex; align-items: center; justify-content: space-between;"> <div> <u>\$ 2</u> Waste removal charge </div> <div style="text-align: center;">per</div> <div> <u>yard</u> Unit of weight or volume </div> <div style="text-align: center;"> x </div> <div> <u>929</u> Units of waste removed annually </div> <div style="text-align: center;"> = </div> <div> <u>\$1,858</u> Annual waste removal charge </div> </div> <p>If applicable, add:</p> <div style="display: flex; align-items: center; justify-content: space-between;"> <div> <u>\$ 20</u> Hauling container(s) rental fee </div> <div style="text-align: center;">per</div> <div> <u>month</u> Time period </div> <div style="text-align: center;"> x </div> <div> <u>12</u> Time Periods per year </div> <div style="text-align: center;"> = </div> <div> <u>\$240</u> Annual waste container rental cost </div> </div> <div style="display: flex; align-items: center; justify-content: space-between; margin-top: 10px;"> <div> <u>\$1,858</u> Annual waste removal charge </div> <div style="text-align: center;"> + </div> <div> <u>\$240</u> Annual waste container rental cost </div> <div style="text-align: center;"> = </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> \$ <u>\$2,098</u> Annual Waste Removal Charge </div> </div> | | | | | |
| E. Waste Removal Charge <i>(If charged per pull)</i> <div style="display: flex; align-items: center; justify-content: space-between;"> <div> <u> </u> Charge per pull </div> <div style="text-align: center;"> x </div> <div> <u> </u> Pulls per year </div> <div style="text-align: center;"> = </div> <div> <u> </u> Annual waste container rental cost </div> </div> <p>If applicable, add:</p> <div style="display: flex; align-items: center; justify-content: space-between;"> <div> <u> </u> Hauling container(s) rental fee </div> <div style="text-align: center;">per</div> <div> <u> </u> Time period </div> <div style="text-align: center;"> x </div> <div> <u> </u> Time Periods per year </div> <div style="text-align: center;"> = </div> <div> <u> </u> Annual waste container rental cost </div> </div> <div style="display: flex; align-items: center; justify-content: space-between;"> <div> <u> </u> Tipping fee </div> <div style="text-align: center;">per</div> <div> <u> </u> Unit of weight or volume </div> <div style="text-align: center;"> x </div> <div> <u> </u> Units of waste removed annually </div> <div style="text-align: center;"> = </div> <div> <u> </u> Annual tipping fee </div> </div> <div style="display: flex; align-items: center; justify-content: space-between; margin-top: 10px;"> <div> <u> </u> Annual waste pulling charge </div> <div style="text-align: center;"> + </div> <div> <u> </u> Annual waste container rental cost </div> <div style="text-align: center;"> + </div> <div> <u> </u> Annual tipping fee per year </div> <div style="text-align: center;"> = </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> \$ <u> </u> Annual Waste Removal Charge </div> </div> | | | | | |

In another case, there may be a charge for each “pull,” that is, each time the container is picked up. This may or may not be tied to the container size: usually the pricing structure does include the amount of waste, but in certain circumstances such as a very remote location where the main cost to the hauler is the time and distance, the “pull” may be the same regardless of container size. (The total cost to a hauler for operating standard garbage truck is approximately \$100 per hour.) In this example, the pull charge is \$12.00.

B Records Review: Waste Collection and Removal

| | | | | | |
|--|----------|------------------------------------|----------|------------------------------------|------------------------------------|
| E. Waste Removal Charge (If charged per pull) | | | | | |
| <u>\$ 12</u> | x | <u>155</u> | = | <u>\$1,860</u> | |
| Charge per pull | | Pulls per year | | Annual waste container rental cost | |
| If applicable, add: | | | | | |
| <u>\$ 20</u> | per | <u>month</u> | x | <u>12</u> | = |
| Hauling container(s) rental fee | | Time period | | Time Periods per year | <u>\$ 240</u> |
| | | | | | Annual waste container rental cost |
| <u>\$ 30</u> | per | <u>ton</u> | x | <u>46.45</u> | = |
| Tipping fee | | Unit of weight or volume | | Units of waste removed annually | <u>\$1,393.50</u> |
| | | | | | Annual tipping fee |
| <u>\$1,860</u> | + | <u>\$ 240</u> | + | <u>\$1,393.50</u> | = |
| Annual waste pulling charge | | Annual waste container rental cost | | Annual tipping fee per year | \$ 3,493.50 |
| | | | | | Annual Waste Removal Charge |

The tipping fee reflects the cost that the hauler is paying at the landfill. In the examples so far, the hauler is charging based upon volume. But the hauler pays the landfill to dump the trash by weight. So a customer with very heavy trash means less profit to the hauler, while a customer with very light trash is paying to dispose of air! Pricing based on weights is becoming more common, particularly when the entire container (such as a debris box or compactor container) is taken to the landfill. For containers (such as dumpsters) which are dumped into a truck, weights are more difficult to assess. Trucks equipped with scales are used in a few locations. A more common method is to periodically weigh a dumpster load and assess an average weight per yard. In this example, the tipping fee is \$30.00 per ton, and the average weight per cubic yard is 100 lbs.

A final and very important consideration regarding hauler pricing structures is contracts. If a contract does not allow you to alter service levels to reduce price, you have lost a valuable benefit of waste reduction. Similarly, a contract which is very long term and/or which is self-renewing can be frustrating to your waste reduction efforts. Ideally, you can avoid signing such contracts. One effective method is to use a contract addendum which states that the contract may be cancelled or renegotiated by either party with thirty days notice, and that the term of the contract is limited, for example to one year. Such an addendum should include language stating that it supercedes language in the contract.

The information gained from examination of hauler records is mostly quantitative: total volumes and perhaps weights, and costs. To use the information effectively, you will also need qualitative information. For example, any alterations in service level, number of containers, or container size may affect operations. Perhaps dropping the service to once per week would get the restaurant in trouble with the Health Department. Or maybe reducing the size of a container is fine most of the time, but causes a real problem on holiday weekends when the restaurant is busy. Or adding a container for cardboard recycling means taking up a parking space: a problem if the restaurant's business is limited by available parking.

Facility Walk-through Activity

Option 1: Actual walk-through in host facility

This is an on-site waste assessment of the facility in which the training course is being held, or get permission from a nearby business for course participants to conduct a waste assessment. The following scenario will give you an idea of how to conduct this activity.

The trainer will play the role of task-force member interviewing an employee; one of the participants will play the employee in a particular operation listed on the mock Worksheet C. The trainer will ask questions to elicit the types and quantities of waste generated, filling in the appropriate blanks on the overhead worksheet transparency. (S)he will elicit ideas from participants for other waste assessment methods that might be used to quantify waste materials.

The groups will then be directed to tour the host facility, looking for waste generation points, observing trash collection facilities and asking questions (either of actual employees or through role-playing within the group). Groups will return to the meeting room to continue the exercise, role-playing further questions and discussing waste assessment methods to be used for different materials.

When all groups have returned and are ready, the trainer will halt the exercise and initiate discussion. Each group will report on:

- Generation points observed
- 3 types of waste generated
- Questions asked to identify and quantify each type
- Other assessment methods to be used for each

FACILITY WALK-THROUGH REPORT

- **Generation points observed**
- **3 types of waste generated**
- **Questions asked to identify and quantify each type**
- **Other assessment methods to be used**

Facility Walk-through Activity

Option 2: Imaginary walk-through

In the meeting room: the trainer will play the role of Waste Reduction Task Force member interviewing an employee; one of the participants will play the employee in a particular operation listed on the mock Worksheet C. The trainer will ask questions to elicit the types and quantities of waste generated, filling in the appropriate blanks on the overhead worksheet transparency. (S)he will elicit ideas from participants for other waste assessment methods which might be used to quantify waste materials.

The trainer will then assume the role of employee for another operation on the mock Worksheet C, while a participant will play the Waste Reduction Coordinator role. A second participant will record information.

Each group will then continue the role-playing separately, completing the Worksheet C for its imaginary business.

After about 20 minutes, the trainer will halt the exercise and initiate discussion. Each group will report:

- 3 types of waste generated
- Questions asked to identify and quantify each type
- Other assessment methods to be used for each

FACILITY WALK-THROUGH REPORT

- **3 types of waste generated**
- **Questions asked to identify and quantify each type**
- **Other assessment methods to be used**

Materials Review, Recycling and Reuse Markets

Right now the CIWMB is in the process of developing a set of uniform material definitions for different material types found in a typical waste characterization. This is important because when you do a waste assessment you may ask yourself, “What is mixed paper, what is yard waste, what is other plastic?” A problem in earlier years when there were no uniform definitions was that you could not compare data from jurisdiction to jurisdiction or company to company. When the CIWMB adopts the uniform definitions, you should utilize them to be consistent with other data being collected around the State.

Let’s cover some basic definitions. Generation of waste is equal to disposal plus diversion. Most states around the country use this equation. Disposal means what is landfilled or incinerated. Diverted is what is source reduced, reused, recycled, or composted. Generation means what can potentially be waste.

GENERATION = DISPOSAL + DIVERSION

Diversion: Source Reduction, Reuse, Recycling, Composting, Grasscycling, etc.

