DEPARTMENT OF THE ARMY
U.S. Army Center for Public Works
7701 Telegraph Road
Alexandria, VA 22315-3862

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FACILITIES ENGINEERING
Utilities

# OFFICE WASTE REDUCTION METHODS AT ARMY INSTALLATIONS

1. Purpose. The purpose of this Public Works Technical Bulletin (PWTB) is to transmit the U.S. Army Construction Engineering Research Laboratory's (USACERL) Office Waste Reduction Methods at Army installations. The USACERL publication outlines the principle of Waste Reduction Methods and offers several management tools to reduce waste.

2. Applicability. This PWTB applies to all U.S. Army Facilities Engineering/Public Works activities.

3. References.

a. AR 420-47, Solid Waste Management, 1 Jan 1985.

b. Policy Letter CEHSC-FU-S, Subject: Army Policy for Solid Waste Management, 29 Mar 1993.

c. TN 420-47-02, Installation Recycling Guide, 1 Sep 1991.

d. PWTB 420-47-03, Decision Makers Guide, 3 May 1993.

e. PWTB 420-47-04, Solid Waste Options, 30 Sep 1993.

f. PWTB 420-47-05, Source Reduction Planning, 1 Aug 1994.

4. Discussion.

a. Traditional Solid Waste Management (SWM) methods have been utilized for quite sometime and have served us well. As a nation, we are starting to realize that we can't solve the solid waste dilemma just by finding new places to put trash. Across the country, many individuals, communities, and businesses have found creative ways to reduce and better manage their trash through a coordinated mix of practices that includes source

reduction. Integrated Solid Waste Management not only continues to offer the traditional components of disposal, combustion and landfilling but also uses the alternatives of source reduction, reuse, recycling and composting.

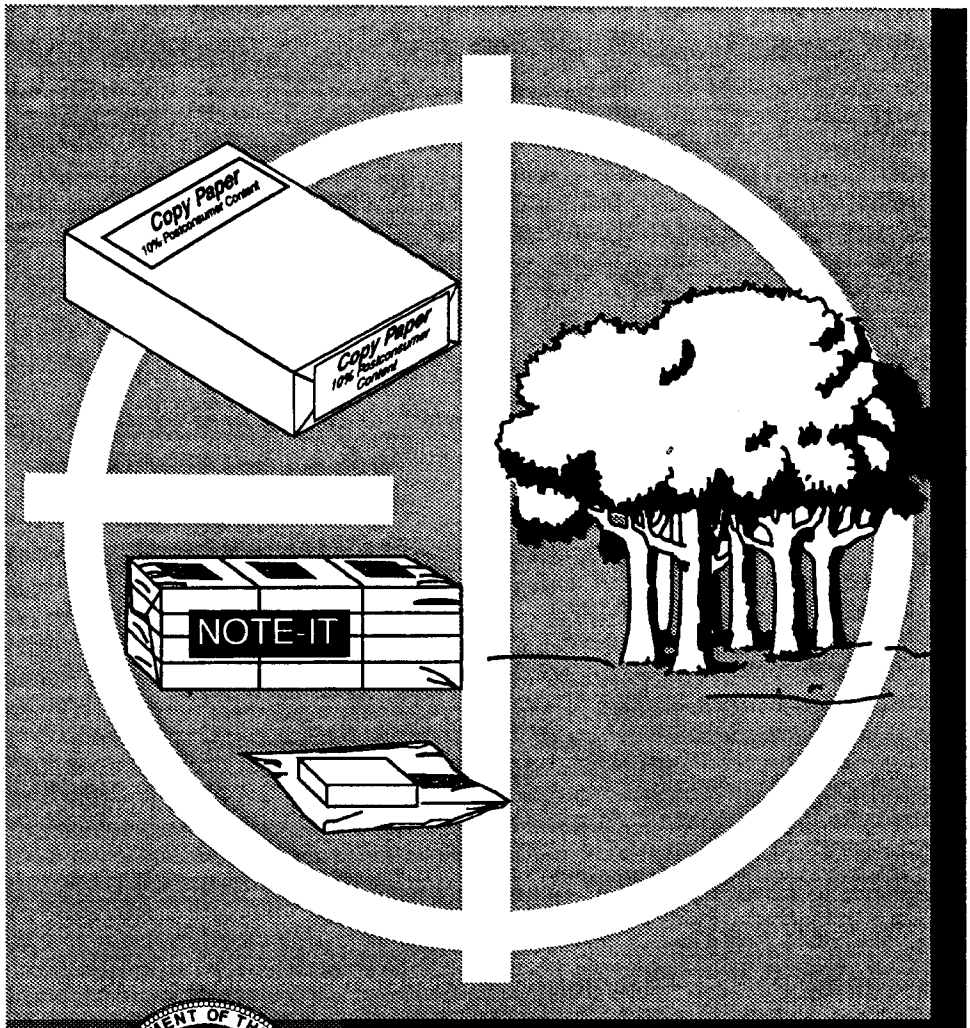
b. AR 420-47 prescribes responsibilities, standards, and procedures for the efficient and economical collection, recycling, and disposal of solid waste. The Army SWM Policy Letter is a summary of proposed revisions to AR 420-47 and requires the installation to develop a ISWM plan. Additional solid waste references include TN 420-47-2 which contains guidance for implementing solid waste recycling programs at Army installations. PWTB 420-47-3 provides guidance for ISWM planning, analysis and implementation of all SWM options. PWTB 420-47-4 is a computer software package developed for evaluating and selecting SWM options.

c. The enclosed USACERL pamphlet, "Office Waste Reduction Methods at Army Installations", sponsored by the U.S. Army Environmental Center will assist personnel at Army installations reduce waste in compliance with Army and federal regulations. Implementing a waste reduction and recycling program save money, raise morale, reduce pollution, and demonstrate to neighboring communities the military's commitment to protect our natural resources. This pamphlet will demonstrate how the solid waste challenge can result in an opportunity to become a leader in environmental compliance and protection.

