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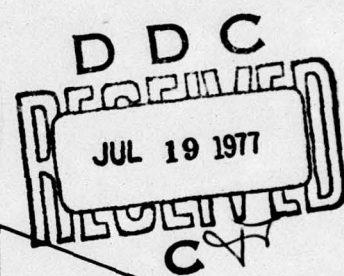
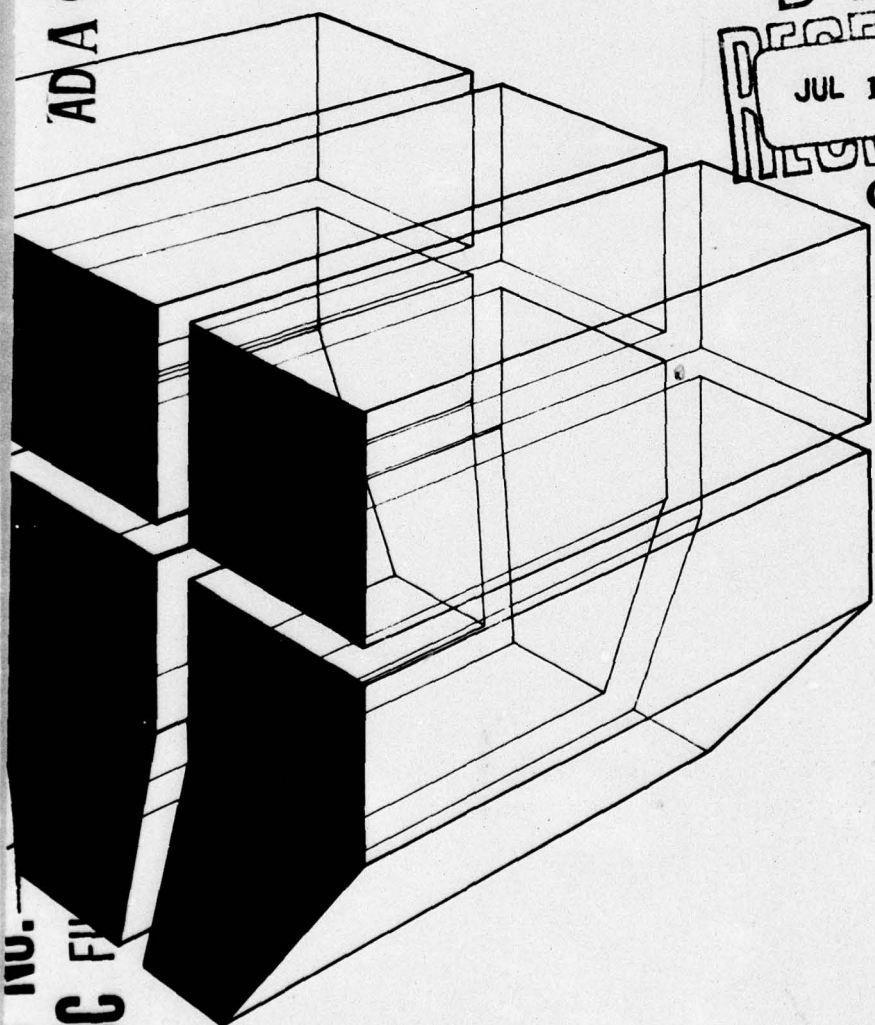
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INTERIM REPORT N-23  
May 1977

ADA 041742

RECOMMENDATIONS FOR DEVELOPING THE OPTIMUM METHOD  
FOR DA INSTALLATIONS TO COMPLY WITH 40 CFR 246 - SOURCE  
SEPARATION FOR MATERIALS RECOVERY GUIDELINES



by  
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER CERL IR-N-23	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle) RECOMMENDATIONS FOR DEVELOPING THE OPTIMUM METHOD FOR DA INSTALLATIONS TO COMPLY WITH 40 CFR 246 - SOURCE SEPARATION FOR MATERIALS GUIDELINES.		5. TYPE OF REPORT & PERIOD COVERED INTERIM repl.	
7. AUTHOR(s) Bernard A. Donahue, James D. Price Harvey W. Gershman, William P. Gardner		6. PERFORMING ORG. REPORT NUMBER Recovered	
8. PERFORMING ORGANIZATION NAME AND ADDRESS Urban Services Group, Inc. <i>New</i> 410284 Washington, DC 20004		9. CONTRACT OR GRANT NUMBER(s) DACA 88-76-C-0008 <i>New</i>	
11. CONTROLLING OFFICE NAME AND ADDRESS CONSTRUCTION ENGINEERING RESEARCH LABORATORY P.O. Box 4005 Champaign, IL 61820		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) <i>12</i> 234p.		12. REPORT DATE May 1977	
		13. NUMBER OF PAGES	
		15. SECURITY CLASS. (of this report) Unclassified	
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited. <i>16</i> 4A762720A896   <i>17</i> 02			
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)			
18. SUPPLEMENTARY NOTES Copies are obtainable from National Technical Information Service Springfield, VA 22151			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report is the end-product of a study which involved both an examination of source separation techniques for materials recovery and an evaluation of current Department of the Army (DA) operations, especially those related to solid waste management. The purpose of the study was to arrive at the optimum method or methods by which DA installations could integrate source separation procedures into their current solid waste management activities, as required by the U.S. Environmental Protection Agency's 40 CFR 246 -- Source Separation			

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cont

for Materials Recovery Guidelines. The report was written with the goal of providing assistance -- both background information and specific instructions for procedures -- to the managing activities faced with compliance with the guidelines at the installation level. The procedures recommended in the report are those which can most easily be included in current operations while still producing significant resource recovery results. It is considered advisable for DA to institute only the "Required" procedures from the guidelines, acting on the "Recommended" procedures only where they can be handled with existing equipment, personnel, and funds. Procedural changes at the installation level must be preceded by DA and Department of Defense policy and guidance alterations, for which Recommendations are also provided.



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FOREWORD

This study was performed for the Directorate of Facilities Engineering, Office of the Chief of Engineers (OCE), under Project 4A762720A896, "Environmental Quality for Construction and Operation of Military Facilities"; Task 02, "Pollution Abatement Systems"; Work Unit 007, "Solid Waste Management, Recycle, and Resource Recovery for Military Facilities." The applicable QCR is 1.03.006(4). The OCE Technical Monitor is Mr. A. P. Norwood.

The report was prepared by the Urban Services Group, Inc., (USG) under contract DACA 88-76-0008 for the U.S. Army Construction Engineering Research Laboratory (CERL), Champaign, IL. The CERL project monitor was Mr. Bernard A. Donahue of the Environmental Engineering Team (Mr. W. A. Mikucki, Chief), Environmental Division (Dr. R. K. Jain, Chief).

The USG staff would like to express their appreciation to the DFAE staffs at Fort Belvoir and Fort Meade for their interest and kind assistance during USG's installation visit in July 1976. The information and guidance provided by Mr. Alfred P. Norwood, Chief of the Sanitary Engineering Branch, Office of Engineers, during the study effort, was most helpful.

COL J. E. Hays is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director.

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## I. INTRODUCTION

### A. Problem Statement

The U.S. Environmental Protection Agency's 40 CFR 246, Source Separation for Materials Recovery Guidelines (hereafter referred to as the Guideline) requires all Federal facilities to implement source separation procedures. Department of the Army (DA) installations need information on how to comply most efficiently with the requirements and recommendations of the Guideline.

### B. Objective

The purpose of this report is to recommend how the DA can most effectively comply with the provisions of the Guideline, including suggested policies for overall program guidance, training requirements, and basic procedures for conducting source separation, collection, pickup, and storage of salable materials.

### C. Approach

Current solid waste generation, storage, collection, disposal, and resource recovery procedures on DA installations were examined and analyzed, and existing DA and Department of Defense (DoD) regulations and directives related to the handling and disposal of solid waste were reviewed. The state-of-the-art of source separation technology and techniques was evaluated, and the report describes in detail those techniques or systems most applicable to situations found at DA installations.

### D. Mode of Technology Transfer

The contents of this report impact on AR 420-47, "Refuse Collection and Disposal," and AR 200-1, "Environmental Protection and Enhancement," Chapter 5 (Solid Waste Management).

### E. Report Contents

Chapter II presents a description of the Federal solid waste laws and

regulations which led to the issuance of the Guideline. This background information is essential for a complete understanding of the Guideline. First, the legislative background is examined, followed by summaries of relevant EPA guidelines. The Guideline itself is then described in some detail, and the Guideline's impact on the DA is examined in terms of the installations it will affect.

Chapter III examines the current state of DA solid waste management. This chapter is prefaced by a description of the DoD directives and DA regulations which dictate DA solid waste management policies. This information, coupled with observations made during USG's visits to Fort Meade and Fort Belvoir (presented in Appendix B), serves as the basis for the ensuing analysis. The chapter details the procedures as well as the costs involved in the storage, collection, disposal, and recovery of solid waste on DA installations. Using the information gathered from the two installation visits, the activities which generate substantial amounts of the various types of recyclable wastepaper are listed.

Chapter IV gives a brief description of the state-of-art of source separation systems designed to recover high-grade paper, corrugated containers, and used newspapers (all required by the Guideline); as well as residential materials (only recommended by the Guideline). The information provided includes a discussion of the preparation, storage, collection, transportation, and cost considerations involved in source separation. A discussion of educational programs for employees, family housing inhabitants, and military personnel is also included.

Chapter V presents a discussion of those source separation systems deemed applicable to DA installations. A discussion of each of the source separation techniques and its ability to be integrated into current solid waste management operations follows. The description of each system includes

aspects relating to separation, storage, collection, transportation, sale and information/education procedures.

Chapter VI includes a suggested plan-of-action to be followed by a Commander faced with implementing the Guideline at an installation. The plan is presented in the form of a step-by-step listing of considerations and procedures to be followed by the managing activity (usually the Facility Engineer) in assessing the source separation system(s) applicable at an installation.

Chapter VII presents some additional recommendations for recovery procedures, policy statements, and revisions to current DoD and DA policies and regulations. This chapter also includes the specific requirements of the Guideline for preparation of compliance reports, annual progress reports, requests for exemption, and market survey procedures.

The following information is included as Appendices:

- A. 40 CFR 246, Source Separation for Materials Recovery Guidelines is provided in its entirety for reference purposes.
- B. Reports of observations made during visits to Fort Belvoir and Fort Meade in July 1976.
- C. The U.S. EPA Draft of "Reporting: Procedures and Formats" is a description of reporting procedures required by the Guideline, including copies of the actual reporting forms.
- D. DoD Directive 4165.60, "Solid Waste Management - Collection, Disposal, Resource Recovery and Recycling Program," presented in its entirety for reference purposes.
- E. The "Categories and Uses of Wastepaper," including its grades, specifications and contaminant levels; and a description of its distribution networks and prices.
- F. Paper Stock Institute Specifications.

- G. A review of "Implementation Tools," including sample contractual items such as bid specifications, as well as sample publicity and education tools.
- H. "Suggested Readings," listing documents relating to source separation technology, as well as pertinent DoD, DA, and EPA directives, regulations, and reference materials.

This study is meant to provide the DA with a reference, planning guide, policy guide, and recommendations for compliance with the Guideline. Because of this, certain sections of the report can be used independently of others. For example, Chapters IV, V, VI, and Appendices A, F, G, and H would be most useful for providing the installation FE with the background information necessary for implementation of source separation programs. Other chapters and appendices are provided for background and documentation purposes, in support of the recommendations made for consideration by DA as a result of this study.

## II. FEDERAL SOLID WASTE LAWS AND GUIDELINES

This chapter contains a summary of the Federal laws and EPA guidelines that affect solid waste management activities within the military services. The Guideline itself is described in detail, and its impact on the DA is evaluated briefly, on a post-by-post basis.

### A. Legislative Background

In 1965, Congress enacted the Solid Waste Disposal Act (PL 89-272), the first Federal legislation that attempted to deal with the effects of solid waste disposal on the environment. The Federal program under this Act was largely a system of grants which stressed state and local responsibility.

By 1970, the far-reaching implications of disposing of used resources and waste products were widely recognized. Congress then amended the 1965 Act with the Resource Recovery Act of 1970 (PL 91-512). This law officially recognized the potential economic benefits of recovering a portion of the solid waste that had been traditionally dumped or burned. That legislation also directed new grant programs for urban areas, where solid waste problems had increased enormously.

Although the primary responsibility for the management of solid waste materials clearly resides with State and local officials, Federal action was directed by Congress in several areas. The 1970 Act included provisions for the issuance of guidelines for the collection, transportation, separation, recovery and disposal of solid waste. Further, a provision was written into Section 211 that Federal agencies "shall insure compliance with the guidelines recommended under Section 209 and the purposes of this Act...."

Executive Order 11752 issued December 17, 1973 strengthened this requirement. It states, in part, that "Heads of Federal agencies shall ensure

that all facilities under their jurisdiction are designed, constructed, managed, operated and maintained so as to conform to guidelines for solid waste recovery, collection, storage, separation and disposal systems issued by the Administrator (EPA) pursuant to the Solid Waste Disposal Act, as amended."

B. EPA Guidelines

In the implementation of the 1970 Act, the Administrator of the U.S. EPA has issued six Solid Waste Management Guidelines, described briefly below.

1. Thermal Processing and Land Disposal of Solid Waste Guidelines, 40 CFR 240 and 241, August 14, 1974--

"...set forth requirements and recommended procedures to ensure that the design, construction and operation of thermal processing and land disposal facilities (by Federal Agencies) meet the environmental and health standards for the area in which they are located."

2. Recommended Procurement Guidelines, 40 CFR 242, recommends revisions in Federal procurement procedures to allow for the purchase of recycled rather than virgin materials by Federal agencies whenever possible.
3. Solid Waste Storage and Collection, 40 CFR 243, March 15, 1976--

"The Guidelines apply to the storage and collection of residential, commercial, and institutional solid wastes and street wastes. Explicitly excluded are mining, agricultural, and industrial solid wastes; hazardous wastes; sludges; construction and demolition wastes; and infectious wastes."

4. Solid Waste Management Guidelines for Beverage Containers, 40 CFR 244, September 21, 1976--requires Federal agencies to impose a deposit on all beverage containers sold on government installations. This, coupled with the Part 246 (Guideline) requirements, will effectively reduce the amount of solid waste requiring disposal.
5. Resource Recovery Facilities, 40 CFR 245, September 21, 1976--requires Federal facilities generating a minimum tonnage of solid waste to establish plants to recover metals, glass, and mixed paper. It is important to note, however, that this requirement is to be observed only when the amount of residual waste after implementation of source separation and beverage container procedures (as set forth in Parts 246 and 244, respectively) reaches the specified thresholds.
6. Source Separation for Materials Recovery Guidelines, 40 CFR 246, May 24, 1976--(the Guideline will be discussed in detail in Section C).

All of these guidelines contain both required and recommended procedures. In general, the procedures are mandatory for those facilities and installations generating large amounts of waste, and where the costs of operating such programs are expected to be reasonable.

C. The Guideline

Background

"Source Separation for Materials Recovery Guidelines," published as 40 CFR 246 on April 23, 1976, presents the EPA's guidelines for all Federal agencies concerning the procedural aspects of materials recycling (Appendix A). The Guideline, which took effect on May 24, 1976, was established in accordance with the Solid Waste Disposal Act of 1965, as later amended by the Resource Recovery Act of 1970. Under the amended Solid Waste Disposal Act, the EPA is required to recommend to appropriate Federal agencies the best-advised procedures for separation, collection, recovery, and disposal of solid waste. Furthermore, the same act requires Federal agencies to comply with such EPA recommendations.

General Description

The Guideline is primarily concerned with the source separation of three types of waste materials: high grade paper, residential materials (newspaper), and corrugated cardboard. "Source separation" is a system by which waste materials earmarked for recycling are accumulated separately at their source of generation. For example, high-grade office paper can be separated from other office waste materials at the office, old newspaper can be bundled apart from other residential trash at the home, and corrugated cardboard can be separated as it is generated at the commercial facility. Through such procedures, contamination of recyclable materials can be avoided along with any resultant loss in market value. The source separation systems recommended in the Guideline have been used in

numerous governmental and private industry settings, and have proven effective in removing large quantities of valuable materials from the waste stream. In addition to being a sound environmental practice, the proper implementation of source separation systems by Federal agencies "could produce a savings to the Federal government at low capital outlay."

For each of the materials categories, the Guideline sets forth two types of procedures: mandatory (required) procedures, and optional (recommended) procedures. The required procedures are applicable to all government activities of a certain minimum size, or, in the case of corrugated container waste, facilities that generate a minimum monthly tonnage of waste materials. The dividing lines between larger and smaller facilities are somewhat arbitrary, but serve the purpose of ensuring that smaller facilities, which produce relatively small volumes of waste materials, will not be forced to source-separate and recycle at an obvious economic loss. The recommended procedures include suggestions on the implementation of the required procedures by those installations that fall below the thresholds for mandatory source separation and for optional separation of glass, cans, and mixed paper at residential units. See Table II-1 for a synopsis of the provisions of the Source Separation Guidelines.

#### Applicability

The Guideline applies to all Army installations located in the fifty United States or the U.S. territories. The Army is responsible for implementation of the Guideline by those activities which occupy Army-owned buildings at all applicable installations.

Table II-1

Summary of EPA  
Source Separation Guidelines

<u>Recyclable Item</u>	<u>Required for Installations Meeting these conditions</u>	<u>Recommended for Installations Meeting these conditions</u>
High Grade Paper	Over 100 office workers	Less than 100 office workers
Corrugated Containers	Over 10 tons per month	Less than 10 tons per month
Newsprint	Over 500 Residential units	Less than 500 Residential units
⊗ Glass, Cans & Mixed Paper	No Requirement	Where markets are available for the quantities of these materials segregated

For Army activities occupying non-Army-owned buildings, the responsibilities will vary as described below:

- In buildings either owned or operated, or both, by General Services Administration (GSA), the Army tenant is responsible for complying with GSA's implementation of the Guidelines.\*
- In Army-occupied buildings or facilities operated by a private contractor who handles the solid waste disposal activities, the Army is responsible for seeing that the contractor complies with the guideline.\*\*
- At Army facilities which have a "revolving fund authority," or are industrially funded, the Army is responsible for the implementation of the guidelines.

A summary of these responsibilities is presented in Table II-2.

---

\* As of December 1976, the name of the Defense Supply Agency (DSA) was in the process of being changed to "Defense Logistics Agency." However, for the sake of clarity, the organization will herein be referred to as "DSA."

\*\* E.O. 11752, Section 3(B) states: "Where activities are carried out at Federal facilities acquired by leasing or other Federal agreements, the head of the responsible agency may at his discretion, to the extent permissible under applicable statutes and regulations, require the lessee or permittee to assume full responsibility for complying with standards."

Table II-2

Summary of Responsibilities

<u>Action</u>	<u>Installation</u>	<u>Full-Service Contractor**</u>	<u>DSA</u>	<u>GSA*</u>
Publicity/Info Program	x	x (high-grade)		x
Source Separation	x			
Collection	x			x
Pickup & Delivery	x	x (high-grade)		x
Storage	x		x	x
Market Surveys			x	x
Sale			x	x
Reports	x			x

\* Buildings owned and/or operated by GSA  
 "x" Indicates who is responsible for the action listed

\*\* For office high-grade source separation services.

Required Procedures

High-Grade Paper Recovery (246.200) - For any office facility consisting of building(s) which houses more than 100 office workers, the following procedures are required:

- Separation of high-grade waste paper as it is generated
- Separate collection of that paper
- Sale of the paper for the purpose of recycling

High-grade paper comprises the following: letterhead, dry copy papers, miscellaneous business forms, stationery, typing paper, white tablet sheets, and computer printout paper and cards. Classified waste is excluded from this requirement unless it has been declassified by shredding.

Residential Materials Recovery (246.201) - Any installation at which more than 500 families reside, must carry out the following:

- Separation of old newspapers at the source of generation
- Separate collection of the newspapers
- Sale of the paper for the purpose of recycling

Corrugated Container Recovery (246.202) - For any commercial facility generating 10 or more tons of waste corrugated containers per month, these procedures are mandatory:

- Separate collection of the corrugated waste
- Sale of the corrugated waste for the purpose of recycling

Implementation and Reporting - The Army must make a determination on implementation of the Guideline for individual installations prior to May 24, 1977. By that date, the Army must submit two reports to OSD.

The first will provide a summary of the compliance actions taken, while the second will provide information on non-compliance decisions. Both reports may be made on the forms prescribed by EPA. Shown in Appendix C are sample guideline reporting formats.

The compliance report should include the following information: actions to be taken to comply with the Guideline, those installations that will initiate a source separation program, and a schedule of implementing actions. This report must be followed up with yearly reports outlining all source separation actions being taken by the Army.

A report of non-compliance by the Army must be based on valid reasons. Acceptable reasons are a lack of market for separated materials, or implementation costs that render source separation economically unfeasible.

The report of non-compliance will provide the following information on those installations which satisfy the criteria for mandatory source separation, but for either of the above reasons elect not to do so: A description of the alternative recycling actions considered, (e.g., hand-picking of recyclable paper from mixed solid waste prior to collection); a description of ongoing or new actions taken or proposed; and an analysis supporting the non-compliance, including technical data, market studies, and policy considerations. The entire non-compliance reporting procedure must be forwarded to OSD every three years.

#### Army Responsibilities

As explained above, Guideline implementation will be accomplished in coordination with other agencies. For example, the responsibility for performing necessary market studies and for contracting for the sale of the reclaimed materials has been assigned to either DSA, GSA, or a private contractor. In some cases involving leased buildings, the lessee (usually GSA)

or a private contractor incurs full responsibility for implementing the source separation program.

Because of this division of responsibility between the Army and "others," those procedures applicable to Army installations along with the related "how-to" recommendations will be discussed separately below. Non-Army responsibilities will then be described.

The following are the normal responsibilities of Army installations:

- Determine what materials are to be source separated and collected
- Establish procedures for separation and collection
- Conduct a cost analysis
- Initiate a public information and education program
- Prepare necessary reporting forms.

Levels of Separation - For most office facilities, it is recommended that high-grade waste paper be separated into: high-grade waste paper, and all other waste. For offices that generate great quantities of waste computer paper and cards, a third waste category should be added encompassing these materials. Printout paper, especially tab cards, is made of a very high-grade fiber, and consequently brings a higher market price when segregated than when mixed with other high-grade waste.

The Guideline calls for a two-level separation of materials from residential facilities: (1) old newspapers, and (2) all other solid waste. The guidelines also suggest, if feasible\*, source separation and separate collection for recycling of the following materials: glass, cans, and mixed paper.

\* In discussions with EPA staff, a residential population of at least 10,000 was indicated as required before separate collection becomes practicable.

At commercial facilities, a two-level separation for corrugated containers calls for: (1) clean corrugated containers, and (2) all other solid waste.

Methods of Separation and Collection - The Guideline discusses three different types of office receptacles for high-grade paper: desk-top container (preferred), a second wastebasket, and a central container (recommended only for computer tab cards or print-outs at points of high generation).

The EPA offers the following alternative methods for the collection of residential materials--used newspapers (required) and glass, cans, and mixed paper (recommended): curbside pickup using specially designated trash trucks, or compartmentalized vehicles using racks (for newspapers) or trailers (for newspapers or multi-materials); bulk containers located outside each building of multi-family dwellings; and centralized collection stations.

Corrugated containers should be accumulated in a compactor or baler where possible. Otherwise, they should be transported in loose form to a centralized baling site.

Other Army Responsibilities - Other Army concerns for implementing the Guideline (i.e., Pickup and Delivery, Storage, Cost Analysis, and Public Information and Education) are dealt with in detail later in the report.

Non-Army Responsibilities - Some of the responsibilities for implementation of source separation programs will be charged to non-Army agencies (DSA or GSA), or in a few instances, to private refuse or materials contractors. The responsibilities normally not assigned to the Army are: storage of separated materials pending sale, market studies for recovered materials, sales contracts for recovered separated materials, and transportation to the buyer's plant. These responsibilities are discussed in subsequent chapters.

D. Impact of the Guideline

Table II-3 presents a listing of the major U.S. installations under each of the Army's commands. Each installation was examined according to appropriate size criteria (estimated number of office workers, estimated dollar sales, or number of residential units). Then a preliminary estimate was made as to which of the Guideline's requirements will affect each installation. Those installations which seem to meet the respective thresholds for compliance are indicated with "x's" under the appropriate requirement. These are only preliminary estimates, which must be confirmed by further inspection of each installation.

Table II-3

Installations Required to Source Separate Wastes  
(Preliminary Estimate)

<u>Command/Inst'l</u>	<u>High-Grade Paper</u>	<u>Computer Paper</u>	<u>Corrugated Containers</u>	<u>Newspaper</u>
<u>Forces Command</u>				
Forts: Bragg, NC	x	x	x	x - 4707*
Campbell, KY	x	x	x	x - 2856
Carson, CO	x	x	x	x - 1835
Devens, MA	x	x	x	x - 1728
Hood, TX	x	x	x	x - 4232
Lewis, WA	x	x	x	x - 3505
Ord, CA	x	x	x	x - 3264
Polk, LA	x	x	x	x - 276
Riley, KS	x	x	x	x - 2129
Schofield Bks, HI	x	x	x	x - 3027
Stewart, GA	x	x	x	x - 1227
McPherson, GA	x	x	x	- 113 <sup>1</sup>
Meade, MD	x	x	x	x - 3128
Shafter, HI	x	x	x	x - 930 <sup>2</sup>
Sheridan, IL	x	x	x	x - 551
Presidio SF, CA	x	x	x	x - 1374

\* Indicates number of residential units. Includes Capehart and Wherry Housing units and residential units classified as substandard; from "Status, Family Housing Programs, Department of the Army," 31 March 1976.

<sup>1</sup> Includes Fort Gillem

<sup>2</sup> Combined with Tripler AMC

Table II-3 (cont.)

<u>Command/Inst'l</u>	<u>High-Grade Paper</u>	<u>Computer Paper</u>	<u>Corrugated Containers</u>	<u>Newspaper</u>
<u>Forces Command</u>				
Forts: Richardson, ALASKA	x	x	x	x - 1812
Wainwright, ALASKA	x	x	x	x - 1429
<u>Materiel Acquisition and Readiness Command</u>				
Depots: Anniston,AL	x	x		- 5
Corpus Christi, TX	x	x		- 0
Letterkenny,PA	x	x	x	- 46
Lexington BG, KY	x	x	x	- 17
New Cumberland, PA	x	x	x	- 143
Pueblo,CO	x	x	x	- 23
Red River,TX	x	x	x	- 39
Sacramento,CA	x	x		- 8
Savanna,IL	x	x		- 47
Seneca,NY	x	x	x	- 150
Sharp,CA	x	x		- 30
Sierra,CA	x	x		- 85
Tobyhanna,PA	x	x	x	- 2
Tooele,UT	x	x	x	- 5
<u>Ammo Plants:</u> Holston,TN	x	x	x	- 0
Lone Star,TX	x	x	x	- 0

Table II-3 (cont.)

<u>Command/Inst'l</u>	<u>High-Grade Paper</u>	<u>Computer Paper</u>	<u>Corrugated Containers</u>	<u>Newspaper</u>
<u>Ammo Plants:</u> Iowa, IA	x	x	x	- 52
Sunflower, KS	x	x	x	- 5
Lake City, MO	x	x	x	- 12
Louisiana, LA	x	x	x	- 25
Milan, TN	x	x	x	- 37
Longhorn, TX	x	x	x	- 0
Radford, VA	x	x	x	- 0
Scranton, PA	x	x		- 0
Volunteer, TN	x	x	x	- 0
Twin Cities, MN	x	x	x	- 14
<u>Arse-nals:</u> Detroit, MI	x	x		- 7
Frankford, PA	x	x		- 24
Michigan MSL PLT, MI	x	x		- 0
Picatinny, NJ	x	x	x	- 90
Pine Bluff, AR	x	x	x	- 0
Redstone, AL	x	x	x	x - 1175
Rock Island, IL	x	x	x	- 50
Rocky Mtn., CO	x	x	x	- 25
Tarheel MSL PLT, NC	x	x		- 0
Watervliet, NY	x	x		- 52

Table II-3 (cont.)

<u>Command/Inst'l</u>	<u>High-Grade Paper</u>	<u>Computer Paper</u>	<u>Corrugated Containers</u>	<u>Newspaper</u>
Research: Aberdeen P.G., MD	x	x	x	x - 1416 <sup>1</sup>
Dugway P.G.,UT	x	x	x	x - 542
Ft. Monmouth, NJ	x	x	x	x - 1216
Harry Diamond Lab,MD	x	x		- 0
Jefferson P.G., MO	x	x	x	- 0
Natick LAB,MA	x	x	x	- 90
St. Louis Spt. Cen.,MO	x	x	x	- 44
White Sands MSL, Rome,NM	x	x	x	x - 885
Yuma P.G.,AZ	x	x	x	- 290
<u>Health Services Command</u>				
Fitzsimmons,CO	x	x	x	- 289
Walter Reed,DC	x	x	x	- 93
Tripler, HI	x	x	x	x - 930 <sup>2</sup>
Ft. Sam Houston ,TX	x	x	x	x - 1175
Ft. Detrick,MD	x	x	x	- 156

<sup>1</sup>Includes Edgewood Arsenal

<sup>2</sup>Combined with Fort Shafter

Table II-3 (cont.)

<u>Command/Inst'l</u>	<u>High-Grade Paper</u>	<u>Computer Paper</u>	<u>Corrugated Containers</u>	<u>Newspaper</u>
<u>Military District of Washington</u>				
Ft. McNair, DC	x	x	x	51
Ft. Myer, VA	x	x	x	- 187
Camerson Sta., VA	x	x	x	- 0
<u>Military Traffic Management Command</u>				
Bayonne MOT, NJ	x	x	x	- 126
Oakland A.B., CA	x	x	x	
Sunny Point MOT, NC	x	x	x	- 5
<u>Army Security Agency</u>				
Arlington Hall Sta., VA	x	x		- 2
Vint Hill Farms Sta., VA	x	x	x	- 253 <sup>1</sup>
<u>Communications Command</u>				
Ft. Richie, MD	x	x	x	- 341
Ft. Huachuca, AZ	x	x	x	x - 2067
<u>National Guard</u>				
Selfridge, MI	x		x	x - 1050

<sup>1</sup>Includes Independent Hill

Table II-3 (cont.)

<u>Command/Inst'l</u>	<u>High-Grade Paper</u>	<u>Computer Paper</u>	<u>Corrugated Containers</u>	<u>Newspaper</u>
<u>Training Command</u>				
Forts: Belvoir,VA	x	x	x	x - 1655
Benning,GA	x	x	x	x - 3869
Bliss,TX	x	x	x	x - 3582
Carlisle Bks., PA	x	x	x	- 326
Dix,NJ	x	x	x	x - 2197
Eustis,VA	x	x	x	x - 1325
Gordon,GA	x	x	x	x - 880
B. Harrison,IN	x	x	x	- 355
Jackson,SC	x	x	x	x - 1187
Knox,KY	x	x	x	x - 4374
Leavenworth,KS	x	x	x	x - 1674
Lee,VA	x	x	x	x - 1473
McClellan,AL	x	x	x	x - 576
Rucker,AL	x	x	x	x - 1573
Sill,OK	x	x	x	x - 1417
L. Wood,MO	x	x	x	x - 2945
Monroe,VA	x	x	x	- 211
<u>HQ Dept. Army</u>				
U.S. Military Academy	x	x	x	x - 1551 <sup>1</sup>

<sup>1</sup> Combined with Stewart Annex

Table II-3 (cont.)

<u>Command/Inst'l</u>	<u>High-Grade Paper</u>	<u>Computer Paper</u>	<u>Corrugated Containers</u>	<u>Newspaper</u>
<u>Office, Chief of Engineers</u>				
Const. Engr. Res. Lab.,IL	x	x		- 0
Cold Regions Res. Lab.,NH	x	x		- 0
Waterways Exp. Sta.,MS	x	x		- 0
Division Offices	x	x		- 0
District Offices	x	x		- 0

### III. CURRENT DA SOLID WASTE MANAGEMENT

#### A. Introduction

The solid waste policies and guidance materials published to date by the Office of the Secretary of Defense (OSD) and DA have been generally limited to the requirements that subordinate military elements comply with the provisions of Federal solid waste laws and the implementing regulations of EPA. In addition, compliance with State laws is required, should the provisions be more stringent than those published by the Federal Government.

Currently, within DoD, the primary environmental policy document is DoD Directive 5100.50; "Protection and Enhancement of Environmental Quality," dated May 24, 1973. However, more definitive and current guidance is provided with the publication of DoD Directive 4165.60, "Solid Waste Management -- Collection, Disposal, Resource Recovery and Recycling Program." A copy of this Directive is contained in Appendix E.

#### B. DoD Policy and Guidance

To the present time, the basic guidance on overall solid waste management as contained in DoD Directive 5100.50 has been limited to the following policy statements:

- Design, use, store, handle, and ultimately dispose of all materials so as to minimize the possibilities for pollution of the environment.
- Use, whenever feasible, municipal or regional waste collection or disposal systems for the disposal of liquid and solid wastes.

- Conserve resources, and to the extent practicable, dispose of waste materials by reprocessing, recycling, and reuse.

Additional resource recovery guidance was provided in a memorandum from the Deputy Secretary of Defense on August 1, 1973. The memo stated that property that can be marketed for recycling will be sold by the Defense Supply Agency (DSA). It also authorized the return of funds from the sale of such materials to the generating agency, to offset the expense of recovery operations. However, the materials involved were restricted to those "from trash and other waste not currently disposed of as surplus personal property." This guidance was coupled with instructions on what constituted authorized program operating expenses (in a memorandum from the Assistant Secretary of Defense on April 3, 1974) to form the basis of DoD Directive 6050.3. Dated November 19, 1974, the Directive is entitled "Resource Recovery and Recycling Program - Solid and Other Waste Material."

The following policies related to resource recovery were taken from the new Directive:

"Solid and other waste materials shall be recovered and recycled to reduce environmental pollution and conserve resources.

The quantities of solid and other waste materials shall be reduced at the source wherever possible; e.g., through the increased use of returnable or reusable containers, and other such measures.

Joint or regional systems, which may include civilian communities, are encouraged when it will be advantageous to combine collection and/or processing facilities.

Voluntary recycling programs are encouraged, particularly where they will accomplish the intent of this Directive. Voluntary programs may either complement a DoD component-operated program or be the sole recycling activity, provided (1) the end result is to further the recycling of trash and waste materials, and (2) the annual cost to the Government is less when compared to a DoD component-operated program.

Contracts for solid and other waste material disposal services shall include provisions for recycling, whenever possible."

To assist DoD in its efforts to establish meaningful recovery programs, the Congress included in Public Law 93-552 (Military Construction Authorization, FY 1975) a special provision pertaining to the recovery of waste materials. Section 612 of the law, specifically authorized the proceeds from the sale of recyclable materials to be credited to the cost of collection, handling, and sale of the material, including purchasing of equipment to be used for recovery purposes in accordance with regulations approved by the Secretary of Defense.

Full implementation of DoD Directive 6050.3 was subsequently deferred in March 1975 by the Deputy Assistant Secretary of Defense for Environmental Quality. The reasons for this action were: the need to update the Directive to incorporate the requirements contained in forthcoming resource recovery guidelines to be issued by EPA; and to implement the provisions of Section 612, Public Law 93-552.

While attempts were being made by the OSD to provide precise guidance on waste recovery, the Army, along with the other Services, encouraged the voluntary recovery of cardboard and glass and metal containers. Because it was apparent that the cost of such programs could not be readily absorbed, sustained efforts were made to have OSD authorize installations to share in the receipts from the sale of these products and help defray the costs of recovery. OSD did not provide this authorization, and when the market value for corrugated cardboard declined in mid-1975, the voluntary material recovery efforts in military services gradually declined.

The publication of the Guideline (40 CFR 246) with its mandatory material recovery provisions, has led to the development of DoD Directive 4165.60. "Solid Waste Management - Collection, Disposal Resource Recovery, and Recycling Program." The Directive encompasses the provisions of all solid waste regulations issued thus far by EPA. Further, the Directive authorizes the Military Services to receive the net proceeds from the sale of "solid waste materials" to help defray certain specified costs of operating resource recovery (recycling) programs. The language of this Directive is somewhat vague as to whether the Military Services will receive the net proceeds from the sale of materials separated, collected, and sold by DSA under the provisions of the Guideline.

The Defense Disposal Manual (DoD 4160.21.M, dated June 1973) published by DSA supplements the basic policy documents discussed above. It defines those items of personal property to be disposed through property disposal channels, and outlines the disposal procedures to be employed by

all components of the DoD. Included among the listed items of personal property required to be collected and sold are high-grade paper, computer paper, and corrugated containers. In the current manual, there is no provision to permit the owner of these materials to be given the net proceeds from their sale. However, the DoD Directive specifically excludes these paper wastes from the provisions of the Defense Disposal Manual, and thereby authorizes installations to receive the net proceeds from their sale.

C. Department of the Army (DA) Policy and Guidance

At the present time, there is no DA regulation of solid waste management or recovery. However, over the past four years, a number of letters have been forwarded by DA Headquarters to all major commands. These letters cite environmental and resource conservation benefits that accrue from recycling, and encourage the initiation of voluntary recovery programs. A mandatory requirement to recycle was never imposed, since the Army was not in a position to provide funds and personnel space for such a program. Further, it was felt that such resources could not be diverted from other operational activities which were short of necessary funding.

For the purpose of protecting the environment, interim guidance on solid waste management was included in DA Circular 200-1, "US Army Environmental Program," dated November 26, 1973. At that time the following broadly defined goal and objectives were stated:

"Goal. Reprocess or reclaim solid wastes for other productive uses to the maximum extent possible. Concurrently, Army materiel will be procured and used in a manner designed to minimize wastes.

Objectives. Specific objectives are--  
Design or procure materiel of such a configuration that  
Components can be economically restored, reconstituted,  
or converted to other uses when the end-item and its  
packaging are no longer suitable for their original pur-  
pose.

