

Recycling Technical Assistance
Final Report

**Mon Valley Refuse Disposal Authority
Business Waste Reduction Guide**

Pennsylvania DEP/SWANA

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MON VALLEY Business Waste Reduction Guide

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INTRODUCTION

The Mon Valley Refuse Disposal Authority (Authority) contracts for the collection of refuse from commercial establishments. Under this contact, commercial establishments may set out up to 96 gallons of refuse per week. If the commercial establishment generates more than 96 gallons per week, the contractor (Waste Management) has the authority to bill the entity. Due to this financial incentive, many businesses desire to reduce their waste stream, but do not have the technical knowledge to start a waste reduction program. For purposes of this report, waste reduction includes waste minimization, recycling and composting.

Consequently, this report provides guidance to the Authority to assist local businesses reduce the quantity of solid waste they generate, and consequently, the financial resources they dedicate to managing unwanted materials. Additionally, this report includes worksheets that can be used by the Authority and/or businesses to implement a successful solid waste reduction program.

To accomplish this, the report will address the following areas:

- Promoting the benefits of waste reduction;
- Obtaining support for waste reduction programs;
- Building a waste reduction team;
- Assessing the waste stream;
- Characterizing waste flows;
- Performing a waste sort;
- Developing an effective program;
- Recycling tips; and
- Promoting success.

This report also contains a profile of manufacturing industries located within the geographic boundaries of the Authority, and worksheets to assist the Authority and/or company assess:

- Disposal costs;
- Materials to target for waste reduction;
- The costs associated with a waste reduction program;
- Avoided disposal costs.

Promoting the Benefits of Waste Reduction

The advantages of waste reduction are numerous. Waste reduction impacts the economic health of all types of businesses, from corner stores to international corporations, because cutting costs, improving image and lifting employee morale make good business sense. Thus, to encourage Authority businesses to institute waste reduction strategies, the following messages need to be conveyed:

- **Economic gain**: Controlling raw material costs and reducing waste disposal expenses are increasingly important business goals. By examining the financial impacts of operations, purchasing practices and disposal methods, costs can be reduced and waste can be transformed from a liability into a potentially profitable resource.
- **Enhanced product and business image**: The benefits of waste reduction extend beyond the short-term economic advantages. Many organizations have implemented strategies that actually cost slightly more in order to reap these long-term benefits. A positive environmental record has greatly benefited many manufacturers and retailers in recent years. U.S. consumers are increasingly changing purchasing habits based on the environmental records of products. According to a study published by Cambridge Research International in July 1994, half of the American public actively seeks recycled content products in the retail store ². The same study also notes that nearly one third of consumers avoid products with excessive or harmful packaging.
- **Improved Employee Morale**: Waste reduction programs have also served as an effective tool for improving employee morale. Many programs suggested in this report are ideal opportunities to involve employees in organizational decision making. Employees provide many of the creative and logistical ideas to start source reduction efforts and the momentum to make these efforts successful.

Obtaining Support

A commitment from company management lends the importance and legitimacy needed to achieve a high level of employee participation in the waste reduction effort. Endorsement from company management is first needed to establish a waste reduction team and then to support that team by backing program goals and activities. Management will also play a key role in encouraging and rewarding employee commitment and participation in the program.

Securing management support may require some additional outreach. Management will need to be educated on the range of short-and long-term benefits waste reduction offers including avoided disposal costs, profits from the sale of recyclable material, and improved community relations. As with any operation, current waste management methods should be re-evaluated on a regular basis to assure cost-effectiveness. The Authority should also provide a list of other businesses that have successfully implemented waste reduction programs. Contacting these business may help convince management that a waste reduction program can be successfully implemented.

Building a Waste Reduction Team

The Authority may want to help larger businesses organize a team of individuals responsible for planning, designing, implementing and maintaining the reduction program. The team approach will enable tasks to be distributed among several employees from different departments within the company. A team with varied perspectives is better able to develop creative ideas for waste reduction.