Disposal: Landfill, Incineration, Pyrolysis, etc. (Note: Transformation derived diversion credit allowed after 1995)

Not in Equation: Illegal disposal, inert disposal, and facilities not permitted by CIWMB

During the walk-through, we looked at different types of materials. During an audit, sometimes extensive waste characterization studies are done. The first question and the most important to ask is “What am I going to use the data for?” because if you don’t know, then you won’t design the optimum program and will sometimes even get wrong kind of data. The next question to ask is “What level of accuracy do I need?” Do I need to be statistically accurate or do I just need a very general overview of paper? What is the level of detail needed?

Other special considerations may include whether the data can be accessed and how much will that cost? What are the resource requirements (e.g. how many people are needed), time requirements, security issues, and health and safety issues.

DESIGNING A WASTE CHARACTERIZATION PROGRAM

- 1. What are you going to use the data for?**
- 2. What level of accuracy will you need?**
- 3. Special Considerations:**

Data Access Issues

Cost Constraints

Resource Requirements

Time Requirements

Security Issues

Health and Safety Issues

The main methods of collecting waste characterization data are organized three ways. The first method is to utilize comparable data. Comparable data is when businesses compare data to similar type businesses or the same company (franchises). Data can also be collected from recyclers and haulers. The second is called Materials Flow or Materials Balance. This is when you actually look at purchasing records and inventory to see how the material is purchased, stored, used, what's wasted, how it becomes a product and how materials are disposed. It is a study of the flow of materials through an organization. The third way is a quantitative field study. There are two main ways to perform a quantitative field study or waste sort: a physical sort or a visual, photographic sort. These are the three main methods of characterizing the waste stream.

WASTE CHARACTERIZATION METHODS FOR FACILITY AUDITS

Comparable Data

Similar Companies

Data from Haulers/Recyclers

Materials Flow (Materials Balance)

Quantitative Field Studies

Physical Sampling (Dumpster Diving)

Visual or Photographic Sorts *Source: Eugene Tseng Associates*

Again, it is important think about to think about what you are going to use the data for. For example, you might just look at general material types: paper, plastic, metal, etc. But if you did that for a hospital, your waste composition would show “60% other plastics!” Obviously, you need more detail. Materials can be sorted by material types and then resorted into functional categories. A functional sort actually identifies what the material is and what it is used for and from where it is generated.

CHARACTERIZATION SORT VS. FUNCTIONAL SORT

Characterization Sort

Materials Classified by Type/Function

Legislatively Defined Classification

Functional Sort

Defines “Activity” Generating the Waste

Defines “Purpose/Use” of Generated Waste

Source: Eugene Tseng Associates

The purpose of this section is to learn the basics of paper grades, and the market grades of other recyclables so that you will know the materials your business purchases and discards and how to design a waste reduction program around these materials. After this training, when you do your waste assessment you will be able to identify the different materials that can be recycled.

You will also learn about “contaminants.” The EPA glossary you have in your manual defines contaminants as:

“Foreign material that makes a recyclable or compostable material impure; for instance, food scraps on paper products.”

It might also be a type of material that does not belong in that specific grade of paper. Some grades will tolerate a certain level, while other materials will not tolerate any contaminants. The economic and environmental goal of every recovery program should be to collect and process secondary materials in a way that allows for them to be used at their highest value. Therefore, the most important concept is not to contaminate a secondary material with non-compatible elements. Once a secondary material is “taken down” a level it is nearly impossible to take it back and increase its value. Keeping a secondary product at its most pure or highest level keeps its “value” at the highest level. When any group of commodities are mixed together the value of the entire mixture is generally brought down to the level of the least valuable of the group of commodities that are mixed together.

For example, mixing glass with dirt, rocks or ceramic pottery, mixing ground with chemical fibers, mixing papers with glass, water, almost any non-paper substance, mixing ferrous with non-ferrous metals, etc., will downgrade the material and may cause it to be rejected. As

another example, glass used in road base could not be recovered and used to manufacture bottles and jars, boxboard made from mixed paper could not be used to make writing paper.

The following are the types of recyclable materials you may find while doing your assessments and analyzing your waste reduction options:

PAPER

High Grade Paper

- Computer Printout (CPO),
- White Ledger (SWL),
- Color Ledger (SCL),
- Coated Book Stock,
- Sorted Office Paper (SOP).

Low Grade Paper

- Old Newspaper (ONP),
- Old Corrugated Cartons (OCC),
- Mixed Paper or Super Mixed Waste Paper (SMP).

All of these grades are found in the commercial waste streams, but the bulk of the paper collected from commercial customers is OCC. In many larger cities or larger volume generators, there are some version of SWL, CPO, or SOP programs. SMP or mixed papers are found in great quantities.

Super Mixed Paper:

Consists of baled clean, sorted mixture of various qualities of papers containing less than 10% groundwood stock, coated or uncoated.

Sorted Office Paper:

Dry baled paper, as typically generated by offices, containing primarily white and colored groundwood free paper, free of unbleached fiber. It may also include a small percentage of groundwood computer printout and facsimile paper. SOP is primarily a white ledger grade with some color and will accept small amounts of other materials. This one has very strict standards.

There are other combinations of paper that are acceptable, depending on the mill the materials are being sent to or whether the collector plans to sort the material on a sorting line. Different mills will tolerate different levels of contaminants depending on their paper making process. Overall, it is important for you to know grades of paper so that you can assess the types of materials that can be recycled, and in what combinations, for your recycling program.

Old Corrugated Container:

What makes cardboard valuable is the kraft paper with the long fibers that provide strength. Cardboard that is coated with plastic or wax is generally not recyclable.

GLASS:

How many different kinds of glass do you think there are in the waste stream? From an engineering perspective, there are several hundred different kinds of glass in the waste stream but the majority of glass that you will find in the waste stream will be soda lime glass which is

container glass.

Glass can be found in the lunch room as beverage containers, in the kitchen of restaurants, in the production room, and at office workers' desks. Bottle and container glass can be either clear (flint) or colored (brown or green). Food container glass is basically the industry standard on what can be recycled. This is one of the most perfect materials because one pound of recycled container glass can be made into another one pound of new glass. It is a 100% recyclable material.

One of the most important elements in recycling glass is quality control. The better the quality and purity, the better the price you will get for the material.

Beverage and food container glass can be recycled together. But window glass, Pyrex and other types of glass are not acceptable in with this mix because of the chemical components of glass. Contaminants to glass also include ceramics, stone, brick, and organics.

PLASTIC

During your audit, you will find a variety of plastic materials. All plastics are not created equal and have different compositions or resins. In most cases, there are a variety of plastics that are being discarded in your business. In the process of doing business your company may produce industrial level scrap plastics or pre-consumer scrap. Depending on the resin type, most pre-consumer plastic scrap can be recycled, if there is enough quantity.

The types of plastic with the highest demand are PET and HDPE containers. PET is used for soda and water containers. HDPE comes as translucent or pigmented (colored). These two types are used for the manufacture of woven, filamented (fibre fill for pillows and clothing), rigid (flower pots, packaging materials) and film products. These types are very abundant in the post consumer category, such as beverage and food containers, and easily identifiable (numbered at the bottom).

Some product manufacturers utilize different packaging materials for the same product (Evian water bottles for example). To tell them apart, look for a button on the bottom which indicates that it is PET or bend the plastic: a crease mark shows that it is made of vinyl.

METALS

There are literally hundreds of types of metals that can be recovered from the commercial and industrial waste stream. The materials you will find in your audit will vary with the type of business you have. If your business is a restaurant, the metals may include aluminum cans from beverages and steel food cans from food production. If you are a manufacturer, and you use metal sheets, your metals would be specific to your production materials.

Local recycling centers may take a range of materials such as aluminum cans, tin cans, and scrap aluminum. Scrap metal processing businesses will take a range of metals including mixes of metals. If you have found metals in your audit, assess the volume, and contact a local scrap metal recycler to see what materials they take and their acceptable standards.

Aluminum is often the most valuable metal found in your audits. Aluminum cans (which contained carbonated beverages) are also subsidized through the California state bottle bill and together with the scrap price can make this material worth recycling in even small quantities.

Other recyclables that you may find in your assessment include:

- Yard Waste from the landscaping around your business.
- Wood pallets
- Food Waste

MARKETS FOR REUSE

Whether materials are reused in-house or sent off-site, reuse is a viable option.

Examples of in-house reuse include:

- Pallets.
- Packaging including boxes, polystyrene packaging pieces and peanuts, etc.
- Buying in bulk reduces packaging. Where possible, buy in reusable containers.
- Toner cartridges for computer printers.
- Office furniture.
- Office Supplies: Have a “clean out your desk day”, collecting paper clips, ink pens, file folders, and other office supplies that staff are not using and resupply the office supply room.

Reuse markets can be found following the same process as finding Recycling markets, and this will be presented later. In the telephone book, they may be listed as Second-Hand, Salvage, Reuse Centers, Thrift Stores or Depots.

CALMAX is a free materials exchange service of the California Integrated Waste Management Board. Listings are provided in three main sections: Available listings, Wanted listings, and Regional listings. All arrangements for materials are worked out between the interested parties. The CALMAX service includes a computerized bulletin board, as well as a catalog published every other month.

After you complete your waste assessment you will know which materials you have to work with.

