

# Conducting a Waste Audit

An effective waste reduction program must be based on current and accurate information on the quantity and composition of the waste stream. Therefore, the first step is a “waste audit,” a systematic procedure to review operations and subsequently, waste generation. Performing this exercise will define the composition of your discards by examining how materials enter and exit your facility.

All operations produce waste and there is nothing shameful or wrong by recognizing it. However, today’s concern over waste generation and increasing costs of collection and disposal are good reasons to find out how to reduce waste, increase recycling, and try to cut costs. An audit alone will not reduce your business’ waste. Rather, it is the starting point that will enable your business to make informed decisions on how to allocate resources for source reduction and recycling programs.

**A waste audit begins with the selection of an audit team.** A representative of each area of your business – maintenance, cleaning, mailroom, purchasing, production line, the building manager, and management – must be included, because each is responsible for the waste stream. It is vitally important for upper management to serve on the team, both to authorize release of necessary records and to demonstrate the company’s commitment to the effort.

Depending on the size of your establishment, **choose two or three people to head up the waste audit team.** They must be motivated, personally interested in and committed to getting the facts with the intention of following up on the waste audit with a program to reduce and recycle the maximum amount of material.

## THE WALK-THROUGH

To assess company waste generation, the first thing the audit team will do is research how waste is currently managed, and **fill out Profile 1 on pages 12 & 13 .**

Following the completion of Profile 1, the team will **conduct a walk-through of the facility.** The inspection should start where materials are first received, noting all operations that generate waste, what types of waste are produced, and how they are managed. Pay attention to the particular types of material discarded at each point of disposal. The walk-through may result in preliminary conclusions about reduction/recycling opportunities. Take notes and refer to them when the entire audit is completed. Be sure to pay close attention to:

|                                |                            |
|--------------------------------|----------------------------|
| Receiving area                 |                            |
| Lounge                         | Individual offices & desks |
| Stock room                     | Assembly lines             |
| Cafeteria, kitchen & lunchroom | Copy and fax machines      |
|                                | Shipping                   |

## THE TRASH SORT

With a basic understanding of your operation’s waste management, the team is ready to take a hands-on approach. **Wearing protective clothing, the audit team will meet at the end of a workday or shift to physically sort through waste generated during that day.** (If the amount or type of trash varies substantially from day to day, the team might want to conduct this inspection on random days over the course of two weeks and then compute an average profile of one day’s waste.)

Since this exercise will require the team to physically sort through the trash, puncture-resistant gloves and old clothes are a must. To conduct the inspection, spread out a large plastic sheet and dump the day’s waste on it. Do not sort recyclables in an area where they might come in contact with food and become contaminated. Use a scale, if possible, to estimate the percentage of each category in the waste stream. If you produce a large amount of waste on a daily basis, use a representative sample of your trash containers. Conduct the inspection in a garage, fenced-in area, or other enclosed location. This will keep trash from blowing away and is easy to clean up afterwards.

**Using the information in Appendix A, titled “Materials Background,” on page 27 as a guide, and Profile 2 on pages 14 & 15 as a worksheet, estimate what percentage each material comprises of your daily waste stream.** Be aware that the identification list might not include everything you find in your waste. There is room at the end of the list to add other categories.

Remember, this guide is intended for municipal solid waste audits. If you generate hazardous waste (chemicals, used oil, etc.) refer to the bibliography for appropriate guides.

## MATERIALS QUANTIFICATION

After broadly identifying the types and percentages of waste generated by the walk-through and visual/hands-on inspection, the team has reached the final element of the audit – quantifying the amounts of each of these wastes. The quantity of materials generated is important because even though many items in the waste stream might be recyclable, they must be present in sufficient volume to make separate collection feasible. This is particularly true for smaller businesses that

might need to cooperatively market their recyclables to generate enough volume. **You will have to choose one of the two ways to quantify your waste, using either Profile 3, Option A or Option B.** Option A focuses on information obtained from purchasing records, and option B uses a volume-to-weight conversion chart to determine monthly tonnage of each component. Select the option that best suits your business operations. Be sure to start with components that comprise a large percentage of the waste stream.