Dispose of that unserviceable or excess materiel and  
materials through property disposal channels or by some  
other means that would enable these resources to be  
recovered and reintroduced into the manufacturing  
process or reclaimed for other productive purposes.

Dispose of wastes or excess materiel not capable of  
being reclaimed or reprocessed, in a manner that will  
avoid or minimize pollution of the environment."

This guidance formed the basis for the Army to stimulate voluntary  
waste material recovery programs. Numerous DA letters were sent to major  
subordinate commands advancing the view that military installations  
should follow the example of civilian communities across the country which  
had established neighborhood "recycling centers."

When corrugated, glass and metal container recovery operations were  
initiated, the management of these efforts became the responsibility  
of the FE. This was regarded as a logical extension of the FE's traditional  
responsibility for waste collection and disposal. Despite having to operate  
continually with limited funds and personnel shortages, a number of FE's on  
large Army installations initiated programs for the recovery of paper, cans and  
bottles during 1973-1974. The installations that initiated significant recovery  
programs included Forts Hood, Sill, Benning, Lewis, and the U.S. Military  
Academy. These efforts were encouraged by the prospect that proceeds obtained  
from the sale of these materials would be returned to the installation to help  
defray recovery costs.

During 1974, when the market price for these materials was rising, these recovery efforts reached their peak. Then in late 1974, a ruling was issued by OSD that installations would be entitled only to the proceeds from those marketable products from residential materials (waste paper, metal, and glass containers). Since it was apparent that these proceeds could not cover the expense of operating the program, resource recovery efforts suffered. When the market for waste paper products slumped in mid-1975 and civilian community recycling projects lost appeal, the Army's early recycling programs came to an end. From these limited experiences, it was generally seen that large installations could more easily justify waste recovery programs than small ones. The proceeds from the sale of collected materials usually covered any additional expenses due to the recovery operations.

D. Overview of Current DA Solid Waste Management

Army installations, which are generally self-contained enclaves, are similar in many respects to small cities and towns in the United States with populations of from 3,000 to 50,000. The activities are those of a commercial and light industrial type. Residential areas on military installations vary in size, but compare very closely in makeup and configuration to housing developments in civilian communities.

Shown in Appendix B are summaries of USG visits to Fts. Belvoir and Meade. Observations made on those occasions provided some input to the information presented here. Visits to other installations to obtain additional information were precluded by limitations on travel prescribed in the contract.

### Sources of Solid Waste

All activities on an installation are sources of varying quantities and types of waste. These amounts vary with the number of personnel involved and the nature of the operations performed. The most common classes of activities for which production factors are available to estimate the amount and types of wastes produced are discussed below.

Office Facilities. Wastes from offices consist predominantly of high-grade paper products with small amounts of plastics, wood, metal, and cloth. The quantity produced is approximately 1.68 pounds per day per employee. Table III-1 presents general factors for estimating the composition characteristics of office wastes, as well as all other solid waste sources discussed below.\*

Retail-Type Facilities. Considered in this category are the activities associated with self-service supply centers, military clothing sales stores, and small branch exchange and commissary stores. Wastes produced are primarily corrugated containers, with small quantities of metal, plastics, and wood. The overall quantity produced is approximately 4.3 pounds per day per employee.

Educational Facilities. Included in this category are the various classrooms found throughout the Army. The predominant waste here is high-grade waste paper. Small amounts of glass, textiles and plastics from training or packaging materials, and beverage containers from vending machines may also be produced. The overall quantity of waste produced is 0.83 pounds per day per staff member using the building.

\*"Installation Solid Waste Survey Guidelines," Technical Report E-75/ADA018879, October 1975, CERL, p. 13-20, 67.

Table III-1

Waste Composition Factors  
(Percent by Weight)

Component	Office Facilities	Warehouse Facilities	Maintenance Facilities	Food Service Facilities	Family Housing	Barracks Facilities	Commissary Facilities	Retail Facilities	Educational* Facilities	Hospital* Facilities
Paper	42	28	17	21	28	28	9	12	-	-
Corrugated	16	46	23	22	7	23	68	51	-	-
Wood	0	0	25	0	0	1	12	0	-	-
Tree & Lawn Trimings	11	0	0	0	20	0	0	0	-	-
Plastic	9	11	7	8	4	5	2	6	-	-
Rubber	0	0	0	0	0	0	0	0	-	-
Textiles	1	3	5	4	1	1	0	0	-	-
Food Waste	5	3	0	18	16	5	6	12	-	-
Ferrous Metals	7	5	19	13	5	13	0	6	-	-
Non-ferrous Metals	1	1	0	1	2	2	0	0	-	-
Glass - Ceramics	8	1	4	12	9	16	1	8	-	-
Misc.	0	2	0	1	8	6	2	5	-	-

Source: Solid Waste Special Study No. 26-009-75/76  
Solid Waste Characterization, Fort Sam Houston, Texas, 1 June - 14 August 1975

\*Composition factors not available at this time.

Warehouse Facilities. Included in this category are supply facilities engaged primarily in shipping and receiving operations under the control of the Director of Industrial Operations. Wastes produced by these activities are mainly high-grade paper, corrugated containers, wood scraps, metal binding strips and plastic dunnage. The quantities produced can fluctuate daily, depending on the level of activity. A factor for estimating purposes is 11.8 pounds per day per employee.

Maintenance Facilities. These activities include those associated with vehicle, aircraft, construction, and general equipment maintenance. The waste materials in this category consist of part packaging, used parts, rags, waste paper, metal and wood scraps and various oils and lubricants. The quantity of waste produced is 6.51 pounds per day per employee.

Commissary Facilities. Included here are the main stores, rather than annex stores. The waste materials generated include corrugated boxes, paper, wood scraps, metal, glass and some food wastes. The overall quantity produced is 0.18 pounds per week per dollar of weekly sales.

Hospital Facilities. Waste products from hospitals are those generated by administrative offices, building maintenance, and the variety of operations associated with the care of patients. The predominant waste materials are high-grade waste paper, corrugated boxes, and small amounts of wood, plastic, metal and cloth. An estimating factor for the overall waste produced is 6.0 pounds per week per hospital bed.

Bachelor Housing. Included here is housing for both bachelor enlisted men and officers. Excluded are the wastes associated with apartment kitchen and related dining facilities. Most wastes in this category consist of mixed paper, newspaper and magazines, corrugated boxes, wood, cloth,

metal, glass and plastic. The overall quantity of waste produced is 1.28 pounds per day per resident.

Family Housing. The wastes produced in military family housing areas are much the same as those in civilian residential communities. The materials include mixed paper, glass, metal, rags, leather goods, plastics, rubber, vegetation and garbage. The overall quantity of waste produced is 3.23 pounds per day per person.

Food Service Facilities. Included in this category are messhalls, officers' and enlisted clubs. Wastes produced are primarily corrugated cartons, metal, glass, with small amounts of plastic and garbage. The overall amount of waste is estimated at 1.0 pounds per meal served.

#### Sources of Recoverable Wastes

A listing of potential sources of recoverable materials was developed from observations made during visits to Ft. Meade and Fort Belvoir, and from a review of Solid Waste Study Reports prepared by the U.S. Army Environmental Hygiene Agency. This list is reproduced in Table III-2.

In general, this display reveals that:

- high-grade paper wastes are produced primarily by administrative and educational activities;
- corrugated waste (cardboard) is the by-product of industrial, food service, medical, and certain retail activities;
- computer cards/printout papers are more common to management operations within an installation headquarters, large medical facilities, and military school facilities;
- newspapers are found in the waste stream from family and bachelor housing, hospitals, and a limited number of offices;

Table III-2

Potential Sources of Recoverable Materials

<u>Activity</u>	<u>High-Grade Paper</u>	<u>Computer Paper</u>	<u>Cardboard</u>	<u>Newsprint</u>	<u>Cans/Glasses</u>
Installation Headquarters					
. Command Offices	x				
. Comptroller	x	x			
. Personnel & Com. Affairs	x	x			
. Plans & Training	x				
. Industrial Operations	x	x	x		
. Facilities Engr'g	x	x	x		
. Communications-Electronics	x				
Educational Facilities	x				x
Medical Dept. Activities					
. Hospital	x	x	x		x
. Dispensary/clinics			x		
Commissary			x		
Post Exchange			x		
Housing					
. Family				x	x
. Bachelor				x	x
Clubs					
. Officer	x		x		x
. NCO	x		x		x
. Service			x		x
Bowling Alleys			x		x
Print Plant	x				
Consolidated Mess			x		x
Troop Units					
. Staff Offices	x				
. Supply Rooms			x		x
. Classrooms	x				x
. Mess Facilities			x		x
. Barracks				x	x

- waste metal and glass containers are produced by messhalls, clubs, hospitals, and family housing; and
- military installations are also sources of large numbers of waste beverage cans from vending machine operations provide under contract by AAFES.

Figures III-1 and III-2 show some of the sources of these wastes that were observed during visits to Forts Meade and Belvoir.

#### Quantities of Solid Waste

The amount of solid waste produced on an Army installation will vary, depending on the nature of activities that take place. This variation is reflected in the data presented for each of the major commands in Table III-3, where the cubic yards generated per person per year ranges from a low of 12.90 in MDW to a high of 516.94 for MTMC. The data tabulated in column 3 of Table III-3 indicate that the major producers of waste are the Forces Command (FORSCOM), Training and Doctrine Command (TRADOC), Army Materiel Command, and the U.S. forces stationed in Germany. However, FORSCOM and TRADOC have installations more representative of typical large Army installations, generating 17.1 and 18.3 cubic yards per person per year.

By using a bulk density conversion factor of 70 pounds per cubic yard, the average of these two unit volumes (17.7 cubic yards per person per year) represents a unit waste production factor of 3.38 pounds per person per day.\*

\*This factor was derived from weights of refuse collected at 10 installations over a 10-day working period. Data was provided by the Office, Chief of Engineers.

Some Sources of Recoverable Wastes



Figure III-1: Multi-Family Residential Units at Ft. Meade, Maryland



Figure III-2: Print Plant high-grade paper wastes at Ft. Belvoir, Virginia

Table III-3

Refuse Handling, United States and Overseas Commands, FY 1975

1. COMMAND	REFUSE HANDLING						
	2. TOTAL SPENT FOR COLLECTION	3. TOTAL CU. YDS. HANDLED	4. TOTAL SPENT FOR COLLECTION & DISPOSAL	5. EXPENDITURE PER CU. YD. COLLECTION & DISPOSAL	6. CU. YDS. GENERATED PERSON/YEAR (EFF. POP)*	7. AMOUNT SPENT/CAPITA/YR (EFF. POP)*	8. FY 1974
ARMY WIDE	\$21,077,466	23,660	\$27,102,706	\$ 1.15	17.60	\$16.31	\$ 30.13
UNITED STATES	13,615,704	17,554	17,921,055	.99	20.64	17.32	20.40
FORCES COMMAND	5,828,998	6,674	7,215,318	1.08	17.08	14.76	18.46
TRAINING & DOCTRINE COMMAND	4,390,276	6,012	5,320,074	.88	18.29	13.88	16.1
ARMY COMMUNICATIONS COMMAND	253,276	284	306,647	1.08	18.12	16.43	19.57
ARMY MATERIEL COMMAND	1,947,480	1,936	2,356,933	1.48	26.53	32.81	39.13
ARMY SECURITY AGENCY	51,679	70	147,178	2.10	24.20	42.63	50.89
HEALTH SERVICES COMMAND	343,319	316	527,821	1.67	34.71	48.65	57.98
MILITARY DIST OF WASHINGTON	336,667	188	382,392	2.03	12.90	27.35	26.24
MILITARY TRAFFIC MGMT COMMAND	257,759	1,617	368,990	.23	516.94	83.13	117.94
US MILITARY ACADEMY	206,420	457	295,702	.65	36.47	26.51	21.60
OVERSEAS	7,461,762	6,106	9,681,651	1.59	12.37	15.03	19.41
EUROPE	7,047,885	5,570	8,815,547	1.58	13.55	13.96	21.44
GERMANY	6,902,635	5,490	8,621,882	1.57	13.62	15.73	21.34
ITALY-SETAF	107,479	53	143,304	2.70	8.55	22.92	23.11
USAMMIE	37,771	27	50,361	1.57	14.92	.00	27.2
JAPAN	392,931	355	835,772	2.35	13.72	19.71	32.29
KOREA	7,855	174	9,388	.05	3.01	.16	.17
ARMY SECURITY AGENCY	\$ 13,111	7	\$ 20,944	\$ 2.99	9.41	\$19.84	\$ 24.13

\*Effective Population is composed of those living on an installation plus one-third of the employees who commute to work daily

SOURCE: Facilities Engineering, "Annual Summary of Operations," FY 1975, Office Chief of Engineers.

Because there is a similarity between Army installations and small cities, it would be reasonable to expect that the amount of waste generated per person in each instance is similar. The following tabulation appears to support this generalization.

Annual average for FORSCOM and TRADOC	3.38#/capita/day
--	------------------

National average*	3.00#/capita/day
-------------------	------------------

Further, considering the broad variety of activities that take place on a military installation, many of which are not too dissimilar to those in a small metropolitan area, there should be a close correlation in the composition of the wastes produced. This general similarity can be noted in Table III-4, where the waste components from Fort Sam Houston are compared with the national average wastes reported by the National Center for Resource Recovery. In the NCRR compilation, the miscellaneous category included wood, food waste, and tree and lawn trimmings.

#### Costs of Solid Waste Management

The overall cost of the collection and disposal of refuse is a significant element in the Army's annual operating budget. In FY 1975, the amount expended worldwide was \$27.1 million. Of this, \$17.4 million was for the collection and disposal of 17.6 million cubic yards of refuse generated on installations in the United States. Table III-3 summarizes the scope and costs of refuse handling activities.

It is pertinent to note the wide spread in the cost per person per year among the various commands (column 7). The reason for this is the difference

\*National Center for Resource Recovery Bulletin, Spring 1973.

Table III-4  
Selected Solid Waste Composition Estimates  
 (After Moisture Transfer)

<u>Component</u>	<u>Ft. Sam</u> <sup>1</sup> <u>Houston</u>	<u>NCRR</u> <sup>2</sup>
	% of Total	% of Total
Paper	49	43.0
Wood	1	-
Plastic	6	2.0
Rubber	-	1.0
Textiles	1	2.0
Food Waste	12	-
Ferrous Metals	8	8.0
Non-ferrous Metals	1	1.0
Glass-Ceramics	9	10.0 (glass only)
Tree & Lawn Trimmings	9	-
Mis.	4	33.0
Total	<u>100</u>	<u>100.0</u>

<sup>1</sup> Solid Waste Special Study No. 26-009-75/76, "Solid Waste Characterization, Fort Sam Houston, Texas," 5 March 1976, USAEHA.

<sup>2</sup> Municipal Solid Waste...Its Volume, Composition and Value, NCRR Bulletin, Spring 1973, Vol. III No. 2. Data extracted from Table 5 which presents NCRR conclusion from an analysis of data obtained from 14 different studies.

in the responsibilities and activities of these organizations. The increase in the overall annual costs between FY 1974 and FY 1975 (almost 18% in the United States) is attributed to the rise in cost of contracted refuse handling services.

#### E. Solid Waste Collection and Disposal Operations

The FE has traditionally held responsibility for solid waste management collection and disposal at DA installations. The FE has used in-house forces, contractual services, or a combination of both to provide for collection and disposal.

##### Waste Collection

The collection of solid waste from buildings, other than family housing units, is normally performed by janitorial crews, provided under a contract administered by the FE. It involves (other than cleaning floors, rugs, and rest rooms) emptying wastebaskets and depositing the contents in large containers conveniently placed nearby and outside the building (Figure III-3). The frequency of service depends on the nature of the activity taking place; however, daily service is customarily provided to most administrative offices.

The collection of wastes from bulk containers is normally accomplished by crews equipped with packer-trucks provided by the installation itself, or by a service contractor. The most common practice today appears to be the combination of in-house forces and service contractors-- the former services the operational areas of the installation, while the latter services the family housing areas. The frequency of pickup varies, depending on the quantities of waste generated. Points of high generation are serviced at least daily, while others may be serviced on a once-a-week schedule.

Family housing areas are commonly serviced 2 to 3 times a week. These crews are also charged with collecting bulky items and periodically washing the large waste storage containers. Housing residents, on the other hand, are responsible for the cleanliness of their refuse storage containers.

Waste collection and disposal procedures are set forth in AR 420-47 (dated September 18, 1967) and in Technical Manual 5-634 (dated July 1958). These documents contain guidance on waste collection equipment, personnel and routing, siting, constructing and operating sanitary landfills; and the operation and maintenance of refuse incinerators. The former sets forth general guidance and instructions on these subjects, while the latter provides more detailed operating instructions. Both documents are presently undergoing revision by the Office, Chief of Engineers.

At Fort Meade and Belvoir, and possibly many other Army installations, "backyard" trash pickup service is now common for family housing areas. The publication of Change 18, AR 210-50 on April 13, 1976, revised this practice, specifying that "curbside or service drive refuse collection will be used unless another collection system provides a cost or environmental advantage to the Government." Observance of this procedure throughout the Army should result in a noticeable reduction in collection costs.

#### Segregation of Wastes

Instructions contained in Technical Manual 5-634, "Refuse Collection and Disposal" (July 1958) encourage the segregation of marketable materials (see Figure III-4) from refuse for separate collection and sale. The decision to segregate is made at the installation and is based on the guidance which states: "When there is an overall profit to the Government from materials delivered by the refuse collectors to the salvage yard, materials



Figure III-3: Dumpsters Behind Print Plant, Fort Belvoir, VA



Figure III-4: Corrugated Containers Inside Commissary Compactor, Fort Belvoir, VA

will be processed and sold." Currently, this practice is limited principally to segregating bones and meat trimmings by commissaries and messhalls, garbage converted to hog-food by messhalls, data processing-cards by a few office complexes, and corrugated cartons by a limited number of commissaries.

#### Waste Disposal

Disposal of collected wastes from Army installations is accomplished by sanitary landfill (see Figure III-5) or incineration. Use of the landfill is by far the most common practice - over 90% of the installations use this method.\* In almost every instance, landfills are located on the installations and operated by either in-house or contractor personnel. The operational practices employed are generally in consonance with the EPA Guidelines contained in 40 CFR 241.

Sanitary landfill operations were observed at Forts Meade and Belvoir and at both locations considerable quantities of paper and cardboard were observed among the wastes. Records on the number of trucks delivering to the landfill and the size of their loads (full, half etc.) are being kept. However, there were no available means to obtain the weight of this refuse.

#### F. Resource Recovery

The separation and collection of materials (see Figure III-6) from the waste stream has been officially encouraged at a number of Army installations, largely due to local initiatives. These efforts have met with initial success. In addition to installation-sponsored recovery programs, there have been smaller-scale programs operated by on-post civic groups and organizations such

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\*Annual Report, Environmental Quality, 1973, Department of the Army.

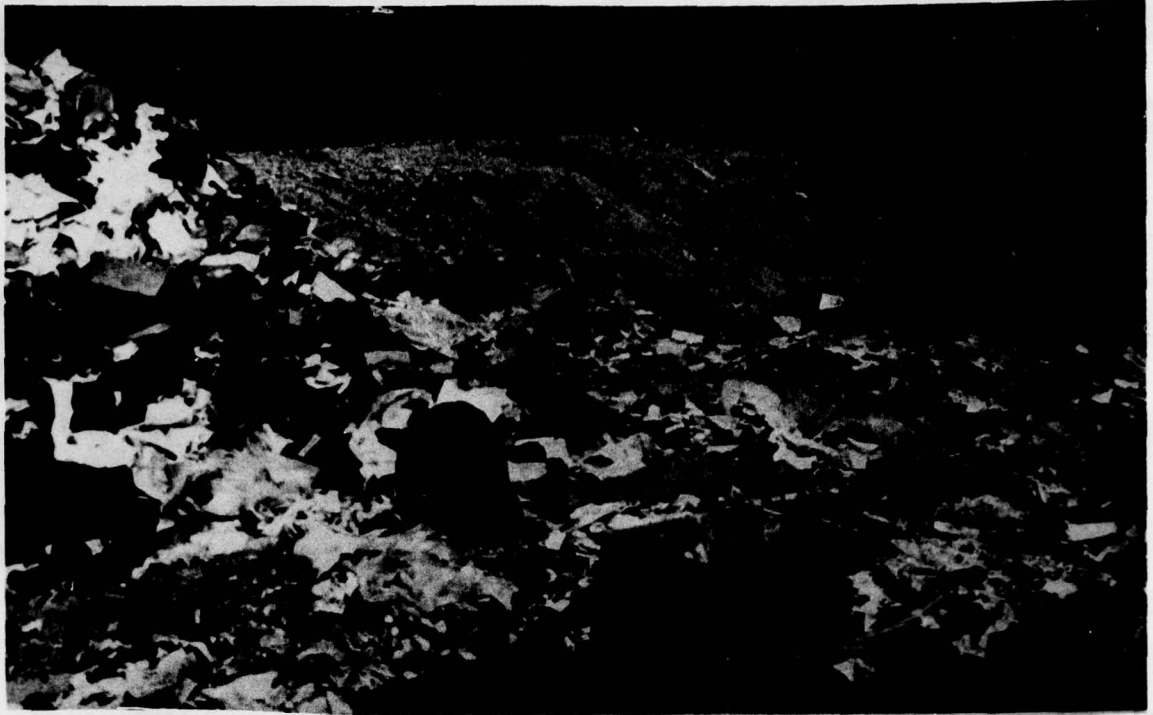


Figure III-5: Corrugated Containers at a Sanitary Landfill.

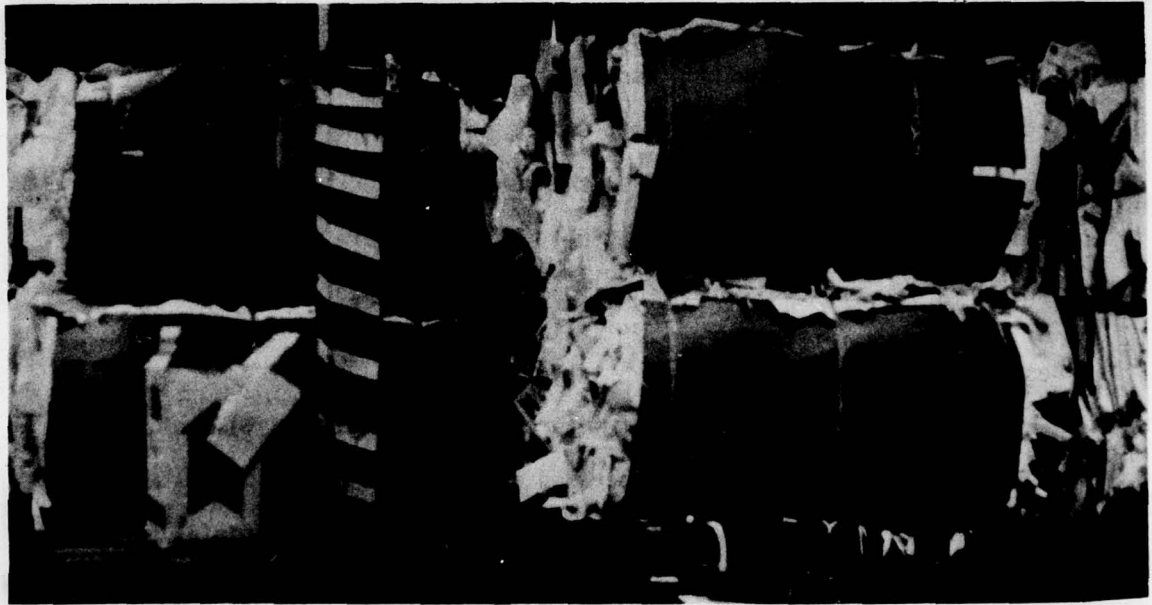


Figure III-6: Recovery of High-Grade Paper at Ft. Meade, Maryland.

as the Boy Scouts, PTA etc. Also, some installations have participated in community recycling projects.

In general, recovery programs have focused on the recovery of corrugated cardboard, tab cards, metal cans and glass containers. To stimulate these programs, DA made a special procurement of seventy 62-inch vertical balers in late 1974. However, before this equipment could be installed and utilized, the market for corrugated cardboard dropped dramatically, causing many installations to lose interest in recovering waste materials.

The stimulus behind the initial recovery efforts was perceived environmental and conservation benefits. Subsequently, interest increased significantly with the prospect that DA Headquarters would be able to authorize the managing activity on the installation (FE) to receive some of the proceeds from the sale of these materials. This was not forthcoming, and the effect has been that little resource recovery activity has continued other than the recovery of scrap metal from industrial activities.

#### Commissary Recovery Procedures

Special considerations have been given to resource recovery. At Army commissaries considerable quantities of bones, fat and corrugated cardboard accrue from the retailing of foodstuffs. Authorization has been given to commissary officers, who use a combination of appropriated and surcharge funds (monies derived from a form of service charge on purchases paid by the customer) to recover the proceeds of the sale of waste materials from the servicing Property Disposal Office (PDO). Funds accrued in this way must be placed into the surcharge fund (Trust Revolving Fund Account) to help defray the cost of commissary operations.

For a number of years, bones and fat from butchering operations have been collected and sold under a property disposal contractual arrangement. Recently, however, has there been a deliberate attempt to collect and sell used corrugated boxes. On May 6, 1974, DA issued instructions authorizing the purchase of appropriate sized balers from surcharge funds by commissary stores having a sales volume of \$350,000 or more per month. This criterion was based on an estimate that each \$25,000 in sales would produce about 2000 pounds of cardboard waste. Requests for the purchase of balers are submitted to and evaluated by the U.S. Troop Support Agency at Fort Lee, Virginia.

Where corrugated recovery is not practiced, these materials are normally placed in trash containers. The FE then collects and disposes of these wastes, generally by placing them in the installation's sanitary landfill.

#### Army Air Force Exchange Service Recovery Procedures

Post Exchanges are found on almost every Army installation and are operated by the Army Air Force Exchange Service (AAFES). This autonomous organization is not under the direct control of the installation commander.

Corrugated boxes are the major source of solid waste from Post Exchanges. In 1972, a resource recovery program designed to collect, bale and sell these materials was initiated. At that time, the following policies were promulgated:

- Baling machines will be installed in main retail stores when monthly sales exceed \$150,000, or when monthly accumulation of wastepaper exceeds 270 cubic yards or 15,000 pounds.

- Baling machines will be installed in regional warehouses when monthly accumulation of paper waste exceeds 270 cubic yards or 15,000 pounds.

To date, over 100 baling machines have been installed throughout the United States. Normal operating procedures call for the bales of cardboard to be loaded on trucks delivering merchandise to the retail stores and backhauled to a central regional location, normally the regional warehouses, where it is then sold. The proceeds from these sales go into the Exchange operating account. In contrast to commissary operations, the AAFES is not required to process recovered wastes through PDO channels.

#### G. Sale of Marketable Wastes

The only authorized mechanism available to the Army for the sale of personal property, such as recovered wastes, is the property disposal system managed by the DSA. DSA services all elements of the DoD in a manner similar to GSA, which serves Federal government non-Defense agencies. Within DSA, the Defense Property Disposal Service (DPDS), located in Battle Creek, Michigan, is responsible for the operation of the property disposal system.

Within DPDS are three regional offices, called Defense Property Disposal Regions (DPDR's) located in Columbus, Ohio; Memphis, Tennessee; and Ogden, Utah. Each Regional Office is in turn responsible for the assigned PDO's located on military installations, bases and facilities. (See Figure III-7 for an organizational chart.)

Surplus or used materials put up for sale originate at an installation, which turns them over to the servicing PDO for disposal. When the PDO feels that there is a saleable quantity, the appropriate DPDR is given

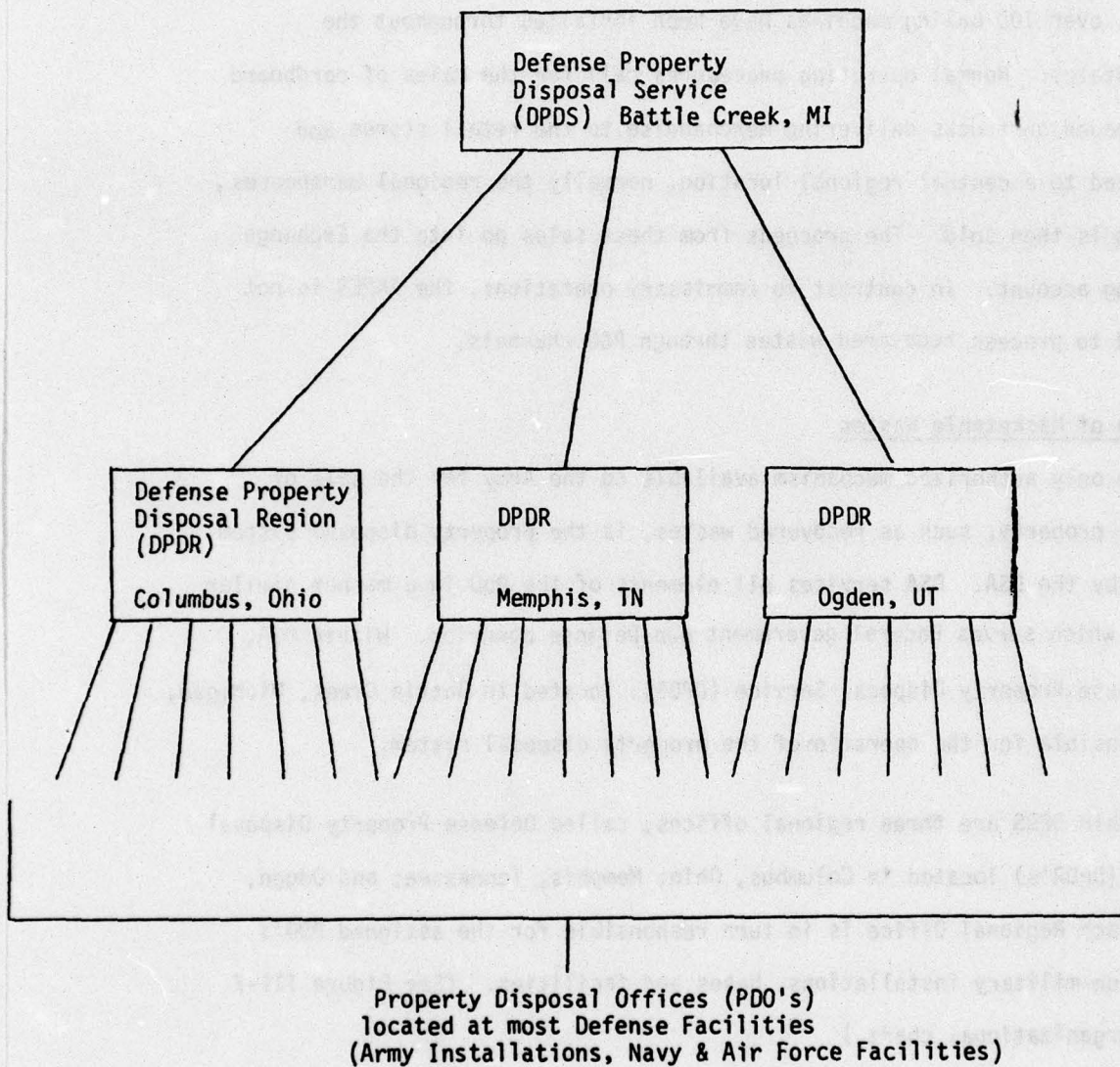


Figure III-7: DPDS Organization Chart

information on the grade, quantity, and location of the lot. The DPDR might "hold" the information reported by the local PDO for two or three weeks, in order to accumulate a sizeable number of sale items from within its Region. Its list is then sent on to the DPDS in Battle Creek to be catalogued.

The DPDS maintains a national bidders list. To add a name to the list, the Region or the DPDS must be contacted. Often, the DPDS receives the sales information from the Regions, and forwards Invitations for Bids (IFB's) to prospective bidders without further market research. Such IFB's are essentially the same as those employed by GSA, providing a complete description of the "Article for Sale" and the exact terms of the proposed contract. However, in the case of a sale item whose price would be tied to a fluctuating commodity quotation (e.g. wastepaper), further investigation is required on the part of the Region and occasionally the local PDO. This entails contacting prospective buyers to determine their interest in the lot, and the minimum price they are willing to pay. This enables the DPDR to determine whether sale would be economically feasible.

Completed bids are sent to the appropriate Region, and the DPDR alone is responsible for determining and letting the contract. The PDO, meanwhile, is responsible for supplying the Region with all pertinent information on Articles for Sale, as well as for interim handling and storing of those items.

The DPDS commander is the manager for all assigned disposal operations and exercises command and control over the Regional Offices and PDO's. The three Regional Offices perform centralized accounting and consolidated sales functions, and command assigned PDO's. PDO's then conduct disposal operations. Contact with this system at the installation level is made

through the servicing PDO. Sales contracts for marketable materials may be for individual lots once they are accrued, or can cover a 12-month term with a stated minimum to be available at specified time intervals. Longer-term contracts, covering three, five, or even ten years, are also possible; in fact, paper dealers and paper companies generally prefer the steady material flow provided by a three- to five-year formula-priced contract, and will often pay a higher price per ton for such a contract.

Among the observations made during visits to PDO facilities at Forts Meade and Belvoir was the limited amount of covered storage for marketable material. At Fort Belvoir, all buildings were reported to be in use, and would not be available for storing recovered paper. Under these circumstances, and since the PDO is not required to take physical custody of this material, the installation would have to provide the necessary storage facilities. At Fort Meade, the PDO had covered storage capacity for about 75 tons of baled paper products, and the capability to bale and box. At the relatively low rate at which wastepaper was being collected, sales could be held about every three months. A more active recovery program would probably require either a monthly sale or a long term contract requiring pickup each month.

#### IV. SOURCE SEPARATION TECHNOLOGY/TECHNIQUES

Source separation is a recovery "technique" more often than it is a technology, since it primarily involves convincing individuals to decide what is waste and what is salvageable (worth saving). In our "throw-away" society, this is often very difficult. Sometimes, even the most optimal techniques require that efforts be made in recovery programs involving the use of additional space, material, and time. Nonetheless, successful source separation techniques have been employed with large groups of households, commercial establishments, and office complexes.

Source separation programs tend to be quite site-specific, with variations reflecting the particular area, neighborhood, part of the country, or implementing organization characteristics. There are almost as many variations in technique as there are programs. For this reason, it is necessary to "custom-design" a system for a particular set of circumstances. At the same time, it is advisable to base any system on the experiences of others.

This chapter provides brief descriptions of the characteristics and peculiarities of the more common source separation technologies/techniques employed today for recovery of high-grade office paper, computer tab cards and printouts, old corrugated containers, newsprint, and other mixed household materials. These materials are either required or recommended in the Guideline. The ensuing discussion provides an overview of source separation technology/techniques as they presently exist, primarily in non-military circumstances. Background information on the categories and uses of waste-paper, including price history, is provided in Appendix E. Specifications and contaminant limitations for different grades of paper are included as

Appendix F. Appendix G provides examples of implementation tools used in the various types of source separation systems described in this chapter. They are provided as working examples from successful programs.

A. High-Grade Office Papers

The wastes in office areas generally contain very high quantities of mixed paper grades and types. Depending on the source, this quantity may be as high as 80-90% of the waste generated in an office area. Since this paper is mixed, its recovery is often discouraged. However, when paper is separated at the source from contaminants such as beverage containers, luncheon garbage, paper binders, plastics, etc., significant and marketable quantities can be recovered.

Three different types of office source separation systems have been used for recovering high-grade office papers. These include: the desk-top system, which provides for a small desk-top container for each desk location; the dual basket system, which provides the waste generator with two wastebasket choices; and the central container system, in which many office workers use a common, centrally located container.