RECYCLING PROGRAMS

Before you start a waste reduction program, it is important to know the businesses that are accepting materials and what materials they are accepting.

Make initial contacts:

- Your garbage hauler: most companies have recycling programs.
- Look in the telephone book under recycling, scrap metals, or waste paper.
- Call local cities and counties, find their recycling coordinators in the Solid Waste Division, Public Works, Public Health, or just call the general information number of your city and ask.

- State Hotline: Listing of local recyclers are available through the Department of Conservation and the CIWMB, both resources are listed at the back of this manual.
- Chamber of Commerce: more and more Chambers are looking at recycling and waste prevention and have made information available to their members.
- Trade associations: If you are a member of a trade association, they may have information and contacts for recycling information, or know of other members who are doing what you want to do. There are also trade associations of recyclers and they may refer you to a local recycler.
- The informal collector: Many areas have people who go around and pick up cardboard from the streets. Ask your business neighbors if there is an informal collector in your area.
- Public buy-backs and drop-off recycling centers: If the quantity is small, you may consider having a staff person take the materials to a local recycling center. If you have a one time large amount of a material, a local buy back may have customers that are willing to come over and pick the material up.

Questions to ask recycling companies when you call:

- What materials do you accept?
- Will you take a variety of materials? What are their definitions of material types?
- Will you help us with our audit?
- Do you have a collection system for these materials and service this area?
- What is the minimum quantity for the collection program? (They will ask how many employees you have working there to get a sense of how much you generate. If you have more exact figures from your audit, you can be clearer about what quantities you will have.)
- Do you pay for materials? How much? How often do you pay? Do you have references of your customers? (If a recycler is saying they you pay a price that seems too good to be true, ask arounddo they pay?...do they aggressively or unfairly downgrade? Downgrading means that, because of contaminants, the grade of material is reduced resulting in a lower price.)
- Will you supply the containers? Do you charge for the containers? How much? Will you collect within the building (or only on the loading dock or near the dumpster)? If there is a large quantity of a material, will you supply equipment such as a baler.
- Do you have staff that will help us set up a program? Hand-outs that explain the program?
- Will you send us tonnage reports? How often?
- You may want to go with a specific company, but keep up with the prices others are paying. Recycling is a competitive business, if you are not satisfied with your recycler, find one that will provide what you need. Small quantity generators have a

more difficult time because there may be a smaller group of recyclers willing to pick up their material.

Markets vary widely depending on whether your business is located near a port, railroad lines, or end markets for recyclables. In addition to those variables, the prices over the years look like a roller coaster ride. Prices on materials go up and down often month by month. If markets for a material are strong, recycling collectors will take smaller quantities and lower grades of material, but that could shift, ask your recycling collector for the outlook/trends for different materials.

Choosing the grades to recycle

What's important to you? Price for the materials? Diverted tonnage? Does your company have staff available to sort various grades of materials?

Remember that material not put in the dumpster means avoided disposal costs. If recyclables are being collected, but not paid for, the avoided disposal cost is the savings. Even when you have to pay to have recyclables picked up, the cost will generally be less than the trash hauling cost.

You may hear the word "co-mingled," which means different materials mixed together such as all beverage and food containers, or all recyclables in one container. The materials would be sent to a processing center or Materials Recovery Facility (MRF) to be sorted. Co-mingling materials may be helpful when space for separate containers is limited.

If you set up a high grade recycling program because the recycler will pay you for the material, and then you start buying recycled computer paper that is called, in the business, Groundwood CPO (a low grade material), you will not be able to put that material in your high grade collection program.

It is important to have a good relationship with your recycler so that you feel free to call and ask about the impact on your recycling program of making a procurement change.

Selecting Waste Reduction Strategies and Activities

Worksheet E from *A Guide for California Businesses* enables you to list potential waste prevention, recycling, composting and purchasing options that might be feasible for a waste reduction program in your assigned business. Information needed to fill out this worksheet will come from the business case study you were assigned to earlier in the workshop. Extra copies of business case studies are included in the appendices. Please select someone from your group to be a team leader in order to give a short presentation at the end and a team recorder to write down the group's ideas.

Each group should read the case study together, keeping in mind the information on the integrated waste management hierarchy, the benefits of waste reduction, how to get started and assessing the waste stream that was presented in previous sessions. The one-page form attached to the case study may help get your group thinking about the categories of waste reduction and a number of potential options listed in Appendix A of the CIWMB Guide.

As a group, please take 15 minutes to use either Worksheet E or the attached form to develop a list of 8-10 program options. At the end of 15 minutes, each team leader will present their group's top five waste reduction activities that they would undertake in their case business and why.

Developing and Implementing an Action Plan

The steps discussed so far include: recruit support, form a task force, identify a team leader, gather information, and develop and prioritize ideas. The Action Plan brings us to the next stage, turning all this planning and information gathering into action. This should not be a broad, long-range plan, but a strategic, step-by-step explanation of tasks to be accomplished with as much specificity as possible.

Every company or organization has its own style, and many have specific formats and formal requirements for planning. Even if a formal written plan is not required in your organization, it is helpful to put each of these elements in writing in order to clarify your thoughts and to make sure that everyone involved has the same vision of what will be done. In general, any action plan will have certain elements:

DEVELOPING AND IMPLEMENTING AN ACTION PLAN

- a. **Goals and objectives**
- b. **Specific measures to be taken**
- c. **Personnel assignments, including time required for training & supervision**
- d. **Any anticipated collateral impacts on operations**
- e. **Timeline**
- f. **Cost analysis**
- g. **Evaluation**

Goals and Objectives should be achievable and measurable: for example,

“To reduce the use of paper towels in employee bathrooms by 25% within the next six months.”

Specific measures to be taken may include things like changes to purchasing specifications, recycling collection program for particular materials, employee education programs, changes in procedures, etc., for example,

“Put signs on each paper towel dispenser asking people to take just one; maintenance staff will fill dispensers more often and not leave piles of towels on the counter where they get wet and wasted.”

Personnel assignments should include time required for training and supervision: for example, “Doris Jones will make the signs for the paper towel dispensers, and she and Bob Smith will put them up.

Maintenance supervisor Jill Brown will assign the night maintenance staff to fill dispensers, and the daytime maintenance staff to check and refill them after lunch.”

Anticipated collateral impacts on operations may include things like space taken by containers, production changes, rearrangement of staff schedules, etc. For example,

“To make recycling tin cans from the cafeteria kitchen easier, a new can opener will be installed on the counter next to the sink, where cans can be rinsed out. Food prep staff will try to get all cans opened before the dishwasher needs to use the sink, which means starting 1/2 hour earlier.”

Timeline may include time to order supplies, conduct pilot tests, schedule training, etc. For example,

August 1: place order for new can opener

August 7-15: can opener installed, staff trained

August 15: food prep schedule changed, 1/2 hour earlier start (trial week)

August 22: progress meeting with kitchen staff: schedule reviewed, finalized.

Cost Analysis will include both costs and benefits. Depending on the organization’s requirements and on the magnitude of the costs involved, it may be very simple, or much more detailed. For example,

COSTS:

| | |
|----------------|---------|
| New can opener | \$50.00 |
| Installation | \$20.00 |
| Bin for cans | \$25.00 |
| TOTAL | \$95.00 |

BENEFITS:

| | |
|---|------------|
| Reduced trash cost | \$30.00/mo |
| (reduce service from 6-yard 2X/wk to 8-yard 1X/wk + 2 barrels for tin cans 1X/wk) | |

The new recycling program will pay for itself in less than four months (not including labor costs which are minimal.)”

Evaluation is an important part of the Action Plan, and is reviewed in detail in the final section.

Implementation

Taking a waste reduction program out of the research and planning phases and into the real world of the workplace requires sensitivity and attention to details. Many of the issues that are important to successful implementation are evident during the information gathering and planning stages.

IMPLEMENTATION ISSUES

- a. **Maintaining top management support**
- b. **Integrating the program into routine operations and the “corporate culture”**
- c. **Motivating and educating employees**
- d. **Efficient materials handling and storage**
- e. **Employee health and safety**
- f. **Security and confidentiality**
- g. **Customer relations**

Maintaining top management support requires good communication. Top managers may not want to know every detail, but should be kept informed of the progress, obstacles and successes of the program. Depending on the executive’s individual management style, it may be appropriate to ask for frequent involvement. For example,

- ask him/her to be present at the inauguration of a new project.
- provide him/her with names of employees who have made a special contribution to the program, to be recognized with a personal note.
- provide him/her with information (or “ghost-written” text) to be used in company newsletter columns or shareholder presentations.

Integrating the program into routine operations and the “corporate culture” is an on-going goal. Waste reduction should be internalized as part of “the way we do things at XYZ Corporation.” Programs should be part of normal operations, not an extra add-on which can be dropped when the initial enthusiasm wears off. Some ways of institutionalizing waste reduction include:

- Adjust and fine-tune each element of the program so that it runs smoothly.
- Keep asking front line employees how the program can be made better.
- Keep abreast of changes in the company and make sure waste reduction is considered in the earliest planning stages.