**Use Profile 3, Option A or Option B for each segment of your waste stream.** Make several copies of Profile 3 so that you have enough clean sheets to quantify all of the significant elements of the waste stream.

#### OPTION A

Completion of Profile 3, Option A requires the audit team to review purchasing records for each of the materials checked off on the identification list (Profile 2). This review will determine how much comes into your facility on a monthly basis. (In an office environment, for example, a vast amount of what is purchased is discarded. In a manufacturing facility, a majority of items purchased become part of the company's product.)

In addition to purchasing records, pay careful attention to other ways materials enter your operations (i.e., mailings, donations). On line (A) of Profile 3, you will put the monthly amount in pounds received by your establishment. Line (B) is an estimate of how much of each type of material is not discarded. Find this amount by estimating how many pounds of each material are retained in your establishment (for filing, storage, etc.) and add it to the amount that leaves the establishment via mail, customers, etc.

It is important that, on line (C), your calculations also estimate how many pounds of each material are currently recycled. Add the amount recycled (C) to the amount that you estimate is retained or mailed out of the office (B). Subtract this subtotal from the amount of material received on a monthly basis (A). This figure will be the total amount disposed.

#### OPTION B

If Option B is used, the form should be completed at the end of the Trash Sort. If you have a scale, weigh each component and use this form to determine monthly weights. If there is no scale available, estimate the volume in cubic yards and use the volume to weight conversion chart on pages 18 & 19 to determine weight. Then use the form to determine monthly weights.

PROFILE 1: CURRENT WASTE OPERATIONS

Name of Hauler: \_\_\_\_\_

List all collection points inside and outside the company: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Amount currently collected by weight: \_\_\_\_\_

Amount currently collected by volume: \_\_\_\_\_

Frequency of collection: \_\_\_\_\_

Average bill: \_\_\_\_\_

Billing Frequency: \_\_\_\_\_

Bills based on weight or volume: \_\_\_\_\_

Where waste is finally disposed: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

List current recycling efforts: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Materials collected: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

How they are collected: \_\_\_\_\_

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Amounts of each material collected by weight: \_\_\_\_\_

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Percentage of overall waste currently recycled: \_\_\_\_\_

Recycling revenue: \_\_\_\_\_

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Recycling costs: \_\_\_\_\_

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Avoided disposal costs (i.e., savings accrued by not paying for material to be hauled to final disposal facilities): \_\_\_\_\_

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PROFILE 2: IDENTIFYING WASTES

|                        | <b>Estimate % in Waste Stream</b> |
|------------------------|-----------------------------------|
| Computer paper         | _____                             |
| White ledger           | _____                             |
| White form feed paper  | _____                             |
| White copy paper       | _____                             |
| White letterhead       | _____                             |
| White ledger pads      | _____                             |
| Cash register receipts | _____                             |
| Adding machine tape    | _____                             |
| Envelopes              | _____                             |
| Colored paper          | _____                             |
| Copy paper             | _____                             |
| Yellow legal pads      | _____                             |
| Letterhead             | _____                             |
| Message pads           | _____                             |
| Spreadsheets           | _____                             |
| Newsprint              | _____                             |
| Corrugated cardboard   | _____                             |
| Mixed waste paper      | _____                             |
| Unsolicited mail       | _____                             |
| Coated stock           | _____                             |
| Windowed envelopes     | _____                             |
| Stick-on notes         | _____                             |
| Boxboard               | _____                             |
| Used paper             | _____                             |
| Paper plates/cups      | _____                             |
| Paper napkins/towels   | _____                             |
| Tissue                 | _____                             |