5. Point of Contact. Questions and/or comments regarding this subject, which can not be resolved at installation level, should be directed to U.S. Army Center for Public Works, CECPW-ES, 7701 Telegraph Road, Alexandria, VA 22315-3862, at commercial (703) 806-5194 (DSN 656),

FOR THE DIRECTOR:

FRANK J. SCHMID, P.E.
Director of Engineering




# Office Waste Reduction Methods at Army Installations

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This pamphlet is intended for Army personnel at any level worldwide. This pamphlet will help Army personnel use the EPA solid waste management program to plan and implement office waste reduction programs within their working environment.

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Integrated Solid Waste Management in the Office Environment.
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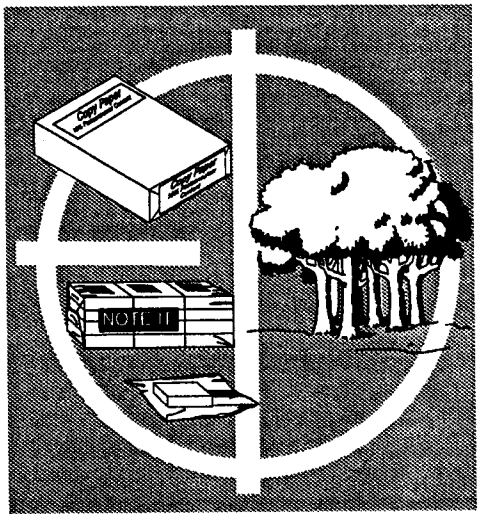


# Office Waste Reduction Methods at Army Installations

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UPDATES TO:

Office Waste Reduction Methods at Army Installations

Page 21 - E.O. 12873 rescinded, replaced by E.O. 13101

Page 21 - AR 200-1 was updated in 1997

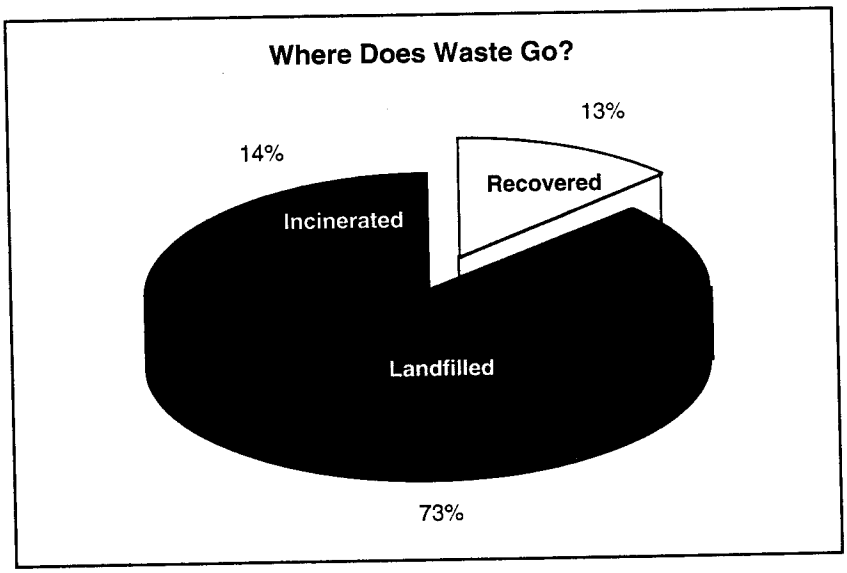
Page 21 - AR 420-47 consolidated into AR 420-49 in 1997

# Table of Contents

## Overview

During the past three decades, the standard of living has increased in the United States. So has the annual production of solid waste. Americans produce, on average, almost four pounds of garbage per person per day (AEPI 15).

Out of the millions of tons of waste generated each year, approximately 73% is landfilled, 14% is incinerated, and only 13% is recovered for reuse (AEPI 16).




Disposal costs continue to rise as waste disposal options decrease. In the past, the main thrust of solid waste management was simply to landfill or bury garbage. This approach is no longer the most practical. Environmental regulations, as well as public opposition, make expanding old landfills or creating new ones more difficult than in years past.

Military installations face the same waste disposal dilemmas as municipalities. The Environmental Protection Agency Resource Conservation and Recovery Act (EPA RCRA) landfill regulations will have closed many landfills across the nation by the October 1993 compliance date, including approximately 50% of Army landfills (AEPI 46).

Installations now face increased scrutiny under the Federal Facilities Compliance Act of 1992 (FFCA), which requires annual inspection of federal facilities. These stipulations, increasing the liability and expense of operating a landfill, are bringing solid waste issues to the forefront on military installations.

In October 1989, the Secretary of Defense mandated that the Department of Defense (DoD) be the federal leader in environmental compliance and protection. DoD has adopted Directive 4165.60 stating that "the military is committed to a rigorous schedule of minimizing waste and reducing solid waste materials at the source whenever possible" (AEPI 35).

In response to the solid waste crisis, several installations have implemented impressive recycling and waste reduction programs. Fort Eustis recycles 22% of its waste stream, and Fort Lewis manages an office recycling program and a drop-off center. In the fall of 1994 Fort Benning plans to open a materials recovery facility (MRF) that is expected to divert nearly 900 tons of waste annually from the landfill.

Implementing a waste reduction and recycling program can save money, raise morale, create new jobs, reduce pollution, and demonstrate to neighboring communities the military's commitment to protect our natural resources.