In the desk-top system, each office worker places the acceptable papers in the provided container (Figure IV-1). This container should be a specially marked, small corrugated box, about the size of boxes in which copy paper is shipped (Figure IV-2). When the container is full, the worker carries the accumulation to another, larger container which is readily accessible to 10-15 other office workers. This is done while the workers are on their way to other office areas, e.g., water fountain, rest room, mailroom, etc. The contents of these containers are then collected by maintenance personnel on a regular basis (Figure IV-3). The collected material is stored in larger

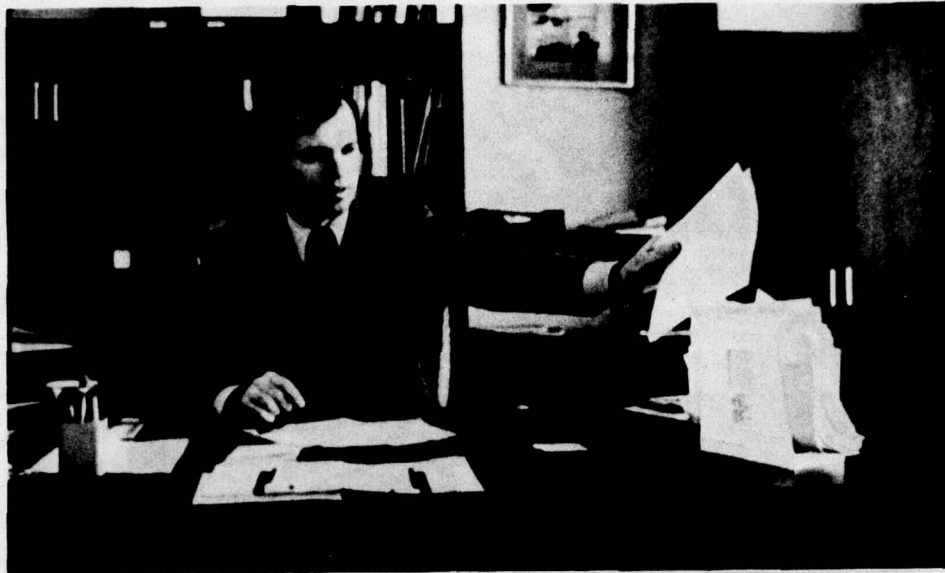


Figure IV-1: Office Worker Placing High-Grade Paper in Vertical Desk-Top Container



Figure IV-2: Office Worker Placing Accumulated Paper in Specially Marked Corrugated Box

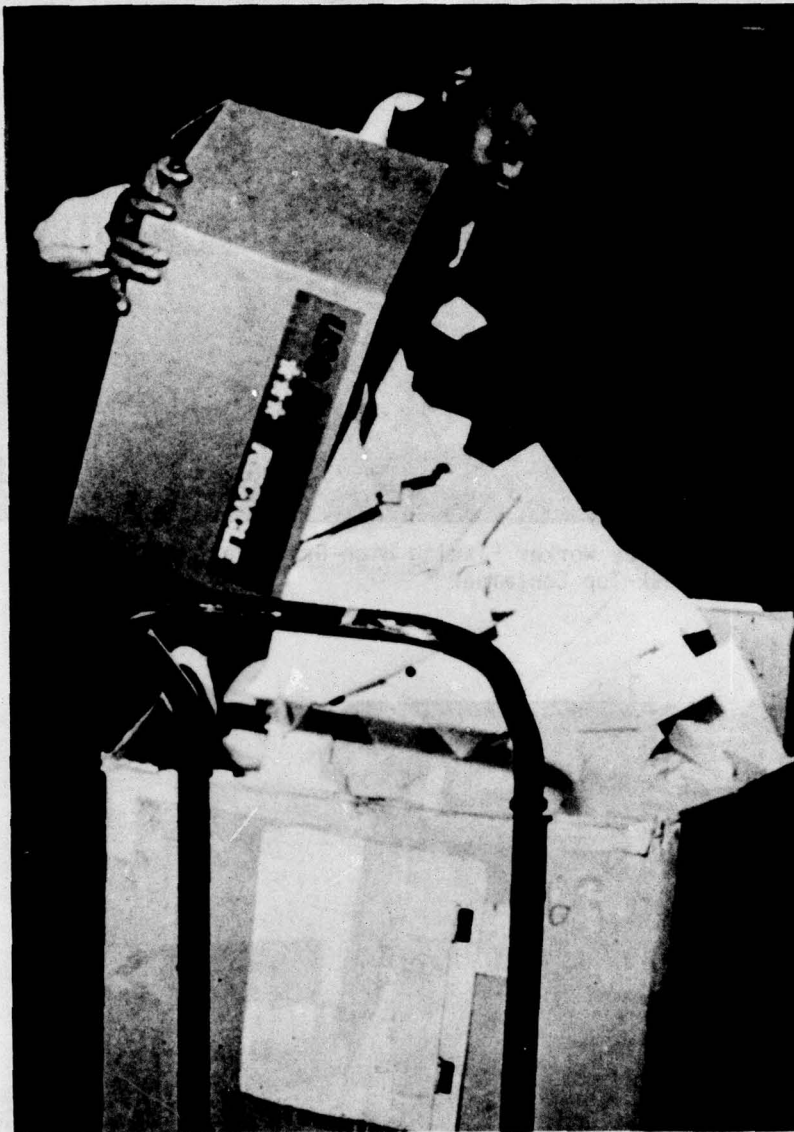


Figure IV-3: Maintenance Man Collecting Office-Separated,  
High-Grade Paper

containers, separate from regular refuse (Figure IV-4). There, it will be picked up for further processing prior to sale.

With the dual basket system, the office worker has two wastebaskets. Often, the wastebaskets are located adjacent to each other; this, however, increases the possibility of contamination because of inaccurate separation or collection by the maintenance staff. After collection from the office area, the paper generally follows the same flow as in the desk-top system.

In the central container system, each office worker must devise his or her own method of short-term storage for separated papers. Some workers will use an extra in/out basket, a spare drawer, or a file divider. When the storage container is full, the worker takes the material to the central container. Often, the container may be remote from the normal walking and traffic patterns of office workers. Placement of these containers near water fountains, rest rooms, or stairways should make it more convenient for office workers to drop off separated material. However, since these central containers are frequently large and open, unacceptable materials such as newspapers and magazines are often placed in them.

There can be significant variability in the economics of different office source separations systems. According to a recent study performed for the EPA,\* major independent variables include the method of separation, type of paper separated, type of building and configuration of offices, building occupancy status (own/lease), and custodial status (employee versus contract). It has been concluded, nonetheless, that office source separation can be practical and economical. In certain programs, overall solid waste management costs have been reduced by up to 59%, with the average reduction

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\* U.S. EPA, Optimization of Office Paper Recovery Systems, May 1976.

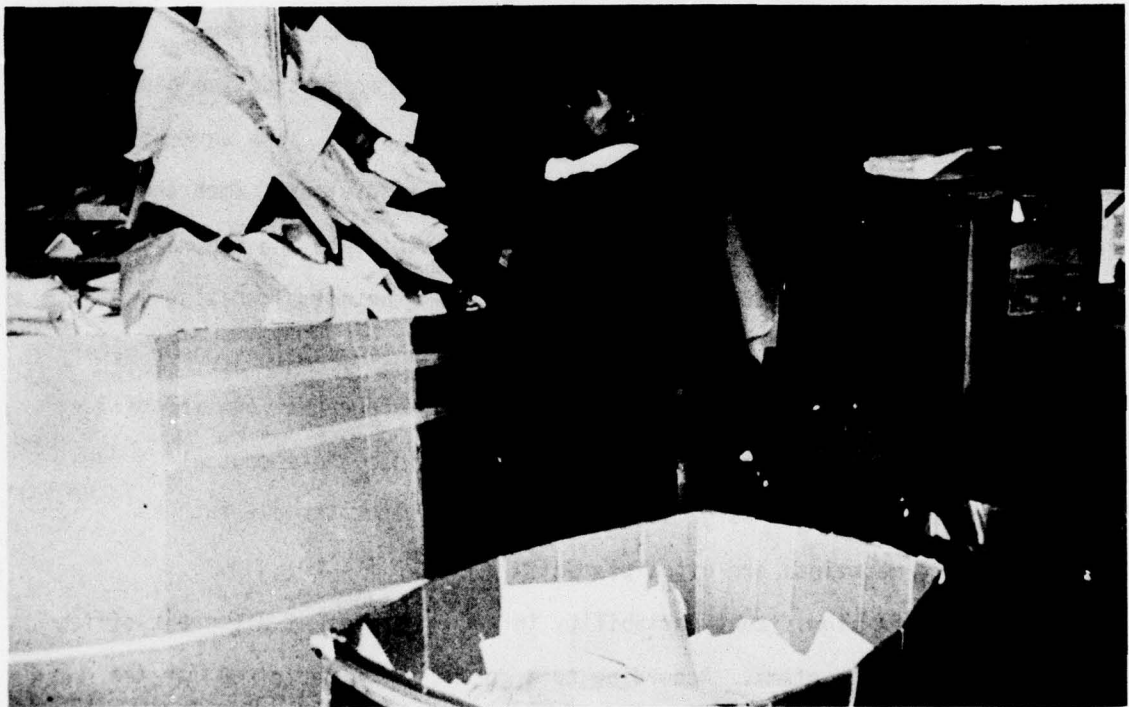


Figure IV-4: Collection Box Being Emptied into "Gaylord" Storage Container (6'x6'x4' reinforced corrugated container on pallet)

being 12%. Generally, it was found that an office worker can recover approximately one-half pound of high-grade paper per working day.

Table IV-1 contains a summary of the cost analyses performed in the EPA study, showing an overall decrease in costs on a net basis. However, in almost all cases, the costs associated with collecting additional material were offset by savings attributable to both disposal savings and revenues. Of the methods investigated, the desk-top method absorbed more collection costs and reduced more overall solid waste management costs than did the other methods. In fact, the desk-top approach, on an average, reduced solid waste management costs 23%; the central container method averaged 12%; and the dual basket, 2-7%. Another benefit of the desk-top method is that it diverts an average of 38% of the total waste, which is slightly less than the central container method (40%). The dual basket approach disposed of 18% of the total waste generated.

Besides the overall effect of the office source separation program on solid waste management for an office building, other "start-up" factors are involved. These factors have costs, and are also key to a successful program planning and implementation. For instance, office workers must become familiar with program procedures and with exactly what constitutes recoverable material. Often, separators will have a small instruction decal placed on a disposal container. Posters are also a very effective instruction technique (Figure IV-5). Additionally, a combination of memos, posters, signs, meetings, ads in newsletters, slide presentations, a list of "do's and don't's", and positive motivation should be provided.

Overall, start-up costs have been estimated at about 5¢ per employee for initial administration, labor, and equipment.\* The cost for materials handling

\* This does not include any costs for desk-top separators or central corrugated boxes, which can be provided by the contractor who purchases the recovered paper.

Table IV-1

Impact of Source Separation on Overall  
Office Building Solid Waste Management Costs\*\*  
-By Source Separation Approach-

Approach/ Building No.	Solid Waste Management Cost (\$/ton)		Net Effect	Incremental Cost Factors (% Change*)		
	Prior to Source Separation	After Source Separation		=	Collection <sup>#</sup>	+ Disposal
<b>Desk Top</b>						
3	92	60	-35	+12	0	-47
5	107	80	-25	+2	-5	-22
10	47	43	-8	+4	0	-12
Average Change	--	--	-23	+6	-2	-27
<b>Dual Basket</b>						
7	74	67	-9	0	0	-9
8	412	419	+2	+6	-2	-2
11	75	80	+7	+12	0	-5
Average Change	--	--	0	+6	= 1	-5
<b>Central Container</b>						
1	34	23	-32	+1	-7	-26
2	61	64	+5	+23	-6	-12
4	53	38	-28	+46	-15	-59
6	315	294	-7	+1	-4	-4
9	77	70	-9	+5	-12	-2
12	134	132	-1	+8	0	-9
Average Change	--	--	-12	+14	-8	-18
Overall Average Change	--	--	-12	+10	-4	-18

\* Change as a percent of total solid waste management cost (per ton) prior to implementation of source separation.

# "Collection" encompasses equipment and/or labor to store, collect, and/or process source separated paper.

\*\* Categorical averages may not be conclusive due to limited number of case studies and multiple independent variables.

Source: U. S. EPA, Optimization of Office Paper Recovery Systems,  
May, 1976.

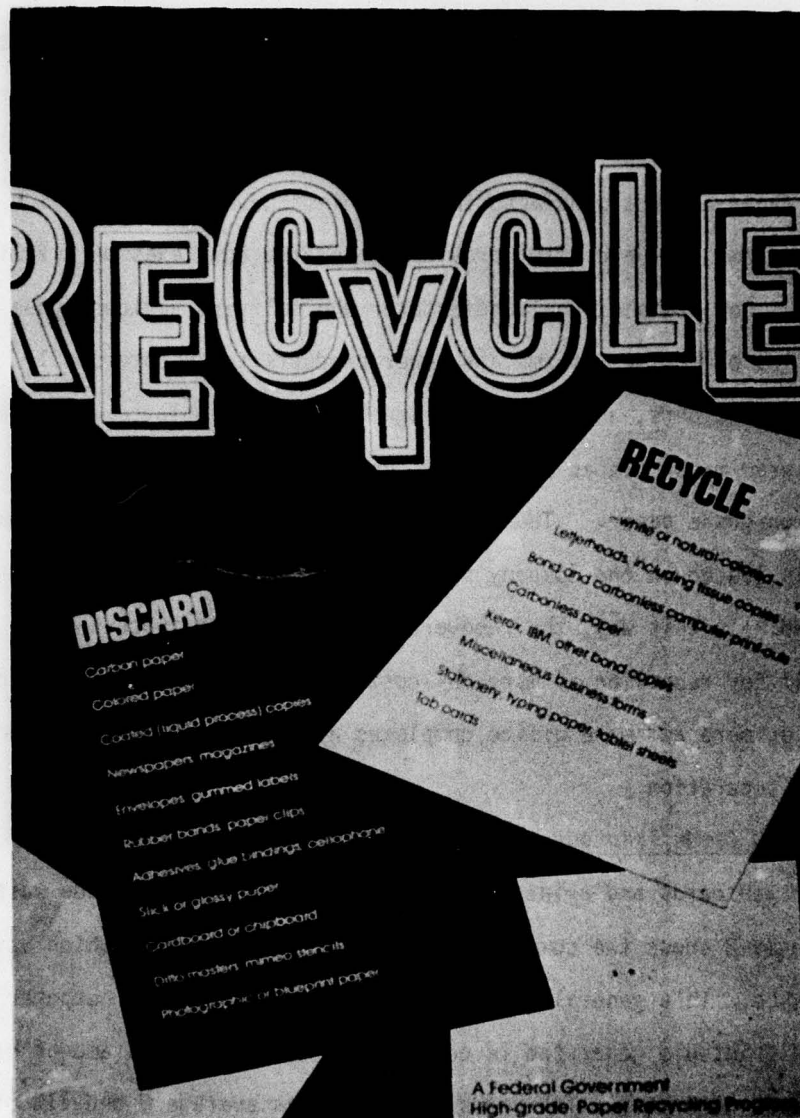


Figure IV-5: "Use It Again Sam" Office Paper Instruction Poster

equipment averages 1¢ per employee, while publicity materials average 3 to 4¢ per employee. Some 3 minutes of staff time per employee are required for effective communication and planning during the start-up phase.

Several paper-product manufacturing companies\* have designed office source-separation programs that are often provided to office complexes on a full-service basis. For example, one manufacturer who delivers various types and large quantities of business forms and paper products to customers will provide desk-top holders, corrugated storage boxes, and employee education and publicity program materials as part of its contract to purchase source-separated, high-grade paper. The separated material, accumulated in loading-dock areas, is loaded on the company's delivery truck after its products have been delivered. In this way, the recovered product can be "back-hauled" to the paper mill for recycling at marginal cost. This mechanism is becoming very popular as more and more office complexes are implementing high-grade office source separation.

#### B. Computer Tab Cards/Printouts

Computer tab cards and printouts are another form of high-grade waste-paper. Table IV-2 shows the composition of office solid waste, which varies by building type. In a general office situation, the amount of computer tab cards and printouts generated is considerably less than the amount of high-grade paper generated. Tab cards and printouts average 5 and 11% of the waste stream, respectively, compared to 51% average for white ledger. However, certain types of offices, such as data centers, would generate much greater quantities of tab cards and printouts. The higher value of this type of paper warrants its separation.

\* Shade Information Systems, Green Bay, Wisconsin; Weyerhaeuser Company, Tacoma, Washington.

Table IV-2  
Composition of Office Solid Waste  
By Building Type\*

Material	Generation/Building Type (lbs/employee/day)					
	Bank/Insurance Co.			General Office		
	Range	Average	%	Range	Average	%
Paper						
Computer Tab Cards	0.28-0.53	0.39	17	0.02-0.11	0.05	3
Computer Printout	0.60-0.74	0.70	30	T -0.17	0.11	7
White Ledger	0.67-0.74	0.70	30	0.31-0.62	0.51	33
Colored Ledger	0.05-0.16	0.12	5	0.05-0.19	0.09	6
Newspaper	T -0.16	0.07	3	0.19-0.36	0.25	16
Corrugated	0.05-0.07	0.05	2	0.11-0.17	0.14	9
Other#	0.11-0.16	0.14	6	0.14-0.22	0.17	11
Garbage	T -0.07	0.02	1	0.05-0.12	0.09	6
Metal	0.02	0.02	1	0.02-0.05	0.03	2
Glass	T -0.02	0.02	1	T -0.06	0.03	2
Plastic	0.02-0.05	0.02	1	0.02-0.09	0.05	3
Textile	T -0.02	0.02	1	T	T	T
Wood	T -0.02	0.02	1	T	T	T
Miscellaneous	T -0.02	0.02	1	T -0.06	0.03	2
Total	---	2.31	100	---	1.55	100

\* Based on representative solid waste sampling conducted at six buildings during study; does not include cafeteria waste

T Trace

# Generally non-recyclable paper: carbon paper, wax coated or impregnated paper products, etc.

Source: U. S. EPA, Optimization of Office Paper Recovery Systems, May 1976.

The separation of both computer tab cards and printouts is a very simple procedure and one that is easily practiced due to the nature of their generation. For protection, tab cards are usually stored in their original boxes. After they are no longer needed, they are usually discarded in the same box. Placement of these containers at a central location (perhaps with other office paper) is convenient for both workers and collection personnel. Computer printouts, unfortunately, are not generally containerized. However, computer paper is usually stacked in an office until it is no longer required for future reference. Centrally located containers and laundry carts commonly serve as collection containers in office areas where large volumes of computer printouts are generated.

In cases where computer printout waste is not generated in substantial quantities, it has been mixed with other high-grade paper. This, however, may downgrade the stock to mixed ledger and result in lower revenues. Centrally located receptacles are important in rooms containing printout and keypunch machines or other data-processing equipment. In such instances, it is not difficult to segregate the more valuable tab cards and printouts from the other office high-grade, as they are generated. For activities generating large quantities of computer-related wastepaper, segregation of this waste from white ledger is profitable.

#### C. Used Corrugated Containers

Roughly 5 million tons of used corrugated material (generally in the form of containers) are recycled each year through the wastepaper industry. This consumption represents a recycling rate of approximately 30% for this type of paper fiber.

Much of the present recycling of corrugated containers is accomplished by private solid waste collection and secondary wastepaper dealers, who have encouraged local retail, wholesale, industrial, and office establishments to separate the corrugated container material in their waste stream.

New demands and correspondingly higher prices have again created interest for corrugated source separation, especially by retail establishments. The interest represents a concern for sensible business operations management. For private solid waste collectors and paper dealers, the drive is purely economic. As long as the market conditions are favorable, their interest in this means of paper supply will continue.

Both private haulers and secondary materials dealers often provide and service containers, compactors, and balers to generators of substantial quantities of used corrugated containers. The financial arrangements for such services vary. When old corrugated containers are source-separated into a high-quality (low-contaminant) material, the installed equipment is often subsidized by the collector (provided free in a sense), or credited against expected corrugated revenues. When contaminants (e.g., beverage containers, miscellaneous non-acceptable packing media, etc.) are not separated from the corrugated materials, the value of the material is decreased and may cause any subsidy for installed equipment to be withdrawn. Generally, retail establishments with large quantities of corrugated packaging install their own baling or compactor-transfer equipment and receive revenue for the tonnage from local wastepaper dealers. However, for smaller establishments which cannot afford to purchase such equipment, trash and separated corrugated often may be collected for a minimal fee by a local solid waste collector. The collector, in turn, receives the revenue from the corrugated material as

payment for the services provided to the customers. Apart from this, small retail establishments may use their own delivery vehicles to transport separated corrugated material to a local wastepaper dealer. This can be advantageous for both the small and large retailer, given that the equipment to perform the service is available.

The collection methods utilized also vary significantly, depending on the size and type of retail establishment being serviced. Some examples have already been discussed. In the case of private haulers, it is difficult to obtain "actual" collection costs. Substantial quantities of corrugated containers can be collected from retail establishments of various types and sizes.

There are four basic methods of source separating old corrugated containers. The first involves the hand separation of containers by personnel during unpacking and loose storage. This method is employed where the boxes may be re-used for future packing; for example, in a liquor store. The second method also involves hand separation, but places the separated material in specially designated compactors for subsequent collection by either a wastepaper dealer or collector. Establishments with high generation rates often do this. The third method involves no separation from other waste generated. Often, private collectors will take loads of high corrugated content (perhaps as much as 50-60%), handpick the clean corrugated from other waste, bale the corrugated for sale, and dispose of what remains. This practice increased dramatically during 1974-75, when the price of corrugated skyrocketed to close to \$60 per ton. When the value of corrugated falls, all the material can be alternatively disposed of without any recovery handling. The fourth method is used at very high generation

points. It, too, involves hand separation, but bales the material on-site (Figure IV-6). Personnel must be trained as to the proper operation of a baler. Bales can be made in different sizes, varying in weight from 200 to 1,000 pounds. In these cases, there must be storage space for the bales as well as materials-handling equipment, such as a fork lift or hand truck, for placement in storage and subsequent loading onto a truck or railroad boxcar.

A corrugated separation system also requires appropriate equipment and training for loading dock, receiving, or stock personnel. Often, the waste collector or secondary materials dealer who has the contract to haul and recover the material will provide initial training and monitoring in order to ensure the quality of separated corrugated.

D. Newsprint

Old newspapers constitute a considerable bulk of total municipal solid waste. In urban areas, newspapers can represent 10-20% of municipal solid waste by weight. The exact percentage of newspapers tends to vary according to whether the specific area is in the high- or low-income bracket, as well as the size and number of newspapers distributed in the area.\*

If newsprint is properly separated from other solid wastes, the result is a valuable resource. Much of the value, however, depends on the cleanliness of the newspaper, and thus separation and collection techniques are of utmost importance in the newspaper recycling process. In addition to its inherent value, removing newspaper from the solid waste stream can greatly reduce the amount of waste landfilled and, therefore, extend the landfill's life.

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\* In addition to residential areas, large office-complexes also generate recoverable amounts of old newspapers.

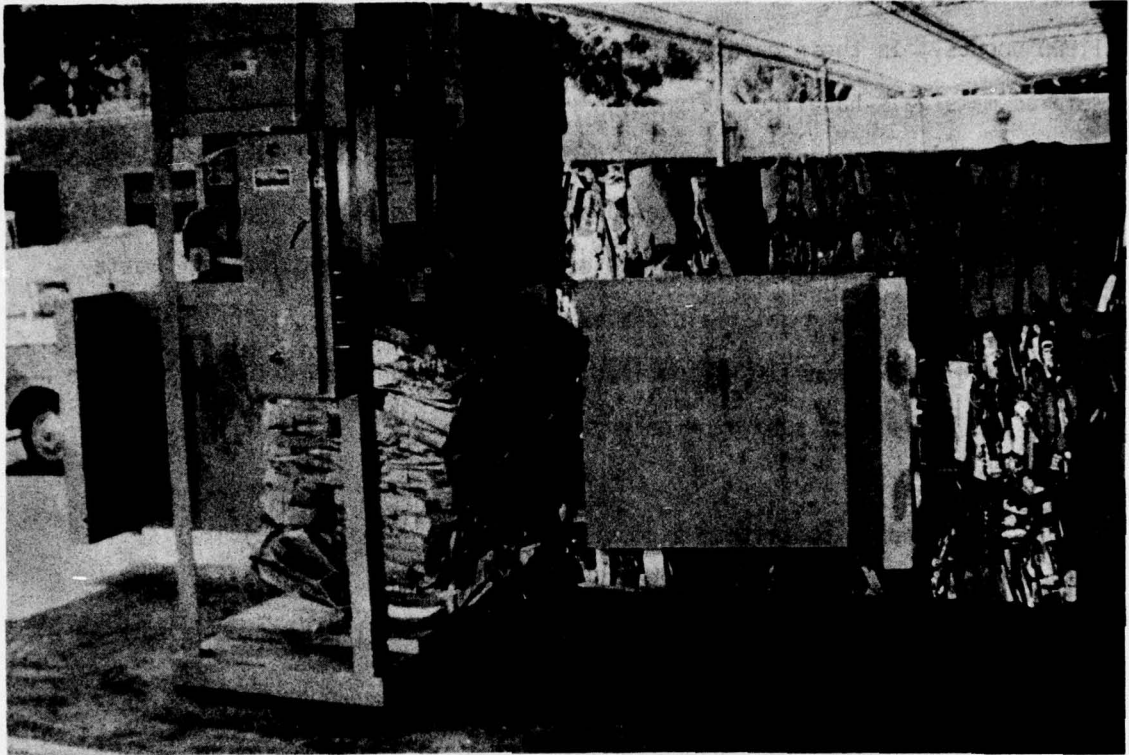
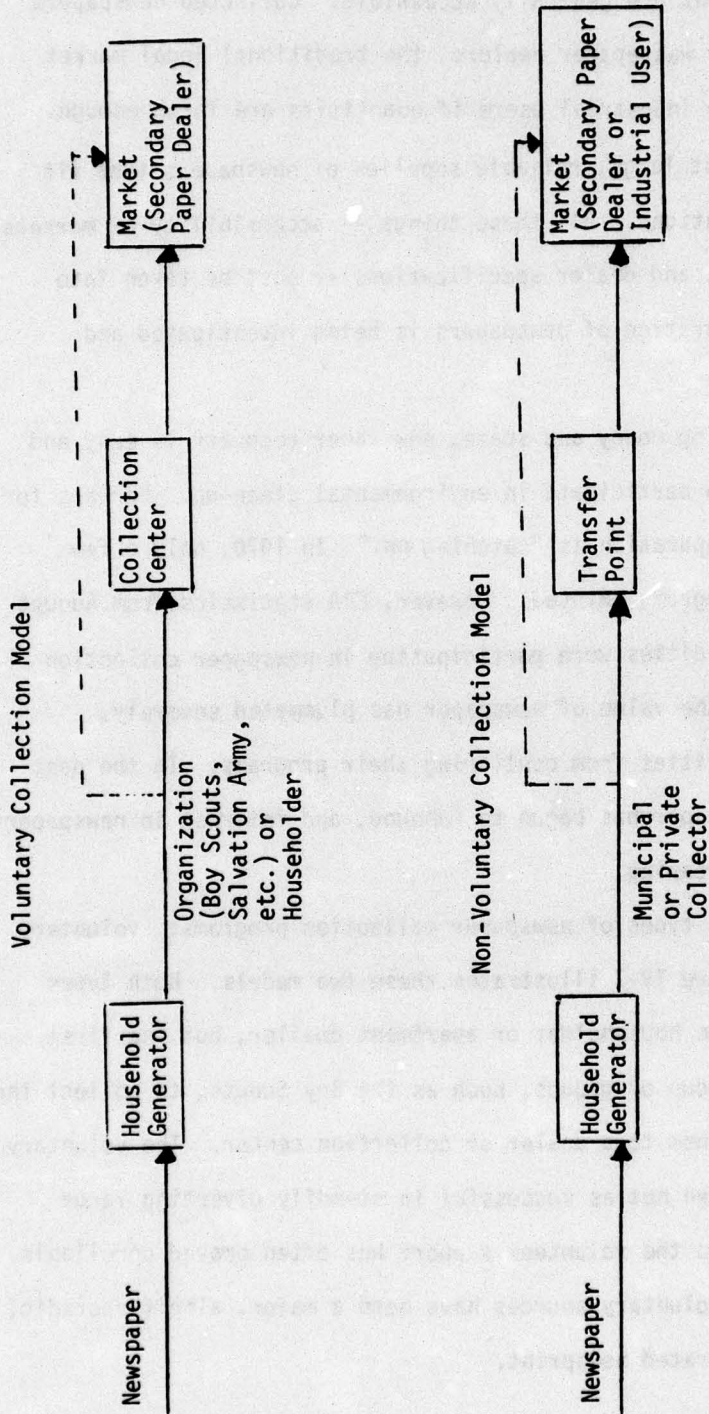


Figure IV-6: Commercial baler for old corrugated containers in use at retail establishment with a very high generation rate. Storage of bales is shown in background.

Markets for newsprint are generally accessible. Collected newspapers can be sold to secondary wastepaper dealers, the traditional local market. They can also be sold to industrial users if quantities are large enough. Most newsprint users want large, reliable supplies of newspapers that fit form and other specifications. All these things -- accessibility of markets, wastepaper market value, and dealer specifications -- must be taken into account when source separation of newspapers is being investigated and planned.

In addition to saving money and space, newspaper recovery is easy and gives people a chance to participate in environmental clean-up. Perhaps for these reasons, source separation is "catching on." In 1970, only a few newspaper collection programs existed. However, EPA statistics from August 1974 show that over 120 cities were participating in newspaper collection programs. Since then, the value of newspaper has plummeted severely, discouraging many communities from continuing their programs. In the past year, the value of newspaper has begun to rebound, and interest in newspaper separation is again increasing.

There are two basic types of newspaper collection programs: voluntary and non-voluntary. Figure IV-7 illustrates these two models. Both types require separation by the householder or apartment dweller, but the first relies on a voluntary group or groups, such as the Boy Scouts, to collect the newspapers and deliver them to a dealer or collection center. The voluntary collection method is often not as successful in steadily diverting large amounts of newspaper, and the volunteer support has often proved unreliable. Historically, however, voluntary sources have been a major, albeit sporadic, source of household-separated newsprint.



Source: National Center for Resource Recovery, Inc.

Figure IV-7: Two Models of Source Separation

In the non-voluntary type of program, the newspapers are put out and collected by the municipality or a private company. After collection, the newspapers can be taken to a transfer point or to market. Costs may be higher with the non-voluntary collection, or at least more obvious, since in the voluntary program the volunteer group (or groups) usually absorbs the costs. Still, the second method offers dependability, and thus a steady diversion of a large bulk from the solid waste disposal stream. Properly done, up to 75% of the potentially recoverable newspaper can be diverted.

Non-voluntary newspaper collection services usually follow one of two forms: collection by separate vehicles, or collection during the regular trash run by using additional racks on the trucks. Usually, municipalities will utilize already available equipment and labor forces when they initiate a newspaper collection program. If the cost is too great for the municipality, they may seek out a private contractor. For separate collection, packer trucks are preferable to open-bed trucks, since they require less physical exertion and do not call for an additional crew member (Figures IV-8 and -9). Either the packer or the open-bed truck can cover 3-5 routes in an 8-hour day.

With the rack approach (Figure IV-10), the racks can fit on the underside of the packer, although they will not fit on all types of vehicles. Since these racks may become filled on the regular refuse run, bigger boxes should be placed along the run so that the racks can be unloaded without leaving the route. The racks cost anywhere from \$100-\$250, and hold from 1/2 - 1-1/2 cubic yards.

The choice between separate collection and rack collection will probably be made by looking at the volume of newspapers, program participation, and the ability of a truck to be fitted with a rack. For example, the rack approach would probably be better suited to areas which have a light volume of newspapers.



Figure IV-8: These bundles of wastepaper are being loaded into a separate collection packer truck in the town of Hempstead, New York.

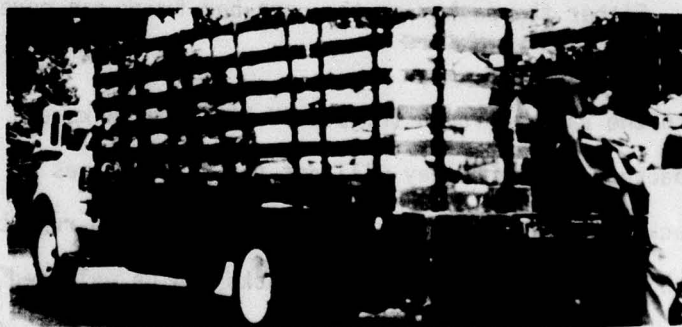


Figure IV-9: Van and open, stake-type trucks are also used for collecting source-separated newspaper.

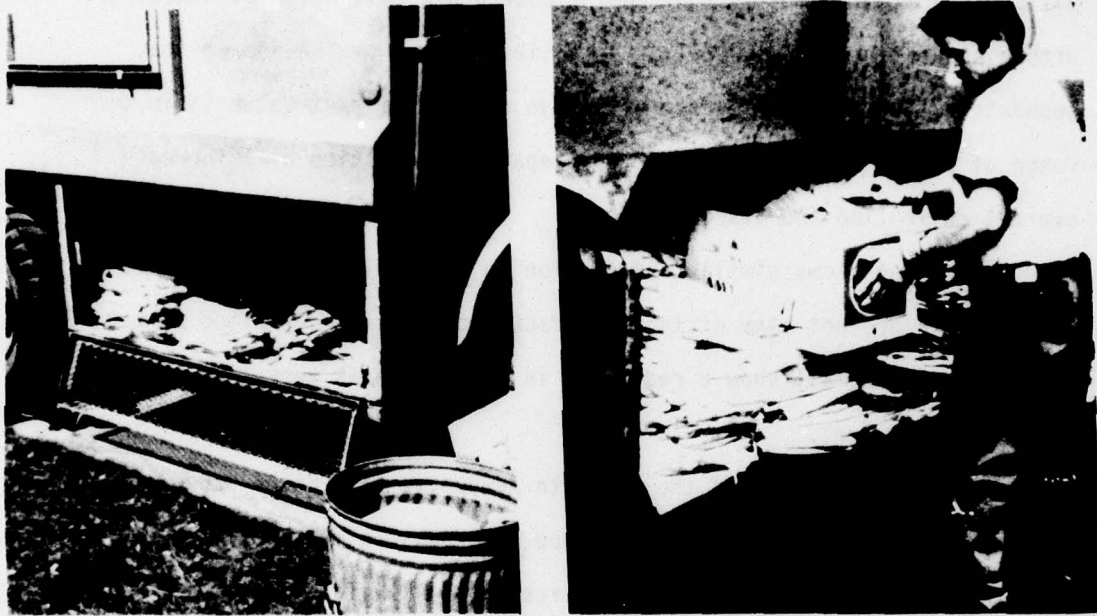


Figure IV-10: This is a special rack installed for holding bundled newspapers collected from residents in Madison, Wisconsin (left) and San Francisco, California (right).

Separate collection seems to fit in areas where newspaper volumes are larger and program longevity is established, with participation fairly certain.

Meaningful cost estimates for the separate collection program are difficult to produce because the program involves so many elements, such as the type of regular collection, paper revenue, disposal costs, and resident participation. However, Table IV-3 shows the economic impact on overall solid waste management costs of adding a separate collection of newspapers with a separate truck. Overall, the cities studied by EPA showed that separate collection can be cost-effective when the market value is in the range of \$15-20 per ton. Below that, separate collection will increase overall collection and disposal cost.

Table IV-4 shows similar information on rack collection programs. As shown, there are not many cities with rack programs. The limited number of existing programs all show a reduction in costs even at very low newspaper prices (\$8 per ton).

Much of the success of the separate newspaper collection program depends on planning and implementation. A group or groups, a municipality, or a private company must take control and responsibility for the program. Often, the program will begin as a pilot and then expand into full-scale when the pilot meets with success.

In addition, participation in newspaper separation programs tends to increase with the increased duration of the program and sustained public education:

<u>Participation</u>	<u>Duration of Program</u>
15 - 20%	4 - 12 months
20 - 40%	1 - 2 years
40 - 65%	2 - 3 years

Municipal newspaper participation rates average 42% where newspaper only is collected.

Table IV-3

Impact of Separate Collection on Overall Residential  
Solid Waste Management Costs  
--Separate Truck Approach--\*

Case Study Location	Collection and Disposal Cost Prior to Implementation of Separate Collection  (\$/Ton)	Collection and Disposal Cost After Implementation of Separate Collection†			
		Low Paper Market (average \$8 per ton)		High Paper Market (average \$25 per ton)	
		(\$/Ton)	(% Change)	(\$/Ton)	(% Change)
Dallas, Tex.	12.10	11.60	-4.1	9.30	-23.1
Fort Worth, Tex.	13.50	14.10	+4.4	11.80	-12.6
Great Neck, N. Y.	36.00	38.70	+7.5	36.50	+1.4
Green Bay, Wisc.	38.70	37.70	-2.6	37.10	-4.1
Greenbelt, Md.	27.20	27.40	+0.7	26.30	-3.3
Marblehead, Mass.	23.10	25.30	+9.5	24.10	+4.3
Newton, Mass.	32.40	32.20	-0.6	31.60	-2.5
University Park, Tex.	14.70	14.90	+1.4	13.10	-10.9
Villa Park, Ill.	13.50	13.40	-0.8	12.40	-8.1
West Hartford, Conn.	26.30	26.50	+0.8	25.20	-5.7

\*SCS Engineers, Source separate collection of recyclable waste.  
†Credit given for diverted disposal costs and revenue generated from the sale of separately collected wastepaper.

Table IV-4

Impact of Separate Collection on Overall Residential Solid Waste Management Costs  
--Rack Approach--\*

Case Study Location	Collection and Disposal Cost Prior to Implementation of Separate Collection (\$/Ton)	Collection and Disposal Cost After Implementation of Separate Collection			
		Low Paper Market (average \$8 per ton)		High Paper Market (average \$25 per ton)	
		(\$/Ton)	(% Change)	(\$/Ton)	(% Change)
Madison, Wis.	22.30	22.00	-1.3	20.50	8.1
New York, N.Y.†	53.50	53.40	-0.2	53.50††	-0-
Sheboygan, Wis.	32.00	31.80	-0.6	31.50	-1.6

\*SCS Engineers, Source separate collection of recyclable waste.

†Queens District 67 only.

††The small quantities of newspaper separately collected had an insignificant effect on overall costs.

Two kinds of ordinances have been implemented by municipalities to aid newspaper recovery: a mandatory separation ordinance and an anti-pirating or anti-scavenging ordinance. Whereas the mandatory ordinances seem to have little value, the anti-pirating ordinances seem not only to help, but to be necessary for municipalities. Neither type of ordinance should be necessary on a DA installation, however.

Still, the basic ingredient for successful newspaper collection is promotion. Unless participating householders are informed clearly, consistently and constantly, the program cannot be as effective. The public must be aware of the program, and they must be educated.

The awareness can come by publicity: through local media -- newspapers, T.V. and radio; through business and civic leaders; and through schools. But in order to be educational, the publicity must be sustained; questions must be anticipated and answers must be available. Newspaper collection programs seem to thrive on slogans or a central theme or logo which can be painted on trash cans or put onto banners or posters but which, chiefly, is "catchy" and can be easily remembered. Some communities have had successful slogan-naming contests to increase public awareness of the program in the initial stages. Before and after the program begins, municipalities have kept people informed through bumper stickers, brochures, inserts into utility bills, flyers, and door hangers. Without the necessary emphasis on public awareness programs and public education, there will probably be little or sporadic public participation; and without public participation, the program will fail to achieve adequate levels of recovery, thus rendering it uneconomical.

#### E. Mixed Household Materials

Besides newsprint, there are other recyclable materials present in the household waste stream. Two demonstration projects funded by EPA\* were designed to economically combine the collection of glass and cans with separate newspaper collection.

The projects are based on the premise that there is both volume and value in recyclable products. Making up more than 30 per cent of the weight and 40 per cent of the volume of municipal solid waste, recyclable glass, cans and paper together represent a sizable portion of the solid waste stream. In fact, for both cities, the reduction of their total municipal solid waste is one of the primary recycling program goals. By setting up publicity and education programs that will increase public participation and obtaining concrete markets for the different material components, collection and disposal costs can be decreased.