**Estimate % in Waste Stream**

|                                     |       |
|-------------------------------------|-------|
| Non-recyclable paper                | _____ |
| Wax-coated                          | _____ |
| Plastic-coated                      | _____ |
| Carbon paper                        | _____ |
| Plastics                            | _____ |
| PETE bottles                        | _____ |
| HDPE bottles, unpigmented           | _____ |
| HDPE bottles, pigmented             | _____ |
| HDPE film                           | _____ |
| LDPE film                           | _____ |
| Vinyl bottles                       | _____ |
| Polypropylene                       | _____ |
| Polystyrene foam                    | _____ |
| Rigid polystyrene                   | _____ |
| Other plastics                      | _____ |
| Aluminum                            | _____ |
| Cans                                | _____ |
| Foil                                | _____ |
| Other                               | _____ |
| Steel cans                          | _____ |
| Other ferrous materials (strapping) | _____ |
| Glass                               | _____ |
| Brown                               | _____ |
| Clear                               | _____ |
| Green                               | _____ |
| Yard waste                          | _____ |
| Grass clippings                     | _____ |
| Leaves and brush                    | _____ |
| Other materials                     | _____ |

PROFILE 3, OPTION A: QUANTIFYING ELEMENTS OF THE WASTE STREAM

Item: \_\_\_\_\_

(A) lbs. received monthly \_\_\_\_\_

(B) lbs. not discarded \_\_\_\_\_

(i.e., retained in files or warehouse, mailed out)

(C) lbs. recycled \_\_\_\_\_

(D) Total monthly discards  $A - (B+C) =$  \_\_\_\_\_

Item: \_\_\_\_\_

(A) lbs. received monthly \_\_\_\_\_

(B) lbs. not discarded \_\_\_\_\_

(i.e., retained in files or warehouse, mailed out)

(C) lbs. recycled \_\_\_\_\_

(D) Total monthly discards  $A - (B+C) =$  \_\_\_\_\_

Item: \_\_\_\_\_

(A) lbs. received monthly \_\_\_\_\_

(B) lbs. not discarded \_\_\_\_\_

(i.e., retained in files or warehouse, mailed out)

(C) lbs. recycled \_\_\_\_\_

(D) Total monthly discards  $A - (B+C) =$  \_\_\_\_\_

PROFILE 3, OPTION B: QUANTIFYING ELEMENTS OF THE WASTE STREAM

(A) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Materials

\_\_\_\_\_ (C) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Column B Converted  
To Weight in Pounds\*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(B)

Quantity Generated  
Per Week in Cubic  
Yards or Pounds

\_\_\_\_\_ (D) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Weight per Month  
(Col. B or C x 4)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\* Optional – Use the conversion table on pages 18 & 19 if you don't have a scale.

CONVERSION FACTORS: VOLUME TO WEIGHT CONVERSION

The conversion factors below will allow you to calculate gross weight from gross volumes. This table was compiled by the National Recycling Coalition Policy Committee for a report entitled, *National Recycling Coalition Measurement Standards and Reporting Guidelines*, published in October 1989. Figures may vary depending on your program's specific processing and handling circumstances, and on how tightly the loads are packed. Changes in container material or design might also vary the amount of material per container. Weights for paper, leaves, and yard waste can be affected by moisture and humidity.