Waste reduction teams should represent the size and departmental organization of the company. Small businesses may utilize a team of one or two people that are familiar with the overall operations of the company. Large businesses and corporations might consider a team comprised of many employees from different departments to encourage widespread input and support. Team members may be appointed or volunteer but it is important that the team be enthusiastic about the program and have time to commit to the effort. The team or management should also appoint a leader to direct team efforts and administer the planning, implementation and operation of the waste reduction program.

The waste reduction team is typically responsible for the following tasks:

- Working with company management to set the preliminary and long-term goals of the waste reduction program;
- Gathering and analyzing information;'
- Promoting the program and training co-workers;
- Measuring progress of the program and making needed changes; and
- Periodically reporting program status to management.

After the team has been established, its members should meet regularly to develop a plan and begin program implementation. The planning stage can range from two or three weeks to several months based on the size and complexity of the company and its waste streams.

Assessing the Waste Stream

A waste assessment is an organized study of a company's waste stream. The waste assessment will provide baseline information about a company's purchasing, waste generation and waste management practices. This data will be useful in developing a strategy for waste reduction and identifying problem wastes to be targeted for reduction and recycling. Also, knowing the volume and type of recyclable material generated is important when contacting recycled material buyers.

An effective waste assessment includes one or more of the following tasks:

Analyze Facility Records

A thorough examination of certain records can reveal sources of waste that may not be apparent. Specific records to analyze include:

- **Purchasing and inventory records:** look for duplicity in purchasing and over-ordering of dated material; look for over-packaging and opportunities to buy non-dated material in bulk.
- **Equipment service contracts and repair invoices:** identify equipment that is not operating efficiently and possibly generating excess waste.
- **Waste hauling and disposal records and contracts:** these records will show the amount of waste disposed and disposal charges. Examine twelve month's worth of records to identify any fluctuations in the amount of waste generated over a year. Worksheet A will aid in calculating disposal costs.
- **Contracts with recycling facilities and records of recycling revenues and expenditures:** take note of the amount and types of material recycled and any changes in charges or revenues.

Characterizing Waste Flows

The Authority may want to conduct a “walk through” of each area of the business and take notes of the following:

- The types and amounts of waste being produced;
- Waste-producing activities and equipment;
- The flow of waste through the facility;
- The layout and operation of departments;
- Existing space and equipment that may be used for storage, processing recyclables, and other activities associated with the waste reduction program;
- Any current waste reduction efforts;
- Additional information gathered through discussions with supervisors and employees. Make a special point to talk with housekeeping or cleaning crews, as these employees often have an accurate picture of the waste generation situation; and,
- Status of dumpsters and compactors. Specifically, are these being hauled away full or partially empty?

A process flow diagram is particularly useful in identifying areas for waste reduction. In theory, the weight of all material entering a process should equal the weight of material leaving the process. Document the material entering the organization by using purchasing and inventory records. Identify all outputs, including products, by-products, materials recycled and waste disposed. The process flow diagram can identify the areas of the operation which need the most attention when starting the waste reduction and recycling programs.

Performing a Waste Sort

A waste sort is the physical collection, sorting and weighing of a representative sample of a company's waste. A waste sort gives a more precise picture of the types and amounts of waste being generated by an organization. The waste sort can be as

simple as the Authority obtaining a sample of the mixed waste stream (i.e. several bags from each department) and sorting it into categories (i.e. office paper, cardboard, glass, metal, etc.). Each category is then weighed to obtain percentages of the waste stream. The Authority may also target one specific department or material. For example, all office paper waste could be separated for a week and the Authority could extrapolate the volume to estimate how much is discarded in a month or year. Materials are often further grouped within each category. In the case of a paper sort, materials may be subdivided into high-grade, low-grade, newsprint, magazines and others. See Worksheet B for more information on performing a limited waste sort.