For example,

“ Our new corporate offices were on the drawing boards when our waste reduction program was just starting up. We were able to work with the architects to include more room for recycling containers, and extra storage for reusable shipping containers in the receiving area. We pointed out that landscaping with shrubs and ground covers would generate less waste and use less water than lawns. We even influenced the decision to install a company-wide e-mail system as part of the new office!”

- Add waste reduction to employee orientation handbook and operation manuals.

Motivating and educating employees is a process that began with the initial information gathering. The key as always is to involve the people whose work will be affected by changes. Wherever possible, seek ways that the waste reduction program can make their work go more smoothly and efficiently. For example,

“The mailroom clerk was not very positive at first about the idea of reusable envelopes for reports coming in from all of the company’s locations. She thought it would be a hassle to collect them all and send them back. But then we suggested that the envelopes could be color-coded for the various departments they were to be sent to. She saw right away that this would make her mail-sorting job much more efficient, and she became a strong advocate for the program.”

or,

“When the foreman of the landscaping crew realized that the composting program would mean he’d get a new chipper and a trailer for hauling mulch around the grounds, he became much more interested. This was equipment he’d been wanting, and he saw that instead of creating more work for his crew, they’d actually be able to operate more efficiently.”

Efficient materials handling and storage is essential to a successful program. Space on loading docks, dumpster areas, and interior storage is seldom as plentiful as we might like. Materials collected for recycling are often spread throughout the operation, and must be handled more than once before final pickup. Reusable containers must be collected, cleaned, stored, and returned. It is helpful to use a “systems approach” when implementing a program, just as we did in the initial information gathering. Look at the movement of the material at every point. How can you minimize the number of times it is handled? How can collection be integrated into other functions? For example,

“Our data-entry staff workday ends at 5:00pm. They are asked to finish up around 4:45 to complete their daily reports and tidy up their workspaces before leaving. With our new recycling program, we ask each worker to bring their recyclables to a wheeled cart in a central area at this time. One person from each floor then brings the cart down with them and leaves it on the loading dock. When the custodial staff comes on duty, they empty the recycling carts into larger containers, and return the carts as they begin their cleaning on each floor. Our recycling program hasn’t added any extra trips to and from the dock!”

Employee health and safety: When materials are handled in new ways, careful attention should be given to any new hazards that may be created. For example, recyclables may have sharp edges. Large containers may be too heavy to lift safely. Fire regulations may affect storage of flammable recyclables. Placement of containers and equipment must allow for adequate workspace and traffic flow. Mechanical equipment such as balers and compactors require appropriate training and supervision. In larger companies, there will be a health and safety officer or department: their active participation will help eliminate any problem issues from the start.

Security and confidentiality issues may arise in a number of ways. For example, purchasing records are useful for determining waste reduction strategies as we have seen, but in some companies these records may be off-limits to all but certain staff people. A systems approach to

planning will help to take account of these various issues.

Customer relations: In a consumer-products or service company, the waste reduction program may be a valuable asset to the company image. The details will be unique to the company, but may range from a low-key approach such as a simple environmental policy statement on a package or sign, to a full-scale ad campaign based on a “green” identity. Perhaps the most important consideration when informing customers about the company’s environmental efforts is credibility. Most people with experience in “green marketing” will agree that it is better to understate than to overstate the company’s environmental track record.

For companies which market to industry rather than general consumers, the customer relations approach may be very different. Depending on the company’s type of business and its own “style,” waste reduction may be part of the “total quality” image. Cost-saving efficiencies can be presented as part of the company commitment to keep prices contained. If a major customer has a strong environmental commitment, your message may emphasize your compatibility.

Through the CIWMB Waste Reduction Awards Program, businesses that have successfully reduced a significant portion of their waste may apply for an award and receive statewide media recognition.

Program Monitoring, Measurement and Evaluation

Monitoring and evaluation are often the neglected steps in a program. It may seem that evaluation work requires extra time and effort that are not necessary if everyone is generally pleased with how the program is going. Too often, we realize the importance of measuring program progress as an after-thought, when we really need the data. For example, a new manager in the company may ask for a report on the waste reduction program, or you may be asked to present its progress to an annual meeting of the shareholders or to the budget committee of your government agency. It is important to determine your measurement approach at the beginning of your program.

Let's list some reasons for monitoring and evaluating a waste reduction program, and the benefits of reporting progress in as measurable terms as possible:

Reasons Why Monitoring, Measurement and Evaluation are Important

- 1. Employee commitment/participation will be greater when their ideas are heard** and taken into account. Make full use of the workplace's already existing channels for information **input and feedback**: regular management and employee meetings, with employee in-service training programs, bulletin boards, newsletters, monthly, quarterly, or annual awards announcements.
- 2. New management, a new administration, new ownership and new employees** will ask questions and need training in the program. **"Show me the numbers"** for company comptrollers and agency fiscal officers means that they are most convinced by quantitative data, especially the **disposal and purchasing cost savings**. They are more likely to support equipment purchases and other long-range investments in the program when you asked for their assistance in setting up the most efficient method for tracking the numbers.
- 3. "Feedback is the Breakfast of Champions."** Reporting to employees about how the program is working, milestone achievements to applaud and pointing out problems that need special attention and improvement will help to maintain their motivation to participate over time. So remember to report back to employees the results of monitoring and evaluation. The idea is not to produce meaningless data that informs no one!
- 4. A method for periodic or ongoing monitoring will help you to identify unexpected problems or shortcomings in the program quickly** so that you can take prompt, corrective actions. Likewise, you can also spot unexpected rapid progress and milestone achievements early and report on these successes.
- 5. "Rank and file" concerns** about how much the waste reduction program may change their job duties or increase their workload can be monitored and measured.

In the early stages of program planning and design, build into the program methods for periodic information gathering -- both qualitative and quantitative -- so that the extra effort for evaluation is minimized.

For Quantitative Monitoring and Measurement — Tracking the Numbers

- Start by determining how you want to measure results, in labor hours, in dollars, in pounds. How will you know if milestones are being met and objectives achieved?

➤ Look for ways to integrate waste reduction data measures into the workplace's already-existing recordkeeping systems for purchasing, production, shipping and receiving, and disposal. This objective --to not duplicate effort, or create extra recordkeeping work-- is becoming easier as more workplaces make full use of computer software for management information systems.

➤ Be sure to ask frontline employees who you may rely on for monitoring or recording data for their advice in setting up the system.

For Qualitative Monitoring and Evaluation

➤ The numbers alone won't give you the information you need about a new program. Your waste reduction team can share the responsibility for asking employees about how it's going.

➤ Spot reality checks and eye estimates give you a better sense of what is actually happening. For example, your own experience in trying out a fancy new office paper recycling container may reveal that it is too small and impractical for employee use.

➤ Set aside a time at regular staff meetings to hear how employees feel about how the waste reduction program is working. This is also a way to meet employees who have developed a special interest in the program and can be groomed for future leadership in the waste reduction team.

Finally, over time, your waste reduction program will become institutionalized and integrated into the company's or agency's systems, planning, and hopefully, the company's or agency's "corporate culture."

Resistance to Change

Be prepared that while you and the members of your waste reduction team may be very enthusiastic about the benefits of a new waste reduction program, not everyone will be eager to make the changes necessary for a successful, company-wide program.

The "rate of adoption" (of innovations-- new ideas or practices) within any given population is often described in terms of how people typically fall into the following five categories:

- Innovators
- Early Adopters
- Majority
- Late Majority
- Laggards

You can expect that a certain percentage of employees will be resistant to changes brought on by a new waste reduction program. After everyone is given the opportunity for training, then, the most effective use of your time will be to make sure that the bulk of employees in the Early Adopters, Majority, and Late Majority categories are trained and supported in their efforts to participate in the new waste reduction program.

REASONS TO MONITOR, MEASURE & EVALUATE YOUR WASTE REDUCTION PROGRAM

- Employee commitment and participation.
- Information for management.
- “Feedback is the Breakfast of Champions.”
- Spot unexpected problems quickly.
- Information about changes in jobs and employee time.

Statewide Waste Reduction Training Program

Case Study 1:

Large Mall

The enclosed two story mall has a total of 100,000 square feet of leasable area. The mall currently contains four large anchor stores and 60 smaller retail stores and restaurants. There is a 4 screen movie theater as one of the tenants. Three spaces are vacant and are being offered for lease. Two of the anchor stores have their own loading facilities, the others utilize the other loading docks shared by all of the tenants.

The mall property management company has an office in one of the wings of the mall. The office is a small administrative office consisting of two conference rooms and a dozen administrative offices and a small reception/secretarial area. There is a photocopy room. The management company is about to order a new photocopy machine because the old machine is too slow and is breaking down much too often. The management company is in the process of preparing the specification for buying a dozen computers.

The management company is part of a very large company that specializes in mall management and operations. The main corporate office is in another city and the mall management company is constantly faxing materials to the corporate office. The mall management company sends weekly reports (average size 200 pages) to the corporate office by express mail. There is a small lunch room with a microwave oven in the management office facilities.

The property management company has a 34-hour security service on-site next to the property management office. The mall property management company employs 40 persons (30 office/secretarial and 10 security). The management company contracts the janitorial service to an independent contractor. The contract will be up in a month. The janitorial service has a single room office and a storage room for their supplies and equipment.