As in all other source separation programs, the paper, glass and cans must be separated in the home for curbside pickup (Figure IV-11). Both Somerville and Marblehead collect all metal cans and flat paper. Marblehead accepts amber, green, and clear glass, while Somerville recovers only clear glass. In both cases, the glass and cans are not sorted by the householder, but are accumulated and set out for collection together in one container. Both locations use a specially designed multi-compartment truck equipped with a rear bucket loader (Figure IV-12). The bucket-loading compartmentalized vehicles allow two recyclable fractions to be collected at the same time (Figure IV-13).

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\*Somerville, Massachusetts, a blue-collar town of 90,000; and Marblehead, Massachusetts, a white-collar community of 23,000.



Figure IV-11: Multi-material set-out of mixed papers, and glass and cans in Somerville, Massachusetts. (Note the catchy sticker that the city distributes to participants.)

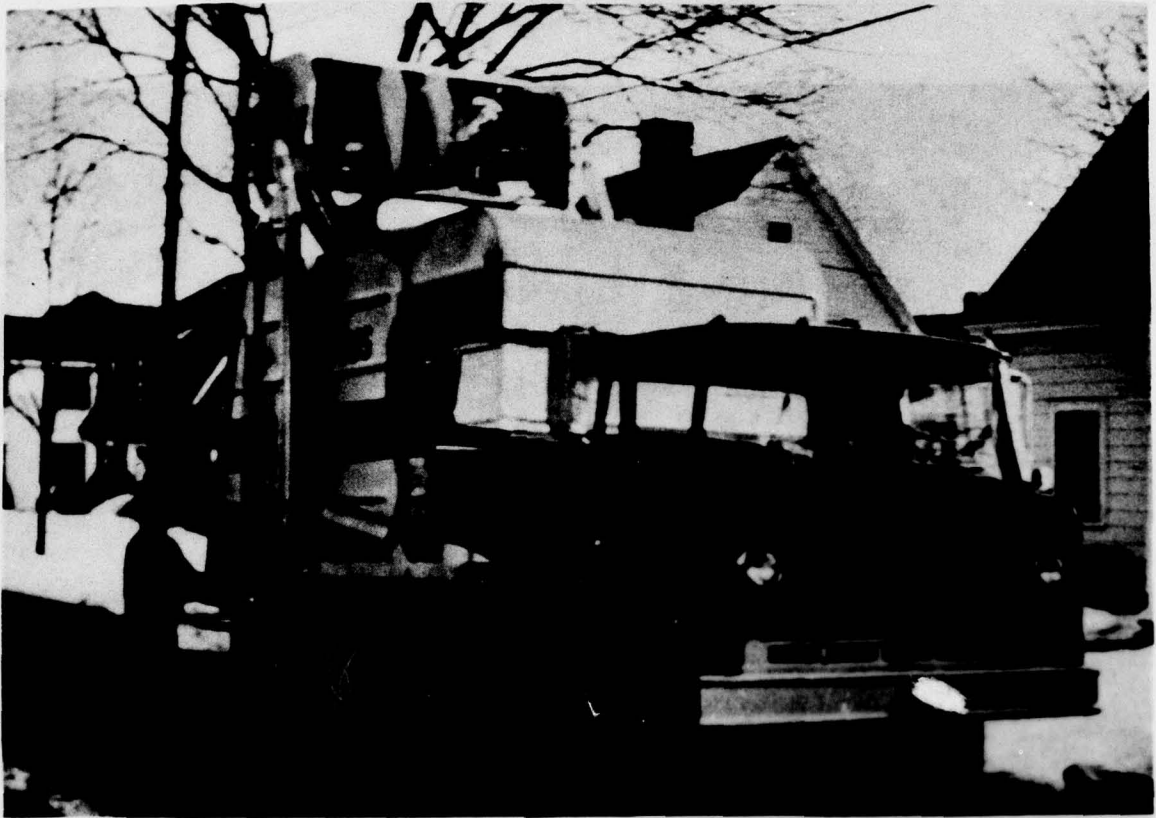


Figure IV-12: Special compartmental collection truck allows simultaneous collection of two separate household material fractions in Marblehead, Massachusetts.

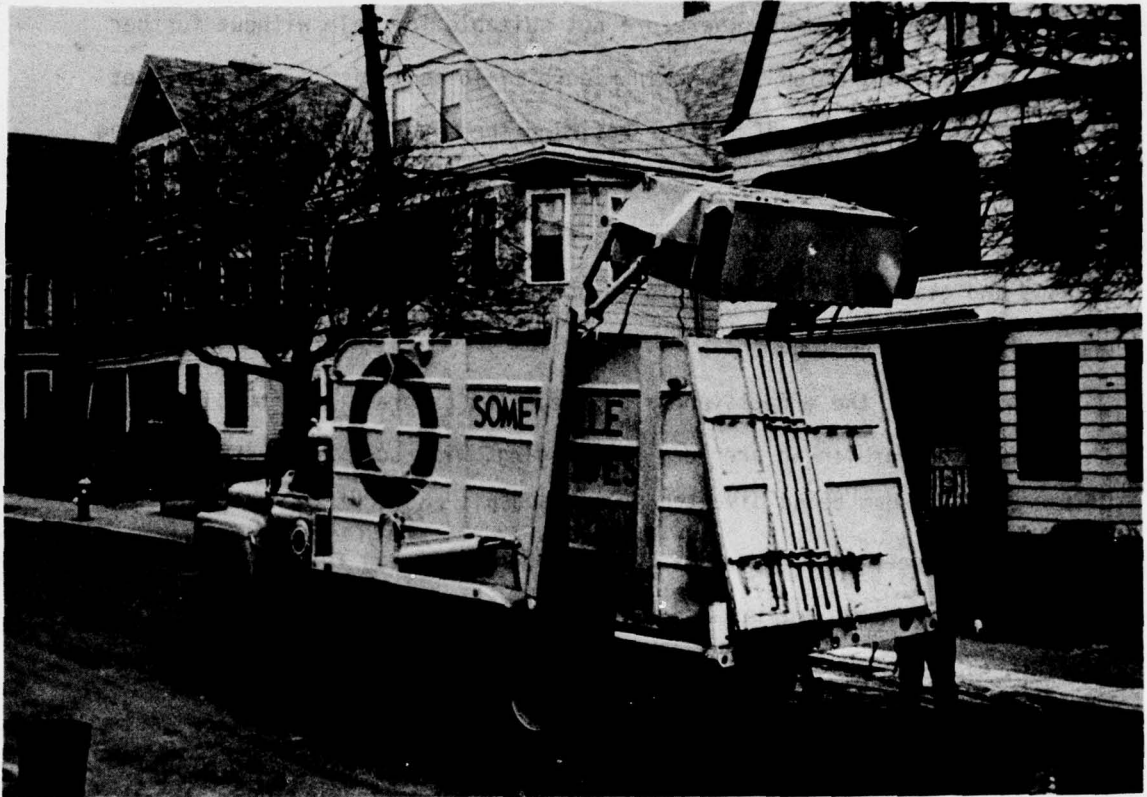


Figure IV-13: When the bucket is full, it is lifted up for unloading into the collection body. When the truck has to be unloaded, one door at a time on each side is opened for removal of collected material.

In Somerville, an available dump truck was "custom fitted" with its own compartmentalized bin (Figure IV-14).

The collected newspaper is transported to a wastepaper processor for baling prior to sale to a consuming mill. The collected glass and cans (Figure IV-15) are mixed, however, and are therefore not suitable for sale without further processing and separation. Shown in Figure IV-16 is a simplified flowsheet illustrating the process of further refining the mixed materials. Utilizing fairly simple unit operations, the mixed materials are separated into three fractions: crude ferrous, crude glass, and an aluminum-rich residue. The ferrous and glass products are sold to user industries while the residue is not presently further refined.

A summary of the effectiveness of these two programs is shown in Table IV-5. The results in Marblehead are very encouraging, with some 25% (by weight) of the waste stream being diverted from disposal. Somerville results, however, have been less encouraging. The poorer results there are due in part to certain labor, union, and publicity problems that have caused a somewhat lower participation.

Each community however, can show a savings in monthly collection costs. Shown in Table IV-6 is a summary of cost information on the two programs. Somerville is just barely saving funds, while Marblehead, a town less than one-quarter the size, is saving almost \$3000 per month. For a small town, that is a big savings!

Although recycling may appear immediately beneficial to some, due to savings in costs, resources, and energy, the majority of people in any community will need to know not only why they recycle but how to recycle. Thus, in a multi-material source separation program as well as in the newspaper separation program and office separation program, the public needs to be educated.



Figure IV-14: "Custom fitted" dump truck collecting multi-materials in Somerville, Massachusetts.



Figure IV-15: The mixed materials (glass and cans) awaiting further processing and separation.

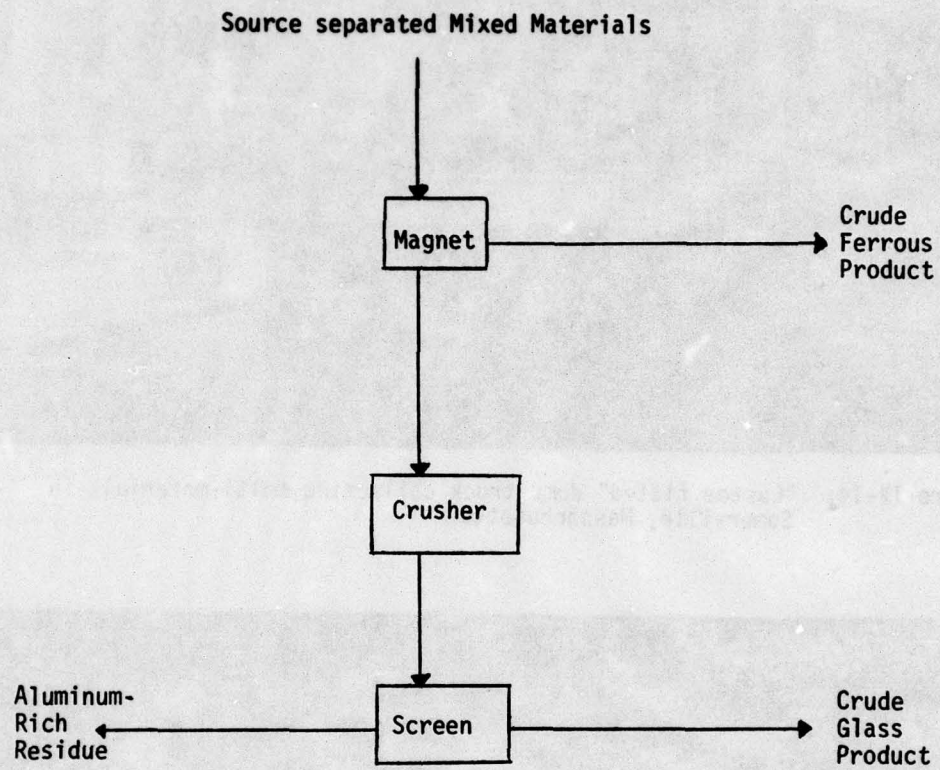


Figure IV-16: Multi-Materials: Simplified Flowsheet

Table IV-5  
Average Figures for Materials Recovery in Two Multi-Material Separation Programs

Location	Materials Recovered	Tons/Month	% of Total Waste
Marblehead*	Paper	92	13
	Cans and Glass	81	12
Somerville**	Paper	122	5
	Cans and Glass	78	3

\*Average figures for 8-month period. (1/76-8/76)

\*\*Average figures for 9-month period. (12/75-8/76)

Source: U.S. Environmental Protection Agency

Table IV-6  
Average Monthly Costs in Multi-Material Source Separation Collections

Cost Factor	Marblehead (Jan. '75- Aug. '76)	Somerville (Dec. '75 - Aug. '76)
	(\$ per month)	
Incremental Collection Cost Increase (IC)	3,972	5,779
Revenue (R)	(3,307)	(2,758)
Disposal Savings (DS)	(3,547)	(2,855)
Net Cost (DS + R - IC)	(2,882)	(166)

Source: U.S. Environmental Protection Agency

Somerville and Marblehead use many of the publicity techniques suggested under the newsprint section. They utilize local media by issuing newspaper articles and having radio and T.V. programs; they develop posters and signs; they send packages and flyers to schools; and they keep up direct communication with various community groups and with individual citizens. These educational techniques are used to create an awareness of the desirability -- for example, conservation and reduction of litter -- of recycling and to instruct the public on procedures for separation within the home, procedures for placing the materials on the curbside, and collection routes and schedules.

#### F. Recycling Centers

Since the dawn of the ecological movement on Earth Day, 1970, literally thousands of recycling centers have opened up around the United States. These centers originally relied primarily upon voluntary labor and donated equipment. However, the ceaseless generation of solid waste has caused the demise of many volunteer-supported recycling centers. Only the more aggressive centers have survived, in many cases due to the availability of public funding and/or labor support (Figure IV-17).

Industry has also played a key role in many recycling programs. For example, in 1975, almost 30 per cent of all of the aluminum cans produced were returned for recycling to industry collection points. The very high value of aluminum (\$300 per ton or 1.5¢/lb.) has made it a worthwhile item for many volunteer groups (Boy Scouts, etc.) to collect in drives to raise funds, much in the same way newspapers are collected.

Different centers accept different materials. Normally newspaper, glass, metal containers and perhaps other materials such as tires, white goods, etc. are accepted. Occasionally, a center will require the removal of labels from the glass and metal containers. Other requirements may be: color-sorting of glass,

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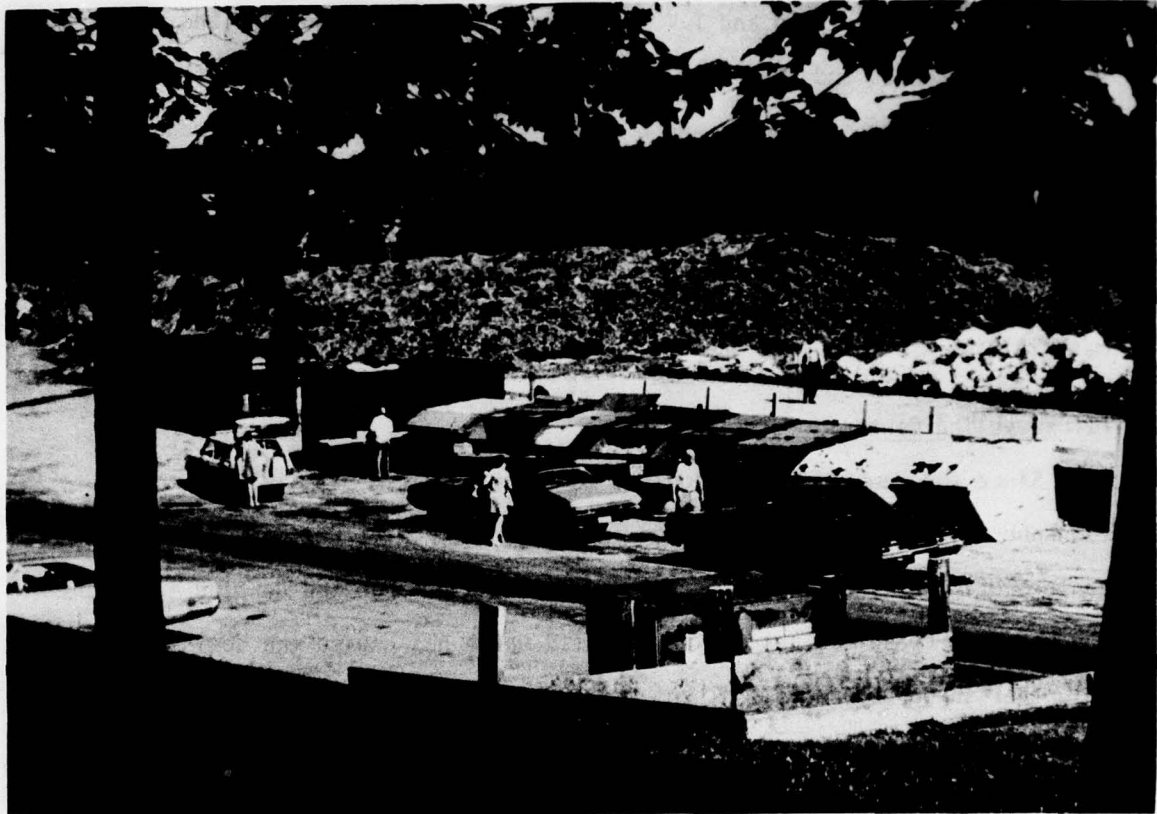


Figure IV-17: Expanded recycling center in Wellesley, Massachusetts, operated by public works.

flattening of cans or separating aluminum cans from other metal cans.

Since costs for running a recycling center vary considerably, it is difficult, if not impossible, to give overall figures. While citizen collection centers seldom spend much money on labor or equipment, commercial and public centers usually do. Furthermore, public and commercial centers are often able to divert more materials on a steadier and more reliable basis, thereby resulting in greater revenues to counter the larger equipment and labor costs.

An EPA study (b) mentioned above found that local collection centers had little impact on the waste collection and disposal costs of their areas. In fact, the average center diverted only about 2% of the total solid waste generated in the local community.

#### G. Conclusion

Successful source separation systems require both the cooperation of the generators and an efficient and convenient collection method for recovering separated products. Cooperative participation and efficient collection systems can, and have, resulted in significant savings in collection and disposal costs at all levels, from newspaper collection at the curb to high-grade waste paper recovery from offices. Source separation programs have a large human factor which must be accounted for. An effective collection program with the proper labor commitment, equipment, scheduling, and community feedback mechanism, is an integral part of the success of the recovery program as a whole.

## V. PROPOSED SOURCE SEPARATION PROCEDURES\*

### A. Introduction

Based on a comprehensive survey of current source separation techniques developed and implemented to date by business and industry, and an understanding of DoD and DA waste management, it has been possible to identify procedures that should be employed by the Army. The procedures recommended herein are compliant with Guideline provisions, and are applicable to both installations required to establish source separation programs, and those installations electing to establish voluntary programs. Table V-1\*\* provides a review summary of the requirements and recommendations of the Guideline.

The procedures recommended here are identified for each category of waste material identified in the Guideline - high-grade paper, corrugated containers, used newspapers and residential materials. Supplementing the text are flow diagrams identifying the sequential steps involved and the person(s) who should be responsible for their execution.

### B. High-Grade Paper

#### 1. Definition

"High-grade paper" includes the following types of white ledger: letter-head, dry copy papers, business forms, stationery, typing paper, white tablet paper, computer printout paper and cards, manuals and miscellaneous reports. Contaminants which decrease the value of these saleable products include envelopes, carbon paper, colored cover sheets, yellow tablet paper, and metal and plastic binders. A listing of all acceptable and unacceptable high-

\* The format of this Chapter varies somewhat from the rest of the report, because of the numerous procedures set forth for future referencing purposes.

\*\* Table V-1 is identical to Table II-1, but is repeated here for further clarification.

Table V-1

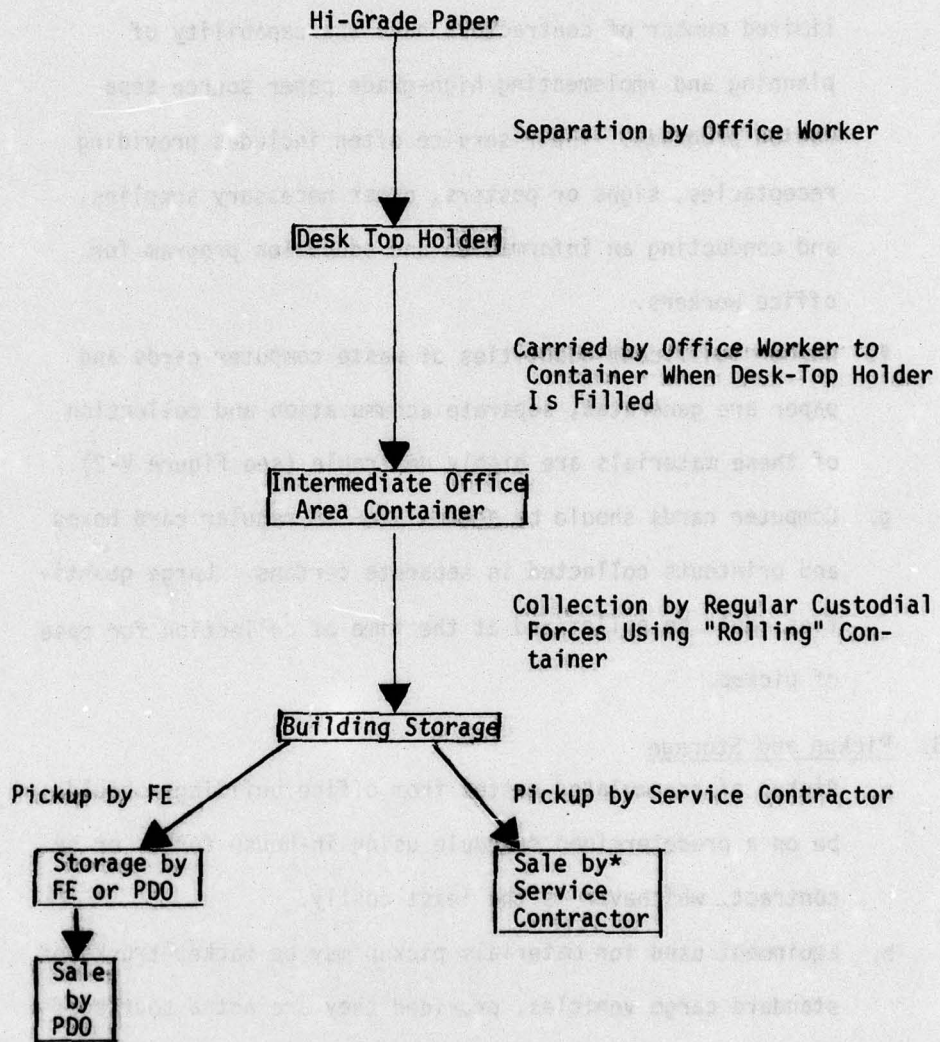
Summary of EPA Source Separation Guidelines

<u>Recyclable Item</u>	<u>Required for Installations Meeting these conditions</u>	<u>Recommended for Installations Meeting these conditions</u>
High Grade Paper	Over 100 office workers	Less than 100 office workers
Corrugated Containers	Over 10 tons per month	Less than 10 tons per month
Newsprint	Over 500 residential units	Less than 500 residential units
Glass, Cans & Mixed Paper	No Requirement	Where markets are available for the quantities of these materials segregated

grade waste paper components should be prominently displayed on desk-top holders and bulk receptacles for convenient reference by office workers.

2. Source Separation and Collection

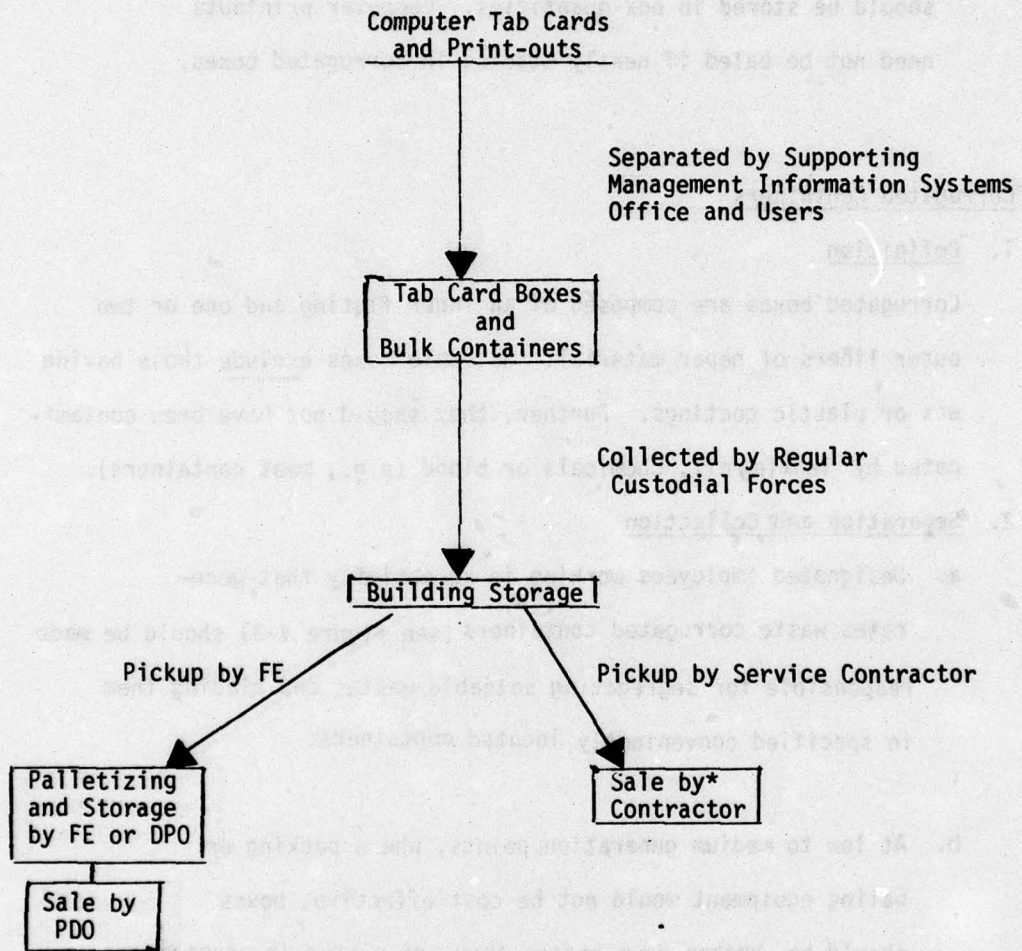
- a. Desk-top separation by the office worker is considered the most effective means of source separation (see Figure V-1). Devices that can be used for this purpose are either vertical paper holders or a specially marked in-box. The two-wastebasket method is considered acceptable; however, it does not provide the same degree of protection against contamination as the desk-top method.
- b. The first step in the collection procedure would be taken by the waste generator, who places desk-top accumulations in a conveniently placed container in the office area.
- c. Collection of wastepaper accumulations from offices should be integrated into the scheduled cleaning of the regular custodial force. Segregated materials should be collected separately, but not as frequently as regular office refuse.
- d. Collection and interim storage receptacles used by the custodial force could be either large corrugated boxes, cardboard barrels, or canvas laundry carts. Bulk waste materials collected would be stored within the generating facility for pickup on a predetermined schedule.



\*When pickup service is provided by contract

Figure V-1: Installation Office Waste Separation

- e. Consideration should be given to having all or parts of the supply and equipment support needed for the above activities provided under a full service contract. A limited number of contractors have the capability of planning and implementing high-grade paper source separation programs. Their service often includes providing receptacles, signs or posters, other necessary supplies, and conducting an information and education program for office workers.
  - f. Where significant quantities of waste computer cards and paper are generated, separate accumulation and collection of these materials are highly desirable (see Figure V-2).
  - g. Computer cards should be accumulated in regular card boxes and printouts collected in separate cartons. Large quantities could be palletized at the time of collection for ease of pickup.
3. Pickup and Storage
- a. Pickup of accumulated wastes from office buildings should be on a predetermined schedule using in-house forces or by contract, whichever is the least costly.
  - b. Equipment used for materials pickup may be packer-trucks or standard cargo vehicles, provided they are not a source of contamination and afford protection in the event of inclement weather.
  - c. Storage of wastepaper awaiting sale must be in facilities of adequate size with essential fire protection. High-grade paper



\*When pickup service is provided by contract

Figure V-2: Installation Computer Paper Separation

may be stored loose in boxes or containers, or baled. The method employed should be based on potential buyer's desires identified during the market survey. Computer cards should be stored in box-quantities. Computer printouts need not be baled if neatly stacked in corrugated boxes.

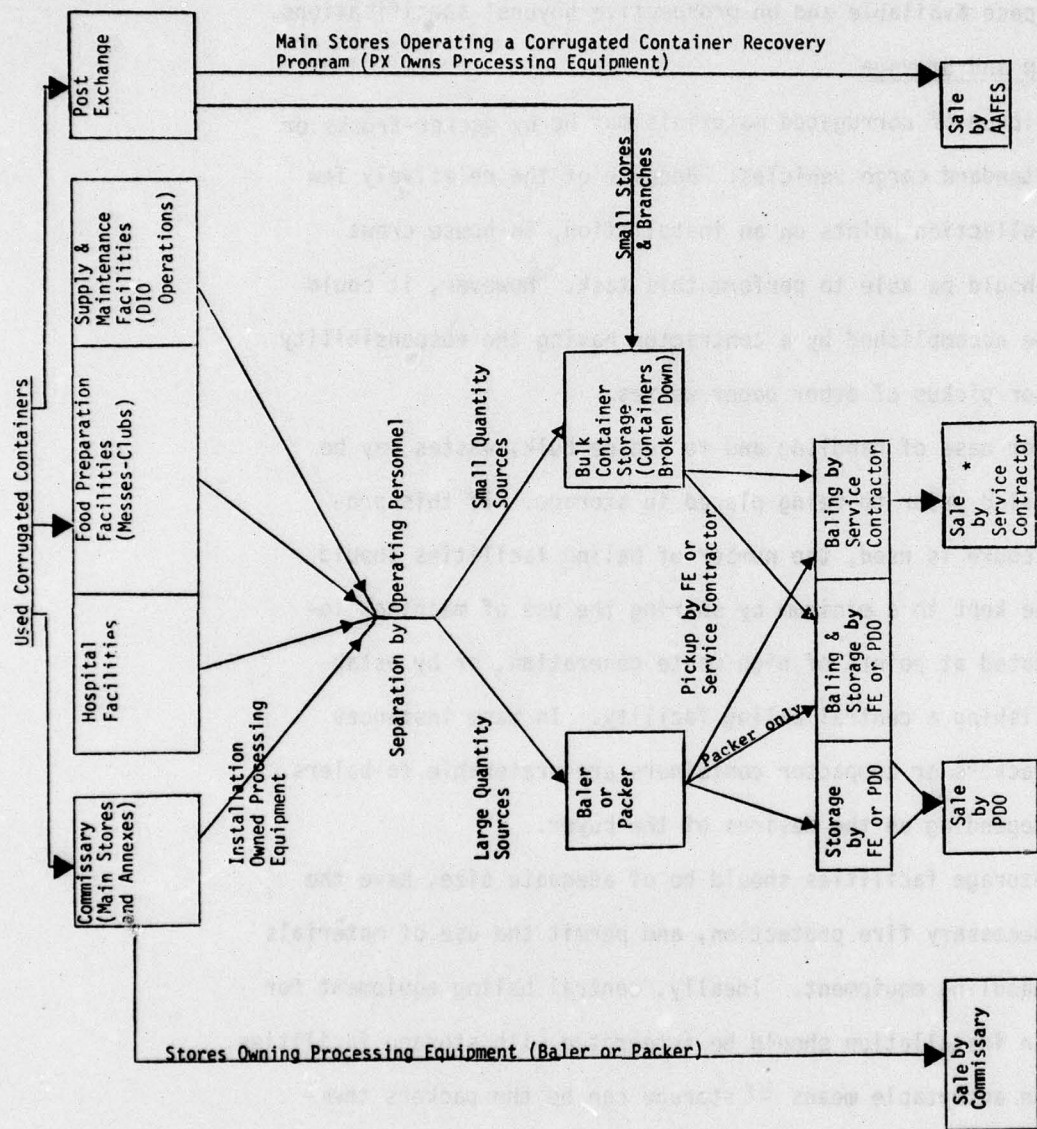
C. Corrugated Containers

1. Definition

Corrugated boxes are composed of an inner fluting and one or two outer liners of paper material. Saleable boxes exclude those having wax or plastic coatings. Further, they should not have been contaminated by leaking oil, chemicals or blood (e.g., meat containers).

2. Separation and Collection

- a. Designated employees working in an activity that generates waste corrugated containers (see Figure V-3) should be made responsible for segregating saleable wastes and placing them in specified conveniently located containers.
- b. At low to medium generation points, where packing or baling equipment would not be cost effective, boxes should be broken down before they are placed in containers (weather-resistant if located outside the building).
- c. Transportable packers or stationary balers should be considered for points of high generation, such as commissaries, messhalls and large hospitals. The



\*When pickup service is provided by contract, the cost of regular collection would be reduced by an amount based on the market value of the corrugated container.

Figure V-3: Installation Corrugated Container Separation

choice of equipment should be based on the amount of space available and on prospective buyers' specifications.

3. Pickup and Storage

- a. Pickup of corrugated materials may be by packer-trucks or standard cargo vehicles. Because of the relatively few collection points on an installation, in-house crews should be able to perform this task. However, it could be accomplished by a contractor having the responsibility for pickup of other paper wastes.
- b. For ease of handling and to reduce bulk, wastes may be baled prior to being placed in storage. If this procedure is used, the number of baling facilities should be kept to a minimum by sharing the use of machines located at points of high waste generation, or by establishing a central baling facility. In many instances packers or compactor containers are preferable to balers, depending on the desires of the buyer.
- c. Storage facilities should be of adequate size, have the necessary fire protection, and permit the use of materials handling equipment. Ideally, central baling equipment for an installation should be integrated with storage facilities. An acceptable means of storage can be the packers themselves, when arrangements can be made for frequent pickup by the buyer of such materials.

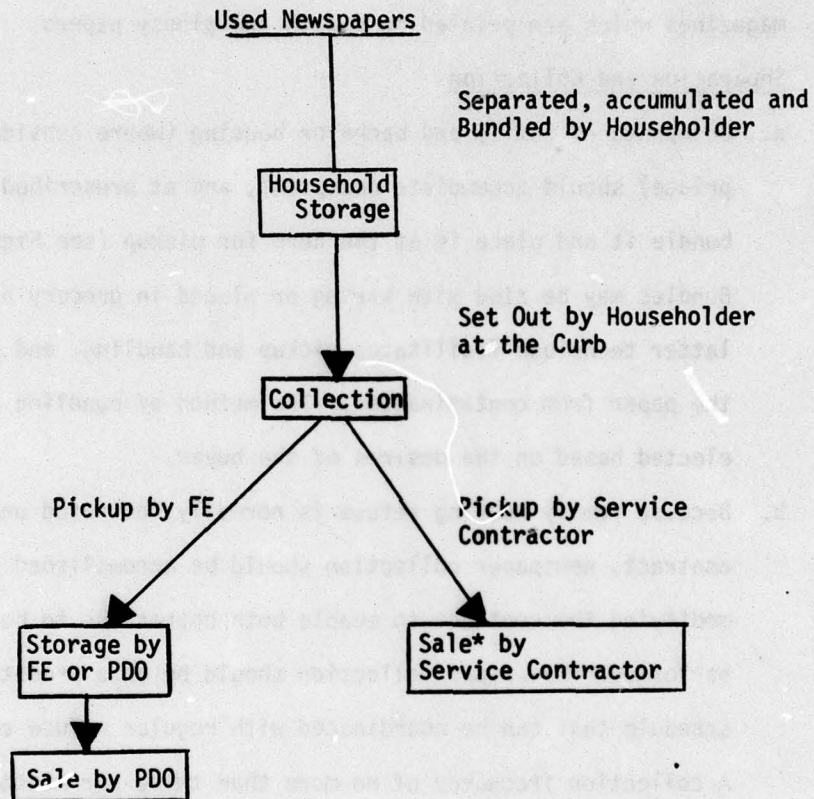
D. Used Newspapers

1. Definition

Newspapers are the variety of documents composed entirely of newsprint. This includes municipal telephone directories and similar documents when covers are removed. Excluded are the majority of magazines which are printed on smooth and glossy papers.

2. Separation and Collection

- a. Occupants of family and bachelor housing (where considered appropriate) should accumulate newsprint, and at prescribed intervals, bundle it and place it at the curb for pickup (see Figure V-4). Bundles may be tied with string or placed in grocery bags. The latter technique facilitates pickup and handling, and protects the paper from contamination. The method of bundling should be elected based on the desires of the buyer.
- b. Because family housing refuse is normally collected under contract, newspaper collection should be accomplished by modifying the contract to enable both operations to be performed. Newspaper collection should be on a predetermined schedule that can be coordinated with regular refuse collection. A collection frequency of no more than twice per month is recommended.
- c. Where the collection contractor is willing to accept the newspaper for recycling, a suitable adjustment in the cost charged for collecting installation refuse could be negotiated. At installations where such an arrangement is not possible, collected newspapers could be picked up by the FE, and stored in large bins or containers pending sale. Baling bundled newspapers is difficult and



\*When pickup service is provided by contract. Cost of regular refuse collection would be reduced by an amount based on the market value of the paper.

Figure V-4: Installation Newspaper Separation

time consuming and should not be done unless desired by potential buyers.