| <u>Materials</u>                    | <u>Volumes</u>          | <u>Weight in Pounds</u> | <u>Weight in tons</u> |
|-------------------------------------|-------------------------|-------------------------|-----------------------|
| Newsprint, loose                    | 1 cubic yard            | 360 – 800               | 0.18 – 0.4            |
| Newsprint, compacted                | 1 cubic yard            | 720 – 1,000             | 0.36 – 0.5            |
| Newsprint                           | 12 inch stack           | 35                      | 0.0175                |
| Corrugated cardboard, loose         | 1 cubic yard            | 300                     | 0.15                  |
| Corrugated cardboard, baled         | 1 cubic yard            | 1,000 – 1,200           | 0.5 – 0.6             |
| Glass, whole bottles                | 1 cubic yard            | 600 – 1,000             | 0.3 – 0.5             |
| Glass, semi-crushed                 | 1 cubic yard            | 1,000 – 1,800           | 0.5 – 0.9             |
| Glass, crushed (mechanically)       | 1 cubic yard            | 800 – 2,700             | 0.4 – 1.35            |
| Glass, whole bottles                | 1 full grocery bag      | 16                      | 0.008                 |
| Glass, uncrushed                    | 1 55-gallon drum        | 125 – 500               | 0.0652 – 0.25         |
| Aluminum cans, whole                | 1 cubic yard            | 50 – 74                 | 0.025 – 0.037         |
| Aluminum cans, flattened            | 1 cubic yard            | 250                     | 0.125                 |
| Aluminum cans                       | 1 full grocery bag      | 1.5                     | 0.00075               |
| Aluminum cans                       | 1 55-gallon plastic bag | 13 – 20                 | 0.0065 – 0/01         |
| Ferrous cans, whole                 | 1 cubic yard            | 150                     | 0.075                 |
| Ferrous cans, flattened             | 1 cubic yard            | 850                     | 0.425                 |
| PETE, soda bottles,<br>whole, loose | 1 cubic yard            | 30 – 40                 | 0.015 – 0.02          |
| PETE, soda bottles,<br>whole, loose | 1 gaylord*              | 40 – 53                 | 0.02 – 0.0265         |
| PETE, soda bottles, baled           | 30" x 48" x 62" bale    | 500                     | 0.25                  |
| PETE, soda bottles,<br>granulated   | tractor trailer load    | 30,000                  | 15.0                  |
| Film, baled                         | 30" x 42" x 48" bale    | 1,100                   | 0.55                  |
| Film, baled                         | tractor trailer load    | 44,000                  | 22.0                  |
| <u>Materials</u>                    | <u>Volumes</u>          | <u>Weight in Pounds</u> | <u>Weight in tons</u> |
| PETE, soda bottles,<br>granulated   | 1 gaylord*              | 700 – 750               | 0.35 – 0.375          |

|  |                      |             |               |
|--|----------------------|-------------|---------------|
| HDPE (dairy only),<br>whole, loose                                   | 1 cubic yard         | 24          | 0.012         |
| HDPE (dairy only), baled   | 30" x 48" x 60" bale | 500 – 800   | 0.25 – 0.4    |
| HDPE (mixed), baled  | 30" x 48" x 60" bale | 600 – 900   | 0.3 – 0.45    |
| HDPE (mixed), granulated   | 1 gaylord*           | 800 – 1,000 | 0.4 – 0.5     |
| Mixed PETE & dairy, whole,<br>loose                                  | 1 cubic yard         | average 32  | 0.016         |
| Mixed PETE, dairy, & other<br>rigid, whole, loose                    | 1 cubic yard         | average 38  | 0.019         |
| Mixed rigid, no film or dairy,<br>whole, loose                       | 1 cubic yard         | average 49  | 0.0245        |
| Mixed rigid, no film,<br>granulated                                  | 1 gaylord*           | 500 – 1,000 | 0.25 – 0.5    |
| Mixed rigid & film, densified<br>by mixed plastic mold<br>technology | 1 cubic foot         | average 60  | 0.03          |
| Leaves, uncompacted**  | 1 cubic yard         | 250 – 450   | 0.125 – 0.225 |
| Leaves, uncompacted**  | 1 cubic yard         | 320 – 500   | 0.16 – 0.25   |
| Leaves, vacuumed   | 1 cubic yard         | 350         | 0.175         |
| Wood chips   | 1 cubic yard         | 500         | 0.25          |
| Grass Clippings  | 1 cubic yard         | 400 – 1,500 | 0.2 – 0.75    |
| Used motor oil   | 1 gallon             | 7           | 0.0035        |
| Tire, passenger car  | 1 tire               | 12          | 0.006         |
| Tire, truck  | 1 tire               | 60          | 0.03          |
| Food waste, solid & liquid fats                                      | 1 55-gallon drum     | 412         | 0.206         |

\* Gaylord size most commonly used: 40" x 48" x 36"

\*\* Yard waste densities are especially variable between communities, and in different seasons within a community, because of differences in types of foliage, moisture, and humidity. The 1500 density factor for grass is based on program experience in Montana.