Each of the anchor tenants have their own administrative and management office in their own store. The mall's public restroom facilities are located on the lower floor. The restroom facilities are neatly maintained. Janitors check (and clean if necessary) the facilities and remove trash and discard paper towels every two hours.

The food shops and restaurants are all located in one area on the lower floor. The food shops and restaurants are located next to one of the loading docks. All of the food shops and restaurants are of the "fast food" variety.

The trash bins are located adjacent to each of the loading docks. the trash hauler is a major national solid waste management company. The trash hauler's records show that there are four 20-cubic yard roll offs and a total of eighteen 3-cy container that are being serviced six days a week. their contract is up for renewal in two years. **There are no existing diversion programs of any kind.**

The mall is very popular and enjoys a very high gross sales to leasable square footage ratio. the property management company is planning to add an expansion (another leasable 500,000 square

feet) onto the existing mall within two years. The plans are being drawn up and will be finalized within six months. Contracts with two high end large anchor stores are being negotiated currently. Part of the expansion is to develop a large food court area with several exclusive sit down restaurants.

The mall has a very small amount of outdoor landscaping consisting of trees and bushes located on a lawn green belt around the parking lot. There are also small trees and ornamental bushes in concrete planters within the mall enclosure. The mall management contracts with an independent contractor to maintain the landscaping and interior plants.

A waste characterization was performed by jurisdiction in 1991 for their AB939 study. The management company said the waste sorters took a bit of trash from every bin and combined it into a single sample and sorted it. The average waste composition by weight percentage is attached:

TABLE 1
MALL WASTE COMPOSITION

| | | |
|------------------------|--|--------------------------------------|
| Paper 55.2% | Cardboard/Kraft Paper Newspaper High Grade Paper Mixed Paper | 25.9% 2.8% 1.3% 25.2% |
| Plastic 14.9% | PET Bottles HDPE Containers Film Plastics Polystyrene Other Plastics | 0.1% 0.5% 8.9% 1.9% 3.5% |
| Glass 2.3% | CA Redemption/Refillable/ Recyclable Other Glass | 2.2% 0.1% |
| Metal 2.2% | All Types | 2.2% |
| Yard Waste 0.8% | All Types | 0.8% |
| Other Organic 21.1% | Food Waste Rubber Wood Waste Textile & Leather | 11.6% 0.2% 4.6% 0.5% |
| Other Waste 2.4% | All Types | 2.4% |
| Special Waste 0.0% | All Types | 0% |
| TOTAL | | 100% |

Prepared by Eugene Tseng and Associates

Case Study 2:

Real Estate Sales Office

The real estate office is located in the commercial district in a stand alone one story duplex building which houses a small sit-down Mexican Restaurant and a real estate office. They are located in the City of rapid Growth. The building is owned by an absentee owner. Part of the building is leased to the restaurant and part of the building is leased to the real estate business.

The real estate business has been there for 10 years. The office is furnished with 40 new modular systems office furniture units installed a year ago. There is a telephone on each desk. Each modular office is supplied with a set of "multiple listing" catalogs, updates and flyers. There are a half a dozen office administrator and manager offices and one large owner/broker office. There are 2 computers in a central computer are that all of the employees share. The business of this real estate office is about 30% residential property sales/leases and about 70% commercial/industrial sales and leases.

There are 3 small conference rooms used primarily by the commercial/industrial sales group. There is one large room that is being used as both a lunch room and photocopy room. There is a refrigerator/freezer and a small microwave supplied by the office. All of the trash in this room is discarded into one large container located next to the refrigerator. One small closet is being used as a supply room where office supplies and photocopy paper is inventoried. the office also sublets part of the building to an independent escrow service with 8 employees.

Their 60 "employees" who are independent contractors with their own real estate license and contract with the managing broker/owner who provides the office, supplies, and support staff for a part of the sales commission. There are two full time receptionists and two full time secretaries. Most of the employees dealing with residential properties are usually in the field. The employees dealing with the commercial and industrial properties spend much more time in the office and deal primarily with businesses wishing to locate in the City of Rapid Growth.

The commercial and industrial property side of the business is growing at a rapid pace. The broker is going to develop a strategic plan to deal with all of the new businesses and how to staff up to handle business.

The trash service is contracted to a small independent hauler. There is no waste prevention or recycling activity currently taking place. the real estate business and the restaurant share two 3-cy bin in the alley in the back of the facility by the employee parking lot. The hauler services the bins 7 days a week. The jurisdiction performed a waste composition study in 1991 for AB939 Solid Waste Generation Study. the restaurant was not there in 1991. At the time of the composition study, the restaurant side of the building was not leased. The waste composition from the 1991 study is attached:

TABLE 2
OFFICE BUILDING WASTE COMPOSITION

| | | |
|------------------------|--|--------------------------------------|
| Paper 74.6% | Cardboard/Kraft Paper Newspaper High Grade Paper Mixed Paper | 3.9% 10.0% 25.8% 35.1% |
| Plastic 6.8% | PET Bottles HDPE Containers Film Plastics Polystyrene Other Plastics | 0.1% 0.4% 2.3% 1.9% 1.9% |
| Glass 2.4% | CA Redemption Other Recyclable Other Glass | 1.1% 1.1% 0.2% |
| Metal 2.3% | All Types | 2.3% |
| Yard Waste 1.3% | All Types | 1.3% |
| Other Organic 12.3% | Food Waste Textile & Leather Miscellaneous Organics | 10.6% 0.2% 1.4% |
| Other Waste 0.1% | All Types | 0.1% |
| TOTAL | | 100% |

Prepared by Eugene Tseng and Associates

Statewide Waste Reduction Training Program

Case Study 3:

Hotel

The hotel is located in a tourist/commercial district of the City of Hot Resort. the hotel is a modern glass and steel/concrete structure with 500 rooms. The hotel employs 200 persons. There is an elegant four-star rate restaurant on the top floor which serves continental cuisine. There is a coffee shop, a Chinese restaurant, a regional specialty fried chicken restaurant, and a bar lounge on the lobby floor.

The hotel has business conference facilities located on the second floor. The conference facilities are used quite frequently for conferences and association meetings. The hotel also has a business center where guests can have access to a computer, printer, copier, and fax service. The administrative offices are located on the second floor. There is an outdoor pool/spa and patio area. Part of the 500 rooms in the hotel are currently being repainted and upgraded.

The hotel provides a free newspaper every morning to every guest. Guest are provided a fruit basket (in disposable containers) on their first day. Hotel sundries (shower cap, small bottles of shampoo, etc.) are provided to every room and replenished every day. Disposable cups are provided in each room. Ice and soda machines are located on every floor. Plastic laundry bags are provided in the closet.

Each room also has a small guest bar. Each room has a telephone and a set of telephone books and a Bible. A small coffee table and sofa is provided in each room. Miscellaneous brochures on television/movie programming and local events are also provided in each room. In the lobby is a rack of brochures which describe the local tourist attractions.

Linen service is contracted out as with the guest clothes dry cleaning/washing service. Worn linens are discarded by the hotel. Clothes that are left by the guests which remain unclaimed after 6 months are discarded with the worn linens.

The hotel is surrounded by a large lawn area which includes a putting green area which is carefully maintained. There are many trees and ornamental bushes surrounding the hotel. The landscaper maintenance crew is part of the hotel staff. Landscaping wastes are thrown into the roll off container or bins located by the loading dock. the loading dock for the hotel is fairly spacious for truck maneuvering and loading.

There is one 20 yard roll off bin and three 3-cy bins that are serviced 5 days per week (Monday-Friday). The hauler the services this hotel also provided services for the other hotels in your chain. You have been provided with a waste composition that was completed at another hotel (same chain as this one, but smaller number of rooms) during 1991. The waste composition study is attached:

TABLE 3
HOTEL WASTE COMPOSITION

| | | |
|------------------------|--|--------------------------------------|
| Paper 35.9% | Cardboard/Kraft Paper Newspaper High Grade Paper Mixed Paper | 8.9% 11.7% 1.2% 14.2% |
| Plastic 7.5% | PET Bottles HDPE Containers Film Plastics Polystyrene Other Plastics | 0.6% 0.6% 3.4% 0.9% 2.1% |
| Glass 5.4% | CA Redemption/Refillable/Recyclable | 5.4% |
| Metal 4.6% | All Types | 4.6% |
| Yard Waste 5.6% | Tree Trimmings | 5.6% |
| Other Organic 31.4% | Food Waste Wood Waste Textile & Leather Miscellaneous Organics | 17.3% 3.3% 1.7% 9.2% |
| Other Waste 7.8% | All Types | 7.8% |
| Special Waste 1.7% | All Types | 1.7% |
| TOTAL | | 100% |

Statewide Waste Reduction Training Program

Case Study 4:

Outdoor Clothes Sales Company Distribution Center

The OSC Company designs, distributes, and sells high quality clothes and related gear for outdoor travel related activities such as fishing, paddling, surfing, sailing, hiking, biking, adventure travel etc. The products are sold via dealers, their own stores, or mail order in North, Central, and South America, Europe, Japan, Korea, and Australia. Although they design and distribute their own products, they do not own any manufacturing capacity. Typically they buy fabric and trims (buttons, zippers, snaps, etc.) made to their specifications and then have them shipped to a contractor that sews their products. The majority of the products sold is outdoor clothing.