A crucial factor in conducting an effective waste sort is assuring that the sample is representative. The Authority should assess all variables affecting waste generation. Waste generation may vary with seasonal, operational or environmental factors. If the potential exists for a high degree of inaccuracy, a multi-day sampling may be necessary. Daily, weekly and seasonal operational variations that affect waste generation must also be considered. The data gathered through the waste sort will be used as a basis for decision making and program evaluation. An inaccurate sample can result in skewed calculations of waste generation, waste composition and waste removal costs.

Developing an Effective Program

There are steps the Authority should take when designing a waste reduction program for businesses. These objectives include: set realistic goals, generate strategies, evaluate options, motivate and train employees, and monitor results. Each of these elements is important to successful waste reduction programs, but the relative importance of each will vary based on the company's size, personnel, flexibility, and other underlying factors.

Step 1: Set Program Goals

Goals set by the Authority and/or the waste reduction team will provide a framework for program evaluation and specific waste reduction efforts to follow. Preliminary goals should be flexible and subject to reexamination and adjustment as needed. Some suggestions for developing goals are:

- Set waste reduction goals for both the company as a whole and for individual departments;
- Make sure goals are compatible with overall company goals;
- Ensure that goals are measurable; and,
- Ensure that goals can be achieved with available resources, personnel and time.

Step 2: Generate Strategies

Using the information gathered through the waste assessment results, the Authority and the waste reduction team should hold a brainstorming meeting to generate ideas to reach waste reduction and recycling goals. Ideas should also be solicited from other managers and employees.

Step 3: Evaluate and Choose Options

After all the potential waste reduction and recycling options have been identified, the Authority and the waste reduction team should evaluate the options based on the company's reduction and recycling goals. Some other areas to consider when reviewing reduction or recycling possibilities include:

Technical Considerations

- Effect on product or service quality and product marketing;
- Operation and maintenance requirements;
- Compatibility with existing operations;
- Equipment requirements; and
- Space or storage requirements.

Economical Considerations

- Potential to reduce waste removal (hauling) costs;
- Reductions in purchasing costs;
- Implementation or start-up costs; and,
- Revenue from sale of recyclables.

Effectiveness and Impact on Business Environment

- Potential to reduce waste generation;
- Potential to increase recycling;
- Effect on community relations, employee morale and environmental awareness; and,
- Implementation feasibility and timeframe.

The relative importance of various evaluation criteria for reduction and recycling ideas will change according to the goals of the waste reduction program. Immediate cost effectiveness may not always be the key factor in selecting waste reduction strategies. For example, the Authority should examine and identify the long-term economic effects of reduction strategies while weighing start-up costs. The measure may result in impressive cost savings or improved productivity over several years. Impacts on other factors such as employee morale and community relations may be equally important and must also be examined along with financial considerations. Worksheets C and D will aid in evaluating the cost effectiveness of each option.

Step 4: Educate Employees

The Authority can assist the waste reduction team build employee enthusiasm for the waste reduction and recycling programs by distributing or posting an announcement from the top management stating their full support of the effort. This statement will impress upon employees that waste reduction and recycling is a high priority for the company. The management announcement should:

- Introduce employees to waste reduction;
- Explain how waste reduction and recycling can benefit the employee, the company and the environment;
- Outline the design and implementation stages of the program; and,
- Provide the team leader's name and encourage employee suggestions.

Seeking employee input from as many sources as possible can also build program support. Memos, updates and announcements should be posted regularly and in a centralized location(s). At the same time, employees should have various opportunities for involvement. Monthly or other regular meetings, suggestion boxes, e-mail communication, and informal surveys are some possibilities. If action is taken as a result of employee input, recognize the source and encourage others to participate.

The waste reduction or recycling programs will almost certainly require the efforts of numerous employees outside of the waste reduction team. At the least, employees will need to change some daily habits. Employees most affected by the program will need to be trained and kept informed of changes.