This pamphlet will demonstrate how the solid waste challenge can result in an opportunity to become a leader in environmental compliance and protection.

As you implement the recommendations made throughout this pamphlet, you will find that reducing waste is the responsibility of all office employees. Various responsibilities such as collection, procurement, public relations, and overall coordination will fall on the shoulders of specific personnel. Use the skills and knowledge of as many employees as possible, and encourage employees to communicate regularly with one another for greater program effectiveness.

EPA advocates approaching solid waste management in the following order: first through source reduction, reuse, and recycling, and finally through incineration and landfilling.

**Integrated Solid Waste Management Hierarchy**


❶ Source Reduction: Procuring items that generate less waste and toxicity in their use or that were manufactured in a way that minimizes waste and toxicity.

❷ Reuse: Reducing waste by using a product or package (without remanufacturing) after its original purpose has been achieved.

❸ Recycling: Collecting and sorting used materials to be remanufactured into new products.

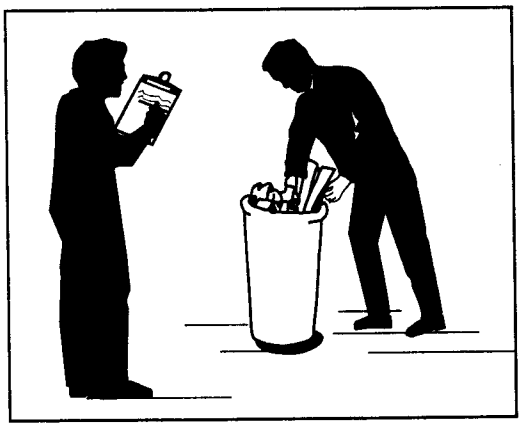
❹ Incineration: Controlled burning of those materials that can't be reduced, reused, or change to "methane gas migration."

❺ Landfilling: Burying garbage in pits designed and monitored to minimize leakage and methane gas migration; landfilling is used only for garbage left over from the above processes.

This pamphlet will help you use the EPA solid waste management program to plan and implement your office waste reduction program.

## Waste Audit

Before you can make plans to reduce office waste, you must identify the components of your waste stream. In other words, take a look at your trash to see what and how much you throw away. This process is called auditing your waste. At the end of this pamphlet are forms and instructions for conducting a waste audit.



**Perform a waste audit**

A waste audit will tell you as much about your usage habits as it will about the components of your garbage. William Rathje, the prominent landfill archaeologist and Director of the Garbage Project at the University of Arizona, refers to garbage or solid waste as a mirror of American society. When you look through your trash you will see physical remnants of your daily activities: apple peels, gum wrappers, plastic shopping bags with handles, and newspapers. All these items reflect consumer and lifestyle choices.

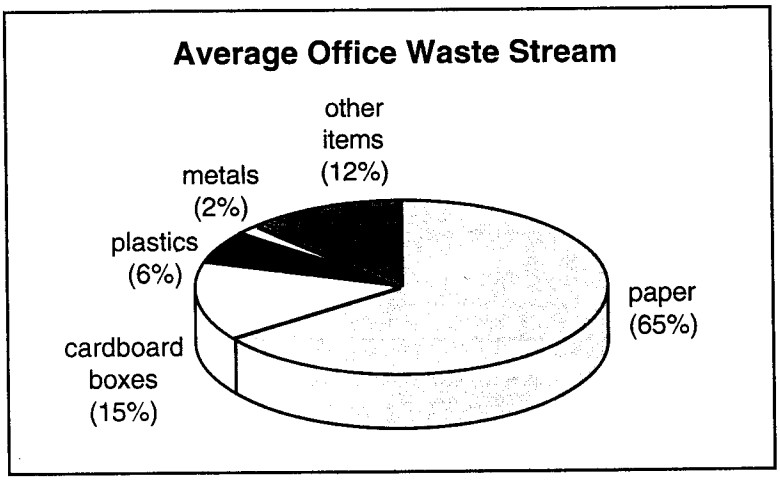
To perform a waste audit you will need to examine trash from several containers on different days. It is a good idea to check several individual wastepaper containers in an office as well as at the central collection location. (That central location is often the dumpster out back.)

Dr. Rathje points out that "what people claim in interviews to have bought and consumed, to have eaten and drunk, to have recycled and thrown away, almost never corresponds directly or even very closely to the actual remnants of material culture in their Glad or Hefty bags" (Rathje 67).

**What we *think* we throw away often differs from what we *do* throw away**

After spending more than twenty years sifting through garbage, Dr. Rathje has discovered some very interesting patterns. He has found that those items in short supply are more often wasted than those that are plentiful. When people fear a shortage they buy in excess, then end up throwing away the item. An audit will give you an opportunity to check this hypothesis in your office.

The waste stream of a typical office includes paper (65%), cardboard boxes (15%), plastic (6%), metals (2%) and other items (12%) (Thompson 7).




Once you have identified the components of your office waste stream, you can process them according to the EPA hierarchy.

## Source Reduction

Source reduction is the first step in the EPA waste reduction plan. Previously, waste stream reduction has meant condensing or compacting the volume of waste just before it goes into the landfill—an end–of–the–pipeline approach. Today the emphasis is on source reduction; that is, creating less garbage in the first place. Source reduction is an economical approach to solid waste management since you do not have to pay for storage, collection, transportation, and processing of garbage that does not exist. Source reduction also includes identifying and reducing hazardous materials used in offices.

The Defense Reutilization and Marketing Office (DRMO) has practiced source reduction for years by selling used items such as furniture and equipment, thus diverting them from the landfill. DRMO's function is becoming broader as the range of marketable recyclable materials expands.