The distribution center is a 120,000 square foot facility that includes activities such as receiving, stocking, wholesale, retail, mail order, and international shipping, returns and guarantee departments, child care, and quality control. Approximately 85 people work at this location.

The distribution center also has a large administrative office and a financial office. The company has an extensive computer system (local area network) which is used to fill the mail orders. The administrative office also has an art department where much of the design work for the mail catalogs are completed. The distribution center also includes a self-contained print shop where the catalogs are printed and mailed.

The administrative and financial offices keep track of all the mail order status and inventory. This office prints daily inventory and sales reports and sends them to the corporate office in another city. A copy of the daily administrative and financial report (approximately 100 pages) is given to all of the administrative and financial staff. All reports which are outdated are shredded and disposed of.

The distribution center has a large mail section where the mail orders are processed. The mail order envelopes are opened and the orders typed into a computer system. Once the orders are typed in, the original (paper copy) order is filled and put into storage with other records for storage for five years. The order is filled by a person in the warehouse section reading the fill order from a computer screen. The warehouse person gets the order and sends it with a computer printed label and packaging slip to the shipping department.

The shipping department clerk gets a new cardboard box and assembles it and fills the order and packs the empty space with polystyrene peanuts. Plastic tape is used to seal the box in preparation for shipping. Once the order is packed and readied for shipment, the shipping clerk types into the computer in the shipping department that the order was filled. After the package is picked up by the UPS truck, the shipping clerk enters the shipping date into the computer.

The receiving area has two large spacious docks. The products which are assembled by the contractors are shipped to the distribution center by trucks owned by OCS. The clothing products are packed in large cardboard boxes which are hauled back to the contractor and reused once they are emptied. The large cardboard boxes last only two round trips and are then

discarded. Other products are received on wooden pallets which are reused four times and then disposed of by the distribution center.

Return catalogs are disposed of in the trash. The distribution facility has a child care center that hosts about 20 kids. The employee lunch room and kitchen is located next to the child care center. there is a microwave oven and two refrigerators in the lunch room/kitchen. There is a coffee and hot water machine as well as a coin operated soda machine.

The facility manager tells you that the hauler comes every day, five days a week, and that he just came by to pick up the trash so there is nothing to look at in the trash bins. The facility manager tells you that the wastes generated at this facility are typical warehouse wastes (cardboard, paper, and plastics products), paper towels, obsolete wood pallets and food waste.

The janitor tells you that the trash is picked up from the different parts of the distribution center in the evenings and all thrown together into the bins and the rolloff containers that are located by the loading docks. the distribution facility is surrounded by a very large lawn area. The lease requires the OCS maintain the large grass area surrounding the facility. The landscape maintenance service is an independent contractor who removes the greenwaste from the facility and disposes of it in the local landfill.

Prepared by Gainer & Associates

Statewide Waste Reduction Training Program

Case Study 5:

Independent, “Family Style” Restaurant

The hungry Hound is a family-operated restaurant which has been a fixture in its small community for more than two decades. Over the years it has grown from little more than a diner to a full-scale restaurant. Several additions over the years have included a banquet room where several civic groups hold regular meetings and which is often rented for events such as wedding receptions; a salad bar and pasta bar where an “all you can eat” lunch is served; and most recently an espresso cafe with seating on the sidewalk. Except for this cafe, the restaurant is closed on Mondays, but serves three meals per day on Tuesday - Sunday. The Hungry Hound serves wine and beer but has no bar.

The back-of-the-house area are cramped and crowded, as remodeling of these areas has not kept pace with increased business. The parking lot is also undersized, and the owners are considering purchasing a vacant lot next door. A small “corral” at one edge of the parking lot houses a single, six yard trash dumpster. This dumpster is emptied three days a week on Mondays, Wednesdays, and Fridays. It is often overfilled on busy weekends.

The Hungry Hound purchases bread, milk, and some produce from local vendors. Due to lack of space inside, plastic bread trays and milk crates are stacked outside the back door for pickup by vendors; there have been several thefts of milk crates. The restaurant receives a large shipment from a food distributor in a nearby city each Wednesday. This is mainly canned and dry goods, which are unpacked immediately and stored in can racks and plastic bins, respectively. Cleaning products are also ordered through the food distributor, these are mostly in quart plastic bottles or aerosol cans, packed twelve/case.

The restaurant is not recycling any material except for used cooking grease. (The grease bin sits outside the back door and has been cited by the Health Department because grease spilling from it has partially dissolved the asphalt and is running into a nearby storm drain.) Joe, the eldest son of the owners, is gradually taking over the restaurant operation. He dreams of improving the kitchen, enlarging the parking area, and landscaping the property, which currently has only a couple of small planters of flowers near the entrance.

Because of a local landfill closure, trash rates have almost doubled in the last year. Joe asked the county recycling coordinator for help and a waste analysis has been completed.

TABLE 5
RESTAURANT WASTE COMPOSITION

| | | |
|---------------------|---|---------------------------|
| Paper 40% | Cardboard Newspaper High grade (white office) paper Mixed Paper | 35% .5% .5% 4% |
| Plastic 3% | PET bottles HDPE containers Film plastics Polystyrene, other plastics | .5% 2% .25% .25% |
| Glass 5.5% | CA Redemption glass Other glass | 3.5% 2% |
| Metals 7.5% | Steel cans Aluminum trays & foil Aluminum cans Other metals | 6% 1% .25% .25% |
| Food Waste 42.5% | Food preparation waste (trimmings) Edible food Postconsumer food (dishroom) | 5% 2.5% 35% |
| Other 1.5% | All Types | 1.5% |
| Total | | 100% |

Prepared by Connie Cloak of C2 Alternative Services

Case Study 6:

School in a Unified School District

The school is “middle” school (junior high) which has 1000 students and 120 full and part time employees. The school consists of traditional bungalow buildings for homeroom classes. The students go to different rooms during each of the periods for the different topics of study. The school has a gymnasium and a large grass field used for physical education. The landscaping around the school consists of ivy, large oleander bushes, and old junipers that have overgrown. The school plans to re-landscape the school. The landscapers are independent contractors that are directly contracted with the unified school district administrative offices and service all the other schools in the district. the contract is up for renewal in another 6 months. The greenwaste is disposed of in the school bins on campus.

The school has a cafeteria that serves hot food for lunch and a small store that sells student supplies and candy/snacks. The school has minimal cooking facilities that prepare and heat up the prepackaged cafeteria food that is delivered daily by a school lunch vendor. The lunch vendor is contracted with the school district to deliver the same pre-set food to all the schools in the districts. The lunch package consists of a polystyrene tray with the food, and one set of disposal silverware all shrink wrapped together. A pint of milk or juice is provide in a polycoated container.

There is a soft drink vending machine located next to the gymnasium. The school has a building for administration, another building for maintenance of school equipment, and a warehouse/storage on site. There is another separate building which contains a darkroom which is utilized by the photography class and the photography club on campus. The warehouse consists mostly of old books which will soon be replaced. All the obsolete books are sent to the landfill. New books are delivered in cardboard boxes which are shrink wrapped onto wooden pallets. The books come from the central book warehouse belonging to the unified school district. Once the books are unboxed, the shrink wrap, boxes and pallets are discarded.

The janitorial staff remove the waste from the different rooms and dump them into 3 cubic yard bins that are located around campus. There is one bin by the wood and metal shop. Another two bins located in the back of the cafeteria in which the cafeteria and the wastes from administrative offices are thrown into. There is another bin located by the play field next to the bleachers.

The school also has a small plot of land next to the PE field which the gardening class uses to plant various crops and flowers.

The hauler is a large national firm and services the other schools in the district. The hauler estimates that about 100 tons of waste per year is disposed of by this school. A waste composition study which was performed at another school (in another school district) in the same county was provided by the County Recycling Coordinator.

| TABLE 1 USD WASTE COMPOSITION | | |
|----------------------------------|-------------------------------------|-------------|
| Paper | Cardboard / Kraft Paper | 5.2% |
| | Newspaper | 2.6% |
| 41.4% | High Grade Paper | 6.9% |
| | Mixed Paper | 26.6% |
| Plastic | PET Bottles | 0.4% |
| | HDPE Containers | 0.9% |
| 12.7% | Film Plastics | 4.4% |
| | Polystyrene | 2.7% |
| | Other Plastics | 4.4% |
| Glass | CA Redemption/Refillable/Recyclable | 1.6% |
| 1.8% | Other Glass | 0.2% |
| Metals | Aluminum Cans | 0.5% |
| | Other Aluminum | 1.8% |
| 6.2% | Ferrous Metals | 0.7% |
| | Tin Cans | 2.2% |
| | Other Metals | 1.1% |
| Yard Waste | Leaves and Grass | 0.4% |
| 5.7% | Tree Trimmings | 1.0% |
| | Other Yard Waste | 4.3% |
| Other Organics | Food Waste | 17.0% |
| | Tires | 0.6% |
| 30.7% | Rubber | 0.3% |
| | Wood Waste | 2.0% |
| | Textile & Leather | 2.2% |
| | Miscellaneous Organics | 8.6% |
| Other Waste | All Types | 1.5% |
| 1.5% | | |
| Total | | 100% |