Step 5: Monitor Results

The Authority should encourage the business to monitor the program results to eliminate problems and to quantify successes. Mechanisms to track a recycling program include:

- Comparing waste hauling records from prior to the program to hauling records after implementation of the program to demonstrate waste reduction and cost savings;
- Asking recycling companies to provide monthly weight reports of material recycled, and the Authority should compare these reports month to month to monitor changes in the amount of material recycled;
- Checking dumpsters for accidental disposal of materials that should have been sent to recyclers; and,
- Tracking of statistics such as decreases in landfill material, avoided hauling costs, recyclable revenue, and employee participation.

Recycling Tips

A potentially significant portion of waste reduction may come from a recycling program. Thus, the following are some tips for a successful recycling program that fits into daily operations.

Contracts

Every waste hauling or recycling company operates uniquely. Carefully compare the available options to find the firm that provides the best range of services. Some service providers handle garbage and recyclables while many others handle only one exclusively. It may or may not be beneficial to have the same company handling both waste and recyclable materials. Cost is an important factor in choosing a recycling service provider. However, several other important factors need to be weighed such as the scope of available services or pick-up schedules.

Be aware that, while recycling markets are growing and the value of materials is generally increasing, recycling markets fluctuate greatly over short periods of time. A recycling program that earns revenue today may not do so in the future if the market for the material changes.

Containers and Container Locations

Bins for collecting recyclable materials should be placed in accessible locations (small bins at each workstation are ideal for an office environment). The waste assessment or informal evaluation will identify areas in the business that generate large and small amounts of material. This will dictate the size of collection bins or containers needed in those areas. Many of the recyclers or haulers will provide containers as part of their services.

Employees can be asked to empty their small workstation containers into large, centrally located collection bins, or cleaning staff may be required to empty recycling containers when trash receptacles are emptied. The waste reduction team should brainstorm ideas for effective recyclable collection methods.

Contamination of Material

A common pitfall of newly implemented reduction and recycling programs is contamination of recyclable materials with non-recyclable waste. Continuing education and awareness campaigns are the best solutions to the problem. Recognizing contamination as a potential problem during training and program development can minimize the problem.

Questions to Ask Potential Buyers of Recyclables

When meeting with recycling companies interested in purchasing your collected materials, there are a number of issues you should discuss, including:

- ◆ What types of recyclables will the company accept and how must they be prepared?
- ◆ What contract terms will the buyer require?
- ◆ Who provides transportation?
- ◆ Who will provide containers for recyclables?
- ◆ Can “escape clauses” be included in the contract?
- ◆ What are the maximum allowable contaminant levels and what is the procedure for dealing with rejected loads?
- ◆ Are there minimum quantity requirements?
- ◆ What is the schedule of collections?
- ◆ Will the material be weighed?

Promoting Success

Internal Communications

The employees that make waste reduction programs work should hear about the successes. The Authority should encourage businesses to announce program accomplishments to build enthusiasm for the program and boost employee morale. When giving numbers and statistics, help employees understand the environmental and business significance by relating numbers to tangible materials. For example:

Award Programs

The Authority may also want to work with the businesses to recognize individual employees and departments. Perhaps departments exceeding targeted participation or recycling rates receive a catered lunch or some other small token of appreciation. Individual awards could include a certificate, plaque, a “We Recycle” t-shirt, a pass to a local entertainment

Tons of paper reduced x 17 = Number of trees saved

Tons of paper reduced x 7,000 = Number of gallons of water saved

Tons of waste reduced x 3.3 = Number of cubic yards of landfill space saved

event or restaurant, a half day off, or any other small recognition. It is important to make the awards program a secondary motivation for participation. Employees should be motivated to participate primarily because it is good for the company, the environment, and themselves as employees and citizens.