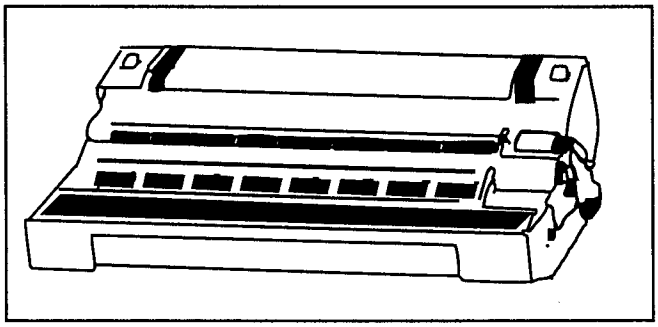
Another example of source reduction is the Personal Property Center, located in Springfield, Virginia, where excess and surplus furniture is restored and sold within the National Capital area. Set up in 1982 to meet the growing need for furniture within the government, the center relieves agencies of the need to maintain costly space for excess furniture. It complies with the Federal Property Management Regulations (FPMR), which require the purchase of excess and restored, rather than new, furniture.

As you begin a waste reduction program you will discover numerous ways to achieve source reduction in your office. Many call for common sense and require little or no money:

- eliminate full–page memos when a half page will suffice (cut off the excess and use it for scratch paper or other memos)
- use e–mail whenever possible
- use shotgun envelopes
- use narrow–lined paper and notebooks
- make memo pads out of outdated documents or stationery
- when appropriate, do not use an envelope: simply fold and tape the paper closed and address one side of it
- use routing slips or a bulletin board instead of sending multiple copies
- purchase reusable mugs for staff and visitors

**Use mugs instead of disposable cups**

Returning toner cartridges to be remanufactured is another cost–effective means of source reduction. You are keeping plastics out of the landfill and paying up to 40–50% less than you would for a new cartridge. Recharged and remanufactured toner cartridges are now available nationwide under General Services Administration (GSA) contracts. Hanscom Air Force Base in Bedford, MA saved $50,000 over a six–month period by returning toner cartridges for laser printers.



**Remanufactured toner cartridges reduce waste and save money**

Hanscom has also mandated that at least 60% of its procured materials have recycled content.

As you begin practicing source reduction and discussing it with others in your office, you will discover many more ways to reduce your waste stream.

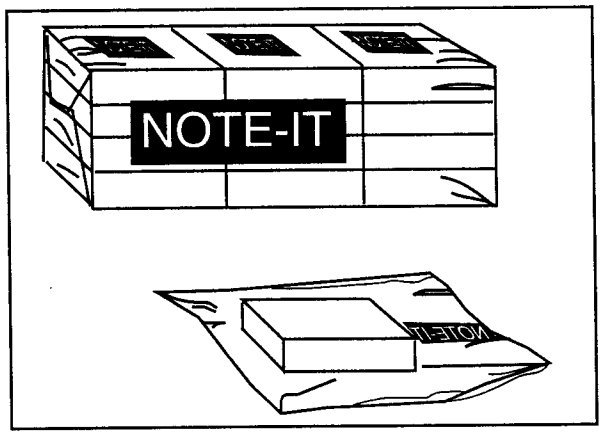
### ☞ *Procurement Decisions Affecting Source Reduction*

The Army practices source reduction through the concept of supply and economy: Buy what you need and not more.

Keep in mind Dr. Rathje's point that people waste more of what is in short supply than of what is plentiful. In other words, when they perceive a forthcoming shortage people buy in excess and then waste.

Before making a purchase, you need to consider how much waste will be generated by the purchase, use, and disposal of the product. You can:

- purchase items that do not come with excessive packaging
- purchase durable items that do not have to be replaced frequently
- buy supplies in bulk, thus reducing packaging waste
- buy supplies in large containers that can be used to refill personal-sized containers




**Let your supplier know your concerns about waste and excessive packaging**

## Reuse

Reuse is the act of using a product more than once. Bottles that are returned to the bottling company for refilling are being reused. You can also:

- make scratch paper from the blank side of documents that would have been discarded
- use all space on a sheet of paper before recycling it
- reuse office supplies such as folders, paper clips, interoffice routing envelopes, and cardboard inserts
- use two–way shipping containers
- reuse packaging materials such as styrofoam peanuts, newspaper, and boxes
- make double–sided copies instead of single–sided

**Make double–sided copies to save paper**

In performing your waste audit you probably found the largest component of your waste stream was paper. The use of double–sided copies cannot be overemphasized. Previously, high–speed copy machines were not designed to run the same sheet of paper twice through the copy process, but that has changed. Following these maintenance tips (provided by GSA) will help your copy machine operate smoothly, even while making double–sided copies:

- be sure the copy machine is fully–serviced at all times
- when you receive a new shipment of copy paper, allow the paper to adjust to room temperature before using it
- be sure the paper is facing in the correct direction when you reload (follow direction of arrow on ream label)
- keep paper in closed wrapper until ready to use
- during long periods of non–use (weekends, holidays, etc.), remove paper from the copy machine and rewrap the paper
- allow copier to cool down after long print runs, especially after printing double–sided copies
- add new toner as soon as machine indicates need
- clean accessible machine parts
- when the paper jams, call service personnel immediately (if the paper is easily removable, clear the jam yourself)

## Recycling

Once you have implemented reduction and reuse measures, you will be ready to address the next component of the solid waste management program—recycling. Recycling is the process of collecting used products for remanufacture into new ones. For recycling to be effective, there must be a market for new products containing recycled materials. GSA has been working to find more markets for recyclables and recycled products.

The average office worker generates 1.55 pounds of office waste per day. Recycling prevents a portion of this waste from ending up in the landfill. It also saves energy and natural resources, and prevents pollution.