Prepared by Eugene Tseng and Associates

***6 Case Studies are attachments to
the California Integrated Waste Management Board's
Establishing a Waste Reduction Program at Work,
Trainer's Manual & Participant's Manual***

TERMS AND DEFINITIONS

| | |
|---|---|
| Baler | A machine used to compact recyclables into bundles to reduce volume. Paper products, corrugated cardboard, plastics, and aluminum and steel cans are commonly baled. |
| Bi-Metal Container | Any metal container that contains at least two different metals such as a steel-bodied can with an aluminum top. |
| Boxboard | Paper product used for office supply, cereal, cracker and shoe boxes, usually made from mixed waste paper. Not to be confused with corrugated cardboard. |
| Commingling | The mixing of materials during collection. |
| Compactor | A machine used to compress materials to a smaller volume. |
| Composting | The controlled process whereby organic materials are biologically broken down and converted into a stabilized humus material. |
| Computer Paper | Also known as CPO, or computer print-out. High quality white paper used either with tractor-feed or single sheet printers. May have blue, green or other color stripe printed on surface, but the basic fiber color is white. |
| Construction & Demolition Debris | Any waste resulting from construction , remodeling, repair, or demolition operations on pavement, buildings, or other structures. Waste that includes lumber, drywall, concrete, pipe, brick, glass, electrical wire, and rubble. |
| Consumption | The amount of any resource (material or energy) used in a given time. |
| Contaminant | A material that is harmful or undesirable to the recycling process when it is included with a recyclable material. |
| Container Rental | The monthly fee for having a compactor or dumpster on-site. |
| Corrugated Cardboard | Also known as cardboard box, and commonly used as a shipping container. Paper product made of unbleached kraft fiber, with two heavy outer layers and a wavy inner layer to provide strength. |
| Cullet | Container glass that has been sorted, crushed, and cleaned for glass factory furnaces to be manufactured into new containers. |
| Disposal | Management of solid waste through landfilling, incineration, or other means at permitted solid waste facilities. |
| Disposal Cost Savings | Economic savings from reduced waste hauling operational expenses and avoided disposal facility tipping fees. |
| Diversion Rate | The amount of all materials recycled as a percentage of the municipal solid waste stream. |

| | |
|------------------------------|---|
| EcoPurchasing | A source reduction strategy used by purchasing managers to select products that create the least amount of waste and toxicity. |
| Ferrous Metals | Metal containing iron (such as steel) in sufficient quantities to allow for magnetic separation. |
| Food Waste | Vegetable and animal food wastes resulting from food preparation, storage, or serving activities. |
| Gaylord | A 1.4 cubic yard cardboard container used to store loose materials. |
| Generation Data | Information on waste amounts derived from actual waste materials produced - usually determined by assessing waste bin on-site. |
| Generator | An individual, company, organization or activity that produces wastes or recyclable materials. |
| Hauler | A company that collects garbage and/or recyclable materials. |
| Hazardous Waste | Waste requiring special precaution in its use, collection, storage, transportation, treatment, or disposal to prevent injury to human health or the environment. Includes flammable, corrosive, ignitable, reactive, toxic, radioactive, volatile and pathological materials. |
| HDPE | High-density polyethylene, or #2 plastic. A plastic resin used for the manufacture of milk jugs, laundry product containers, margarine and butter tubs, and some plastic bags. |
| Landfill | A land waste disposal site that is designed to minimize water pollution from run-off and leaching. |
| Ledger | A paper category that includes most office paper, such as letterhead, computer paper, copier bond, and notebook paper. |
| Market | A business or industry that accepts recyclable materials for further processing or final manufacturing into new products. |
| Materials Exchange | See Waste Exchange |
| Mixed Paper | Types of paper that are not included in the high-grade category, such as envelopes, manila folders, junk mail, greeting cards, wrapping paper, glossy inserts, catalogs, and magazines. |
| Municipal Solid Waste | That portion of the waste stream that includes residential waste, commercial/institutional waste, and some light industrial waste. It does not include hazardous waste, radioactive waste, medical waste, or heavy industrial waste. |
| Non-ferrous Metal | Scrap metal that a magnet will not attract, such as aluminum, copper, lead, zinc, brass, precious metals, and other alloys. |
| Pallet | A wooden platform placed underneath large items so they may be picked up and moved by a forklift. |

| | |
|-------------------------------|---|
| PET | Polyethylene terephthalate or #1 plastic. Clear plastic resin used in the manufacture of soda and liquor bottles, and some food containers, such as peanut butter jars. |
| Postconsumer Waste | Waste materials generated by businesses or households. |
| Preconsumer Waste | Waste, scrap, or offcuts from industrial and manufacturing processes (it has not been used by businesses or households). |
| Processing | Operations performed to make recyclable materials more marketable. Processing may include sorting, baling, grinding, pelletizing or crushing. |
| Pull Fee | The charge for collecting and transporting waste to a waste disposal facility. |
| Recyclable Material | Those materials that are capable of being recycled and which would otherwise be discarded as solid waste. |
| Recycled Content | That part of a product which has been manufactured using preconsumer or postconsumer recycled material. |
| Recycling | The process by which materials otherwise destined for disposal are collected, remanufactured, and purchased. |
| Reuse | The use of a product more than once in its same form for the same or similar purpose. |
| Roll-Off | A special truck which deposits and picks up a 10-to-50-cubic yard container at a site. |
| Secondary Materials | Recyclable materials such as waste paper and scrap metal. |
| Sludge | Solid or semi-solid residue resulting from waste water treatment or industrial processes. |
| Solid Waste Management | The administration of activities that provide for the collection, storage, transportation, processing, treatment and disposal of solid waste. |
| Source Reduction | Strategies that reduce the total amount and/or toxicity of the materials entering the waste stream. Also referred to as “waste prevention.” |
| Source Separation | The process of segregating various materials by type at the point of generation in order to manage them through recycling, composting or other waste handling system. |
| Special Waste | Solid wastes/recyclables that can require special handling and management, such as used motor oil, whole tires, white goods, mattresses, lead-acid batteries, furniture and medical wastes. |
| Tin Cans | Food and beverage cans with steel bodies that are plated with tin. More correctly referred to as steel cans. |

| | |
|-------------------------|---|
| Tipping Fee | Charge for dumping (“tipping”) a container of waste at a landfill, incinerator or other waste disposal facility. The fee is usually dollars per ton. |
| Virgin Materials | Natural resources, such as oil, timber, natural gas, and minerals that are extracted from the earth, as opposed to secondary materials that have already been used at least once. |
| Waste Assessment | An on-site assessment of the waste stream and recycling potential of an individual business, industry, institution, or household. |
| Waste Exchange | Two or more companies exchange materials that would otherwise be discarded. It may also be an organization with electronic and/or catalog networks to match companies that want to exchange their materials. |
| Waste Prevention | See “Source Reduction.” |
| Waste Stream | The total flow of solid waste generated by a business, industry, institution, household, or municipality. Components of the waste stream are reduced by implementing source reduction, reuse, recycling, and composting techniques. |
| White Goods | Large appliances such as refrigerators, stoves, water heaters, washers, dryers, and air conditioners that are made of enameled metal. |
| Yard Waste | The portion of the waste stream consisting of vegetative matter resulting from landscaping, maintenance and land clearing operations, such as leaves, grass clippings, brush, tree trimmings, and garden wastes. |

INFORMATION RESOURCES

ORGANIZATIONS

Aluminum Recycling Association

1000 Sixteenth Street, NW, Suite 603
Washington, DC 20036
(202) 785-0951

American Paper Institute

260 Madison Avenue
New York, NY 10016
(212) 340-0600

American Plastics Council

1275 K Street NW, Suite 400
Washington, DC 20005
(202) 371-5211

Appliance Recycling Centers of America (Northern California)

745 85th Avenue, Units M&N
Oakland, CA 994621
(510) 562-6227

Appliance Recycling Centers of America (Southern California)

1920 Acacia Avenue
Compton, CA 90220
(310) 763-2212

Business for Social Responsibility

1683 Folsom Street
San Francisco, CA 94103
(415) 865-2500

Buy Recycled Campaign

National Recycling Coalition
1727 Knight Street, Suite 105
Alexandria, VA 22314-2720
(703) 683-9025

California Chamber of Commerce

P.O. Box 1736
Sacramento, CA 95812-1736
(916) 444-6670

California Resource Recovery Association

4395 Gold Trail Way
Loomis, CA 95650
(916) 652-4450

Californians Against Waste

926 J Street, Suite 606
Sacramento, CA 95814
(916) 443-5422

The Composting Council

114 South Pitt Street
Alexandria, VA 22314
(703) 739-2401

Co-op America

2100 M Street NW, no.403
Washington, DC 20037
(202) 872-5307/(800) 424-2667

Council on Packaging in the Environment (COPE)

275 K Street, NW, Suite 400
Washington, DC 20005
(202) 331-0099

Environmental Action Foundation

1525 New Hampshire Avenue, NW
Washington, DC 20036
(202) 745-4870

Environmental Defense Fund

257 Park South
New York, NY 10010
(212) 505-2100

Environmental Protection Agency (Region IX)

75 Hawthorne Street
San Francisco, CA 94105
(415) 744-2080
1-800-EPA-WISE

Flexible Packaging Association

1090 Vermont Avenue, NW, Suite 500
Washington, DC 20005
(202) 842-3880

Food Service and Packaging Institute

1025 Connecticut Avenue, NW
Washington, DC 20005
(202) 347-0020

Glass Packaging Institute

1627 K Street, NW, Suite 800
Washington, DC 20006
(202) 887-4850

Green Hotels Association

PO Box 420212
Houston, TX 77242-0212
(713) 789-8889

Institute of Packaging Professionals

11800 Sunrise Valley Drive
Reston International Center
Reston, VA 22091
(703) 620-9380

Institute of Scrap Recycling Industries

162 K Street, NW
Washington, DC 20006
(202) 466-4050

Keep America Beautiful

9 Broad Street, West
Stamford, CT 06902
(203) 323-8987

Municipal Solid Waste Management Assn.