Standard Industrial Classification (SIC) Codes

The SIC system is used throughout the federal government to group establishments into industries. The SIC Division Structure makes it possible to collect and calculate establishment data by broad industrial divisions (labeled A through K), industrial groups (the 2-and 3-digit SIC levels), and specific industries (the 4-digit level). It is helpful for communities looking to establish or enhance commercial recycling programs to assess local industries using this classification system. This information can provide insight as to the types of materials most likely to be recovered, and the prevalence of particular industries in a region. If one industry is particularly prevalent in a region, for example, it might be cost-effective to target businesses in that particular industry. Table 1, below, provides 2-digit SIC Codes and their definitions.

Table 1

Two-Digit SIC Code Definitions – Division D: Manufacturing

SIC Code	Industry
20	Food and Kindred Products
21	Tobacco Products
23	Apparel and Other Products Made from Textiles
24	Lumber and Wood Products, Except Furniture
25	Furniture and Fixtures
26	Paper and Allied Products
27	Printing, Publishing, and Allied Industries
28	Chemicals and Allied Products
29	Petroleum Refining and Relating Industries
30	Rubber and Miscellaneous Plastic Products
31	Leather and Leather Products
32	Stone, Clay, Glass, and Concrete Products
33	Primary Metal Industries
34	Fabricated Metal Products, Except Machinery and Transportation Equipment
35	Industrial and Commercial Machinery and Transportation Equipment
36	Electronic and Other Electrical Equipment and Components, Except Computers
37	Transportation Equipment
38	Measuring, Analyzing and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks
39	Miscellaneous Manufacturing Industries

Manufacturing Industries Profile in Monessen and Belle Vernon

Table 2 lists the manufacturing industries located in Monessen and Belle Vernon, according to data obtained from the October 2000 Harris Directory.

Table 2

Manufacturers in Monessen and Belle Vernon

Company Name	SIC Code	Address	City	Phone	Contact	Product
Jurassic Dog Products LLC	20	224 Nazareth Dr	Belle Vernon	724-929-5423	Lee Davis, General Manager	ANIMAL FOOD: Dog & Cat
Wyatt Inc	24	112 Riverview Dr	Monessen	724-929-9834	Mr Dan Faiola, Plant Manager	WOODWORK: Architectural
Dupli-Tech	24	35 Carson St	Belle Vernon	724-929-5253	Mr Eric Farner, Owner	CABINETS: Custom Made
Malec's Custom Cabinetry	24	515 Donner Ave	Monessen	724-929-7300	Mr William Malec, President	CABINETS: Custom Made
Valley Independent	27	Eastgate 19	Monessen	724-684-5200	Mr Richard Scaife, Publisher	PUBLISHERS: Newspaper
After Hours Print Shop	27	601 Broad Ave	Belle Vernon	724-929-5522	Mr Russell G Bentz, Partner	PRINTING: Offset
Hollick Press	27	908 McClintock Ave	Belle Vernon	724-929-5850	Ms Pat Hollick, Owner	PRINTING: Offset
L K Graphic Communications	27	220 Nazareth Dr	Belle Vernon	724-684-7424	Mrs Linda Gush, Partner	PRINTING: Offset
Sudor Products Co	27	916 Locust Ave	Monessen	724-684-6600	Mr William Sudor, Owner	STAMPINGS: Hot Stamping/Decorating
Marsh Asphalt Inc	29	Interstate 70 & Route 906	Belle Vernon	724-684-3311	Mr Joe Miller, Plant Manager	ASPHALT & ASPHALT PRODUCTS
Parker Precision Molding Inc	30	485 Rehoboth Rd	Belle Vernon	724-489-4538	Mr Blake Parker, President	PLASTICS: Injection Molded
Bianchi Monuments	32	240 Donner Ave	Monessen	724-872-4200	Mr Ernest Parnell, Owner	MEMORIALS, MONUMENTS & MARKERS
Jones Stone & Marble	32	191 Pollack Run Rd	Belle Vernon	724-929-6432	Mr Chip Stevenson, President	MARBLE PRODUCTS
Koppers Industries Inc		345 Donner Ave	Monessen	724-684-6330	Mr Michael Beck, Dir Human Res	COKE: Steel Mill Byproduct