Listed below are the steps you can take to start a recycling program:

- establish a point of contact (POC) within your office
- identify the recycling authorities on your installation
- conduct a waste audit and identify recyclables
- address collection and storage issues
- continually educate office personnel about the program
- monitor the program

The individual in charge of the office recycling program should be enthusiastic, have good communication and organizational skills, and be able to serve as your POC with the recycling authorities on the installation. The POC should provide leadership, maintain contact with recycling authorities, educate and relay information to office staff, oversee program logistics, and monitor the program.

The POC should check with the installation recycling authorities to determine what type of program exists on base and how your office can participate. Because recycling responsibilities vary with each installation, it may be necessary to make several calls to locate the recycling authorities. Directorate of Personnel and Community Activities (DPCA), Directorate of Public Works (DPW), and Directorate of Engineering and Housing (DEH), are good places to begin checking.

Whether or not items can be collected and sold depends on the availability of local markets (manufacturers) that will accept your recyclables. You will need to work with other offices on post to establish an office recycling program.

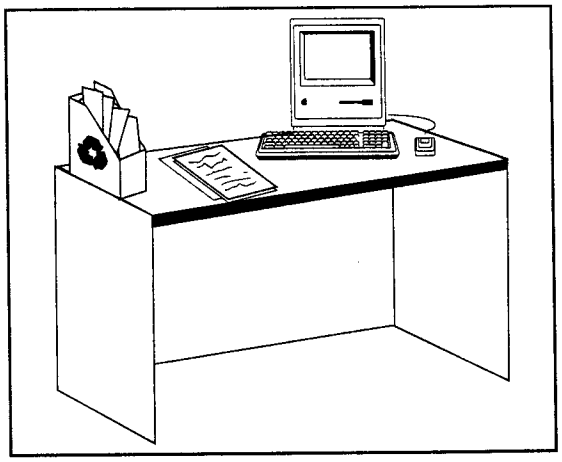
> *Do not assume it is okay for you to directly market your materials off base.* Any materials purchased with appropriated funds must be recycled through DRMO unless prior approval has been given to do so.

The activity or department in charge of recycling will help you determine:

- what materials are acceptable
- how to prepare those materials for collection
- where to store materials for collection
- what day materials are collected
- where and when non-collected materials are to be delivered

You will also need to establish interoffice procedures. In some offices there is one recycling collection box, usually located by the copy machine. Participation will be greater if every person has a container (such as a box or a folder) at his or her desk, in addition to a trash can for non-recyclables (see "Contamination of Recyclables" on page 15). Individuals can empty their containers into the central one. These procedures should be cleared with the appropriate supervisor in your office.

A desktop recycling box, similar to the one shown in the illustration below, is available from the GSA catalog (Item No. 7520–00–985–5907).



**Desktop containers encourage recycling**

Tell people that you are beginning an office recycling program. This can be done through staff meetings, one–on–one communication, electronic mail, memos, or all of the above. Let office workers know whom they can talk to if they have questions.

To maintain cooperation and enthusiasm among staff, be sure to:

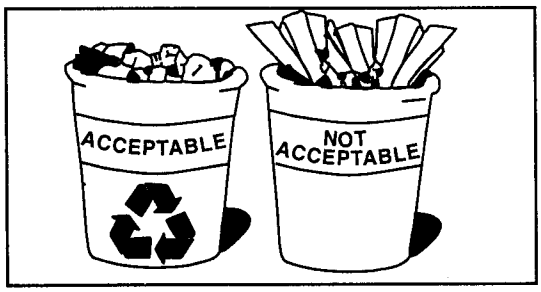
- acknowledge staff success in reducing waste
- post in a central location the volume of materials diverted from the landfill as a result of your office recycling program
- celebrate the success of your program
- be available to hear concerns about the program

Communication is essential to maintain enthusiasm as your program is established. Acknowledge staff success in reducing waste, and keep staff apprised of the volume of materials they have diverted from the landfill. An open line of communication provides a structure that will help ensure that your program succeeds.

## ☞Contamination of Recyclables

Contamination is a serious issue. As markets continue to be swamped with recyclables and processors are faced with more materials than they can use, contaminated materials are likely to be rejected. Continually monitor the materials leaving your office, and educate staff about what is and isn't acceptable for recycling.

Keeping recyclables separated from non–recyclables is often the greatest challenge in a recycling program. To avoid contamination of recyclables, place a separate container for non–recyclables near each container for recyclables. Prepare a list of items that are acceptable and unacceptable for recycling. (Food waste, for example, would not be acceptable in a bin for recycled paper.) Post the list on or near the central collection container, and take the time to discuss the list with office staff.

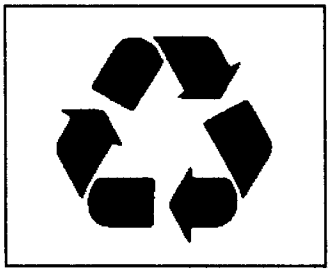



**Keep recyclables separate from non-recyclables**

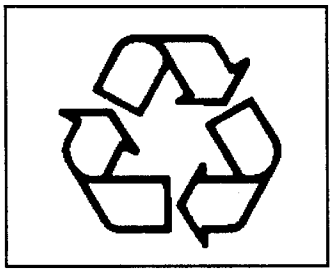
## ☞Procurement Decisions Affecting Recycling

The materials (paper, aluminum cans, glass, etc.) you have been collecting and sending to the recycling center are manufactured into new products. However, if there is no demand for these products, the material you collect could end up in the landfill. By purchasing materials with a recycled content, you are supporting the collection component of your waste reduction program.