E. Residential Materials (Source Separation Recommended, but not required by the Guideline)

1. Definition

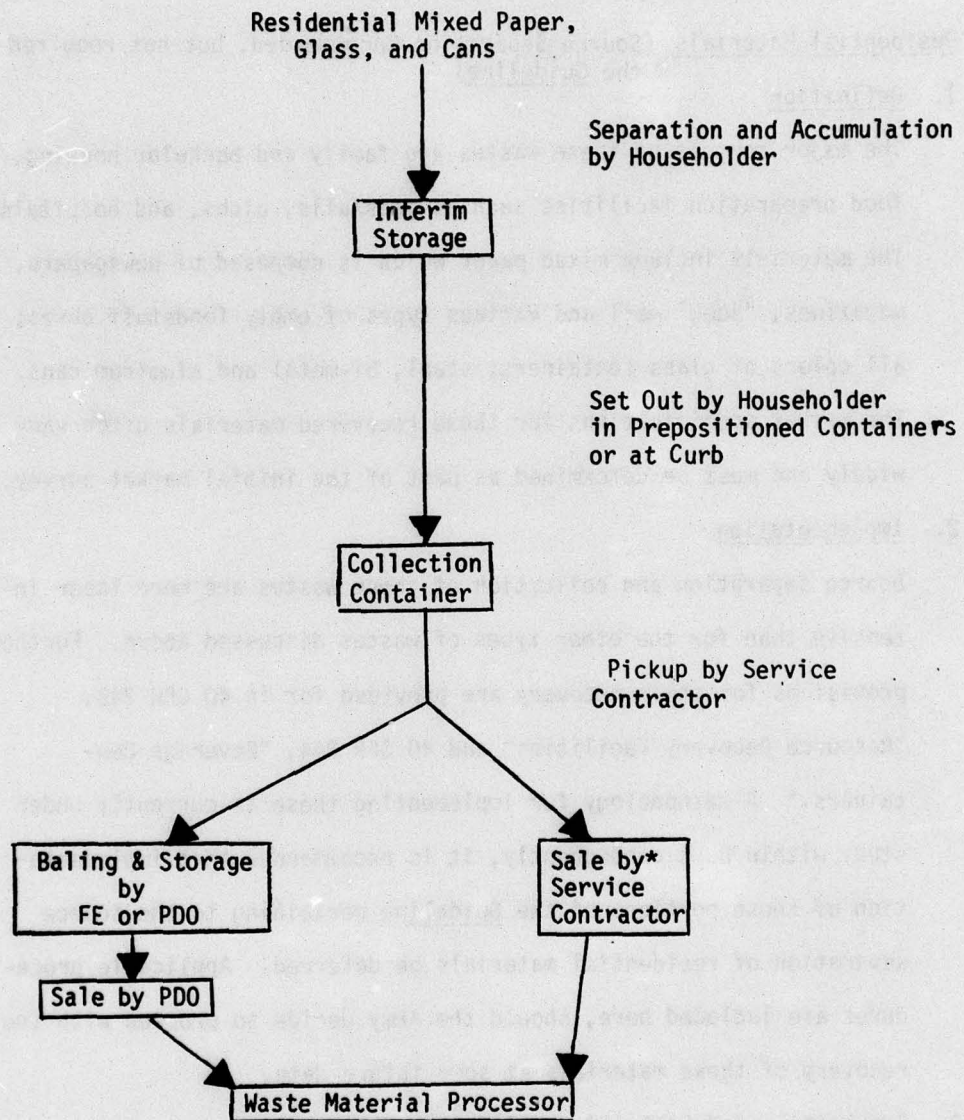
The major sources of these wastes are family and bachelor housing, food preparation facilities such as messhalls, clubs, and hospitals. The materials include mixed paper which is composed of newspapers, magazines, "junk" mail and various types of empty foodstuff boxes; all colors of glass containers; steel, bi-metal and aluminum cans. The market specifications for these recovered materials often vary widely and must be determined as part of the initial market survey.

2. Implementation

Source separation and collection of these wastes are more labor intensive than for the other types of wastes discussed above. Further, provisions for their recovery are provided for in 40 CFR 245, "Resource Recovery Facilities" and 40 CFR 244, "Beverage Containers." A methodology for implementing these is currently under study within DoD; consequently, it is recommended that implementation of those portions of the Guideline pertaining to the source separation of residential materials be deferred. Applicable procedures are included here, should the Army decide to proceed with the recovery of these materials at some future date.

3. Segregation and Collection. (Figure V-5)

- a. Residents should separate clean mixed paper and metal and glass food/beverage containers and place them in a storage receptacle. The flattening of metal cans would be by individual choice. In installations having less than 2500 family housing units,

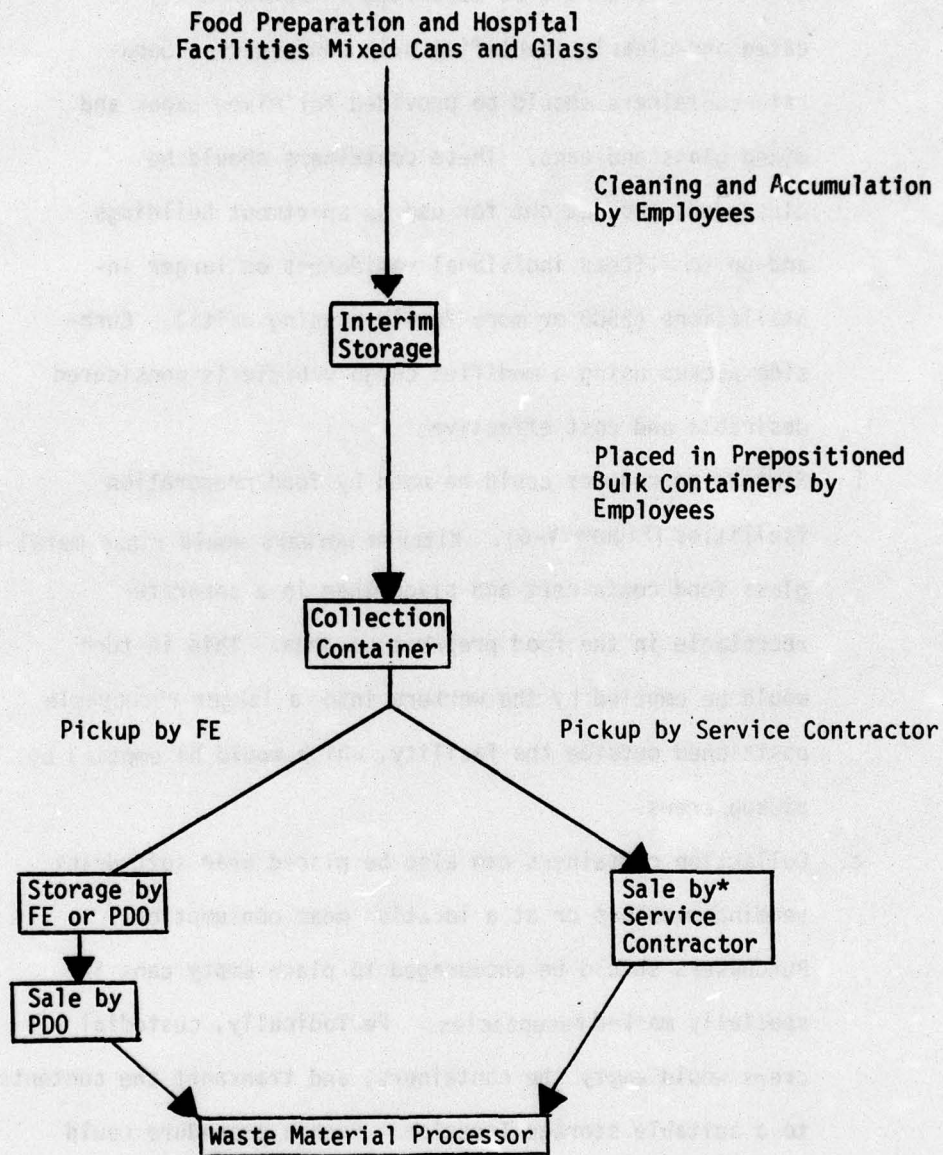


\* Total contract pickup service is the preferred procedure. Cost of regular refuse collection would be reduced by an amount based on the market value of the materials.

Figure V-5: Installation Residential Materials Separation (Housing)

accumulations should be deposited in conveniently located and clearly identified bulk containers. Separate containers should be provided for mixed paper and mixed glass and cans. These containers should be clustered, and set out for use by apartment buildings and up to fifteen individual residences on larger installations (2500 or more family housing units). Curb-side pickup using a modified cargo vehicle is considered desirable and cost effective.

- b. Similar procedures could be used by food preparation facilities (Figure V-6). Kitchen workers would rinse metal and glass food containers and place them in a separate receptacle in the food preparation area. This in turn would be emptied by the workers into a larger receptacle positioned outside the facility, which would be emptied by pickup crews.
- c. Collection containers can also be placed near soft drink vending machines or at a location near consumption. Purchasers should be encouraged to place empty cans in specially marked receptacles. Periodically, custodial crews would empty the containers, and transport the contents to a suitable storage location. Such a procedure could work effectively for military school facilities, field training sites and most of the modern barracks.



\* Total contract pickup service is the preferred procedure. Cost of regular refuse collection would be reduced by an amount based on market value of the materials.

Figure V-6: Installation Residential Materials Separation  
(Food Preparation and Hospital Facilities)

#### 4. Pickup and Storage

- a. Pickup of collected materials should be integrated into the regular installation refuse pickup schedule. Conventional cargo trucks that have been compartmentalized to keep the materials separated could be used for this purpose.
- b. Installations wishing to support on-post civic organizations such as the Scouts, PTA, Women's Club, could permit them to pick up a portion of these materials for independent disposal through sale on the private market. By limiting their operations to specific areas and requiring reliable performance, little interference with installation pickup efforts should be experienced.
- c. Open storage of cans and glass is acceptable, and sufficient space for this purpose should be available within the PDO facility.

#### F. Sale of Recovered Materials

1. The sale of paper and residential material wastes is primarily the responsibility of the PDO servicing an installation. Three- to five-year sales contracts are preferable both to the purchasing contractor as well as the Army (and the PDO), since they insure a steady flow of material for the contractor and a constant market for the Army and the PDO. In contrast, single-lot sale procedures, typically employed by DSA to dispose of scrap materials, are inappropriate as they fail to provide for a continuous market.
2. The services of the PDO are not used when an installation contracts for total source separation services. In such instances, the con-

tractor is required to dispose of recovered materials for recycling purposes only. This procedure should be employed when it is advantageous to the Government. Contracts for such service should provide monetary credit for the amount of material collected and sold by the contractor, based on some acceptable minimum quantity of waste generated by the installation per month and the market price for these materials during the generating period. Again, long-term (three to five year) sales contracts are preferable, and should be sought by the managing activity.

**G. Financial Management**

1. Proceeds from the sale of recovered materials, less the amount the DPDS deducts for expenses, are to be deposited to an account established for the managing activity at the installation.
2. Net proceeds from the sale of solid waste materials shall be used to reimburse the following expenses incurred in operating solid waste resource recovery programs (see Appendix D):
  - a. The acquisition of replacement equipment for recycling purposes.
  - b. The identification of containers and container stands for proper segregation of solid waste material.
  - c. The collection of waste materials from the containers.
  - d. The separating, baling, compacting, shredding, pulping, or otherwise altering the size, shape or form of the waste materials.
  - e. The transfer of marketable items to the accountability of the PDO. Transfer of physical custody is not required;

such property shall be moved only when it is most economical and effective to do so.

f. The installation-level administration and support of the above functions by the managing activity.

3. Elements of expense as charged to all activities by the installation-level accounting system are included, but military personnel expense may not be reimbursed from the net proceeds. Any net proceeds after expenses and replacement equipment costs have been reimbursed may be made available by the managing activity to finance special projects for environmental improvement and energy conservation. The amount of such financing for such projects shall not exceed \$50,000 per installation per year. Should any balance be left in the designated account after the environmental and energy conservation projects are financed, it will be transferred to Budget Account 97-F 3860.5191, "Proceeds from the Sale of Scrap, Salvage, or Surplus Materials, Defense Supply Agency."
4. Solid waste material recycling expenses that are not offset from net proceeds are eligible for reimbursement from any net proceeds remaining in Budget Clearing Account 97-F 3860.5191, after reimbursement of all other categories of disposal expense.

H. Management

Representatives from those offices and activities on the installations that have relatively large numbers of personnel or whose activities would be noticeably affected by the source separation procedures should be part of a planning and implementation team for the source separation program. Project team members would include representatives from the Directorate of Facilities Engineering, Directorate of Industrial Operations,

Directorate of Personnel Operations, Family Housing Office, Information Officer, Commissary Office, Post Exchange, and Property Disposal Office. A single program monitor should be designated as the central point of contact for performance data collection, reporting requirements, construction monitoring, contract revision initiations, and overall performance monitoring. Additionally, monitors should be designated throughout the installation to ensure that proper source separation takes place. Close coordination between the FE, PDO, Family Housing Office, Information Officer, and contractors will especially be required after the program becomes operational.

I. Public Information/Education

A public information and education program should be coordinated with the Information Officer (IO) at the installation. The IO should provide the necessary tools for effectively communicating the installation's source separation program. Close coordination between the IO and FE will be necessary to accomplish this.

J. Reports

A series of reports are prescribed by the Guideline which must be prepared by the Army and submitted in accordance with the DoD Directive 4165.60. The format and content of these reports are provided in Appendix C (Reporting Format). The following tabulation (Table V-2) summarizes these requirements and the submission schedule.

Table V-2

Summary of Required Reports\*

<u>Report</u>	<u>Submission Date</u>	<u>Remarks</u>
Program Initiation Report Implementation Report Non-Compliance Report	24 May 1977 24 May 1977	Forward to ASD (I&L) RCS DD-I&L (A&AR) 1435
Non-Compliance Report (Triennial Submission)	24 May 1980, 1983, etc.	Submitted every three years to ASD (I&L) RCS DD-I&L (A&AR) 1435
Annual Report to EPA	30 Nov 1977 (Initial Report)	Forward to ASD (I&L) RCS DD-I&L (A&AR) 1435
Annual Report to Congress (Section 612 PL 93-552)	30 Nov 1977 (Initial Report)	RCS-DD-I&L (A&AR) 1436 Copy to ASD (I&L) Information as of end of fiscal year
Construction Requirements in Support of Solid Waste Management	Semi-annually as prescribed by Chapter 10, AR 200-1	Forward to ASD (I&L) RCS DD-I&L (SA) 1383

\* Detailed instructions on the preparation and submission of these reports will be provided by HQ DA.

## VI. IMPLEMENTATION PLAN

Each DA installation will be required to assess the applicability of source separation procedures for its own facilities. On the surface, the integration of source separation techniques into the normal spectrum of activities conducted on an Army installation may appear to be relatively uncomplicated. However, because of the wide range of activities and missions, physical distribution of buildings on an installation, dispersion of staff offices, and diversity of family housing that must be considered in instituting a source separation program, careful and detailed planning is required.

To accomplish this planning, it is appropriate to establish an ad hoc project team office to assist in: obtaining data, developing and coordinating operational procedures, and implementing the plan.

Following is a discussion of the necessary planning steps that should be undertaken to properly implement a source separation program. A graphic representation of the steps involved, with an approximate time schedule, is shown in Figure VI-1.

### A. Initial Wastepaper Recovery Estimates

The first step for the installation is to estimate the approximate tonnages of each of the three types of wastepaper that could potentially be recovered through source separation. This can be accomplished in short order by applying the information presented in Figure VI-2. The order-of-magnitude approximations derived from the information in Figure VI-2 should be relayed to the PDO to enable DPDS/DDP to identify a potential market value for the recovered materials.

### B. Identification of Potential Markets

The PDO will take the above tonnage estimates and, in conjunction with DPDS, determine and advise the installation of potential markets and market values for the three types of wastepaper. This step should not be time-consuming,

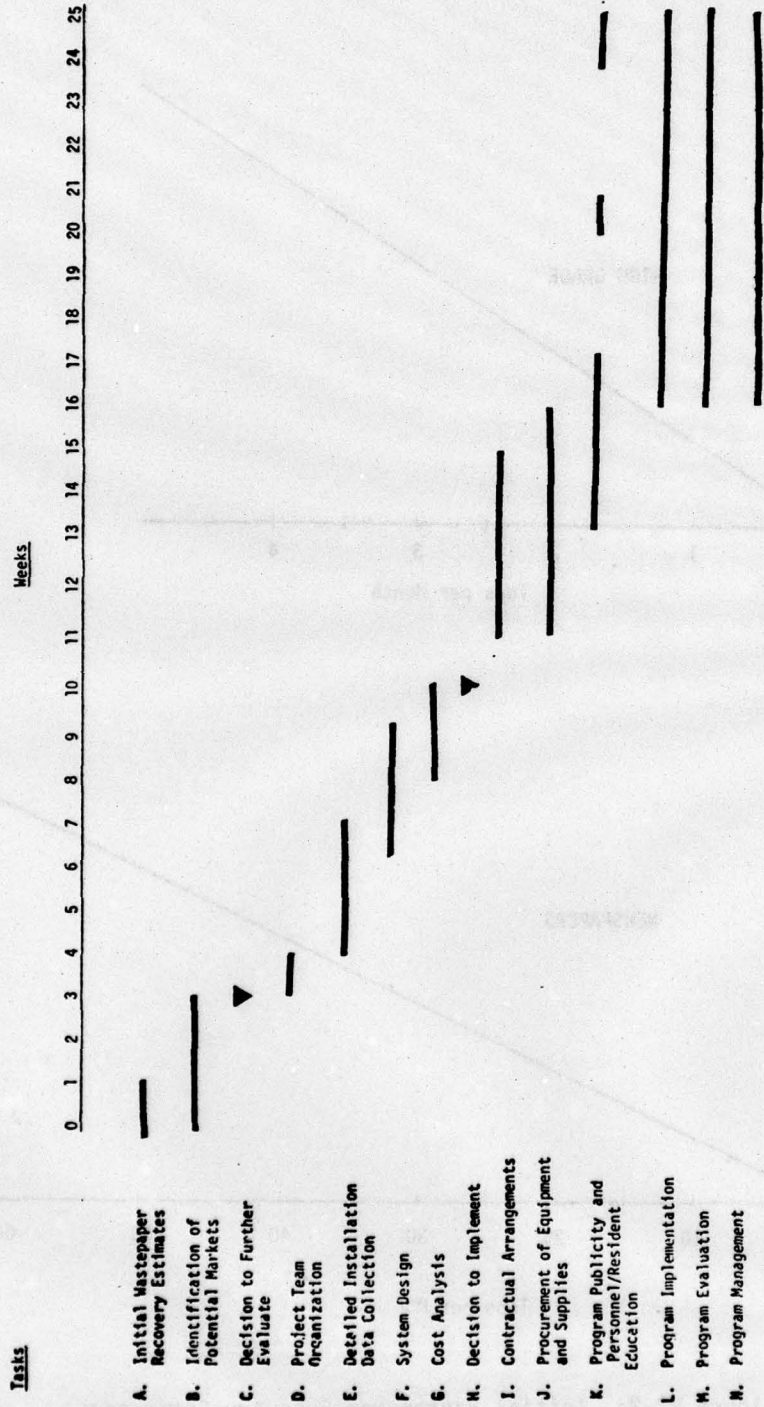


Figure VI-1: DA Installation Source Separation Implementation Plan

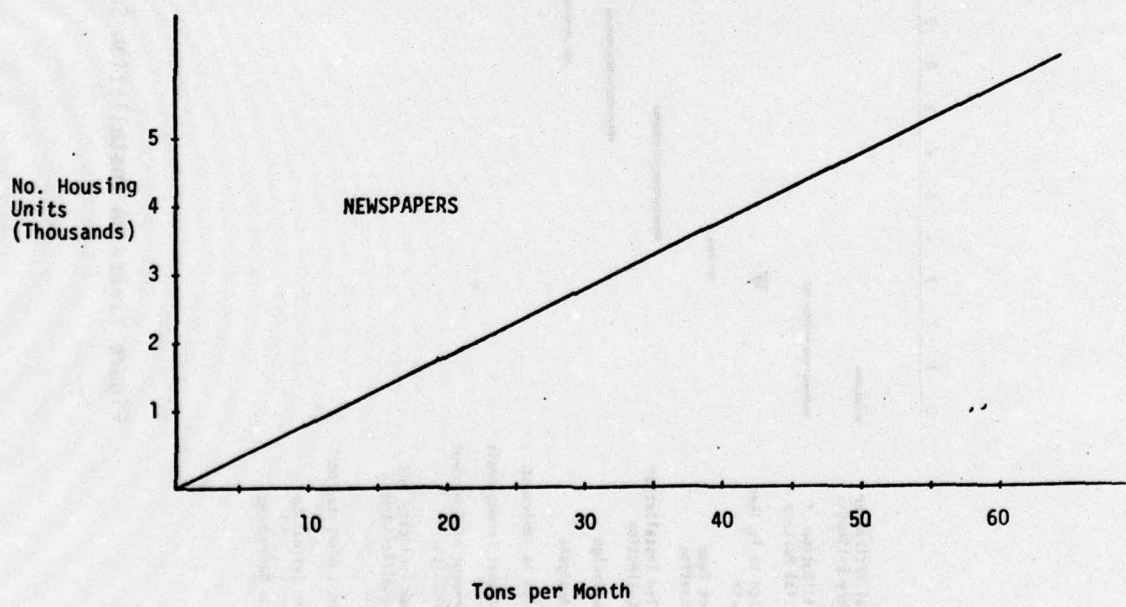
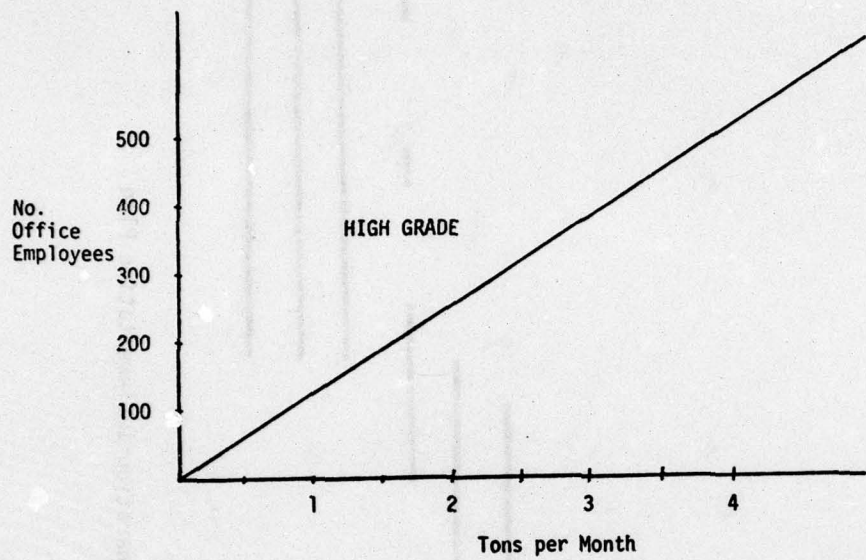


Figure VI-2: Initial Wastepaper Recovery Estimates

CORRUGATED:

Add the following:

- (10.7 x no. employees in retail facilities\*)
- ( 0.4 x \$ weekly Commissary sales\*)
- (116 x no. warehouse employees)
- (10 x no. personnel regularly serviced at mess halls)

(Divide total by 2,000 to obtain approximate no.  
tons of recoverable corrugated per month)

TAB CARDS\*\*:

(No. boxes consumed monthly) x (#/box) x .70 =  
# recoverable tab cards per month

COMPUTER PRINTOUT\*\*:

(same formula as above)

- 
- \* At applicable facilities only (i.e., those whose separated corrugated boxes would be handled by the installation rather than be sold by AAFES or Commissary).
  - \*\* Consumption quantities obtainable from Management Information Systems Office or Supporting Computer center.

Figure VI-2 (cont.)

as DPDS, in its ongoing nationwide market research effort, should already have obtained at least initial information on wastepaper markets in the installation's area. In addition to the usual wastepaper and scrap dealers, DPDS should be looking at a less obvious market: paper manufacturing companies which will purchase the paper directly and may even provide program implementation services.

C. Decision to Further Evaluate

If adequate markets are identified by DPDS/PDO, the decision should then be made by the Project Team to go ahead with further data collection and analysis, described below. The lack of markets could preclude the possibility of source separation, since the Guideline allows for non-implementation in cases of either a documentable lack of markets or prohibitive implementation costs.

D. Project Team Organization

The Project Team should be composed of representatives from those offices and activities on the installation that have relatively large numbers of personnel, or whose activities would be noticeably affected by instituting source separation procedures. Representatives from the following installation headquarters and support activities should be considered when forming the project team:

- Directorate of Facilities Engineering
- Directorate of Industrial Operations
- Directorate of Personnel and Community Affairs
- Family Housing Office
- Information Officer
- Commissary Office
- Post Exchange
- Property Disposal Office

Because of his/her responsibility for environmental protection matters and for refuse collection and disposal, the FE could be designated as project

team leader. The FE would be primarily responsible for managing source separation operations once the source separation program has been implemented.

#### E. Detailed Installation Data Collection

A variety of installation data is required as a basis for more accurately determining the amount of recoverable wastes, as well as points of generation, storage requirements, and pickup schedules. These data can ultimately be integrated into a comprehensive implementation plan. Specifically, the data that must be gathered include:

- Installation Activities Survey - identify by building, the number of occupants, principal types of activities, storage capacities, and types of paper wastes generated. Figure VI-2 shows a format for this data collection.
- Recoverable Waste Estimate - calculate the amount of recoverable waste using factors for each type of activity (family housing, administrative, warehousing facilities etc.).
- Survey of Locally Available Resource Recovery Capabilities - identify those local publicly or privately operated resource recovery activities or companies with which the installation could participate to recover waste materials.
- Equipment and Personnel Resources Inventory - inventory currently available supplies equipment, storage site availability, and personnel assets that could be used in developing the implementation plan.
- Refuse Collection and Disposal Cost Records - obtain, from the most recent operating records, the amount of refuse collected and disposed of, and the costs of these operations. This data is required for a cost comparison of waste management operations before and after source separation.

For the installation activities survey, the data collection forms in Figure VI-3 (buildings) and Figure VI-4 (family housing) can be used. Some of the required data may be available from existing records; however, it is expected that on-site visits will also be necessary.

Calculations of the amount of recoverable waste are dependent on data collected in the above survey. The steps involved are identified in Figures

Building Number	Building Activity Monitor	Number Occupants Office Other	Type* Activity	Significant Types of Waste (mark with "x" as appropriate) Hi-Grade Computer Corrugated Newspaper	Estimate** Total Waste Generated (yd <sup>3</sup> /wk)	Waste Collection Equipment (list)	Waste Pickup point (describe)	Availabl <sup>e</sup> Bldg Storage (Size/Capacity)

\*Indicate Principal Activity  
 e.g. Administrative Warehouse  
 Hospital Educational  
 Retail Food Service  
 Maintenance Commissary

\*\*Visual Inspection, custodial  
 crew Judgement or FE Records

Figure VI-3: Building Data Collection Form

Subdivision or Area Designation	Type Housing Units (single, duplex, apt.)	Number Housing Units Subdivision area	Type Refuse Storage Containers (30 gal., 25 cu ft., etc.)	Newspapers* Avg. Ht. per week	Remarks

\*May be calculated by determining the number of subscribers from the newspaper circulation office, distributor or delivery person. Weight should be obtained by weighing an accumulated weekly sample.

Figure VI-4: Family Housing/BOQ Data Collection Form

VI-5, 6 and 7. Most of the factors required in these calculations have been derived from a limited number of studies of Army installations wastes. Consequently, they should be used with the caution that if local data has been developed by the installation concerned, modification of these factors is appropriate. The calculation factors of waste composition, recovery rate and total waste generation have been calculated for the primary DA activities, as shown in Table VI-1.

F. Source Separation System Design

Based on the information identified above, a plan should be developed for each installation, to make the best use of available markets, personnel resources, equipment and storage space. The plan should include the necessary detail relating to program management, operating procedures, collection routes and scheduling, equipment requirements, procurement of contract services, proposed sales contracts, and information on education of personnel.

G. Cost Analysis

Based on the design of the source separation system, a comprehensive cost analysis should be performed for solid waste management after the planning stage and prior to the implementation of the source separation system. Estimates will have to be made for this analysis, including the effectiveness of the overall source separation program, proceeds from the sale of the recovered products, and the potential cost savings from disposal attributable to source separation. This cost analysis will be the basis for deciding whether or not the source separation program should be implemented at the installation. If full-service contracts are chosen to accomplish particular source separation requirements, the receipt of bids will indicate whether they provide a savings to the installation. In order for this analysis to be meaningful, reasonable

Activity Evaluated  
(Select One)

Office Facilities	Warehouse Facilities	Commissary Facilities	Hospital Facilities
Educational Facilities	Retail Facilities	Food Service Facilities	Maintenance Facilities

1. Waste Generated

$$\text{Total Generation Factor (See Table VI-1)} \times \left( \begin{array}{l} \text{No. Employees} \\ \text{No. Beds} \\ \text{Sales Volume} \end{array} \right) = \text{Total} \quad \#/\text{day wk}^*$$

2. Waste Component (High-grade/corrugated)

$$\text{Total Waste (} \quad \#/\text{day wk)} \times \text{Composition Factor (See Table VI-1)} = \text{Total} \quad \#/\text{day wk}$$

3. Recoverable Material

$$\text{Waste Component Total (} \quad \#/\text{day wk)} \times \text{Recovery Factor (See Table VI-1)} = \text{Total} \quad \#/\text{day wk}$$

4. Conversion

$$\text{Total Recoverable Material (} \quad \#/\text{day wk)} \times 30 \text{ or } 4 \div 2000 = \text{Total} \quad \text{tons/Mo.}$$

\*Per day or week, whichever unit the particular generation factor (e.g. for Office, Commissary, etc.) is shown with in Table VI-1.

Figure VI-5: Calculation Form (High-Grade Paper/Corrugated Paper)



1. Family Housing Waste Generated

$$\text{No. Residents ( )} \times \text{Total Generation Factor (3.23 \#/person/day)} = \text{Total \# /day}$$

$$\text{No. Housing Units} \times 3.2 \text{ (Average Family size)} \times 3.23 = \text{Total \# /day}$$

2. Newspaper Fraction

$$\text{Total Waste ( )} \times \text{Newspaper Component (0.12 )} \times \text{Recovery Factor (0.7)} = \text{Total \# /day}$$

3. Conversion

$$\text{Total Newspaper ( \# /day)} \times 30 \div 2000 = \text{Total \# /month}$$

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4. Verification

$$\text{No. Newspaper Subscriptions ( )} \times \text{Weight of Papers ( \# /wk)} =$$

$$\text{No. Installation Newspapers ( )} \times \text{Distribution ( \# /wk)} =$$

$$\text{Total \# /month} \div 2000 =$$

$$\text{ \# /month} = \text{ \# /month}$$

Figure VI-7: Calculation Form (Newspapers)

Table VI-1  
Calculation Factors of Waste Generation

Activity	Total Waste Generation Factor	High-Grade Paper		Corrugated Containers	
		Composition Factor	Recovery Rate Factor**	Composition Factor*	Recovery Rate Factor**
Office Facilities	1.68 #/day/employee	.42	0.7	.16	Negligible
Warehouse Facilities	11.8 #/day/employee	.28	0.7	.46	0.7
Maintenance Facilities	6.51 #/day/employee	.17	Negligible	.23	Negligible
Food Service Facilities	1.0 #/meal served	.21	Negligible	.22	0.5
Commissary Facilities	0.18 #/wk/weekly \$ sales	.09	Negligible	.68	0.8
Retail Facilities	4.3 #/day/employee	.12	Negligible	.51	0.7
Hospital Facilities	6.0 #/day/bed	***	0.7	***	0.7
Educational Facilities	0.83 #/day/staff member	***	0.7	***	Negligible

\* Fraction of total waste generated.

\*\* Portion of particular segment of waste stream that is normally recoverable.

\*\*\* Reliable factors not currently available. Local estimates should be made/used.

Contributing Factors	Prior to Separation	After Separation
I. Waste Generation		
A. Estimated Total (Mixed) Tonnage		
B. Estimated Recyclable Tonnage		
II. Costs (\$/month)		
A. Collection Labor		
B. Collection Equipment		
C. Storage		
D. Administration		
E. Disposal		
F. Total		
III. Revenue		
IV. Net Solid Waste Management Costs		
V. Potential Savings		

Figure VI-8: Cost Analysis Format (Source Separation Program)

estimates of costs related to collection and pickup requirements, processing and storage requirements, contractual services, in-house services, and employee education programs will be required.

Figure VI-8 provides a format to determine the cost for the source separation. It should be recognized that a cost analysis should be performed for each source-separated product. (EPA guidance in this regard is forthcoming, in addition to that provided in the reporting format set forth as Appendix C of this report.)

#### H. Decision to Implement

At this point it will be possible to determine whether or not implementation of all or part of the source separation program should proceed. The Guideline allows non-compliance for two reasons:

- 1) *lack of market for separated materials, and*
- 2) *costs of implementation so high as to render source separation economically unfeasible.*

After it has been determined to proceed with implementation, appropriate reports should be completed and forwarded through command channels to DA. The various elements of the plan should be finalized and coordinated with participating activities and agencies to ensure success. A program implementation schedule should be formulated to include the following steps: drawing up the appropriate contracts, procuring the necessary supplies and equipment, and formulating an education and publicity program for all personnel on the installation. Each of these steps is discussed below.

#### I. Contractual Arrangements

The contracting process should begin as soon as possible. First of all, the Project Team must provide DPDS/PDO with all the necessary information to determine and let the appropriate sales or sales/service contracts. This informa-

tion includes the refined tonnage estimates for the different recovered materials, and all service desires and preferences. Close coordination between the Project Team and DPDS/PDO is necessary in order to identify which of the following marketing opportunities is available for each type of wastepaper:

- Market obtained by means of modifying contractual specifications of present custodial services and/or waste disposal contracts.
- Market obtained via new arrangement for a full-service source separation program.
- Market obtained whereby portions of the program are performed in-house, while other portions are under a contractual service arrangement.
- Market obtained for long-term (three-to five-year) sale of different grades of already-separated paper.

While DPDS is drawing up and advertising the invitations for bids (IFB's), evaluating the bids received, and letting the contract(s) - a process which should be expected to take about one month - the FE can save time by concurrently arranging for any changes that might be required in current custodial or pickup service contracts.

J. Procurement of Equipment and Supplies

Procurement of necessary supplies and equipment (e.g., desk-top paper holders, cardboard collection containers, etc.) can also be begun concurrently with the bidding process and the other contractual arrangements. These purchases should be made with regular operating funds, although subsequent defrayal is possible from the special account in which paper sale receipts from DPDS will be deposited.

K. Program Publicity and Personnel/Resident Education

Program publicity and employee/resident education should begin approximately three weeks prior to the start of the program and carry into the first week

of the program. This should include a kick-off memo or letter to all office employees and residents, and a slide presentation or film for office employees. Newspaper articles, posters, door-knob hangers, fliers, utility bill inserts, presentations and discussions at volunteer group (PTA, Scouts, etc.) meetings, and other devices may also prove useful in this respect.

Once the program has started, ongoing publicity is necessary throughout its duration. The results of the program (recovery rates, proceeds, etc.) should be periodically communicated to installation personnel and residents to ensure their continued interest and commitment, a key to the program's success.

L. Program Implementation

On a scheduled, pre-publicized date, the program should begin simultaneously all around the installation. On this day old habits are discarded and new habits begin formation for all participating personnel and residents.

M. Program Evaluation and Reporting

During the start-up period in particular, there will be numerous quirks to be ironed out in the system. Therefore, a central contact for installation personnel and residents should be provided to answer any questions and resolve problems. In addition, the quality of the separated products should be monitored on a building and residential area basis during this first phase of operation. Appropriate publicizing of any operational problems found on the first day of the program and their solutions will provide good public relations and instruction. Also, there are bound to be some problems in collecting and handling the separated wastes at the beginning of the program. Patient, prompt follow-through on reported problems will lessen future occurrences. After the program has been in operation for three months, data should be gathered to evaluate the effectiveness

of the source separation program. Records should be kept on the quantities of materials recovered and value received to determine overall program effectiveness. This information must be reported annually to OSD. Participating residents and workers should be encouraged to suggest improvements for the program. Problems commonly raised should be investigated and resolved. Responsiveness in this regard will illustrate the installation's commitment to a successful program, and will help to reinforce positive attitudes toward program participation.

N. Program Management

Throughout the program, it will be necessary to have a single program monitor for installation residents, employees and contractors to report any problems that arise. This same monitor should also collect performance data, compile necessary reports, monitor contractor performance and initiate contract revisions when needed. In addition, activity monitors should be established throughout the installation to ensure continuing source separation, and to assist the installation program monitor as needed. Further, coordination must continue among key participants (FE, PDO, any service contractors, and Family Housing Office) to ensure that the momentum of the program is maintained.

## VII. RECOMMENDATIONS FOR COMPLIANCE WITH THE GUIDELINE

This chapter contains recommendations on how the DA can most effectively and readily comply with the provisions of the Guideline. Presented are suggested policies for overall program guidance, training requirements, and basic procedures for conducting source separation, collection, pickup and storage of saleable waste materials.

### A. Program Management

To implement the Guideline, DA Headquarters must publish guidance and instructions to its major commands. This may be accomplished by the publication of AR 200-1, "Environmental Protection and Enhancement," Chapter 5 (Solid Waste Management); and the revision of AR 420-47, "Refuse Collection and Disposal." With regard to the recovery portion, an appropriate objective should be stated that is consistent with the Solid Waste Disposal Act, EO 11752, and DoD Directive 4165.60. The DoD Directive states such an objective:

"Dispose of unserviceable, excess and salvable material through property disposal channels or by some other means that would enable these resources to be reused, recovered or recycled or used for productive purposes."

The chapter should also contain policy statements consistent with those enunciated in DoD Directive 4165.60. Statements that can be used for this purpose are as follows:

1. Source separation and recovery of paper wastes will be performed at Army owned and/or operated installations or facilities located in the United States in accordance with the following minimum criteria, unless specifically exempted by DA:

- a. High grade paper wastes generated in office facilities of over 100 workers.
  - b. Corrugated cardboard at installations or facilities generating 10 or more tons per month.
  - c. Newspapers at installations where more than 500 families reside.
2. Where source separation and recovery of waste material is not mandatory, optional resource recovery programs are encouraged. In these instances, the annual costs to the government must be less when compared to those for normal solid waste collection and disposal.
3. Acceptable alternatives to conducting in-house resource recovery operations include:
- a. Inclusion of recycling provisions in contracts for solid waste material collection/disposal services.
  - b. Utilization of a locally available commercial recycling industry which offers a total resource recovery system.
  - c. Participation in a joint or regional resource recovery program operated by the civilian community as consistent with 40 CFR 245.
  - d. Consumption of paper wastes for energy production in lieu of recycling as consistent with 40 CFR 245 (only if it is not economically feasible to recover paper as fiber).

AR 420-47, "Refuse Collection and Disposal," should be updated to reflect the requirements imposed by the Guideline and the other published EPA regulations on solid waste management. A specific section should be added in the regulation on source separation for materials and resource recovery facilities.

Detailed procedures similar to those presented in Chapter V of this report for resource recovery through source separation, could be published in the Tri-Service Manual. The Department of the Navy has the lead responsibility for this manual, which is currently being prepared.