Mon Valley

Company Name	SIC Code	Address	City	Phone	Contact	Product
Ebara Solar Inc	34	13 Airport Rd	Belle Vernon	724-929-3345	Mr Richard Rosey, President	SOLAR EQUIPMENT
Leonard Sapko	34	1310 Rostraver Rd	Belle Vernon	724-684-5500	Mr Leonard M Sapko, President	IRON PRODUCTS: Structural
Ward Industries Inc	34	111 Riverview Dr	Monessen	724-684-7949	Mr Jeffrey Weiner, Vice President	DUCTS & FITTINGS
Rick's Kustom Polishing	34	1600 Grand Blvd	Monessen	724-929-3349	Mr Rick Frantz, Owner	METAL FINISHERS
Bethem Machine Shop Inc	35	538 Main St	Belle Vernon	724-483-8883	Mr Ronald A Bethem, President	MACHINE SHOPS
CAM Tech Inc	35	153 Piersol Rd	Belle Vernon	724-684-9030	Mr James Campana, President	MACHINE SHOPS
Ehlers Auto Parts Inc	35	923 Broad Ave	Belle Vernon	724-684-7799	Mr Ernest P Ehlers, President	MACHINE SHOPS
Lesleh Precision Inc	35	25 Carson St	Belle Vernon	724-684-7224	Mr Ron Helsel, President	MACHINING: Precision
Webster Machining	35	682 Tyrol Blvd	Belle Vernon	724-684-7060	Mr Willis Conaway, Owner	MACHINE SHOPS
Mountainman Enterprises Inc	39	1521 Ridge Rd	Belle Vernon	724-930-8099	Mr Dennis S Delmastro, President	TOYS: Games & Gamebooks
Dec-O-Com Signs	39	301 Market St	Belle Vernon	724-379-6500	Mr Mike Sylvester, Owner	SIGNS: Screened
Don's Signs	39	116 7th St	Monessen	724-684-1000	Mr Don Fraser, Owner	SIGNS: Painted
Learnard Industries	39	1045 Donner Ave	Monessen	724-684-6223	Mr Cliff Learnard, Owner	SIGNS: Plastic
Pierre A Luti Advertising Co	39	24 Willow Dr	Monessen	724-929-7441	Mr Pierre A Luti, Owner	SIGNS: Architectural
Halco	39	2037 Gibsonton Rd	Belle Vernon	724-684-9440	Mr Allen M Hoffman, President	DECORATIONS: Christmas
Johnny De Salon Furniture	39	551 Donner Ave	Monessen	724-684-7703	Mr William Runyon, President	BEAUTY SHOP FURNITURE

Worksheet A: Estimating Disposal Costs

Off-Site Waste Removal

A. Name of waste removal company _____

Telephone number _____ Date contract expires _____

B. Removal Schedule

Number of times _____ Per (day/week/month/other) _____
Days of week _____ Time(s) of day _____

Choose one of the following equations (C1, C2 or C3):

C1. Waste removal charge (If charged as flat fee or part of rent)

$$\frac{\text{_____}}{\text{Waste removal fee}} \times \frac{\text{_____}}{\text{Number of Times per Year}} = \frac{\text{_____}}{\text{TOTAL WASTE DISPOSAL}}$$

C2. Waste removal charge (If charged by weight or volume)

$$\frac{\text{_____}}{\text{Waste removal charge per unit of weight or volume}} \times \frac{\text{_____}}{\text{Number of units of waste removed of waste (from receipts or call haulers)}} = \frac{\text{_____}}{\text{Annual waste removal charge}}$$