1620 I Street, 4th Floor
Washington, DC 20006
(202) 293-7330

The National Association of Home Builders Research Center

400 Prince George's Boulevard
Upper Marlboro, MD 20772-8731
(301) 249-4000

National Association for Plastic Container Recovery (NAPCOR)

4828 Parkway Plaza Blvd., Suite 260
Charlotte, NC 28217
(704) 357-3250

National Office Products Association

301 North Fairfax Street
Alexandria, VA 22314
(703) 549-9040

National Recycling Coalition

727 Knight Street, Suite 105
Alexandria, VA 22314-2720
(703) 683-9025

National Solid Waste Management Assn.

1730 Rhode Island Avenue, NW, Suite 1000
Washington, DC 20036
(202) 659-4613

Northern California Recycling Association

P.O. Box 5581
Berkeley, CA 94705
(510) 893-7066

Paperboard Packaging Council

1101 Vermont Avenue, NW, Suite 411
Washington, DC 20005
(202) 289-4400

Scrap Tire Management Council

1400 D Street NW
Washington, DC 20005
(202) 408-7781

Solid Waste Assn. of North America

8750 Georgia Avenue, Suite 140
Silver Spring, MD 20910
(310) 585-2898

BOOKS AND GUIDES

The Bottom Line of Green is Black: Strategies for Creating Profitable and Environmentally Sound Businesses (1993)

Tedd Saunders & Loretta McGovern
HarperCollins Publishers
10 East 53rd Street
New York, NY 10022

Business Guide for Reducing Solid Waste (1994) (EPA 530-K-92-004)

Call EPA RCRA/Superfund Hotline
(800) 424-9346 or (703) 412-9810

Business Recycling Manual (1991)

INFORM, Inc.
381 Park Avenue, South, Suite 1201
New York, NY 10016
(212) 689-4040

Buy Recycled Products: How Your Office Can Complete the Recycling Loop (1991)

National Office Paper Recycling Project
US Conference of Mayors
1620 Eye Street, NW, Fourth Floor
Washington, DC 20006
(202) 293-7330

Directory of US & Canadian Scrap Plastics Processors & Buyers (1994)

Resource Recycling, Inc
PO Box 10540
Portland, OR 97210
(503) 227-1319

Ecopreneuring (1991)

Stephen J Bennett
John Wiley & Sons
605 Third Avenue
New York, NY 10158-0012

Environmental Dividends

INFORM, Inc.
381 Park Avenue South, Suite 1201
New York, NY 10016
(212) 689-4050

Environmental Executive Directory (1992)

Carroll Publishing Company
1058 Thomas Jefferson Street, NW
Washington, DC 20007
(202) 333-8620

The Green Encyclopedia (1992)

Irene Frank & David Brownstone
Prentice-Hall General Reference
15 Columbus Circle
New York, NY 10023

***Green is Gold: Business Talking to Business
About the Environmental Revolution (1991)***

Patrick Carson & Julia Moulden
HarperCollins Publishers Ltd.
Suite 2900, 55 Avenue Road
Toronto, Ontario, M5R 3L2

***In Search of Environmental Excellence:
Moving Beyond Blame (1990)***

Bruce Piasecki & Pete Asmus
Simon & Schuster/Touchstone
Rockefeller Center
New York, NY 10020

The Official Recycled Products Guide

Recoup Publishing Ltd.
PO Box 577
Ogdensburg, NY 13669
(800) 267-0707

Packaging for the Environment (1991)

E. Joseph Stillwell, R. Claire Canty, Peter W.
Kopf, Anthony M. Montrone
AMACOM Books
135 W. Fiftieth Street, 15th Floor
New York, NY 10020

Recycled Products Guide (1992)

Federal Supply Service
US General Services Administration
Centralized Mailing List Service
PO Box 6477
Fort Worth, TX 76115
(817) 334-5215

***Recycling and Source Reduction for the Lodg-
ing Industry (1993)***

American Hotel and Motel Assoc.
1201 New York Avenue, NW
Washington, DC 20005-3917
(202) 289-3100

***Reusable Transport Packaging Directory
(1994)***

Kenneth Brown and David Van Hattum
Minnesota Office of Waste Management
Waste Education Clearinghouse
1350 Energy Lane, Suite 201
St. Paul, MN 55108
(612) 649-5750

The Rodale Book of Composting (1992)

Rodale Press, Book Reader Service
33 East Minor Street
Emmaus, PA 18098

***School Recycling Programs: A Handbook for
Educators (August 1990)***

(EPA/530-SW-90-023)
US Environmental Protection Agency
Solid Waste & Emerg. Response (OS-305)
Washington, DC 20460

Source Reduction Now (1992)

Minnesota Office of Waste Management
Waste Education Clearinghouse
1350 Energy Lane, Suite 201
St. Paul, MN 55108
(612) 649-5750

***Think Green: A Retailer's Environmental Idea
Book (1992)***

Illinois Retail Merchants Association
36 S. Wabash Avenue, Suite 1226
Chicago, IL 60603
(312) 726-4600

Waste Prevention Pays Off (1994)

(EPA-K-92-005)
Call EPA RCRA/Superfund Hotline
(800) 424-9346 or (703) 412-9810

Worms Eat My Garbage (1982)

***Worms Eat Our Garbage: Classroom Activities
for a Better Environment (1993)***

Mary Appelhof
Flower Press
10332 Shaver Road
Portage, MI 49002
(616) 327-0108

JOURNALS

American Recycling Market

Recoup
PO Box 577
Ogdensburg, NY 13669

Biocycle

419 State Avenue
Emmaus, PA 18049
(610) 967-4135

Co-op America Quarterly

Co-op America
1850 M Street, NW, Suite 700
Washington, DC 20036
(202) 872-5307

Environmental Action Magazine

Environmental Action
1525 New Hampshire Avenue, NW
Washington, DC 20036
(202) 745-4870

In Business

PO Box 323
18 S. Seventh Street
Emmaus, PA 18049
(215) 967-4135

Packaging

1350 E Touhy Avenue
PO Box 5080
Des Plaines, IL 60018-3303
(708) 635-8800

Packaging Digest

400 N. Michigan Avenue
Chicago, IL 60611-4104
(312) 222-2000

Pollution Abstracts

7200 Wisconsin Avenue
Bethesda, MD 20814-4811
(301) 961-5700

Pollution Engineering

1935 Shermer Road
Northbrook, IL 60062-5319
(708) 498-9846

Pollution Equipment News

650 Babcock Boulevard
Pittsburgh, PA 15237-5821
(412) 364-5366/364-5667

Recycling Times

1730 Rhode Island Ave., NW, no. 1000
Washington, DC 20036-3196
(212) 659-4613

Recycling Today

4012 Bridge Avenue
Cleveland, OH 44113-3320
(216) 961-4130

Resource Recovery Report

5313 Thirty-Eighth Street, NW
Washington, DC 20015
(202) 298-6344

Resource Recycling

PO Box 10540
Portland, OR 97210-0540
(503) 227-1319

Reuse/Recycle

PO Box 3535
851 New Holland Avenue
Lancaster, PA 17604

Solid Waste Report

951 Pershing Drive
Silver Spring, MD 20910-4432
(301) 587-6300

Waste Age

170 Rhode Island Avenue, NW, no. 1000
Washington, DC 20036-3196
(202) 861-0708

Wastetech News

131 Madison Street
Denver, CO 80206-5427
(303) 394-2905

World Watch

World Watch Institute
1776 Massachusetts Ave, NW
Washington, DC 20036

Worm Digest

Box 544
Eugene, OR 97440-9998

ESTABLISHING A WASTE REDUCTION PROGRAM AT WORK

Participant's Manual

**A Training Program of the
California Integrated Waste Management Board**

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TRAINER MANUAL

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In addition to the CIWMB waste reduction education materials, there are a growing number of excellent publications on business waste reduction programs. No attempt was made to "re-invent the wheel" in the development of this training curriculum. In particular, worksheets for participants in this training program were originally prepared by the U.S. E.P.A. for the "Business Guide for Reducing Solid Waste" (1993.) Resources and Recommended Reading are provided in the Appendices.

Preface

This training manual is designed for individuals from both government and business who have the potential to train large numbers of program coordinators or otherwise make a significant reduction in waste by implementing in-house waste reduction programs. It may be used as a stand-alone tutorial for those who are unable to participate in a workshop. However, the on-site walk-throughs, group discussions and case study analyses in the recommended workshop agenda greatly enhance learning opportunities and complement the training manual information.

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