## B. Training

Formal training courses on Facilities Engineering Management given to Engineer Officers at Fort Belvoir, Virginia, should be amended to incorporate resource recovery subjects, and specifically, the Guideline provisions. At this time, most of the student pamphlets used in these courses are dated January 1973, which predates all Federal regulations on solid waste published by EPA. Consequently, considerable updating of existing school publications is necessary.

While understanding the provisions of the Guideline or the recommendations presented in this study is not difficult, their application by the many Army installations may give rise to a variety of questions and unforeseen problems. In turn, these problems could delay the implementation of a resource recovery program. To preclude this, it appears appropriate to suggest that a short seminar for FE personnel be held subsequent to the publication of DA guidance on this subject. At such a seminar, attendees could be made familiar with DA policies and guidance, given planning assistance and provided with further explanation of source separation procedures and reporting requirements.

## C. Implementation Assistance

In addition to the training assistance as recommended above, the FE should be given a written proposed plan for implementing a source separation program. This plan, with the necessary steps for implementing and carrying out a program, was stated in Chapter VI. Despite the care taken to ensure that it is complete, some unforeseen situations may arise at the installation level, which will necessitate revision/additions to the step-by-step procedure. Consequently, it is recommended that this plan be field-tested

and revised accordingly. One or two test installations could be selected for the field test. Then, under a closely monitored implementation, the designated agency at the installation would plan and implement a source separation/resource recovery program using the guidance provided in this report. The results of this test should be incorporated into an updated version of the implementation plan for all other DA installations to use.

D. Publicity and Education

Proper publicity and personnel education is vital to the successful start and continuance of every office source separation program. Because the optimum source separation techniques will vary little from one situation to another within the military services -- all of which are affected by the Guideline -- a standardized publicity/education plan should be prepared by DoD for distribution to all the services. This plan should include a brief educational film, to be viewed by all participating office personnel, depicting office source separation techniques. Also, a standardized kick-off memo addressed to participating office personnel should be provided by the plan. Posters and bumper stickers, on the other hand, should be obtained in bulk by DA from EPA and distributed to FE's at the installations.

For newspaper source separation publicity, DoD could provide a standard kick-off letter addressed to participating residents as well as door-knob hangers or pamphlets for residential distribution.

E. Procedures

Overseas Installations

While the provisions of the Guideline are not applicable to Federal installations located on foreign soil, or on land outside the jurisdiction of the U. S. Government, this limitation does not appear in the implementing DoD Directive 4165.60. The intent of OSD is that source separation and

other resource recovery activities should be undertaken overseas on a voluntary basis, when markets are available and there is a cost advantage. This policy should be adopted by DA, and specifically stated in both AR 200-1 and the revised AR 420-47.

#### Residential Materials Recovery

The Guideline only "recommends," rather than "requires," the source separation of mixed paper, glass and cans. While there are apparent advantages to the recovery of these materials, a number of factors prompt the recommendation that DA defer publication of implementing procedures at this time. Among the most significant reasons for deferral are the on-going field tests on the source separation of these materials at Fort Bragg, as part of a CERL-sponsored source separation demonstration project, and the pending trial projects at ten DoD installations on implementing a returnable beverage container system as required by 40 CFR 244. For these reasons, it is premature for DA to initiate such a recovery effort simultaneously with the source separation and recovery of paper wastes.

#### Newspaper Collection

Where newspaper collection is required under the provisions of the Guideline and DoD Directive 4165.60, curbside pickup should be required rather than optional. Curbside rather than backyard collection of refuse from family housing is now required, unless it can be proven to be more expensive. However, not all installations have made the change from backyard to curbside as required by Change 18 to AR 210-50. Failure to do so will cause added expense in conducting newspaper recovery operations. Command action to remedy this situation is considered appropriate.

Newspaper collection should occur not more than once every two weeks.

#### Corrugated Container Recovery

On an installation, there are normally few low-generation points of corrugated material. Consequently, engaging a separate contractor for collection of this type of material is not considered economical. In-house forces and equipment should be used for this purpose where possible.

#### High-Grade Paper Recovery

Contractors should be sought only for pick-up and purchase of the recovered paper. "Full service" options - in which some contractors provide publicity/education assistance and desk-top and office collection containers in addition to pick-up and purchase of the paper - should not be sought. Greater efficiency and fewer contracting and implementation complications for DA as a whole will result from the following procedures:

1. a standardized DoD-wide publicity/education plan;
2. procurement and distribution by DA of posters and bumper stickers from EPA;
3. procurement by the installations of plastic paper holders or desk trays (in-boxes) at modest cost from GSA; and
4. also, installations can avoid an additional implementation expense by making every effort to use empty copy paper boxes as office collection containers, procuring corrugated boxes through GSA only when necessary.

#### Compaction/Baling and Storage Facilities

The availability of these facilities is essential for the implementation of an installation source separation/resource recovery program. Where the servicing PDO cannot provide them, the installation must make the necessary arrangements for baling and/or compaction of corrugated and storage of high-grade paper. High-grade paper does not require either baling or compaction,

and should be stored in loose form in large gaylord storage containers.\* This could be accomplished by arranging for the joint use of existing facilities on the installation, e.g., both the commissary baler and existing buildings could be used for wastepaper storage. As an alternative, consideration should be given to obtaining large-size compaction equipment, which in itself constitutes a form of storage. This equipment could be obtained either by acquisition or through a service contract with a local hauler or wastepaper dealer. Since some paper buyers pay higher prices for compacted corrugated material than for baled corrugated, the selection of equipment should be based, to the extent possible, on the demands of the market.

#### Commissary Waste Materials

Fund accounting procedures are to be instituted when resource recovery programs are initiated under the provisions of DoD Directive 4165.60. To minimize the opportunity for accounting errors, commissaries baling their own corrugated containers should be made responsible for the delivery of these bales to the PDO. Where pickup service is provided to a non-baling commissary, FE would provide this and other refuse service. In return, the FE would receive all the net proceeds from the sale of the corrugated materials as reimbursement for expenses incurred.

#### Post Exchange Waste Materials

For the same reasons as given for Commissaries, the FE should be permitted to receive the net proceeds from the sale of corrugated waste from PX's and branch stores that do not operate their own recovery programs.

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\* Gaylord storage containers are large - approximately 6 x 6 x 4 feet - heavy corrugated containers, which, if situated on a wooden pallet, are easily moveable. These are often supplied by the purchaser for interim storage of wastepaper at the generating facility.

#### Waste Composition Factors

These factors are essential in estimating the amount of each type of waste in the refuse stream. In this study, the only composition data based on weight was that from an AEHA study of wastes at Fort Sam Houston. Additional waste characterization studies are necessary to validate those factors presented in this report.

#### Installation Publicity and Education Program

The Information Officer (IO) at each installation should be given overall responsibility for providing the tools necessary for effective communication of source separation to those parties affected. The IO should make the best use of its in-house capabilities in preparing necessary publicity materials such as posters, newspaper articles, hand-outs, signs, etc. The FE will be required to work closely with the IO in providing the necessary background information so that the materials prepared will be in concert with the intended program. Efforts should be made to draw upon the publicity and educational tools employed by other successful source separation programs. Appendix H contains descriptions of these tools, especially those materials made available through the Government Printing Office.

#### Privacy Act Restraints

Most often, personnel and financial data take the form of computer printouts. The recovery of this paper for recycling purposes could give unauthorized persons access to the now-obsolete information. A determination is needed as to whether collecting and turning over such paper to a buyer without some form of obliteration is a violation of the Privacy Act. If violation is determined, some simple method of converting such records into an acceptable form is needed to permit the recovery of this high-grade paper.

#### Sale of Recovered Materials

The sale of recovered materials is the responsibility of the installation's servicing PDO. However, contracts are prepared by the Regional Office of DPDS. To gain maximum advantage of the market, it is recommended that contracts be prepared to permit the sale of materials received from several installations in the region at the same time. Long-term contracts (three to five years) also tend to improve wastepaper's market value, as paper companies can thereby be assured of a steady flow of materials. Long-term contracts also benefit DA (by providing a stable market) and DPDS (by reducing their administrative load).

#### Source Separation/Resource Recovery Reports

To minimize the workload of installation FE's, simplification of the data reporting required by DoD Directive 4165.60 should be considered. It appears that, by modifying the input format used in the compilation of the Technical Data Report, the number of new and separate reports generated by the installation could be reduced to a minimum.

APPENDIX A

40 CFR 246 -  
SOURCE SEPARATION FOR MATERIALS RECOVERY GUIDELINES

# federal register

FRIDAY, APRIL 23, 1976



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PART I:

## ENVIRONMENTAL PROTECTION AGENCY

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### MATERIALS RECOVERY

Solid Waste Management  
Guidelines for Source Separation

## RULES AND REGULATIONS

On August 14, 1974, "Thermal Processing and Land Disposal of Solid Waste Guidelines" were promulgated in the FEDERAL REGISTER (39 FR 29327) as the first set of guidelines that were promulgated in fulfillment of the requirement for guidelines on disposal systems. On January 15, 1976, "Guidelines for Procurement of Products that Contain Recycled Material" were published in the FEDERAL REGISTER (41 FR 2355). On February 13, 1976, "Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste" were promulgated in the FEDERAL REGISTER (41 FR 6766). Additionally, on November 13, 1975, EPA published "Beverage Container Guidelines" in the FEDERAL REGISTER (40 FR 52967), and on January 15, 1976, published "Guidelines for Resource Recovery Facilities" (41 FR 2359), in proposed form for public comment. The guidelines now being promulgated are intended to meet the Administrator's initial obligation to publish guidelines in the areas of recovery and separation systems. The EPA expressly recognizes that Section 209 mandates that guidelines "shall be revised from time to time" and it intends to revise and supplement these guidelines in the future.

Section 211 of the Act and Executive Order 11752 make the "Requirements" sections of the guidelines mandatory upon Federal agencies. The recommendatory sections of the guidelines present methods and techniques that EPA studies and analyses indicate will be the most effective and economic in carrying out the mandatory requirements. The recommendatory sections, therefore, present desirable actions while allowing for implementation of other source separation techniques in instances in which these recommended methods and techniques are not practicable or economically feasible.

The economic and inflationary impacts of the guidelines have been carefully evaluated. It has been determined that the effects will be minor and that the guidelines are not a "major action" requiring an inflation impact statement as prescribed by Executive Order 11821 and OMB Circular A-107.

### INTRODUCTION

These guidelines are intended to provide requirements and recommended procedures for the establishment and utilization by Federal agencies of source separation systems which will, in an economic manner, conserve resources, reduce waste disposal and produce high value industrial raw materials.

The materials that must be separated for recycling are high-grade office papers (white ledger, computer print-outs, and computer cards), corrugated containers and newspapers. Also recommended, but not required, is the separation of glass, cans, and mixed low-grade papers. The latter materials (glass, cans, and mixed low-grade papers) may also be retrieved through mechanical systems, as discussed in the "Resource Recovery Facili-

ties Guidelines" that were proposed in the FEDERAL REGISTER on January 15, 1976 (pp. 2359-2363).

The systems described in these guidelines have been designed to separate specific materials at the source of generation in order to minimize contamination and to recover high value materials that can be sold for recycling. These materials, if mixed with other elements of the waste stream, would lose their inherent value. Source separation has long been used by government and private industry to retrieve a large variety of materials which would either not be recoverable at all or not be recoverable at their highest economic value if placed with mixed solid waste. The source separation systems recommended in these guidelines have been proven to be effective in numerous private industry and governmental settings in removing large quantities of the specified materials from the waste stream. In addition, the systems described herein, if implemented correctly, could produce a savings to the Federal government at low capital outlay.

### PUBLIC COMMENT

Written comments on the proposed regulations were invited and were received from 90 sources. Of these 90 comments, 28 favored promulgation without modifications, 35 favored promulgation with modifications that would strengthen the guidelines and reduce flexibility, five favored promulgation of the guidelines with modifications that would weaken the requirements placed on agencies, and one opposed promulgation of the guidelines. In addition, 21 comments were received that favored promulgation with minor clarifications and/or procedural changes.

As a result of these written comments and in an effort to clarify the intent of the regulations, certain changes were made. All of the written comments and the Agency's disposition of the comments are on file with the Agency. The major issues raised by the commenters and the Agency's consideration of them are described below.

Twenty-five commenters objected to the exclusion of smaller facilities (those with less than a minimum number of people or minimum quantity of discards) from compliance with the guidelines. The General Services Administration, however, wanted the size limitation raised rather than lowered. The limitations were originally placed in the guidelines in response to the comments received from Federal agencies during the first interagency review period. These comments suggested that mandating paper recovery from all Federal facilities would place an intolerable administrative burden on agencies with hundreds of small (two- or three-person) offices, military bases with ten to fifteen families or commercial facilities that produce a few hundred pounds of corrugated per month.

In response to these comments and in order to maximize the recovery of materials and minimize the administrative

[FRL-517-7]

### PART 246—SOURCE SEPARATION FOR MATERIALS RECOVERY GUIDELINES

On September 17, 1975, notice was published in the FEDERAL REGISTER (40 FR 42985) proposing regulations to establish a new part 246 of Chapter I of Title 40 of the Code of Federal Regulations pursuant to the authority of Section 209 (a) of the Solid Waste Disposal Act of 1965 (Public Law 89-272), as amended by the Resource Recovery Act of 1970 (Public Law 91-512). Section 209 of the amended Act requires the Administrator of the U.S. Environmental Protection Agency (EPA) to "recommend to appropriate agencies and publish in the FEDERAL REGISTER guidelines for solid waste recovery, collection, separation, and disposal systems (including systems for private use). . . . Further, section 211 mandates that Federal agencies "shall insure compliance with the guidelines recommended under section 209 and the purposes of (the Solid Waste Disposal Act) . . . ."

burden, EPA has retained the size limitation requirements of sections 246.200-1, 246.201-1 and 246.202-1, as they were in the proposed document and has added sections 246.200-2, 246.201-2, and 246.202-2 which recommend that recovery systems in conformance with the guidelines be investigated and implemented in facilities of smaller size than those mandated in the Requirement sections.

Numerous comments were received on the issue of burning recoverable paper for energy. While some wanted EPA to prohibit such usage, most wanted clarification as to whether the materials covered by these guidelines must be separated at the source for recycling or whether such materials could be recovered in centralized recovery facilities or burned for energy production.

The Requirement sections of these guidelines state that high-grade paper, newsprint and corrugated shall be source separated and sold for purposes of material recycling. However, there may be circumstances where the source separation and recycling of high-grade paper, corrugated containers, or newspaper is economically impracticable due to inability to sell the recovered materials or costs that are unreasonably high. Under such circumstances, Agencies may choose to recover these materials in centralized recovery facilities or through conversion into energy. The rationale and analysis supporting a decision to choose this form of recovery instead of source separation must be reported to the Administrator.

It is the intent of EPA that agencies carry out to the maximum extent possible both source separation, as outlined in these guidelines, and centralized recovery of materials and energy, as outlined in the "Resource Recovery Facilities Guidelines" which have been proposed by EPA. Following source separation of paper, the remaining wastes should be processed when possible in accordance with the "Resource Recovery Facilities Guidelines." Implementation of both guidelines will result in maximum conservation benefit to the country and economic savings to the government. Additionally, it is desirable and it is the clear intent of Congress that the Federal government take a leadership role in the demonstration of techniques for both the separation of materials at the source and the utilization of resource recovery facilities.

Nineteen comments favored the inclusion of glass and can recovery through separate collection as a requirement rather than as a recommended procedure. It is EPA's responsibility to mandate recovery systems on which data have been developed. Glass and can recovery through recycling centers has been practiced for a number of years and, given favorable, nearby market conditions, can be economically viable. Separate curbside collection systems for these materials are now in the demonstration stage and are currently under investigation by EPA. As data are developed, these guidelines may be modified to reflect the inclusion of glass and can recovery in the Requirement section of

these guidelines. It is expected that Federal agencies with available markets for glass and cans will make every effort to implement the recommendation.

Sixteen commenters requested that reports be published in local newspapers to inform interested citizens of the reasons put forth by agencies for not implementing the guidelines. In addition, one commenter requested the phrase "the Administrator may publish notice of availability of this report" be changed to "must". Section 246.100(g) has been changed in response to these comments and now states, "The Administrator shall publish notice of the availability of this report to the general public in the FEDERAL REGISTER." (The FEDERAL REGISTER is the official organ of the Federal government for the publication of notices of this type.)

One commenter suggested that the quantity of materials to be recovered should be estimated prior to recovery and that this factor should be included in the market study, cost analysis and contract sections of the guidelines. In response to this comment, sections 246.200-3, -8, -9, 246.201-4, -7 and -8, and 246.202-3, -6 and -7 have been altered to include quantity estimations.

Eleven commenters requested that the guidelines be recommended to all contractors and grantees of the Federal government. Although contractors and grantees of the Federal government are certainly free to adopt the recommended practices, Section 209(a) of the Solid Waste Act, as amended, specifically states that the Administrator shall recommend the guidelines to appropriate agencies. It is the judgment of EPA from this passage and from other sections of the Act, that the term "agencies" is meant to refer to a governmental body. This is why the guidelines are recommended to State, interstate, regional, and local governments. The guidelines are mandatory for certain contractors and grantees of the Federal government, as prescribed by Sections 208 and 211 of the Act. However, there is no indication from the Act or the legislative history that the guidelines were intended to be specifically recommended to all Federal grantees and contractors.

Two comments were received that express concern that Federal agencies would use the excuse of budget restrictions to justify non-implementation and requested that EPA specifically define the term "unreasonably high costs." Also, on this point, several Federal agencies requested that EPA specify that programs be implemented only when they are self-supporting.

As provided in section 211 of the Act and section 3(d) of Executive Order 11752, heads of Federal agencies are ultimately responsible for determining which facilities under their jurisdiction shall comply with the guidelines. EPA believes that practices required by the guidelines will be less costly than existing solid waste management practices in the long term. However, the legislative history of the Solid Waste Disposal Act,

as amended, in the portion that is quoted in the next paragraph, indicates that even where implementation of the guidelines results in cost increases, budget restrictions do not constitute a sufficient excuse that would prevent compliance with the guidelines and that Federal agencies have a responsibility to request sufficient appropriations from Congress to manage solid waste properly as part of their normal operating expenses. The legislative history does not provide any guidance as to how much additional cost is acceptable. Consequently, the Federal agencies must make the decision based on a case-by-case analysis of actions required by the guidelines.

In making this decision, agencies are reminded of the legislative history concerning section 211 of the Solid Waste Disposal Act, as amended, which indicates that the Congress intended that Federal agencies take a leadership role in solid waste management, as indicated by the following quote from page 15 of the Senate Report No. 91-1034, Senate Committee on Public Works, 91st Congress, 2d Session (1970).

Federal agencies are inclined to place important environmental quality control functions in a subordinate role to their mission. This is no longer appropriate or acceptable. Federal agencies which generate volumes of waste have a correlative responsibility to request appropriations from Congress necessary to properly manage such waste as part of their normal operating expenses. The public will not tolerate the excuse that budget restrictions prevent compliance with waste management standards and guidelines; it is abundantly clear that the provisions of the environmental control laws do not permit the same excuse to be advanced by individuals or private organizations. Federal agencies must take the lead in overcoming the reluctance to invest funds necessary to control solid waste pollution.

A number of agencies questioned how responsibility for compliance would be handled when the buildings in which they are housed are maintained or controlled by another agency, usually the General Services Administration (GSA). GSA suggested that in these instances it should have the responsibility for determining compliance with the guidelines.

EPA proposes that responsibility for program implementation be shared as follows:

(1) In buildings owned or operated, or both, by GSA, the responsibility for implementing the guidelines would be as follows: GSA would be responsible for overall program coordination, for negotiating for the sale of the separated paper, arranging for collection of the paper from the central office locations and its delivery to the storage space, arranging for the storage space, arranging for the pick-up of the paper by the sales contractor, conducting any required economic analysis, and preparing the reports required by these guidelines. The agency or agencies occupying the building would be responsible for the necessary publicity and for the procurement of desk-top containers and centralized bins or boxes.

## RULES AND REGULATIONS

(2) In buildings leased by GSA, but managed by the tenant agency, and in those buildings owned and managed by an agency other than GSA, that agency would be responsible for guideline compliance. This would include all of the actions listed in paragraph (1) above except negotiating for the sale of the recycled paper, which would be the responsibility of GSA.

(3) In facilities in which the tenant agency has "revolving fund" authority, the agency would be responsible for guideline compliance and would carry out all of the actions listed in paragraph (1), including marketing the recycled paper.

(4) In facilities operated for a Federal agency by a private contractor when the performance of the contract involves the contractor in solid waste disposal activities, the agency would be responsible for assuring that the contractor complies with the guideline. Section 3(b) of EO 11752 states, "Where activities are carried out at Federal facilities acquired by leasing or other Federal agreements, the head of the responsible agency may at his discretion, to the extent permissible under applicable statutes and regulations, require the lessee or permittee to assume full responsibility for complying with standards."

Three agencies questioned whether they would have to conduct market studies for each facility or geographic area. Under the Federal Property and Administrative Services Act—1949, as amended (40 U.S.C. 471), agencies responsible for disposal of excess government property are required to set specifications and request bids for the purchase of various grades of paper specified in the guidelines in accordance with their normal procedures. In the majority of cases, the agency responsible for market studies and sales contract negotiation will be either the General Services Administration or the Defense Supply Agency. It is expected that these agencies will investigate markets and negotiate contracts on a regional basis and that all agencies within a Federal region will be required to do no more than request from GSA or DSA the present revenue level for each grade of paper to be recycled in order to factor this figure into their costs analysis. If no bids are received for a given paper grade, no facility within the geographic region covered by the bid specification will be required to source separate that grade.

While the above is typical of the majority of cases, exceptions do exist. Agencies with revolving fund authority may, if they wish, conduct independent market studies and negotiate separate contracts. Of the ten Federal facilities presently recovering white ledger grade papers in conformance with these guidelines, seven have done so under a sales contract negotiated by GSA, while the remaining three have negotiated separate contracts under a revolving fund authority.

## PROMULGATION

These guidelines are issued under the Authority of Section 209(a) of the Solid

Waste Disposal Act of 1965 (Pub. L. 89-272) as amended by the Resource Recovery Act of 1970 (Pub. L. 91-512).

Chapter I of Title 40 of the Code of Federal Regulations is amended effective May 24, 1976 by adding a new Part 246 reading as follows:

Dated: April 16, 1976.

RUSSELL E. TRAIN,  
Administrator.

## Subpart A—General Provisions

Sec.	Scope.
246.100	Definitions.
246.101	Definitions.
<b>Subpart B—Requirements and Recommended Procedures</b>	
246.200	High-grade paper recovery.
246.200-1	Requirements.
246.200-2	Recommended procedures: high-grade paper recovery from smaller offices.
246.200-3	Recommended procedures: market study.
246.200-4	Recommended procedures: levels of separation.
246.200-5	Recommended procedures: methods of separation and collection.
246.200-6	Recommended procedures: storage.
246.200-7	Recommended procedures: transportation.
246.200-8	Recommended procedures: cost analysis.
246.200-9	Recommended procedures: contracts.
246.200-10	Recommended procedures: public information and education.
246.201	Residential materials recovery.
246.201-1	Requirement.
246.201-2	Recommended procedures: newsprint recovery from smaller residential facilities.
246.201-3	Recommended procedures: glass, cans, and mixed paper separation.
246.201-4	Recommended procedures: market study.
246.201-5	Recommended procedures: methods of separation and collection.
246.201-6	Recommended procedures: transportation to market.
246.201-7	Recommended procedures: cost analysis.
246.201-8	Recommended procedures: contracts.
246.201-9	Recommended procedures: public information and education.
246.202	Corrugated container recovery.
246.202-1	Requirement.
246.202-2	Recommended procedures: corrugated container recovery from smaller commercial facilities.
246.202-3	Recommended procedures: market study.
246.202-4	Recommended procedures: methods of separation and storage.
246.202-5	Recommended procedures: transportation.
246.202-6	Recommended procedures: cost analysis.
246.202-7	Recommended procedures: establishment of purchase contract.
246.203	Reevaluation.
246.203-1	Requirement.

## APPENDIX—RECOMMENDED BIBLIOGRAPHY

AUTHORITY: Sec. 209(a), Pub. L. 89-272, as amended by Pub. L. 91-512.

## Subpart A—General Provisions

## § 246.100 Scope.

(a) These guidelines are applicable to the source separation of residential, commercial, and institutional solid wastes. Explicitly excluded are mining, agricultural, and industrial solid wastes; hazardous wastes; sludges; construction and demolition wastes; infectious wastes; classified waste.

(b) The "Requirement" sections contained herein delineate minimum actions for Federal agencies for the recovery of resources from solid waste through source separation. Pursuant to Section 211 of the Solid Waste Disposal Act, as amended, and Executive Order 11752 Section 4(a), the "Requirement" sections of these guidelines are mandatory for all Federal agencies that generate solid waste. In addition, they are recommended to State, interstate, regional, and local governments for use in their activities.

(c) The "Recommended Procedures" sections are presented to suggest actions or preferred methods by which the objectives of the requirements can be realized. The "Recommended Procedures" are not mandatory for Federal agencies.

(d) The Environmental Protection Agency will render technical assistance in the form of sample cost analysis formats, sample bid specifications, implementation guidance documents and other guidance to Federal agencies when requested to do so, pursuant to Section 3(d)1 of Executive Order 11752.

(e) Within one year after the effective date of these guidelines, agencies shall make a final determination as to what actions shall be taken to adopt the requirements of these guidelines and shall, within two months of such determination, submit to the Administrator a schedule of such actions.

(f) Federal agencies that make the determination not to source separate as described in §§ 246.200-1, 246.201-1, and 246.202-1, for whatever reason, shall make available to the Administrator the analysis and rationale used in making that determination. The Administrator shall publish notice of the availability of this report to the general public in the FEDERAL REGISTER. The following are considered to be valid reasons for not source separating under individual facts and circumstances: inability to sell the recovered materials due to lack of market, and costs so unreasonably high as to render source separation for materials recovery economically impracticable.

(1) The following points are to be covered in the report:

(i) A description of alternative actions considered with emphasis on those alternatives which involve source separation for materials recovery.

(ii) A description of ongoing actions which will be continued and new actions taken or proposed. This statement should identify all agency facilities which will be affected by these actions including a brief description of how such facilities will be affected.

(iii) An analysis in support of the action chosen by the agency including technical data, market studies, and policy considerations used in arriving at such a determination.

In covering the points above, agencies should make every effort to present information succinctly in a form easily understood, but in sufficient detail so that the factors influencing the decision not to source separate for materials recovery are clear.

(2) The above report shall be submitted to the Administrator as soon as possible after a final agency determination has been made not to adopt the requirements of these guidelines, but in no case later than sixty days after such final determination. The Administrator will indicate to the agency his concurrence/nonconcurrence with the agency's decision, including his reason therefor.

(3) Implementation of actions that would preclude source separation for materials recovery shall be deferred, for sixty days where feasible, in order to give the Administrator an opportunity to receive, analyze and seek clarification of the above required report.

(4) It is recommended that where the report required by § 246.100(f) concerns an action for which an Environmental Impact Statement (EIS) is required by the National Environmental Policy Act, that the report be circulated together with the EIS.

(g) In order that the Administrator may fulfill his responsibilities as set forth in EO 11752, Section (d.6) to "maintain a continuing review of the implementation of this order", agencies shall, on a yearly basis, submit to the Administrator a report outlining the actions taken by the agency pursuant to these guidelines.

(h) The reports required under § 246.100 (e), (f), and (g) shall be made on forms to be prescribed by the Administrator by notice in the FEDERAL REGISTER.

§ 246.101 Definitions.

As used in these guidelines:

(a) "Agricultural solid waste" means the solid waste that is generated by the rearing of animals, and the producing and harvesting of crops or trees.

(b) "Baler" means a machine used to compress solid wastes, primary materials, or recoverable materials, with or without binding, to a density or form which will support handling and transportation as a material unit rather than requiring a disposable or reusable container. This specifically excludes briquetters and stationary compaction equipment which is used to compact materials into disposable or reusable containers.

(c) "Bulk container" means a large container that can either be pulled or lifted mechanically onto a service vehicle or emptied mechanically into a service vehicle.

(d) "Classified Waste" means waste material that has been given security classification in accordance with 50 U.S.C. 401 and Executive Order 11652.

(e) "Collection" means the act of removing solid waste (or materials which

have been separated for the purpose of recycling) from a central storage point.

(f) "Commercial establishment" means stores, offices, restaurants, warehouses and other non-manufacturing activities.

(g) "Commercial solid waste" means all types of solid wastes generated by stores, offices, restaurants, warehouses and other non-manufacturing activities, and non-processing wastes such as office and packing wastes generated at industrial facilities.

(h) "Construction and demolition waste" means the waste building materials, packaging, and rubble resulting from construction, remodeling, repair, and demolition operations on pavements, houses, commercial buildings and other structures.

(i) "Compartmentalized vehicle" means a collection vehicle which has two or more compartments for placement of solid wastes or recyclable materials. The compartments may be within the main truck body or on the outside of that body as in the form of metal racks.

(j) "Corrugated container waste" means discarded corrugated boxes.

(k) "Corrugated box" means a container for goods which is composed of an inner fluting of material (corrugating medium) and one or two outer liners of material (linerboard).

(l) "Federal facility" means any building, installation, structure, land, or public work owned by or leased to the Federal Government. Ships at sea, aircraft in the air, land forces on maneuvers, and other mobile facilities are not considered Federal facilities for the purpose of these guidelines. United States Government installations located on foreign soil or on land outside the jurisdiction of the United States Government are not considered Federal facilities for the purpose of these guidelines.

(m) "Food waste" means the organic residues generated by the handling, storage, sale, preparation, cooking, and serving of foods; commonly called garbage.

(n) "Generation" means the act or process of producing solid waste.

(o) "High-grade paper" means letterhead, dry copy papers, miscellaneous business forms, stationery, typing paper, tablet sheets, and computer printout paper and cards, commonly sold as "white ledger," "computer printout" and "tab card," grade by the wastepaper industry.

(p) "Industrial solid waste" means the solid waste generated by industrial processes and manufacturing.

(q) "Infectious waste" means: (1) Equipment, instruments, utensils, and fomites (any substance that may harbor or transmit pathogenic organisms) of a disposable nature from the rooms of patients who are suspected to have or have been diagnosed as having a communicable disease and must, therefore, be isolated as required by public health agencies; (2) laboratory wastes, such as pathological specimens (e.g. all tissues, specimens of blood elements, excreta, and secretions obtained from patients or laboratory animals) and disposable fomites attendant thereto; (3) surgical

operating room pathologic specimens and disposable fomites attendant thereto and similar disposable materials from outpatient areas and emergency rooms.

(r) "Institutional solid waste" means solid wastes generated by educational, health care, correctional and other institutional facilities.

(s) "Mining wastes" means residues which result from the extraction of raw materials from the earth.

(t) "Post-consumer waste" (PCW) means a material or product that has served its intended use and has been discarded for disposal or recovery after passing through the hands of a final consumer.

(u) "Recoverable resources" means materials that still have useful physical, chemical, or biological properties after serving their original purpose and can, therefore, be reused or recycled for the same or other purposes.

(v) "Recovery" means the process of obtaining materials or energy resources from solid waste.

(w) "Recycled material" means a material that is used in place of a primary, raw or virgin material in manufacturing a product.

(x) "Recycling" means the process by which recovered materials are transformed into new products.

(y) "Residential solid waste" means the wastes generated by the normal activities of households, including but not limited to, food wastes, rubbish, ashes, and bulky wastes.

(z) "Separate collection" means collecting recyclable materials which have been separated at the point of generation and keeping those materials separate from other collected solid waste in separate compartments of a single collection vehicle or through the use of separate collection vehicles.

(aa) "Sludge" means the accumulated semiliquid suspension of settled solids deposited from wastewaters or other fluids in tanks or basins. It does not include solid or dissolved material in domestic sewage or other significant pollutants in water resources, such as silt, dissolved material in irrigation return flows or other common water pollutants.

(bb) "Solid waste" means garbage, refuse, sludge, and other discarded solid materials, including solid waste materials resulting from industrial, commercial, and agricultural operations, and from community activities, but does not include solids or dissolved materials in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial wastewater effluents, dissolved materials in irrigation return flows or other common water pollutants. Unless specifically noted otherwise, the term "solid waste" as used in these guidelines shall not include mining, agricultural, and industrial solid wastes; hazardous wastes; sludges; construction and demolition wastes; and infectious wastes.

(cc) "Source separation" means the setting aside of recyclable materials at

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their point of generation by the generator.

(dd) "Specification" means a clear and accurate description of the technical requirements for materials, products or services, identifying the minimum requirements for quality and construction of materials and equipment necessary for an acceptable product. In general, specifications are in the form of written descriptions, drawings, prints, commercial designations, industry standards, and other descriptive references.

(ee) "Stationary compactor" means a powered machine which is designed to compact solid waste or recyclable materials, and which remains stationary when in operation.

(ff) "Storage" means the interim containment of solid waste after generation and prior to collection for ultimate recovery or disposal.

(gg) "Virgin material" means a raw material used in manufacturing that has been mined or harvested and has not as yet become a product.

**Subpart B—Requirements and Recommended Procedures**

**§ 246.200 High-grade paper recovery.**

**§ 246.200-1 Requirements.**

High-grade paper generated by office facilities of over 100 office workers shall be separated at the source of generation, separately collected, and sold for the purpose of recycling.

**§ 246.200-2 Recommended procedures: High-grade paper recovery from smaller offices.**

The recovery of high-grade paper generated by office facilities of less than 100 office workers should be investigated in conformance with the following recommended procedures and implemented where feasible.

**§ 246.200-3 Recommended procedures: Market study.**

An investigation of markets should be made by the organization responsible for the sale of recyclable materials in each Federal agency and should include at a minimum:

(a) Identifying potential purchasers of the recovered paper through standard market research techniques;

(b) Directly contracting buyers, and determining the buyers' quality specifications, the exact types of paper to be recycled, potential transportation agreements and any minimum quantity criteria; and

(c) Determining the price that the buyer will pay for the recovered paper and the willingness of the buyer to sign a contract for purchase of the paper at a guaranteed minimum price.

**§ 246.200-4 Recommended procedures: Levels of separation.**

A two-level separation is recommended for most facilities. This separation should consist of (a) high-grade wastepaper and (b) all other waste. Facilities that produce large enough quantities of waste computer paper and cards to make their

separation into a separate category cost effective may choose to implement three levels of separation: (1) computer papers, (2) other high-grade papers, (3) all other wastes.

**§ 246.200-5 Recommended procedures: Methods of separation and collection.**

(a) Systems designed to recover high grades of office paper at the source of generation, i.e., the desk, are the desk-top system, the two-wastebasket system, and the office centralized container system.

(b) With the desk-top system, recyclable paper is placed by the generator in a container on his desk, while other waste is placed in a wastebasket. With the two-wastebasket system, recyclable paper is placed by the generator in one desk-side wastebasket, and all other waste is placed in another. In the centralized container system, large containers for the collection of recyclables are placed in centralized locations within the office areas of the building. Nonrecyclable waste is placed in desk-side wastebaskets.

(c) The recommended system is the desk-top system because it is designed to maximize recovery of high value material in an economically feasible manner. While the two-wastebasket system and centralized container system have been implemented with success in isolated instances, data indicate that, on the whole, these systems have experienced high levels of contamination, low levels of participation, and low revenues. The desk-top system has been designed to minimize these problems.

(d) The precise method of separation and collection used to implement the desk-top system will depend upon such things as the physical layout of the individual facility, the ease of collection, and the projected cost effectiveness of using various methods. The recommended desk-top system is carried out in the following manner:

(1) Workers are to deposit high-grade paper into a desk-top tray or other small desk-top holder to be supplied by the agency. This holder should be designed in such a way as to prevent it holding contaminants, such as food or beverage containers.

(2) At the office worker's convenience or when the tray is filled, the worker carries the paper to a conveniently located bulk container within the office area. This large container should be located in an area the worker frequents in the normal course of business.

(3) In locations where computer cards and printouts are to be collected separately, the receptacle for these wastes should be near the computer terminal or in some other logical, centrally located place.

(4) Collection of the high-grade paper from the bulk containers in the office area should be performed by the janitorial or general maintenance service. The number of locations and the frequency of collection of these containers will be determined by office size and maintenance staff capacity.

(e) Mixed paper and some high-grade office papers have also been recovered for recycling by hand-picking in an individual building's trash room or at a centralized facility serving several buildings. With these hand-picking systems, recyclable waste is not separated at the source of generation, but is mixed with other waste in the usual manner and removed to a centralized location where recyclable paper is picked out of the mixed waste by hand. Facilities may choose to use this method of high-grade paper recovery if it is shown by analysis to be economically preferable to source separation.

**§ 246.200-6 Recommended procedures: Storage.**

Among the alternatives for paper storage are on-site baling, the use of stationary compactors, or storage in corrugated boxes or normal waste containers. Stored paper should be protected from fire, inclement weather, theft, and vandalism.

**§ 246.200-7 Recommended procedures: Transportation.**

Transportation to market may be supplied by the facility, by a private hauler, or by the purchaser. Collection of the recyclable paper should be on a regular, established schedule.

**§ 246.200-8 Recommended procedures: Cost analysis.**

After potential markets have been located (but prior to initiation of formal bidding procedures), preliminary determinations of various separation methods, storage, and transportation costs have been made, and estimated tonnages of both recoverable high-grade paper and residual solid waste have been established, an analysis should be conducted which compares the costs of the present waste collection and disposal system with the proposed segregated systems. At a minimum, the study should include all capital, operating and overhead costs and take into account credits for revenue from paper sales and savings from diverting recycled materials from disposal. Potential costs to upgrade collection and disposal practices to comply with EPA's Guidelines for the Storage and Collection of Residential, Commercial and Institutional Solid Wastes (40 CFR Part 243) and Thermal Processing and Land Disposal Guidelines (40 CFR Parts 240 and 241) should be included in the analysis. In formulating a separation system and evaluating its costs, every effort should be made to use janitorial and waste collection resources efficiently. This cost analysis should enable the facility to determine the most cost effective method of implementing the requirements of this part.