If applicable, add:

$$\frac{\text{_____}}{\text{Hauling container(s) rental fee per time periods}} \times \frac{\text{_____}}{\text{Number of time periods per year}} = \frac{\text{_____}}{\text{Annual container cost}}$$

$$\frac{\text{_____}}{\text{Annual Waste Removal Cost}} + \frac{\text{_____}}{\text{Annual Container Cost}} = \frac{\text{_____}}{\text{Total Waste Disposal Cost}}$$

C3. Waste removal charge (If charged per pull)

$$\frac{\text{_____}}{\text{Charge per pull}} \times \frac{\text{_____}}{\text{Pulls per year}} = \frac{\text{_____}}{\text{Annual waste pulling charge}}$$

If applicable, add:

$$\frac{\text{_____}}{\text{Hauling containers(s) rental fee per time period}} \times \frac{\text{_____}}{\text{Number of time periods per year}} = \frac{\text{_____}}{\text{Annual Waste container rental cost}}$$

$$\frac{\text{_____}}{\text{Annual waste pulling charge}} \times \frac{\text{_____}}{\text{Annual waste container rental cost}} = \frac{\text{_____}}{\text{Total Waste Disposal Cost}}$$

WORKSHEET B: CONDUCTING A WASTE ANALYSIS

The following are two options for estimating the types and quantities of materials in a company's waste stream. This knowledge will aid you in targeting materials for recycling and reduction and in contacting recyclers.

Method I

This Method involves visually monitoring the dumpster each day and keeping track of the following:

- What materials are visible in the dumpster?
- What materials take up the largest volume in the dumpster?
- How full is the dumpster?

If the majority of a company's waste is placed in garbage bags before disposal, have cleaning staff use different colored bags for each area. For example, put the waste from the offices in clear bags, the cafeteria waste in white bags, the restrooms' in blue bags, the production waste in black bags, etc. This will help to identify the areas which are generating the most material. Then, walk through those areas to see what is being thrown away. In the above example, we could assume that the clear bags contained primarily office paper.

Waste Analysis Estimation – Method 1

Day observed _____

How full _____

Materials Visible

Estimated percentage of waste stream

Color of bag

in dumpster

Type of waste generated in the designated area

Method 2

This method provides a more accurate estimation of the quantity of material in the waste stream. Place a container near the dumpster or in a central location and designate it for your targeted material. Notify all employees that, for a specified period of time, all of the targeted material will be placed in this container rather than the dumpster. With certain materials, such as OCC, it may be possible to have one employee or the cleaning staff segregate the material. For other materials, such as office paper, all employees will need to be involved. Note that the container must be under shelter.

Continue the sort for at least two weeks. At the end of the specified time period, record the quantity of material accumulated. Contact the local recyclers listed in the back of this guide to find one that will pick up or allow you to drop-off the sorted material for recycling.

Waste Analysis Estimation – Method 2

Material sorted _____ Time period sorted _____

$$\frac{\text{_____ cubic yards}}{\text{Size of containers}} \times \text{_____} = \frac{\text{_____ cubic yards}}{\text{Amount sorted}}$$

$$\left(\frac{\text{_____ pounds}}{\text{Weight of full Container}} - \frac{\text{_____ pounds}}{\text{Weight of empty container}} \right) \times \text{_____} = \frac{\text{_____ pounds}}{\text{Amount sorted}}$$

Extrapolate this amount to a month or year. This information will be extremely useful when contacting recyclers and determining the cost-effectiveness of your recycling program.

$$\left(\frac{\text{_____ pounds}}{\text{Amount sorted}} \div \text{_____} \right) \times 52 \text{ weeks/year} = \frac{\text{_____ pounds}}{\text{Targeted material discarded per year}}$$