The recycle symbol, a series of three chasing arrows, is referred to as the recycling loop. Although the two logos have different meanings, as shown in the illustrations below, the black logo on the left is, in practice, used to signify "recycled" *and* "recyclable."



**Recycled products bear this logo**



**Recyclable products bear this logo**

The three arrows represent the collection and remanufacture of used materials, and the sale of the recycled products. To make recycling a viable component of any solid waste plan, all parts of the loop must be addressed. In other words, if you're not *buying* recycled items, you're not recycling.

The Army, by virtue of its size and purchasing power, is in a position to have tremendous impact on the recycled product economy. By buying items with a recycled content, the military is closing the recycling loop.

Realizing that federal purchasing decisions could accelerate research, development, and stabilization of the recycled product economy, President Bush signed Executive Order 12780 in October 1991, directing all federal agencies to promote recycling and the efficient use of our nation's resources. Included in this order were instructions to buy materials with a recycled content.

Other federal recycling initiatives include Section 6002 of RCRA, which requires any agency spending at least $10,000 in federal funds on items (such as paper) to develop an affirmative action procurement program for purchasing products with the highest percentage of recovered materials practical (Thompson 69), and an environmental policy memorandum, issued by DoD, entitled "Preference for Recycled Paper." The policy memo requires that:

- the purchase of paper and paper products containing recycled materials be consistent with EPA Procurement Guidelines (40 CFR 250)
- all reports (or other paper products) produced by and for DoD be consistent with the EPA Guidelines (40 CFR 250)
- paper deliverables contain recycled materials
- you purchase letterhead stock containing recycled materials and imprinted with a recycling logo and the words "Printed on Recycled Paper" (existing stock should be used before new letterhead is ordered)
- all documents longer than two pages be double–sided
- you make maximum use of GSA schedules for paper and paper product procurements pursuant to DFAR Subpart 208.404

The memo allowed the requirements to be waived if:

- the price of the recycled paper is unreasonable
- the recycled content standard results in inadequate competition
- the standard results in unreasonable delay
- the recycled content product fails to meet performance specifications
- the defense mission will be impaired

The memo concludes with a reminder that the quality of recycled paper has greatly improved, and quality, therefore, should not be an issue when choosing between recycled and virgin paper.

GSA has responded to these directives with the Federal Recycling Program. Working closely with EPA, GSA has assisted federal offices across the country in establishing recycling programs. A key component of this effort includes offering products with a recycled content to their customers.

GSA has made a commitment to replace many of their virgin products with those containing recycled content. GSA now carries more than 900 recycled content products, including envelopes, writing paper, xerographic paper, spirit duplicating paper, fax paper, adding machine tape, vinyl binders, pocket report covers, index cards, facial tissue, and steno notebooks. At times GSA has trial–offer prices on their recycled products.

New products are introduced frequently. That two–liter soda pop bottle you were drinking from yesterday may be your office carpet tomorrow. GSA now has a contract with a vendor who offers 25 colors and 1,800 patterns of recycled carpet.

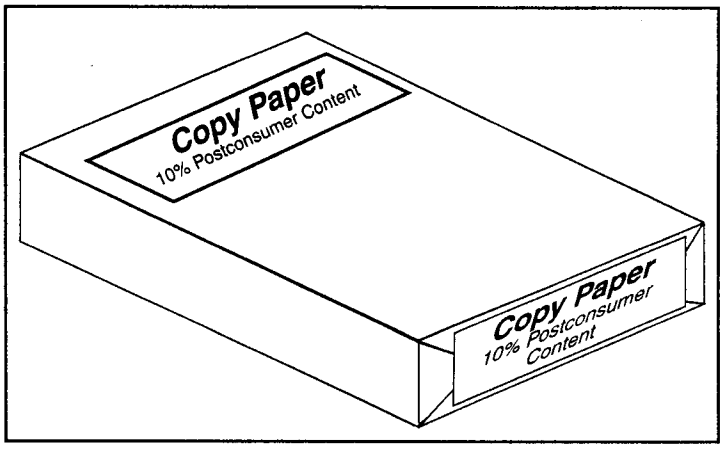
Contact your GSA customer service representative today for a complete list of recycled products. If you do not already have a copy of the *Environmental Products Guide* (formerly the *Recycled Products Guide*), be sure to request it. A subscription to *Marketips* is also recommended. For information on obtaining these publications, please see "Additional Sources for Information" on page 22.

### ☞Purchasing Postconsumer Content

When purchasing paper (or other recycled items) it is important that you buy products with a postconsumer content.

According to EPA guidelines, those materials which "have passed through their end usage as a consumer item" are considered postconsumer. The piece of paper you write on today, then toss into the recycling bin tomorrow, will go to the recycling center. From there it goes to the paper mill where it is reprocessed into a new sheet of paper. Because it was made from paper that had been used as a consumer item, this new paper now has a postconsumer content.

By buying postconsumer products, you are supporting the collection end of your recycling program. Examples of items with postconsumer content are copy paper, legal pads, and folders.




**Purchase postconsumer products**

## Need for Education

To help maintain a high–quality waste reduction program, you will need to establish a program that encourages communication among all levels of office staff. You can do several things to educate personnel about waste reduction efforts:

- **Establish a waste reduction task force to help identify and correct areas of office waste.**

  Include representatives from DRMO, DEH or DPW, DPCA, SSSC, and the Supply and Service Division, DOL. Also, include a staff member from the Contracting Office and at least two supply clerks.

The task force should be responsible for:

- setting goals for the types and volumes (or percentage) of waste to be reduced
- setting a schedule for regular meetings
- establishing a training program for office personnel

- **Offer ongoing training sessions with office staff to maintain quality control of all aspects of waste minimization.**

**Provide training and information**

Ask personnel for feedback to update and improve the programs. Make announcements through your installation's daily newspaper about waste reduction achievements when appropriate.