**§ 246.200-9 Recommended procedures: Contracts.**

Formal bids should be requested for purchase of the recovered materials, such bids being solicited in conformance with bidding procedures established for the responsible agency. Contracts should include the buyer's quality specifications,

quantity and transportation agreements, a guarantee that the material will be accepted for one year or more, and a guaranteed minimum purchase price.

**§ 246.200-10 Recommended procedures: Public information and education.**

A well-organized and well-executed public information and education program explaining the justification, goals, methods and level of separation should be conducted to inform and motivate office personnel and secure their cooperation in separating their waste. This public information and education program should precede the program and continue on a regular basis for its duration.

**§ 246.201 Residential materials recovery.**

**§ 246.201-1 Requirement.**

Separation of used newspapers at the source of residential generation in conjunction with separate collection shall be carried out at all facilities in which more than 500 families reside, and the newspapers shall be sold for the purpose of recycling.

**§ 246.201-2 Recommended procedures: Newspaper recovery from smaller residential facilities.**

The recovery of newsprint generated by residential facilities of less than 500 families should be investigated in conformance with the following recommended procedures and implemented where feasible.

**§ 246.201-3 Recommended procedures: Glass, can, and mixed paper separation.**

In areas where markets are available, it is recommended that glass, cans, and mixed paper be separated at the source of generation and separately collected for the purpose of recycling.

**§ 246.201-4 Recommended procedures: Market study.**

An investigation of markets should be made for each material by the organization responsible for sale of recyclable materials in each agency and should include at a minimum:

- (a) Identifying potential purchasers of the recovered material through standard market research techniques.
- (b) Directly contacting buyers and determining the buyers' quality specifications, potential transportation agreements and any minimum quantity criteria.
- (c) Determining the prices that the buyer will pay for the recovered material and the willingness of the buyer to sign a contract for the purchase of the material at guaranteed minimum prices.

**§ 246.201-5 Recommended procedures: Methods of separation and collection.**

Following separation within the home, any of the following methods of collection may be used:

- (a) Materials may be placed at the curbside by the resident and may be collected from each household using

separate trucks or compartmentalized vehicles.

- (b) For multi-family dwellings, separated materials may be placed in bulk containers located outside of the building and collected by trucks dispatched to collect recyclables.
- (c) Collection stations may be set up at convenient locations to which residents bring recyclables. These stations should provide separate bulk containers for each item to be recycled. The size and type of container will depend on the volume and type of material collected, the method of transportation to be used in hauling the materials to market and the frequency of removal.

Transportation to market may be supplied by the facility or the community generating the waste, by a private hauler, or by the purchaser.

**§ 246.201-6 Recommended procedures: Transportation to market.**

Transportation to market may be supplied by the facility or the community generating the waste, by a private hauler, or by the purchaser.

**§ 246.201-7 Recommended procedures: Cost analysis.**

After potential markets have been located (but prior to initiation of formal bidding procedures), preliminary determinations of various separation methods, storage and transportation costs have been made, and estimated tonnages of both recoverable materials and residual solid waste have been established, an analysis should be conducted which compares the costs of the present waste collection and disposal system with the proposed segregated systems. At a minimum this study should include all capital, operating and overhead costs and take into account credits for revenue from paper sales and savings from diverting recycled materials from disposal. Potential costs to upgrade collection and disposal practices to comply with EPA's Guidelines for the Storage and Collection of Residential, Commercial and Institutional Solid Wastes (40 CFR Part 243) and Thermal Processing and Land Disposal Guidelines (40 CFR Parts 240 and 241) should be included in the analysis. In formulating a separate collection system and evaluating its costs, every effort should be made to use idle equipment and underutilized collection manpower to reduce separate collection costs. This cost analysis should enable the facility to determine the most cost effective method if implementing the requirements of this part.

**§ 246.201-8 Recommended procedures: Contracts.**

Formal bids should be requested for purchase of the recovered materials, such bids being solicited in conformance with bidding procedures established for the responsible jurisdiction. Contract material will be accepted for one year or more should include the buyer's quality specifications, quantity and transportation agreements, a guarantee that the material and a guaranteed minimum purchase price.

**§ 246.201-9 Recommended procedures: Public information and education.**

A well organized and well executed public information and education program explaining the justification, goals, methods and level of separation should be conducted to inform and motivate householders and to secure their cooperation in separating their waste. This public information and education program should precede the program and continue on a regular basis for its duration.

**§ 246.202 Corrugated container recovery.**

**§ 246.202-1 Requirement.**

Any commercial establishment generating 10 or more tons of waste corrugated containers per month shall separately collect and sell this material for the purpose of recycling.

**§ 246.202-2 Recommended procedures: Corrugated container recovery from smaller commercial facilities.**

The recovery of corrugated containers from commercial facilities generating less than 10 tons per month should be investigated in conformance with the following recommended procedures and implemented where feasible.

**§ 246.202-3 Recommended procedures: Market study.**

An investigation of markets should be made by the organization responsible for sale of recyclable material in each Federal agency and should include at a minimum:

- (a) Identifying potential purchasers of the recovered corrugated through standard market research techniques.
- (b) Directly contacting buyers and determining the buyers' quality specifications, potential transportation agreements and any minimum quantity criteria.
- (c) Determining the price that the buyer will pay for the recovered corrugated and the willingness of the buyer to sign a contract for purchase of the paper at a guaranteed minimum price.

**§ 246.202-4 Recommended procedures: Methods of separation and storage.**

The method selected will depend upon such variables as the physical layout of the individual generating facility, the rate at which the corrugated accumulates, the storage capacity of the facility, and the projected cost-effectiveness of using the various methods. All of the following suggested modes of separation and storage presuppose that the corrugated boxes will be accumulated at a central location in the facility after their contents are removed and that the boxes are flattened.

- (a) Balers of various sizes; corrugated boxes are placed in balers and compacted into bales. These bales may be stored inside or outside of the facility. The bales should be protected from fire, inclement weather, theft, and vandalism.
- (b) Stationary compactors or bulk containers; corrugated boxes are placed in a stationary compactor or bulk con-

tainers outside of the facility. The containers should be protected from fire, inclement weather, theft and vandalism.

**§ 216.202-5 Recommended procedures: Transportation.**

Transportation to market may be supplied by either the facility, a private hauler or the purchaser. In facilities to which goods are delivered from a central warehouse, corrugated may be backhauled by delivery truck; to the central facility and baled there for delivery to a user.

**§ 216.202-6 Recommended procedures: Cost analysis.**

After potential markets have been identified (but prior to initiation of formal bidding), preliminary determinations of various separation methods, storage and transportation costs have been made, and estimated tonnages of both recoverable material and residual solid waste have been established, an analysis should be conducted which compares the costs of the present waste collection and disposal system with the proposed segregated systems. At a minimum, the study should include all capital, operating and overhead costs and take into account credits for revenue from paper sales and savings from diverting recycled materials from disposal. Potential costs to upgrade collection and disposal practices to comply with EPA's Guidelines for the Storage and Collection of Residential, Commercial and Institutional Solid Wastes (40 CFR Part 243) and Thermal Processing and Land Disposal Guidelines (40 CFR Parts 240 and 241) should be included in the analysis. This cost analysis should enable the facility to determine the most cost effective method of implementing these guidelines.

**§ 216.202-7 Recommended procedures: Establishment of purchase contract.**

Formal bids should be requested for purchase of the recovered materials, such bids being solicited in conformance with bidding procedures established for the responsible agency. Contracts should include the buyer's quality specifications, transportation agreements, a guarantee that the material will be accepted for one year or more and a guaranteed minimum purchase price.

**§ 216.203 Reevaluation.**

**§ 216.203-1 Requirement.**

Agencies in which facilities make the determination not to comply with these guidelines must conduct the required analysis and report in accordance with § 246.100 (e) or (f), as appropriate, yearly.

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[FR Doc. 76-11864 Filed 4-22-76; 8:45 am]

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APPENDIX B

REPORTS OF DA INSTALLATION VISITS --  
FORT BELVOIR AND FORT MEADE

## FORT BELVOIR VISIT

On July 28, 1976, USG staff made an on-site visit to Fort Belvoir, Virginia. There, the sources of solid waste were observed, and current methods of collection and disposal were discussed with key personnel. Arrangements for the visit were made with Major Watson, Deputy Facility Engineer, and Captain Elton Morehouse served as escort. Activities at the following locations were visited and observed:

- Commissary Store
- Print Plant
- Engineer School, Humphrey Hall
- Clothing Sales Store
- Fort Belvoir Exchange Services
- Fort Belvoir Exchange Store
- Management Information Systems Office (MISO)
- Consolidated Mess Hall
- Sanitary Landfill
- Property Disposal Office

### Current Trash Collection and Disposal

Solid waste is collected by in-house personnel and under a service contract with Kehoe, Inc. Kehoe picks up trash from family housing areas for disposal at the post landfill. The FE crane truck picks up trash from all other locations and also disposes of the waste at the post landfill.

The in-house organization has 10 personnel - four truck drivers, four laborers, one landfill controller and a crane truck supervisor. The major pieces of equipment are three front lifting dumpmasters and one tilt-frame trailer for transporting cardboard packers which are positioned at the commissary and the two consolidated messhalls. Trash is picked up twice a week, except for points of high waste generation. At the commissary, pickup occurs about three times a day; at Humphrey Hall (classroom buildings) trash is picked up daily.

Cardboard constitutes the largest volume material put into the landfill. Until about 18 months ago it was collected and sold when there was a good market for this material. Recently, no effort has been made to reinstate the program, primarily because the PDO baler has been dismantled, and there is no other baler available to the FE. According to the Chief of the

Sanitation Branch, even the PX cardboard goes to the landfill; the rope ties on the bales preclude its sale. The collection/disposal operations cost the post \$175,000 annually. Contract service amounts to \$45,000, and in-house operations cost \$130,000 per year.

#### Sources of Waste

Office High-Grade - A visit to the print plant in Williams Hall revealed that printing operations consume about 23 tons of high-grade paper per month. Of this amount, waste is estimated at about five percent (1.1 tons/month). The products of the print plant are primarily text books used by the various schools located at Fort Belvoir, although some printing is also done for DoD agencies outside the post.

The Engineer School at Humphrey Hall was visited. There, the Director of Instruction provided some insight into the magnitude of high-grade waste generated by Fort Belvoir's schools. About ten to fifteen thousand students per year attend six schools at Fort Belvoir: Humphrey Hall, the Department of Mechanical and Technical Training, Tompkins Basin, the Atomic Demolition School, the Defense Management Institute, and the Cartography School of the Defense Mapping Agency. Generally, a high percentage of the waste generated by these schools consists of texts discarded by students, obsolete texts discarded by the school, and paper used in the various classes. At Humphrey Hall, the used textbooks are stored and accumulated in anterooms adjacent to the classrooms, and subsequently disposed of in bulk. Since the segregation of these texts is already effectively accomplished, the simple removal of the soft covers would produce a sizeable and largely contaminant-free source of high-grade wastepaper.

Each of the schools at Fort Belvoir also has offices for its faculty and staff. These offices could easily institute standard office source separation procedures to segregate high-grade paper. The Director at Humphrey Hall did not favor the desk-top method of separation, but felt that distinctive floor containers (the dual-wastebasket system) were more appropriate.

A visit to the Management Information Systems Office (MISO) revealed that increasing use is being made of computerized data throughout the post. The users of data produced in this manner include the post comptroller, the Director of Industrial Operations (DIO), Director of Personnel and Community Affairs, and DFAE. There is little waste within MISO itself - only rejected programs and a few computer tabcards. Printouts and tab-card decks go to the customer, who disposes of them after they are obsolete or superceded by new data. One problem cited by the MISO director is the legality of recycling personnel records and financial printouts under the restrictions of the Privacy Act. The same concern was also expressed by the (DPCA) Director of Personnel and Community Affairs, at Fort Meade.

Corrugated - The Commissary is a large-scale generator of corrugated container waste. Sales volumes at the store amount to \$30.1 million annually.\*

\*Applying the waste generation rate provided in Chapter III, of 0.18 pounds per week per dollar of weekly sales, this activity would generate approximately 52 tons of solid waste each week. About 68% or 35 tons per week of this waste would consist of corrugated containers. (See Chapter III, solid waste composition estimates.) The Commissary would therefore exceed by at least tenfold the Guideline compliance threshold of 10 tons of corrugated containers generated per month.

Most old corrugated containers are segregated from other waste and placed in a transportable packer at the rear of the store, while some boxes are provided to shoppers for use as packing containers. Formerly, the packer was transported with its contents to a baler located in a temporary shed and operated by the PDO. For a period of time, the baled cardboard was sold, but this practice was discontinued due to limited revenue received and the lack of personnel at the PDO. Baling ceased when the baling facility was dismantled and the old baler discarded in June, 1976. Currently, the FE hauls the packer and dumps its contents in the sanitary landfill two or three times each day. It was learned that the Troop Support Agency located at Fort Meade, Maryland, is presently studying a means to upgrade the waste collection system at the Belvoir Commissary.

At the Clothing Sales Store, containers were placed in a wooden box located outside the building, and emptied by hand about once a week. Many of these used corrugated containers were taken by individuals for use in packing personal effects.

At the Post Exchange Store (PX), old corrugated containers are baled on a continuing basis. In recent years, when the market for corrugated containers was higher, the bales were carried to the regional Army Air Force Exchange Service (AAFES) distribution point by trucks which delivered the merchandise, presumably for eventual large-lot sale. Currently, the bales are picked up by the FE and landfilled. The PX uses a small, horizontal baler which produces 200-pound bales; the machine is considered by store personnel to be too small for their operation.

The Consolidated Mess Hall was also visited as a probable source of corrugated waste. A packer of the type used by the Commissary is used for the disposal of corrugated waste here, and it is emptied once a day by the FE. Foodstuffs are ordered through the Commissary and issued to the consolidated mess halls by the Troop Issue Point.

Other sources of waste cardboard at Fort Belvoir, resulting from the procurement of foodstuffs and beverages, are the Officers Club, the NCO Club, and the Services Club. The quantity produced by each is not large, but in total, it is worth segregating. The major problem is the inability of these facilities to store the containers while awaiting pickup and delivery to a baler.

Defense Property Disposal Office - USG met with the Property Disposal Officer to discuss current storage and sale operations, and the feasibility of handling large volumes of reclaimed waste paper. As mentioned above, the PDO once operated a centrally-located baler, to which the FE delivered corrugated waste collected from various post activities. Since both the baler and the shed were disposed of in June, 1976, the PDO has not been involved in wastepaper handling except for some computer tab-cards. At present, the PDO does not have the money, the personnel, or the storage space to handle any other form of waste paper. All sales contracts for items handled by the PDO are determined entirely by the Columbus, Ohio Regional Office of the Defense Property Disposal Service (DPDS).

### FORT MEADE VISIT

On July 30, 1976, three members of the USG project team visited Fort Meade, Md. The purpose of the trip was to witness firsthand the sources of solid waste, methods of disposal, and any ongoing recycling operations. Arrangements were made with Col. Bouffard, DFAE. The purpose of the visit was detailed during the initial brief meeting with Col. Bouffard and his staff; tours of the installation were planned with Mr. Howard D. Stull, Director of Building and Grounds. The escorts for the ensuing tours were: Mr. Warren Bossert, CH, Environment and Energy Branch; and Mr. Paul Martin, CH, Ground Transportation Branch.

Activities at the following facilities were visited by Mr. Harvey Gershman (USG) with Mr. Martin:

- Commissary
- PX (Main Store, Toyland, and Garden Center)
- Family Housing Complexes
- Sanitary landfill

Mr. W. P. Gardiner (consultant) and Mr. James Price (USG) visited the following facilities with Mr. Bossert:

- Property Disposal Office (PDO)
- Post Headquarters
- Director of Industrial Operations (DIO) office building
- DIO Maintenance
- 1st Army headquarters
- Army Intelligence (USAINTA)
- Management Information Systems Office (MIDO)

### General Post Background Information

Fort Meade is a FORSCOM installation located in Anne Arundel County, Maryland, between Washington, D.C. and Baltimore. The site consists of 13,588 acres, about 6,000 of which constitute "improved ground." The post is rather unique in that it houses more tenants than any other CONUS post. The utilization of the grounds on the base vary widely, from a large family housing complement (3,278 families living on base) to the National Security Agency.

### Custodial Service

All custodial services required by industrial and office facilities on the base are contracted out to private firms. Colonel Bouffard indicated that his office ( FE) has had terrible problems getting consistently good custodial service from contractors.

### Current Trash Collection and Disposal

The FE deploys its own trucks and personnel to collect solid waste from the various operational, industrial, and office activities around the post. The National Security Agency (NSA), Fort Meade's principal tenant, is currently serviced for all its unclassified waste by a private collection firm contracted by the General Services Administration (GSA). NSA, however is seeking to augment this pick-up arrangement with FE services through an Inter Service Support Agreement. Family housing areas are serviced by private contractors. Presently, two firms handle the collecting duties, which involve backyard pick-up (non-curb-side). The Director of Building and Grounds at the FE office advocates a switch to the less expensive curbside pickup, but the Post Commander opposes it because of anticipated scavenger problems.

All solid waste collected by the FE and by contractors is delivered to a sanitary landfill located on the post. The total amount of solid waste generated annually on the base is about 12,400 tons, estimated from two weeks of weighing at the landfill.

Fort Meade presently uses the trench method of landfilling, but is planning to adopt the area-fill landfill method in the near future. The planned landfill site has a projected life of twenty years per layer, indicating that landfill space will be in plentiful supply for several decades to come.

A post-wide recycling program was begun at Fort Meade five or six years ago. The program has since lost momentum. Currently, only a carryover of the program remains, as some of the more resource-conscious employees continue to segregate mixed paper and tab cards for pickup by the PDO.

### Sources of Waste

Office High-Grade - The office buildings that produce high grade waste were visited, including the following: Post Headquarters, 1st Army Headquarters, DIO Supply Division, MISO, and the logistics office of USAINTA. In each of these visits, generally standard office procedures were observed.

Most of these offices made considerable use of data via computer printouts. This was especially true of DIO Supply Division and MISO, where computer tab cards were also used in sizeable quantities. Printout paper and tab cards constitute two particularly high grades of waste paper when segregated from other office high-grade wastepaper. Both DIO and MISO office personnel stated that these two types of waste were currently segregated and set out periodically for pickup and subsequent recovery. Neither office knew whether the PDO or the FE provided the pickup services. In both instances, the personnel interviewed indicated support for the recovery of printout and tab card waste.

It was concluded both from observations and discussions with management personnel of the Logistics Office of USAINTA, that segregation of white paper would not present a problem. Rather, it would simply be an extension of the current practice of segregating classified and unclassified materials. Disposal of classified wastes appears to be a major problem, however, and including this type of waste in the wastepaper recovery program would not be feasible. Furthermore, the small quantities of classified waste generated by USAINTA (250 lbs/week) would hardly justify implementing a special recovery system.

Corrugated - The Commissary and Commissary Annex were examined as potential sources of recoverable corrugated cardboard. The two branches have combined gross sales of \$1.8 million per month. Both stores currently segregate corrugated waste and store it in compactors located at their rear loading docks. The cubic yard compactor at the main store is hauled to the landfill and emptied every other day, while the same-sized compactor at the Annex is emptied once each week.

Currently, the main Commissary has one baler which is installed, but not in operation. The Annex has a similar baler which is not fully installed at present. With all three balers in operation, the commissary would have the capacity to bale all its corrugated waste. The bales could be hauled periodically to the PDO for indoor storage and subsequent sale. Together, the two stores represent a large, steady source of clean, saleable corrugated waste, with their combined gross sales indicating a generation of about 37 tons of solid waste each week, of which 68 per cent or 25 tons consists of corrugated containers.\* The meat-packing area of the main Commissary, however, produces substantial amounts of corrugated waste soaked with meat juices; this waste would be a serious contaminant in the clean corrugated bales, and should therefore be disposed of with the other solid waste.

The Post Exchange (PX) was also identified as a steady source of clean corrugated waste. The PX currently segregates its corrugated waste and bales it in a large baler (800 - 1,000 lb. bales) located on the premises. Six or seven of these bales are generated each week. The bales are backhauled in delivery trucks to a regional Army Air Force Exchange Service (AAFES) distribution center in Philadelphia (Taconic); the corrugated waste is presumably sold there in large lots. The PX also has a separate garden shop and toyland center from which no corrugated is recovered. Since AAFES is a self supporting operation, revenues from such sales remain within the Exchange Service. Therefore, the PX's recovery system, including the use of its baler, is autonomous, and would remain separate from the corrugated recovery operations carried out by other post activities such as the Commissary.

DIO Maintenance was visited. It was initially seen as a source of substantial corrugated waste, as this facility orders and receives numerous shipments in corrugated cartons. However, the shipments are subsequently dispersed in their original packaging to other facilities around the post, with Maintenance actually generating very little corrugated waste on its premises.

Newspaper Waste - The family housing areas were visited to evaluate present waste-disposal operations, as well as the operational feasibility of collecting

\*From Chapter III, solid waste composition estimates.

separated used newspapers. The housing is comprised of a mix of housing complexes totalling 3,278 family units. The housing is comprised of single-family dwellings, townhouses, and duplex and garden apartments.

Private contractors handle the regular waste collection for the single-family and townhouse units. Currently, two companies are contracted to provide back-yard pick-up services three times each week. The FE supplies inhouse pick-up for the bulk waste containers used by the duplex and garden units. Both the private contractors and the FE dump the solid waste in the on-post sanitary landfill.

#### PDO

The PDO represents the vital, final link for any post recycling program. Most storage of reclaimed paper and all negotiations for sale of the material must be handled by DSA. As such, PDO procedures were observed and its physical storage and handling capabilities examined.

The PDO had substantial indoor storage space, enough for 75 tons of reclaimed paper. The forklift in its warehouse is adequate for moving pallets or bales. In addition, the warehouse contains an old vertical baler which is presently used to bale recovered paper.

The PDO currently accumulates and sells both mixed paper (comprised of newspaper, magazines, office high-grade, and substantial amounts of computer printout) and tab cards. The paper is separated by a few of the activities on the post. As indicated previously, this is probably simply a holdover from the now-defunct post-wide recovery program. The paper is collected loose, in bags or boxes, by both the FE and the PDO. The mixed paper is then baled by the PDO, and both it and the tabcards are accumulated over the course of a few months and sold in lots. Enough material for about two trailer loads (CA. 75 tons) is normally accumulated prior to sale, in order to obtain the best possible price for the lot. Two lots were sold in the first six months of 1976, with the prices obtained in the most recent sale being quite high:

75 tons of mixed paper @ \$51.57/net ton, and 16 tons of tab cards  
@ \$175.57/net ton.

APPENDIX C

APPENDIX C  
EPA DRAFT OF  
"REPORTING: PROCEDURES AND FORMATS"

## INTRODUCTION

Pursuant to Sections 209 and 211 of the Resource Recovery Act of 1970 (Public Law 91-512), the U.S. Environmental Protection Agency has mandated, through the publication of guidelines in the Federal Register, that Federal facilities separate, at their point of generation, certain types of wastepaper from the solid waste stream. The recovered materials are to be sold for recycling. Federal facilities are required by these guidelines to file with the EPA Administrator either a compliance report or a noncompliance report, and a yearly update report. Samples of these three forms are attached for your review. Comments and questions may be directed to Ms. Penny Hansen at (202) 755-9140.

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INSTRUCTIONS FOR SOURCE SEPARATION GUIDELINES REPORTING FORMS

PART I

The following reporting forms must be filed with the U.S. Environmental Protection Agency by July 23, 1977:

A. Implementation Report

This form is required to be completed for federal office facilities with more than 100 employees, federal housing facilities where more than 500 families reside, and federal facilities generating 10 or more tons of waste corrugated containers per month. The facilities to be included in the report are those which have made the determination to implement the source separation provisions of the federal regulations in regard to recovering high-grade office paper and/or newsprint and/or waste corrugated containers. This report should include all of the facilities under the agency's jurisdiction which are implementing some or all of the source separation provisions (i.e. one consolidated report rather than a separate report for each facility). If more than one form is required, utilize identical forms and attach them to the initial form containing the submitting office information.

An example of the information required is as follows:

A) Facility Name	B) Address	C) Date	D) High-grade # employees	Newsprint # families	Corrugated tons/month
Federal Bldg.	123 Main Salem, Va.	8/9/77	10000	—	15
GSA Bldg.	789 S. 23rd Balto., Md.	9/5/77	6000	—	—

In this case, the Federal Bldg. in Salem, Va. has greater than 100 employees and has made the determination to separate high-grade office paper. It does not house more than 500 families (or any families for that matter) so this column is left blank. It does generate more than 10 tons of waste corrugated containers per month, and has made the determination to separate these as well. The implementation date is the date when the actual separation of materials will begin.

In the case of the GSA Bldg. in Balto., Md., it contains more than 100 employees and has made the determination to separate high-grade office paper. However, this building may generate more than 10 tons of waste corrugated containers per month, but due to lack of a market or unreasonable costs, has chosen not to separate this material. This column is therefore left blank and the facility must also be reported on the non-implementation report, described next.

**B. Non-Implementation Report**

This form is required to be completed for federal office facilities with more than 100 employees, federal housing facilities where more than 500 families reside, and federal facilities generating 10 or more tons of waste corrugated containers per month. The facilities to be included in the report are those which have made the determination not to implement the source separation provisions of the federal regulations with regards to recovering high-grade office paper and/or newsprint and/or waste corrugated containers. This report should include all of the facilities under the agency's jurisdiction which are not implementing some or all of the source separation provisions (i.e. one consolidated listing). If more than one form is required, utilize identical forms and attach them to the initial form containing the submitting office information.

The following information should provide assistance in completing the report:

In item 2C, for each of the three classes of materials which the facility has chosen not to separate (and for which the regulations require separation) complete the information requested (i.e. # of employees, # of families, tons/month corrugated). In addition, after each figure, identify the reason for non-implementation. According to federal regulations, there are only two permissible reasons for determining not to implement:

NO BID--no responsible bids received in response to the solicitation in which the facility was included

COSTS--costs so unreasonably high as to render source separation economically impracticable

If the reason for non-implementation is NO BID, as described above, no cost analysis need be submitted for that facility for that particular material.

If the reason for non-implementation is COSTS, as described above, then a cost analysis (Form xxx, Supplement to Non-Implementation Report) is required to be submitted for each facility for those materials which it chooses not to separate based on costs.

Continuing the example used previously:

A) Facility Name	B) Address	C) Materials Not To Be Separated & Reason		
		High-grade	Newsprint	Corrugated
		# employees	# families	tons/month
GSA Bldg.	789 S. 23rd Balto., Md.	—	—	11-Costs

In this case, the facility chose to separate high-grade office paper and this was reported on the implementation report. It chose not to separate waste corrugated and for that material, information is required on the non-implementation report.

The reason for not separating corrugated is given as Costs. Therefore a separate cost analysis (described next) for that facility must be attached to the non-implementation report, justifying the decision.



**NON-IMPLEMENTATION REPORT -- SOURCE SEPARATION**

This form is required to be completed for Federal Office Facilities with more than 100 Employees, Federal Housing Facilities where more than 500 Families reside, and Federal Facilities Generating 10 or more Tons of Waste Corrugated Containers per Month, which have made the determination not to implement the Source Separation provisions of the Federal Regulations.

**IMPORTANT:** This report cannot be completed without reference to the detailed cost analyses contained in Office Paper Recovery - An Implementation Manual, chapter 3, (EPA publication Y77) and these instructions.

1. Agency Name (include Bureau, Office, etc.) \_\_\_\_\_

2. Facilities which have made the determination not to implement source separation requirements:

A) Facility Name	B) Facility Address	C) # employees-reason	# families-reason	tons/mo. corrugated-reason
Complete only for those materials not to be separated and include reason for non-implementation for each material:				
--- High-grade paper      Newspaper      Waste Corrugated ---				

1--According to Federal Regulations, there are only two permissible reasons for determining not to implement:

- NO BID (i.e. no responsible bids received in response to solicitation). No cost analysis required.
- COSTS (i.e. costs so unreasonably high as to render source separation economically impracticable). Form xxx, Supplement to Non-Implementation Report -- Cost Analysis, is required for each such facility.

Typed name, title, signature, phone number, mailing address of the submitting official: \_\_\_\_\_

**SUPPLEMENT TO NON-IMPLEMENTATION REPORT -- COST ANALYSIS**

This form is required to be completed for each facility making the determination not to implement the Source Separation provisions of the Federal Regulations based upon costs, as reflected on the Non-Implementation Report. **IMPORTANT:** This report cannot be completed without reference to the detailed cost analyses contained in Office Paper Recovery - An Implementation Manual, chapter 3 (EPA publication yyy) and the instructions for this form.

1. Agency Name (include Bureau, Office, etc.) \_\_\_\_\_
2. Facility Name and Address \_\_\_\_\_

PART A Facilities with more than 100 employees	PART B Facilities with more than 500 families	PART C Facilities with 10 tons corrugated
<p>1. # of employees at facility _____</p> <p>2. Cost Analysis</p> <p style="text-align: center;">Column 1 Prior to Implementation</p> <p style="text-align: center;">Column 2 Projected after Imple- mentation</p> <p><b>Factors</b></p> <p>1. Waste Generation (tons/mo.)</p> <p>A. Estimated total (mixed) high-grade _____</p> <p>B. Estimated _____</p> <p>2. Costs (\$/mo.)</p> <p>A. Collection \$ _____</p> <p>B. Collection Labor _____</p> <p>C. Storage Equipment _____</p> <p>D. Administration _____</p> <p>E. Disposal _____</p> <p>Total \$ _____</p> <p>3. Revenues (\$/mo.) --- \$ _____</p> <p>4. Net Costs \$ _____</p> <p>5. Savings (if loss, indicate by minus sign) \$ _____</p>	<p>1. # of families at facility _____</p> <p>2. Cost Analysis</p> <p style="text-align: center;">Column 1 Prior to Implementation</p> <p style="text-align: center;">Column 2 Projected after Imple- mentation</p> <p><b>Factors</b></p> <p>1. Waste Generation (tons/mo.)</p> <p>A. Estimated total (mixed) newspaper: _____</p> <p>B. Estimated _____</p> <p>2. Costs (\$/mo.)</p> <p>A. Collection \$ _____</p> <p>B. Collection Labor _____</p> <p>C. Storage Equipment _____</p> <p>D. Administration _____</p> <p>E. Disposal _____</p> <p>Total \$ _____</p> <p>3. Revenues (\$/mo.) --- \$ _____</p> <p>4. Net Costs \$ _____</p> <p>5. Savings (if loss, indicate by minus sign) \$ _____</p>	<p>1. # tons waste corrugated _____</p> <p>2. Cost Analysis</p> <p style="text-align: center;">Column 1 Prior to Implementation</p> <p style="text-align: center;">Column 2 Projected after Im- plementation</p> <p><b>Factors</b></p> <p>1. Waste Generation (tons/mo.)</p> <p>A. Estimated total (mixed) corrugated _____</p> <p>B. Estimated _____</p> <p>2. Costs (\$/mo.)</p> <p>A. Collection \$ _____</p> <p>B. Collection Labor _____</p> <p>C. Storage Equipment _____</p> <p>D. Administration _____</p> <p>E. Disposal _____</p> <p>Total \$ _____</p> <p>3. Revenues (\$/mo.) --- \$ _____</p> <p>4. Net Costs \$ _____</p> <p>5. Savings (if loss, indicate by minus sign) \$ _____</p>

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APPENDIX D

DoD DIRECTIVE 4165.60,  
"SOLID WASTE MANAGEMENT - COLLECTION,  
DISPOSAL, RESOURCE RECOVERY AND RECYCLING PROGRAM"

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October 4, 1976  
NUMBER 4165.60

ASD(I&L)

## Department of Defense Directive

**SUBJECT** Solid Waste Management - Collection, Disposal, Resource Recovery and Recycling Program

References: (a) DoD Directive 6050.3, "Resource Recovery and Recycling Program - Solid and Other Waste Material," November 19, 1974 (hereby cancelled)  
(b) through (u) are listed in enclosure 1

### I. PURPOSE AND CANCELLATIONS

- A. This Directive incorporates the provisions of reference (a), updating Department of Defense policies and procedures relative to the DoD comprehensive program of solid waste collection, disposal, material recovery, and recycling in consonance with the guidelines published by the U. S. Environmental Protection Agency (EPA) (references (b), (c), (d), and (e)), the National Environmental Policy Act (reference (f)), the Solid Waste Disposal Act (reference (g)), and DoD Directive 5100.50 (reference (h)).
- B. Reference (a) and Report Control Symbol DD-H&E(SA) 1359 are hereby superseded and cancelled.

### II. APPLICABILITY AND SCOPE

- A. The provisions of this Directive apply to the Office of the Secretary of Defense, the Military Departments, and the Defense Agencies (hereinafter referred to collectively as "DoD Components").
- B. The processing and selling of scrap and similar material, except high grade paper, as defined in DoD Manual 4160.21-M (reference (i)) and generated from

military and industrial-type activities, are excluded from the provisions of this Directive.

### III. DEFINITIONS

For the purposes of this Directive, the definitions contained in enclosure 2 apply.

### IV. OBJECTIVES

A. The preservation and protection of the environment.

B. The conservation of natural resources through:

1. Judicious collecting and disposing of solid waste;
2. Reducing the amount of material wasted; and
3. Recovering and recycling materials and/or energy from solid waste products as an alternative to burial in landfills, incineration or environment-menacing dispositions.

### V. POLICIES

A. The criteria listed in the "requirement" section(s) of published EPA Solid Waste Management Guidelines (references (b), (c), (d) and (e)) are mandatory for minimum acceptable levels of performance and shall be implemented by the DoD Components. The "recommended" section(s) of the Guidelines, representing current techniques and practices, shall be implemented when feasible and contributory to the effectiveness of the program. Waste disposal on Federal property will be in accordance with appropriate material criteria. Local permits may not be mandatory for Defense installations; however, State and local criteria, if more stringent than EPA Guidelines and/or Defense practices, shall be applied when feasible. Resource recovery facilities established in accordance with the provisions of this Directive will be compatible with appropriate State and local plans.

B. All solid waste generated on a DoD installation shall be considered Government property for purposes of disposal under the provisions of this Directive except in those instances

where Military Exchanges and Commissary Stores salvage and dispose of their recoverable resources.

- C. Commercial, residential, and institutional solid and other waste materials shall be recovered and recycled to reduce environmental pollution and conserve resources, consistent with guidelines prescribed herein.
- D. The quantities of solid waste materials shall be reduced at the source, whenever possible.
- E. Contracts for solid waste material disposal services shall include provisions for recycling, whenever feasible.
- F. A DoD facility that generates 100 tons or more per day of residential, commercial and institutional solid waste after complying with waste reduction and source separation policies, shall establish and/or utilize resource recovery facilities to separate and recover materials or energy, or both, from solid waste.
- G. DoD facilities located within a Standard Metropolitan Statistical Area (SMSA) are required to participate with other DoD Components and Federal facilities in the establishment and/or utilization of a single resource recovery facility if: (1) any one Federal facility generate 50 tons or more of residential, commercial, and institutional solid waste per day after complying with waste reduction and source separation policies; and (2) the combined total of this solid waste for all Federal facilities within the SMSA is 100 tons per day. The Federal Agency having jurisdiction over a Federal facility that generates the largest quantity of residential, commercial and institutional solid waste in the SMSA will be designated the lead agency in the planning, programing and budgeting for the resource recovery facility in accordance with EPA Guidelines (reference (b)).
- H. Joint or regional civilian community resource recovery facilities/systems shall be utilized whenever possible, in lieu of establishing separate DoD facilities/systems.
- I. DoD Components shall not compete with a locally available commercial recycling industry which offers a total resource recovery system. Every effort shall be made to use the established commercial industry in accordance with DoD Directive 4100.15 (reference (j)).

- J. The separation of used newspapers at the source of residential generation, in conjunction with separate collections, shall be carried out at all DoD installations in which more than 500 families reside. The newspapers shall be recycled or, alternatively, used as an energy resource.
- K. Any installation generating 10 or more tons of waste corrugated containers per month shall segregate and separately collect for purposes of recycling or, alternately, used as an energy resource.
- L. High grade paper generated in office buildings of over 100 workers shall be separated at the source of generation and collected for the purpose of recycling.
- M. At facilities where resource recovery is not mandatory as required by this Directive, optional programs are encouraged. In these instances, the annual cost to the Government should be less when compared to the normal solid waste procedure or disposal.
- N. All actions to implement the requirements of this Directive will first be assessed to determine the necessity for preparing an environmental impact statement in accordance with DoD Directive 6050.1 (reference (k)).

## VI. PROCEDURES

### A. General

1. Solid waste collection, disposal and resource recovery programs will be implemented in the most cost effective manner and periodically reviewed to assure continuing cost effective operation (DoD Instruction 7041.3 (reference (l))). The programs, proposed or ongoing, shall be evaluated under the provisions of DoD Instruction 4100.33 (reference (m)).
2. Alternative methods to processing solid waste through Federally established resource recovery facilities shall be considered in the establishment of local programs and implemented, singly or in combination, if beneficial.

- a. Sale through the Defense Supply Agency (DSA).
  - b. Use as fuel or fuel supplement.
  - c. Local reuse of recovered waste materials.
  - d. Joint or separate efforts by contractors handling solid and other waste material to recover recyclable materials.
  - e. Participation in a joint or regional resource recovery program operated by the civilian community.
3. Prior to implementing procedures for segregating or processing specific waste material for sale, it shall be determined that adequate markets do exist and will continue to exist for a reasonable length of time. Such determination shall include sufficient detailed market analyses and economics to ensure that an economical analysis can be made by the DoD Components.
  4. Exceptions to the requirements prescribed by this Directive may be made after appropriate analysis has determined that markets for recovered products are not available or that costs are so high as to be economically impracticable. Analysis in accordance with VI, E. 2., below, must be made and will serve as the basis for required reporting which concern actions taken by the DoD Component pursuant to the EPA Guidelines. Such analyses will be reviewed at least every 3 years.
  5. Waste and debris not otherwise utilized in accordance with these procedures are to be disposed of by prescribed EPA Guideline procedures (reference (d)) in authorized landfills and/or incinerators.