WORKSHEET C: EVALUATING THE COSTS OF A WASTE REDUCTION OR RECYCLING PROGRAM

Monthly Program Costs

Additional labor (cleaning/maintenance staff) ----- \$ _____
Additional energy requirements ----- \$ _____
Transportation ----- \$ _____
Additional space requirements ----- \$ _____
Education/promotion ----- \$ _____
Record keeping ----- \$ _____

START-UP COSTS (AMORTIZED MONTHLY)

Containers ----- \$ _____
Equipment (if any) ----- \$ _____
Other ----- \$ _____
Total Program Costs ----- **\$ _____**

Monthly Program Savings and Revenues

Avoided collection/disposal costs (See Worksheet D) ----- \$ _____
Decrease in new material costs ----- \$ _____
Revenues from sale of recyclables ----- \$ _____
Avoided purchases ----- \$ _____
Avoided labor (cleaning/maintenance staff) ----- \$ _____
Total Program Savings/Revenues ----- **\$ _____**

(Total Program Savings/Revenues – Total Program Costs) ----- \$ _____

WORKSHEET D: CALCULATING AVOIDED COLLECTION/DISPOSAL COSTS

Material targeted for recycling or waste reduction _____

Approximate percentage of waste stream _____

By Volume

Use this formula if you used a visual estimate of the waste stream or if you calculated volumes in the waste sort.

$$\begin{array}{r}
 \text{_____} \\
 \text{\% of material} \\
 \text{(by visual estimation} \\
 \text{or sort)}
 \end{array}
 \times
 \begin{array}{r}
 \text{_____} \\
 \text{Total cubic yards disposed} \\
 \text{(ex.: 4 cubic yard dumpster emptied} \\
 \text{3 times per week = 12 cubic yards} \\
 \text{or 48 cubic yards per month.)}
 \end{array}
 =
 \begin{array}{r}
 \text{_____} \\
 \text{Targeted for} \\
 \text{diversion}
 \end{array}$$

$$\begin{array}{r}
 \text{_____} \\
 \text{cubic yards} \\
 \text{yards} \\
 \text{Targeted for diversion}
 \end{array}
 \times
 70\%^{**}
 =
 \begin{array}{r}
 \text{_____} \\
 \text{cubic} \\
 \text{Expected diversion}
 \end{array}$$

$$\begin{array}{r}
 \text{_____} \\
 \text{cubic yards} \\
 \text{yards} \\
 \text{Expected diversion}
 \end{array}
 \div
 \begin{array}{r}
 \text{_____} \\
 \text{Total volume of all waste disposed}
 \end{array}
 =
 \begin{array}{r}
 \text{_____} \\
 \text{cubic} \\
 \text{Percent of Waste} \\
 \text{Stream Diverted}
 \end{array}$$

By Weight

Use this formula if you calculated weight in the waste sort and if your hauler will provide weight slips for your dumpster.

$$\begin{array}{r}
 \text{_____} \\
 \text{pounds} \\
 \text{Pounds of material} \\
 \text{Discarded per year} \\
 \text{(Worksheet B)}
 \end{array}
 \times
 70\%^{**}
 =
 \begin{array}{r}
 \text{_____} \\
 \text{pounds} \\
 \text{Expected diversion}
 \end{array}$$

$$\begin{array}{r}
 \text{_____} \\
 \text{pounds} \\
 \text{Expected diversion}
 \end{array}
 \div
 \begin{array}{r}
 \text{_____} \\
 \text{Total volume of waste disposed} \\
 \text{(provided by hauler)}
 \end{array}
 =
 \begin{array}{r}
 \text{_____} \\
 \text{Percent of Waste Stream} \\
 \text{to be Diverted}
 \end{array}$$

**To be conservative, assume that you will divert 70% of the target material.

Depending upon the amount of material diverted from the waste stream, a business may be able to save money by reducing the number of times per week the dumpster is hauled or by reducing the size of the dumpster. The Authority should encourage the business to ask their waste hauler how much disposal costs can be reduced if the waste stream is reduced by the percent estimated above.