- **Establish a waste reduction incentive program to encourage the development of new reduction ideas.**

  Develop a mechanism that encourages office and procurement personnel to suggest waste reduction ideas.

  Publicize suggestions that are implemented with an announcement in your installation's daily bulletin.

  Investigate the possibility of offering cash awards or leave time to personnel whose ideas are adopted.

## Closing Thoughts

The Army Policy Memorandum for Obtaining Utility Services and AR 200–1 encourage reducing the volume of the Army's solid waste stream. Training and Doctrine Command (TRADOC) has set a goal to reduce every installation's landfilled solid waste by 50% by the year 2000. Forces Command (FORSCOM) likewise has set goals to reduce its waste stream by 25% in 1992, 35% in 1994, and 50% by the year 2000 (AEPI 36). Show your support of these goals by practicing reduction, reuse, and recycling in your office. And take your waste reduction habits home with you. Many of the suggestions in the pamphlet can be easily implemented at home.

## Federal and Army Regulations

In October 1989, the Secretary of Defense mandated that the Department of Defense be the federal leader in environmental compliance and protection. The Resource Conservation and Recovery Act (RCRA), amended in November 1984, is the primary federal statute on solid waste. Its major goal is to reduce waste and conserve energy and natural resources. Subtitle D specifically relates to solid waste management. The Federal Facilities Compliance Act of 1992 (FFCA) waives federal immunity from these laws, thus requiring compliance by installations.

Three other laws regulate solid waste management on Army installations and provide assistance in planning a waste reduction program:

- Executive Order 12873 (1991) requires federal agencies to establish reduction and recycling programs for all operations. The order also stipulates that recycled products be purchased whenever practical.
- AR 200-1 (updated in 1991) outlines source reduction and recycling methods and describes how to allocate funds received through the sale of recyclables.
- AR 420-47 provides implementation guidance that describes the responsibilities, requirements, and procedures for solid waste management at Army installations.

## Additional Sources for Information

GSA Catalog
*Environmental Products Guide* (formerly *Recycled Products Guide*)
*Marketips*

Contact the Local GSA Customer Service Director at (817) 334–5215 to obtain these publications (phone number current as of October 1993).

## Solid Waste Terms and Definitions

The following definitions are taken from *Analysis of US Army Solid Waste Management Policy* and *Recycled Papers: The Essential Guide.*

*Incineration*: Controlled burning of those materials that can't be reduced, reused, recycled, or composted.

*Integrated Solid Waste Management*: The complementary use of a variety of disposal methods to handle wastes safely and effectively, including source reduction, reuse, recycling, composting, incineration, and landfilling.

*Landfilling*: Burying garbage in pits that are designed and monitored to minimize leakage and explosions; landfilling is used only for garbage left over from the other waste reduction processes.

*Leachate*: Liquid that has percolated through solid waste or another medium and has extracted, dissolved, or suspended materials from that medium. Leachate may include potentially harmful materials. Leachate collection and treatment is of primary concern at municipal waste landfills.

*Lifecycle*: The projected life of a system, subsystem, or component being evaluated. The stages of a component's lifecycle include development, procurement, operation, maintenance, and support, as well as demilitarization and disposal.

*Lifecycle Analysis*: Evaluation and projection of the life of the system, subsystem, or component considering development, procurement, operation, maintenance, and support of the system, as well as demilitarization and disposal.

*Lifecycle Costs*: Costs incurred during the projected life of the system, subsystem, or component during the process of evaluation. Includes all costs from the development, procurement, operation, maintenance, and support of the system to its demilitarization and final disposal.

*MSW (municipal solid waste)*: Wastes collected by municipalities from residential, office, commercial, institutional, and a limited number of industrial sources. Municipal wastes do not include many industrial process wastes, municipal sludges, or incinerator ash, even though these wastes sometimes do end up in municipal landfills or incinerators.

*Nonrenewable Resource*: A resource that cannot be replaced once it has been depleted. For example, it takes 100 million years for petroleum to be made through natural processes.

*OCC (old corrugated containers)*: A large category of wastepaper consisting primarily of old corrugated containers and cuttings from the manufacture of containerboard, paperboard, and brown, heavy paper grocery bags.

*ONP (old newsprint)*: A wastepaper category including mostly old newspapers but also related wastes such as over–issue news and printed or unprinted scrap from newspaper printing plants.

*Preconsumer Waste*: Waste generated before a product has reached its final end user. For paper production this includes a broad category of both unprinted and printed paper scrap generated by paper mills, converters, printers, publishers, manufacturers, and a variety of other businesses. Some of this waste requires de–inking.

*Postconsumer Content*: The portion of a recycled product that is made of materials recovered after consumer use.

*Postconsumer Waste*: As defined in the EPA Guidelines, this consists only of paper wastes collected from offices, retail stores, and residences "after they have passed through their end usage as a consumer item." Upon careful questioning about wastepaper sources, however, it is evident that some mills and wastepaper dealers are taking liberties with their classification of postconsumer materials. In addition, some organizations use a

definition that differs from the EPA definition and includes a broader range of wastepaper.

*Postmill Waste*: Wastepaper recovered from sources after the original manufacturing, trimming, sheeting, and converting operations are completed. Not all users of the term agree, but many feel that in order to be considered postmill, these wastes should be purchased from independent businesses in which the manufacturer has no financial interest.

*RCRA (Resource Conservation and Recovery Act)*: An act passed by the US Congress in 1976. Among other requirements, RCRA mandates EPA to institute guidelines for federal purchasing that promote the use of paper and other products made with recovered materials.

*Recyclable*: A product that can be collected and remanufactured into a new product.

*Recycling*: A process to collect, transform, or remanufacture materials otherwise destined for disposal.

*Renewable Resource*: A resource that can be replaced naturally once it has been harvested, like trees.

*Reuse:* Reducing waste by using a product or package (without remanufacturing) again after its original purpose has been achieved.

*Source Reduction*: Minimizing the quantity and/or toxicity of waste produced at the place of origin through the design, manufacture, acquisition, and reuse process. Source reduction prevents waste either by redesigning products and processes, or by otherwise instilling behavioral changes in consumption, use, and waste generation. The reuse of products is crucial to source reduction, since it reduces the need for new ones.

*Waste Stream*: The total flow of solid waste from homes, businesses, institutions, and manufacturing plants that must be recycled, incinerated, and finally disposed of. Can also be a portion of the total, such as the "residential waste stream" or the "recyclable waste stream."

## Acronyms

| | |
|---|---|
| DEH | Directorate of Engineering and Housing |
| DoD | Department of Defense |
| DOL | Directorate of Logistics |
| DPCA | Directorate of Personnel and Community Activities |
| DPW | Directorate of Public Works |
| DRMO | Defense Reutilization and Marketing Office |
| EPA | Environmental Protection Agency |
| FFCA | Federal Facilities Compliance Act |
| FORSCOM | Forces Command |
| FPMR | Federal Property Management Regulations |
| GSA | General Services Administration |
| MRF | Materials Recovery Facility |
| POC | Point of Contact |
| RCRA | Resource Conservation and Recovery Act |
| SSSC | Self Service Supply Center |
| TRADOC | Training and Doctrine Command |
| US | United States |

## References

Funke, Odelia, et al. *Analysis of US Army Solid Waste Management Policy*. Champaign, IL: AEPI, 1992.

Rathje, William L. and Cullen Murphy. *Rubbish!: The Archeology of Garbage*. New York: HarperCollins, 1992.

Thompson, Claudia G. *Recycled Papers: The Essential Guide*. Cambridge, MA: MIT Press, 1992.

## Individual Waste Audit: Instructions

On the following page is a handout containing instructions for conducting individual waste audits. Make enough copies of the handout to distribute to everyone in your office.

The table below is given as an example.

| Material | What % of Waste Stream? 1st Day | 2nd Day | 3rd Day | 4th Day |
|---|---|---|---|---|
| High-grade paper | 30 | 10 | 25 | 30 |
| Computer paper | 30 | 40 | 25 | 25 |
| Colored paper | | | 10 | 5 |
| Newspaper | 15 | 15 | 20 | |
| Magazines, journals | 5 | 5 | | |
| Other paper | | 10 | | 5 |
| Corrugated cardboard | | 5 | | 15 |
| Printer cartridges | | | | |
| Aluminum | 10 | 10 | 10 | 5 |
| Glass | | | 5 | |
| Food | 10 | 5 | | 10 |
| Other waste | | | 5 | 5 |

## Individual Waste Audit: Handout

To create an effective waste reduction program, we need to know what recyclable and non–recyclable materials are contained in our trash. Please check your individual wastebasket at the end of any four days over the next two weeks. Estimate the percentage of each material in your trash can, and record the results in the table below. Thank you for your help.

| | What % of Waste Stream? | | | |
|---|---|---|---|---|
| **Material** | **1st Day** | **2nd Day** | **3rd Day** | **4th Day** |
| High–grade paper | | | | |
| Computer paper | | | | |
| Colored paper | | | | |
| Newspaper | | | | |
| Magazines, journals | | | | |
| Other paper | | | | |
| Corrugated cardboard | | | | |
| Printer cartridges | | | | |
| Aluminum | | | | |
| Glass | | | | |
| Food | | | | |
| Other waste | | | | |

If your waste stream varies by season, you will need to repeat this audit during the year.

## Comprehensive Waste Audit

EPA has prepared these instructions for an office waste audit. Your office POC should be responsible for performing this audit. On the following page is a blank form to record your results. The audit should be performed several times to ensure the validity of your results.

1. Obtain a representative sample of mixed waste (approximately 50 pounds) from a collection cart or storage bin at your office. Place the waste in a container of known volume and weight.
2. Weigh the sample and estimate the volume (in cubic yards or cubic feet). For example:
   - The estimated volume of the sample is 2.5 cubic feet (or 0.09 cubic yards).
   - The total sample weight is 35.6 pounds (container weight is 1 pound and the waste sample weight is 34.6 pounds).
3. Estimate the density (pounds per cubic yard) of the sample by dividing the waste sample weight by the estimated volume:

   34.60 pounds
   ÷ 0.09 cubic yards
   = 384 pounds per cubic yard

   Once you have calculated the average density, you can estimate the amount of solid waste generated each month. Just multiply the cubic yards of waste disposed in a month by the waste density.
4. Divide the sample into components (as shown on the individual waste audit sheet), placing each material into a corrugated or other type container of known weight.
5. Weigh each box of waste separately and subtract the container weight to obtain the net material weight.

6. Calculate the percentage of total weight represented by each material by dividing the weight of each material by the total weight and multiplying by 100. For example:

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   15.00  pounds of white paper
÷  34.60  (total weight of sample)
=    .43
x 100.00
=  43%
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| Material Type | Weight of Material | x Total Weight of Sample | ÷ 100 equals Total % of Waste |
|---|---|---|---|
| Paper | | | |
| White | | | |
| Colored | | | |
| Newsprint | | | |
| Mixed | | | |
| Food | | | |
| Metal | | | |
| Glass | | | |
| Miscellaneous | | | |
| **Total** | | | |