B. Organization

1. The DoD Components shall develop the organization for the management and operation of their resource recovery programs. Management of these programs at the installation level will generally be accomplished by the element which is already functionally responsible for refuse collection and disposal (DoD Directive 4165.2 (reference (n) ). Recyclable/ marketable materials shall be referred to DSA for sale.

2. Duplication of effort shall be avoided in the collecting, sorting, and transporting of recoverable waste by combining new and existing efforts. However, Military Exchanges and Commissary Stores which purchase or lease processing equipment may salvage and dispose of their recoverable resources.
3. The managing activities shall be provided market information for the studies or the sale of recoverable waste material within a reasonable time period.

C. Financial Management

1. Sale of marketable items from solid waste materials shall be administered through DSA under the provisions of DoD Directive 4160.21 (reference (i)). This procedure does not apply to waste materials turned over to voluntary organizations or civilian communities for recycling. The procedure also does not apply to Military Exchanges and Commissary Stores where the activity owns or leases its own processing equipment.
2. Net proceeds from the sale of solid waste materials shall be deposited to the account designated by the managing activity to reimburse the following expenses incurred in operating the solid waste resource recovery programs:
  - a. The acquisition of replacement equipment for recycling purposes. The provisions of DoD Instruction 4160.1 (reference (o)) apply in the financing of replacement equipment.
  - b. The acquisition and identification of containers and container stands for proper segregation of solid waste material.
  - c. The collection of waste materials from the containers.
  - d. The separating, baling, compacting, shredding, pulping, or otherwise altering the size, shape or form of the waste materials.
  - e. The transfer of marketable items to the accountability of the property disposal office. Transfer of physical

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custody is not required; such property shall be moved only when it is most economical and effective to do so.

- f. The installation-level administration and support of the above functions by the managing activity.
3. Elements of expense as charged to all activities by the installation-level accounting system are included, but military personnel expense may not be reimbursed from the net proceeds. Any net proceeds after expenses and replacement equipment costs have been reimbursed may be made available by the managing activity to finance special projects for environmental improvement and energy conservation. The amount of such financing for such projects shall not exceed \$50,000 per DoD installation. Should any balance be left in the designated account, after the environmental and energy conservation projects are financed, it will be transferred to Budget Account 97-F 3860.5191, "Proceeds from the Sale of Scrap, Salvage, or Surplus Materials, Defense Supply Agency."
4. Solid waste material recycling expenses that are not offset from net proceeds are eligible for reimbursement from any net proceeds remaining in Budget Clearing Account 97-F 3860.5191, "Proceeds from Sale of Scrap, Salvage or Surplus Materials, Defense Supply Agency," after reimbursement of all other categories of disposal expense.
5. Expenses incurred by DSA that are related to the sale of recovered materials shall be deducted from gross sales proceeds. Accounting and reporting procedures for property disposal expenses shall be in accordance with DoD Instruction 7310.1 (reference (p)).

D. Construction Projects and Equipment Procurement

1. Construction projects for resource recovery programs shall be planned and programmed in accordance with DoD Instruction 7040.4 (reference (q)); such projects shall be included in the reports submitted pursuant to OMB Circular A-106 (reference (r)). (See section VIII., this Directive.) Proceeds of sale shall not be used to finance these projects.
2. Each resource recovery facility will be designed with sufficient capacity to process (a) all of the residential,

commercial and institutional solid waste generated by the DoD facilities that will utilize the resource recovery facility, and (b) at least 65 percent by wet weight of the input solid waste into recycled material, fuel or energy. If inability to meet the 65 percent criteria is based on costs so high as to be economically impracticable or lack of market circumstances, then the processing percentage shall be as great as practicable within those circumstances.

3. Use of existing facilities and equipment shall be considered in planning and establishing recycling programs. Equipment, such as balers, available at a Defense installation or activity shall be shared whenever possible to reduce costs.
4. Equipment items for the establishment of recycling programs will be procured through the appropriations normally available for equipment acquisition. The acquisition of replacement equipment, related solely to recycling of solid and other waste materials, is eligible for financing from net proceeds generated by the sale of waste materials. Annual programs for the acquisition of such equipment will be coordinated with the Assistant Secretary of Defense (I&L). The provisions of DoD Directive 5126.15 (reference (s)) shall apply to the acquisition of equipment.
5. The financing of equipment that is jointly used or shared with such activities as the Defense Property Disposal Office or a Commissary store, shall be governed by the procedures applicable to the activity that owns or is accountable for the equipment or facility.

**E. EPA Guidelines Implementation**

1. Within 1 year from the respective dates of promulgation of the EPA Guidelines (references (b), (c), (d) and (e)), DoD Components shall make a final determination as to what actions shall be taken to comply with them and with the requirements of this Directive and submit to the ASD(I&L) a schedule of said actions. Where prescribed by the individual Guidelines, DoD Components shall submit a report to the ASD(I&L) annually thereafter outlining the actions taken pursuant to the applicable Guidelines.
2. Where the determination is made not to adopt the mandatory

requirements prescribed by the applicable EFA Guidelines (references (b), (c), (d) and (e)), the complete analysis and rationale used by the DoD Component in reaching that determination shall be included in the initial submission to the ASD(I&L). The required analysis shall be conducted at least every 3 years thereafter as appropriate and forwarded to the ASD(I&L) in accordance with section VIII., below. The following points will be addressed in the analysis:

- a. A description of ongoing actions, and actions taken or proposed, not in compliance with this Directive. Include a brief description of how specific DoD facilities will be affected.
  - b. A description of the alternative actions considered. Emphasize those alternatives which, if taken, would be in compliance with this Directive.
  - c. An analysis in support of the action chosen by the DoD Component. Include technical data, market studies, and policy considerations utilized in arriving at the determination.
3. Following a technical review of the DoD Component's schedule/analysis, the ASD(I&L) shall submit the determination and/or schedule for required interagency coordination.

## VII. RESPONSIBILITIES

- A. The Assistant Secretary of Defense (Installations and Logistics) shall have primary staff responsibility for this Directive and shall be responsible for:
1. Formulating, developing and monitoring policy for the DoD solid waste management program.
  2. Developing implementing policy and monitoring the storage and disposal of recovered materials generated from solid waste materials.
  3. Programing, planning, approving design criteria, and

conducting technical reviews of facilities for resource recovery and recycling.

4. Establishing a Joint Service Committee to act in an advisory capacity on solid waste management, resource recovery and recycling matters.
  5. Providing necessary interagency coordination with EPA and other Federal Agencies involved in resource recovery and recycling.
  6. Providing technical guidance to the other DoD Components concerning the environmental consequences of their solid waste activities that (a) significantly affect the quality of human environment or (b) are environmentally controversial.
- B. The Director of Defense Research and Engineering shall be responsible for:
1. Establishing a Defense research, development, test and evaluation (RDT&E) plan to identify interim and long range programs in the resource recovery and conservation areas.
  2. Coordinating the RDT&E efforts of the DoD Components in developing systems, equipment and techniques for solid waste management, recycling and resource recovery.
  3. Coordinating DoD resource recovery and recycling research with the work of other Federal Agencies.
  4. Assuring that consideration is given to resource recovery and recycling in other RDT&E projects and programs.
- C. The Secretaries of the Military Departments and the Directors of Defense Agencies shall be responsible for:
1. Identifying those installations which should establish resource recovery programs in accordance with the policies and procedures set forth in this Directive.
  2. Budgeting and financial planning for approved programs which provide for solid waste management, collection, disposal, recycling and resource recovery, consistent with the provisions of this Directive and with mission requirements.

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- D. The Director of the Defense Supply Agency, in addition to VII. C., above, shall be responsible for:
1. Determining market availability for recoverable resources, as well as estimated length of market availability, and furnishing this information to DoD Components within a reasonable time period prior to the establishment of recycling programs.
  2. Negotiating sales contracts for marketable materials recovered from the solid waste as well as contracts for sale of solid waste to public or commercial resource recovery operations.

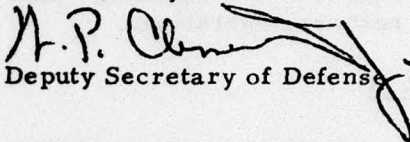
#### VIII. REPORTS

- A. The reporting requirements prescribed by OMB Circular A-106 (reference (r)) and further outlined in VI. D. 1., have been determined to be exempt from interagency approval pursuant to subparagraph 7. d. (2)(a), OMB Circular A-40 (reference (t)). Construction projects prescribed for resource recovery programs under the provisions of this Directive shall be included with the OMB Circular A-106 (reference (r)) projects reported under RCS DD-I&L(SA)1383.
- B. Requirements concerning the solid waste management program implementation and operation reporting are summarized in VI. E. above. For DoD management and control, the assigned Report Control Symbol is DD - I&L (A&AR) 1435 for submission of the required reports to ASD(I&L).
- C. The statutory language of Section 612 of Public Law 93-552 (reference (u)) has been interpreted to mean the proceeds from the sale of recyclable material recovered from solid wastes as encompassed within the provisions of the Directive. Accordingly, the Secretary of each Military Department shall report to Congress annually concerning, as a minimum, the proceeds received from sales of the recovered materials, expenses incurred in this program, the number and costs of projects for environmental improvement and energy conservation, and any remaining proceeds transferred to the prescribed

Budget Account 97-F 3860.5191. A copy of this report shall be provided ASD(I&L) concurrently with its formal transmission to Congress. For DoD management and control, the assigned Report Control Symbol is DD - I&L (A) 1436 for submission of the required reports to Congress.

**IX. EFFECTIVE DATE AND IMPLEMENTATION**

This Directive is effective immediately. Three copies of implementing instructions shall be forwarded to the Assistant Secretary of Defense (I&L) within 90 days.

  
Deputy Secretary of Defense

Enclosures - 2

1. References
2. Definitions

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REFERENCES, Continued

- (b) U. S. Environmental Protection Agency, "Solid Waste Management Guidelines - Resource Recovery Facilities," 40 CFR 245, September 21, 1976
- (c) U. S. Environmental Protection Agency, "Solid Waste Management Guidelines - Solid Waste Storage and Collection," 40 CFR 243, March 15, 1976
- (d) U. S. Environmental Protection Agency, "Solid Waste Management Guidelines - Thermal Processing and Land Disposal," 40 CFR 240 and 241, August 14, 1974
- (e) U. S. Environmental Protection Agency (EPA), "Solid Waste Management Guidelines-Source Separation for Materials Recovery," 40 CFR 246, May 24, 1976
- (f) National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq.
- (g) Solid Waste Disposal Act, as amended, 42 U.S.C. 3251 et seq. (1970)
- (h) DoD Directive 5100.50, "Protection and Enhancement of Environmental Quality," May 24, 1973
- (i) DoD Manual 4160.21-M, "Defense Disposal Manual," June 1973. Authorized by DoD Directive 4160.21, February 23, 1972
- (j) DoD Directive 4100.15, "Commercial or Industrial Activities," July 8, 1971
- (k) DoD Directive 6050.1, "Environmental Considerations in DoD Actions," March 19, 1974
- (l) DoD Instruction 7041.3, "Economic Analysis and Program Evaluation for Resource Management," October 18, 1972
- (m) DoD Instruction 4100.33, "Commercial or Industrial Activities - Operation of," July 16, 1971
- (n) DoD Directive 4165.2, "DoD Real Property Maintenance Activities Program," February 21, 1976
- (o) DoD Instruction 4160.1, "Nonexcess Personal Property to be Sold or Exchanged for Replacement Purposes," March 23, 1971
- (p) DoD Instruction 7310.1, "Accounting and Reporting for Property Disposal and Proceeds from Sale of Disposable Personal Property and Lumber or Timber Products," July 10, 1970
- (q) DoD Instruction 7040.4, "Military Construction Authorization and Appropriation," July 16, 1971

4165.60 (Encl 1)  
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- (r) OMB Circular A-106, "Reporting Requirements in Connection With the Prevention, Control, and Abatement of Environmental Pollution at Existing Federal Facilities," December 31, 1974
- (s) DoD Directive 5126.15, "Delegation of Authority with Respect to Facilities and Equipment for Metal Scrap Baling or Shearing, or for Melting or Sweating Aluminum Scrap," March 13, 1970
- (t) OMB Circular A-40, "Management of Federal Reporting Requirements," May 3, 1973
- (u) Public Law 93-552, "Military Construction Authorization Act, 1975," December 27, 1974

DEFINITIONS

- A. Commercial Solid Waste. All types of solid waste generated by stores, offices, clubs, cafeterias, mess halls, warehouses and other such nonmanufacturing activities, and nonprocessing waste generated at industrial facilities such as office and packing wastes. Construction and demolition wastes are not included in this category.
- B. DoD Facility. Any building, installation, structure, land or public work owned by or leased to a DoD Component. Ships at sea, aircraft in the air or forces on maneuvers are not subject to this Directive.
- C. High grade Paper. Includes letterhead, dry copy papers, miscellaneous business forms, stationery, typing paper, tablet sheets and computer printout paper and cards, commonly sold as "white ledger," "computer printout," and "tab card" grade by the wastepaper industry. Consistent with EPA guidelines, high grade paper is included within commercial solid waste category.
- D. Institutional Solid Waste. Solid waste originating from educational, health care, correctional and other such facilities.
- E. Managing Activity. An administrative element assigned to manage the recycling program (including personnel, funds and equipment) for the purposes of carrying out the objectives of this Directive.
- F. Office Waste. Solid wastes generated in the buildings, room, or series of rooms in which the affairs of a business, professional person, branch of government, etc., are carried on; excludes waste generated in cafeterias, snack bars, or other food preparation and sales activities.
- G. Recycling. The process by which recovered materials are transformed into new/usable products.
- H. Resource Recovery. The process of obtaining materials or energy from solid waste.

- I. Residential Solid Waste. Includes garbage, rubbish, trash and other solid waste resulting from the normal activities of households.
- J. Resource Recovery Facility. Any physical plant that processes residential, commercial or institutional solid waste, biologically, chemically or physically, and recovers useful products, such as shredded fuel, combustible oil or gas, steam, metal, glass, etc., for resale or reuse.
- K. Recoverable Resources. Materials that have useful physical or chemical properties after serving their original purpose and can be reused or recycled for the same or other purposes.
- L. Sludge. The accumulated semiliquid suspension of settled solids deposited from waste waters or other fluids in tanks or basins.
- M. Solid Waste. Includes garbage, refuse, and other discarded solid materials, including solid waste materials, resulting from residential, institutional, industrial, commercial, and agricultural operations, and from community activities. Mining and agricultural solid wastes, hazardous wastes, sludges construction and demolition wastes, and infectious wastes are not included in this category.
- N. Source Separation. The separation of recyclable materials at their point of generation by the generator.

There are three basic categories of paper products: paper (generally 25-35 million tons), pulp (generally 15-20 million tons) and waste paper (generally 10-15 million tons). The waste paper category is the most diverse and is included in Table E-1. In this table, the waste paper category is divided into three sub-categories: (1) waste paper from virgin fiber production, (2) waste paper from recycled fiber production, and (3) waste paper from other sources.

APPENDIX E

CATEGORIES AND USES OF WASTEPAPER

The waste paper category is divided into three sub-categories: (1) waste paper from virgin fiber production, (2) waste paper from recycled fiber production, and (3) waste paper from other sources. The waste paper from virgin fiber production is the most diverse and is included in Table E-1. In this table, the waste paper category is divided into three sub-categories: (1) waste paper from virgin fiber production, (2) waste paper from recycled fiber production, and (3) waste paper from other sources.

The waste paper from recycled fiber production is the most diverse and is included in Table E-1. In this table, the waste paper category is divided into three sub-categories: (1) waste paper from virgin fiber production, (2) waste paper from recycled fiber production, and (3) waste paper from other sources.

The waste paper from other sources is the most diverse and is included in Table E-1. In this table, the waste paper category is divided into three sub-categories: (1) waste paper from virgin fiber production, (2) waste paper from recycled fiber production, and (3) waste paper from other sources.

- 1. Waste paper from virgin fiber production
- 2. Waste paper from recycled fiber production
- 3. Waste paper from other sources

The waste paper from virgin fiber production is the most diverse and is included in Table E-1. In this table, the waste paper category is divided into three sub-categories: (1) waste paper from virgin fiber production, (2) waste paper from recycled fiber production, and (3) waste paper from other sources.

### Role of Paperstock in Paper and Paperboard Production

There are three broad categories of "paper" products: paper (generally 25-28 millions tons), paperboard (28-30 million tons) and construction paper and board (5-6 million tons). The major products within each of these categories are included in Table E-1. In all three cases, production of final outputs from virgin fiber generally progresses as follows:

1. wood harvesting
2. wood pulping in pulp mills
3. paper or paperboard production in paper or board mills
4. conversion to finished products (e.g., envelopes, tab cards, or corrugated boxes.)

For many, paper, paperboard, or construction paper and board categories, "paperstock" -- that is, wastepaper which has been sorted and graded to meet user specifications -- can be a suitable substitute for virgin fiber. Paperstock generally is introduced into the process at the paper/board mill, where it is received dry (generally in bales, to increase density for shipping and storage), pulped on-site, and either mixed with virgin pulp or used as 100% of the "furnish" for making a specific paper or board type.

In total, paperstock, (which by definition excludes paper "broke," the wet or dry waste product produced within a paper or board mill, which generally is re-pulped and used on-site) accounts for over 20% of the fibrous raw material used in the production of new paper and board. This percentage varies widely depending upon the type of paper or board product. Paperstock accounts for only around 7% of total raw material for paper production, versus approximately 35% for paperboard and 24% for construction board. Within these broad categories, an individual paper or board mill may use from 0 to 100% paperstock.

### Paperstock Distribution Network

Wastepaper is generated in virtually every sector of the economy, where it may or may not be collected, sorted/graded, and moved as paperstock. In general, the most important sources of paperstock are:

1. Paper/board converting or printing plants (sources of cuttings or sheets)
2. Paper/board product distributors (sources of over issue newspapers and overruns of particular specification paper products).
3. Wholesale and retail establishments and some industrial plants (sources of corrugated containers and certain other packaging types).
4. Households (sources of used newspapers and various other miscellaneous paper wastes, generally too contaminated and heterogeneous to warrant recovery).
5. Office buildings (sources of mixed paper and/or sorted "high grades" such as tab cards and sorted white or colored ledger).

Paperstock, once recovered, is sold to paperboard (boxboard or containerboard), construction paper and board (wallboard or gypsum board), paper (tissue, writing, or book), or newsprint de-inking mills for use as raw material. In some cases (generally large regional wastepaper generators who have entered into a long-term supply contract with one or more mills), a generator may sell directly to the end user. In this case, it generally will be responsible

Table E-1

Paper and Board Product Types

Paper

Printing and writing paper  
Newsprint  
Groundwood paper, uncoated  
Coated printing and converting paper  
Book paper, uncoated  
Bleached bristols  
Writing and related paper, other

Packaging and industrial converting paper  
Wrapping paper  
Shipping sack paper  
Bag and other sack paper  
Other converting paper  
Glassive, greaseproof and vegetable parchment  
Special industrial paper

Tissue and other creped paper  
Sanitary paper  
Tissue paper

Paperboard

Liverboard  
Corrugating medium  
Folding carton type paperboard  
Tube, can, and drum paperboard  
Other unbleached kraft paperboard  
Container chip and filler paperboard  
Combination bending board  
Combination nonbending board  
Special combination paperboard

Wet Machine Board

Construction Paper and Board

Construction paper  
Construction board

Source: U.S. Department of Commerce, Bureau of Domestic Commerce, "Pulp, Paper, and Board," Quarterly Industry Reports series.

for quality control and for transportation. This is not the usual distribution route, however.

Generally, a wastepaper dealer/packer takes the wastepaper in small bales loose, or compacted, sorts it, compacts it into high-density bales, and sells it to a mill. Alternatively, it is sold to a wastepaper broker who will take title to the material (already baled at the generator's facility) and re-sell it to a mill without actually processing it. In either case, the dealer/packer or broker is responsible to the mill for quality control. Generally, however, both will assure in their contractual or spot dealings with generators that they have the right to refuse acceptance of or return material which does not meet their specifications.

Dealers/packers or brokers may buy on a "spot" basis (i.e., for immediate delivery at the market price) or they may sign long-term contracts with generators or mills or both. These contracts may include provision for guaranteed "floor" prices or they may be tied to one of the regularly published wastepaper price indexes (e.g., the weekly Official Board Markets). Long-term (e.g., 5 year) contracts with floors gained in importance during the 1973-4 supply shortage but seem to have lost ground since (and there are some cases of contracts that were broken in the ensuing market down-turn).

In some cases, a dealer/packer or broker may be owned by a paper company which owns producing mills. Also, more than one dealer/processor and broker may be involved in a single transaction (the so-called "daisy chain"). Nevertheless, the basic distribution route - generator to dealer/packer or broker to consuming mill - is essentially valid.

#### Paperstock Grades

The American Paper Stock Institute, part of the National Association of Recycling Industries (NARI), lists 47 generally used paperstock grades with brief specifications for each, and 26 specialty grades. These conventionally are grouped into "bulk grades" (or "low grades"), consisting of mixed papers, news, and corrugated; and "high grades," consisting of pulp substitutes and de-inking grades. Mixed paper, the lowest paper grade, sells in October 1976 for \$5 - \$10 per ton, while such "high grades" as manilla tab cards or hard white envelope cuttings sell for \$225 per ton.

Paperstock value is partly a function of the characteristics of the underlying wastepaper, including particularly the type of original fiber pulp (groundwood, sulfite, sulfate, or semi-chemical); whether the product is bleached or unbleached; and the inherent presence or absence of contaminants (particularly "hot-melt" or other water-insoluble adhesives, clay or other hard-to-handle coatings, and certain chemicals added to some paper or board products to give them "wet strength"). It also is partly a function of the amount of contamination inherent in the paper's use (for example, a food chain's food wrappers versus "cuttings" from a box plant). Finally, it is partly a function of the practices of the wastepaper generator himself. In particular, all else being equal, paperstock is more valuable (a) the more homogeneous it is (for example, tab cards and colored ledger paper are worth more when segregated and sold separately than when sold together as a "mix") and (b) the lower the level of outside contaminants such as metal, dirt, etc. Also, because storage and shipping and general "transaction costs" per unit are

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reduced, paperstock also generally is more desirable in large quantities (particularly where they are generated on a consistent basis) and in high-density bales.<sup>1</sup>

Because of the above factors, many of the most desirable sources of paperstock really are not "post-consumer waste" at all. For example, cuttings or sheets from paper converting or printing plants are the most significant source of high grades. Similarly, overruns of particular specification papers, custom printed papers, or packages and newspaper overissues are considered more desirable (and hence, as grades, are priced higher) than comparable post-consumer grades.

#### Paperstock Prices

Paperstock is a commodity which, like many other commodities, is subject to fairly broad price savings. The range of paperstock prices in October 1976, as shown for selected grades in Table F-2, is from \$5 to \$225 per ton. In general, post-consumer bulk grades in 1976 have traded in the \$5 - \$35 range (with the low represented by mixed paper and the high represented by No. 1 News), while various high grades have traded from \$75 to \$225 or more. Thus, where clean white ledger (worth \$90/ton) may represent 1/3 - 1/2 of one office's mixed paper (worth \$5/ton as mixed), for example, sorting may be warranted.

In addition to higher prices, high grades also enjoy greater price and demand stability, as shown in Figure F-1. At the peak of the waste-paper market, in the Fall of 1974, high grades were trading in a range of \$125 - \$300 per ton, while low grades were trading at their peaks (in the Spring of 1974) for \$25 - \$50. In both cases, premiums raised the actual prices substantially higher (for example, there were isolated cases of corrugated and news delivered for export for close to \$100 per ton). Six to twelve months later, high grades had fallen as much as 50% in price but were still moving to some degree. Low grade prices had fallen substantially more and for close to a year in many cases could not be given away.

#### Lessons for DA

From the above generalizations about the paperstock industry, the following points can be drawn:

1. The highest revenues per ton can be derived from high grades, which on most bases will be relatively low-volume specialized

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<sup>1</sup>American Paper Stock Institute, Inc., "Paper Stock Standards and Practices," Circular PS-74 (see Appendix G).

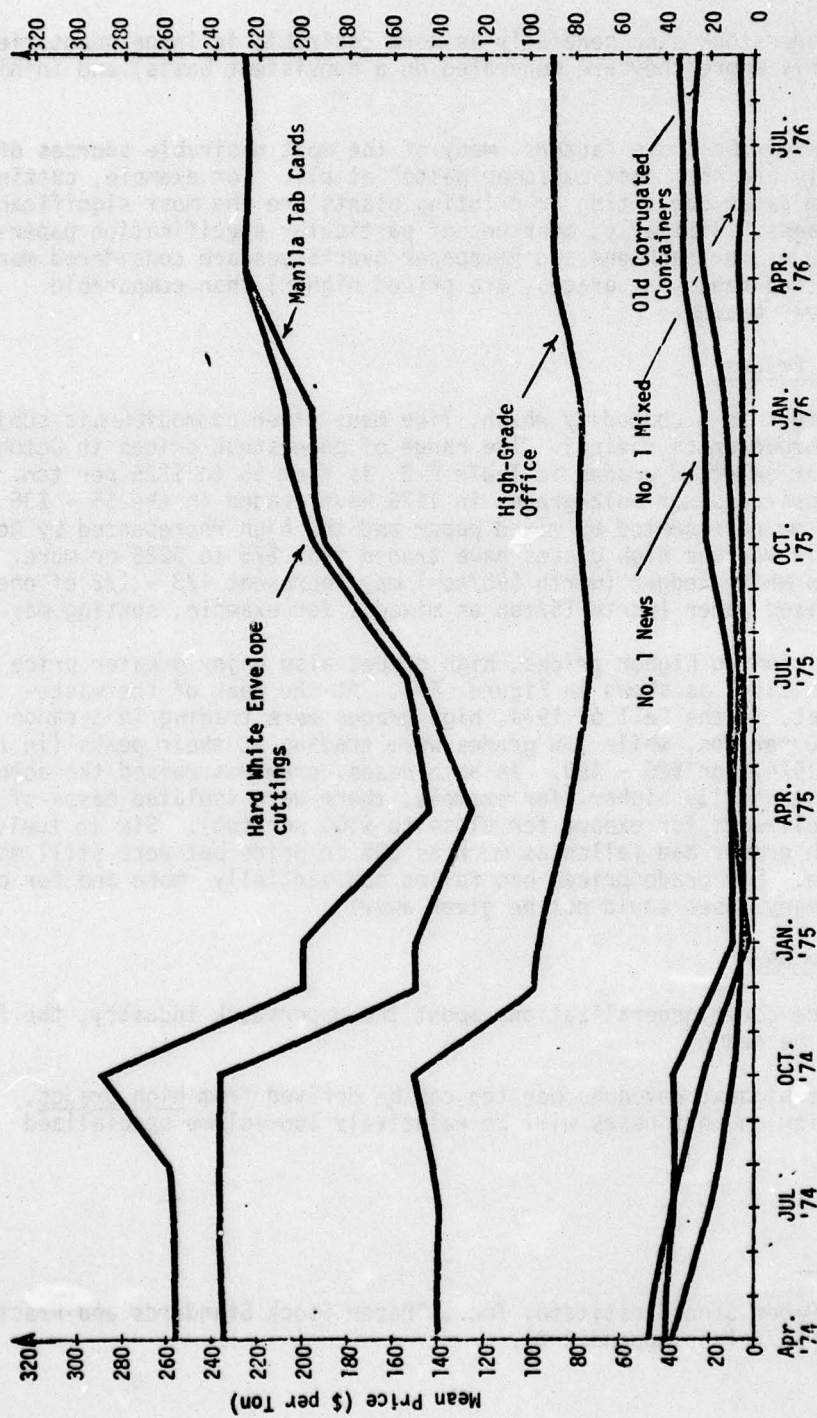


Figure E-1: Price Trends for Specific Paper Grades 1974-1976

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Table E-2:

Illustrative Paperstock Prices, October 1976

(mean price, New York City, as reported in Official Board Markets)

<u>No. <sup>1</sup></u>	<u>Bulk Grades</u>	
(2)	No. 1 Mixed	\$ 7.50/ton
(6)	No. 1 News	35.00
(11)	Old Corrugated Containers	22.50
	<u>High Grades</u>	
(40)	No. 1 Sorted White Ledger	90.00
(37)	Manilla Tab Cards	222.50
(31)	Hard White Envelope Cuttings	225.00

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<sup>1</sup>Refers to grade number as shown in American Paper Stock Institute's "Paper Stock Standards and Practices." (See Appendix G)

paper wastes. The most likely opportunities for recovery of high grades exist in data processing units (tab cards), printing or training units (overruns, out-of-spec sheets, etc.), and those offices where relatively high volumes of high-grade office papers (white or colored ledger) can be segregated economically.

2. Quality control is an extremely important aspect of any paperstock recovery program. The American Paper Stock Institute publishes a number of useful quality control aids (including a Handbook of Contaminants which gives actual samples of each contaminant generally found in wastepaper). However, it also requires clear instructions to and regular supervision of employees involved.
3. The DA may have sufficient volume in certain Property Disposal Regions to justify direct contracting with paperstock consumers. This presumably would result in a slight savings by not having a broker's fee (generally \$2 - \$3 per ton) and possibly in greater leverage over the consumer in soft markets (when mills generally cut down on purchases for which they are not committed on a regular basis). On the other hand, this curtails some extra work and some risk due to reliance on a single customer (as opposed to a broker, who typically deals with many consuming mills).

APPENDIX F  
PAPER STOCK INSTITUTE SPECIFICATIONS

# PAPER STOCK INSTITUTE OF AMERICA

A Commodity Division of  
NATIONAL ASSOCIATION OF RECYCLING INDUSTRIES, Inc.

Paper Stock Standards and Practices

CIRCULAR PS-74



Effective January 1, 1974

Issued from  
ASSOCIATION HEADQUARTERS  
330 Madison Avenue, New York, N.Y., 10017

### PREAMBLE

These standards and practices apply to paper stock for repulping only and are for use in the United States and Canada. Transactions covering shipments to or from other countries shall also be in accordance with these standards and practices, unless modified by mutual agreement between buyer and seller.

Basic to the success of any buyer-seller relationship is an atmosphere of "good faith."

In keeping with this, the following underlying principles have been accepted as necessary to the maintenance of amicable dealings:

1. Seller must use due diligence to ascertain that shipments consist of properly packed paper stock and that shipment is made during the period specified.
2. Arbitrary rejections, deductions and cancellations by the buyer are counter to acceptable good trade practice.
3. Seller shall deliver the quality of paper stock agreed upon but shall not be responsible for its use or the paper or paperboard manufactured therefrom.

### I. The Purchase Agreement

Each transaction covering the purchase or sale of paper stock should be confirmed in writing and include agreement on the following items:

#### 1. Quantity

Where possible the quantity shall always be specified in terms of a definite number of tons of 2,000 lbs. each.

a. If the quantity is specified in tons, the order shall be considered completed when aggregate shipments are 5% under or over the quantity ordered.

b. If the quantity is specified in carloads, a carload is defined as not more than 10% above minimum weight agreed upon.

c. If the quantity is specified in truckloads, unless otherwise agreed to, a truckload is defined as:

A motor truck loaded to full visible capacity but the weight of the load shall not exceed legal limits.

#### 2. Grades

Where possible, each grade purchased shall be specified in accordance with the grade as defined in SECTION VI hereof.

#### 3. Packing

Whether units are to be bales, skids, rolls, pallets, boxes, or bundles should be stated. Where possible, approximate sizes or weights should be specified.

#### 4. Price Units

The price agreed upon shall be clearly stated in dollars and cents per 2,000 lb. ton or in dollars and cents per hundredweight.

#### 5. Transportation Charge

This shall be clearly indicated with the use of the phrases "f.o.b. shipping point" or "delivered destination" or "f.o.b. shipping point—(\$\$\$) freight allowed."

#### 6. Shipping Instructions

Shipping instructions should clearly specify shipping schedule, route, delivering carrier and destination.

#### 7. Shipping Period

The shipping period shall be understood to be within 30 days of date of order unless otherwise specified.

#### 8. Terms

Terms shall be "net cash 30 days after date of shipment" unless otherwise agreed upon.

#### 9. Method of Invoicing

Invoicing instructions shall be clearly stated.

### II. Fulfillment By The Seller

Practices of the seller shall be in accordance with the following:

#### 1. Acceptance

An order is confirmed if verbal or written agreement or initial shipment is received by the buyer.

#### 2. Grading

Paper stock which is sold under the grade names appearing in SECTION VI shall be warranted to conform to those grading definitions.

#### 3. Baling

Each bale must be secured with a sufficient number of bale ties drawn tight to insure a satisfactory delivery.

#### 4. Tare

Sides and headers must be adequate to make a satisfactory delivery of the packing but must not be excessive, nor can they consist of prohibitive materials. The weight of skids or iron cores should be deducted from a gross invoice weight.

#### 5. Identification

The shipper should mark each individual bale as to weight and grade when possible.

#### 6. Loading

Paper stock shall be loaded as follows:

a. Before they are loaded, cars and trucks shall be free from objectionable materials, odors, and have sound floors.

b. Grades should be loaded in straight loads unless otherwise agreed to. When two or more grades are included in the same shipment, units of each grade should be kept together in a separate part of the car or truck.

c. Paper stock must be loaded in a manner that will minimize shifting and breakage. Excessive breakage due to improper loading shall be cause for rejection.

**7. Shipping Notice**

A shipping notice or an invoice showing the date of shipment, car number and contents shall be mailed to the buyer within 24 hours of shipment. On request, a bill of lading should also be furnished.

**8. Invoicing**

Invoicing should conform to instructions on the order and include the following data:

- |                             |                        |
|-----------------------------|------------------------|
| a. Date of Shipment         | f. Number of Bales,    |
| b. Car or Truck Number      | Rolls, etc.            |
| c. Customer's Order Number  | g. Quantity and Grade  |
| d. Shipper's Invoice Number | h. Price and Extension |
| e. F.O.B. Point             | i. Terms               |

**9. Rejection**

When a seller has been notified of a rejection, he must within 48 hours advise the buyer as to which of the following procedures he has decided upon:

- a. Order reshipment of the material.
- b. Require the opportunity to inspect the quality of the rejected material within three business days and during such period give buyer final disposition.
- c. Agree with the buyer to a compromise acceptance and settlement.
- d. Request the buyer to agree to submit the rejected shipment to arbitration.

**III. Fulfillment By The Buyer**

The practice of the buyer shall be in accordance with the following:

**Unloading**

After arrival of the shipment the buyer is to inspect the contents so far as possible while it is still loaded.

If the shipment appears to be in accordance with the order and shipping notice, the buyer shall proceed with the unloading.

Where the bales are tagged or labeled, the buyer shall keep an accurate tally by identifying each bale by number, grade and weight.

If the shipment does not appear to be in accordance with the order and shipping notices, or if the quality of the stock is not in accordance with specifications as agreed, the buyer shall immediately notify the seller of such rejection before unloading.

If during the process of unloading, any portion of the shipment not visible in the original inspection is not in accordance with specifications, shipping notice and order, that portion shall be set aside and the seller immediately notified of its rejection.

If at any time within 21 days after receipt of shipment the buyer upon opening the bales finds objectionable materials heretofore not visible, he

shall have the right to reject the stock and shall immediately notify the seller.

In the event of any rejection, the buyer shall use due diligence to protect all controversial paper stock from external deterioration or contamination.

**Settlement**

In the event that the buyer does not intend to make settlement in accordance with the seller's shipping notice or invoice for reasons **OTHER THAN QUALITY**,

— the buyer shall within 10 days of unloading notify the seller of any necessary changes and shall furnish detailed information with regard to these changes.

**IV. Miscellaneous Practices****1. Ownership**

a. If the shipment is purchased "f.o.b. shipping point" and is in accordance with the agreement covering the transaction, it becomes the property of the buyer upon date of shipment.

b. If the shipment is purchased on a "delivered destination" basis and is in accordance with the agreement covering the transaction, it remains the property of the seller until it is delivered to the buyer by carrier.

c. If the shipment is purchased on an "f.o.b. shipping point-specified freight allowed" basis and is in accordance with the agreement covering the transaction, it becomes the property of the buyer upon date of shipment.

**2. Demurrage Charges**

a. Any demurrage accrued on a shipment due to the failure of the seller to ship in accordance with the order, except with respect to quality, is the liability of the seller.

b. In the event that a rejection for quality stands, any demurrage accruing on the shipment prior to notification to the seller shall be the buyer's liability.

c. In the event that negotiation of a substantiated rejection for quality results in agreement by the buyer to accept the shipment, then only the demurrage, following notification of rejection and including 24 hours after the agreement, becomes the liability of the seller. Demurrage accruing prior to and including the day of notification becomes the liability of the buyer.

**3. Switching and Freight Charges**

Any extra switching or excess freight charges accruing on a shipment due to the failure of the seller to protect the agreed upon minimum rail rate or to ship in accordance with the agreement, is the liability of the seller.

## 4. Weight Discrepancies

No debits, credits or adjustments shall be issued on any shipment of paper stock when the weight variation is 1% or less.

In the event that a discrepancy exceeds those mentioned above as 'allowable,' the buyer and seller shall exchange copies of unloading and loading records showing individual bale weights. In the event that both parties have such records, and errors cannot be determined, it is recommended that the weight closest to the public carrier's scale weight shall be assumed to be correct. In the absence of such records on the part of one of the parties, the records of the other party shall govern.

## 5. Moisture Content

- a. All paper stock must be packed air dry. Where excess moisture is present in the shipment, the buyer has the right to reject it.

## 6. Replacement of Shipment

- a. In the event that any shipment is rejected due to quality,  
Whether or not the shipment is to be replaced is to be decided by mutual agreement between buyer and seller.

## 7. Promptness of Shipment

- a. In the event that shipments are postponed,  
(1) on instructions of the BUYER the seller shall have the option of extending the time limit of the order by the same number of days of the postponement, or of cancelling that portion of the order on which shipment was postponed. Seller shall promptly notify buyer of option selected.  
(2) on instructions of the SELLER the buyer shall have the option of extending the time limit of the order by the same number of days of the postponement, or of cancelling that portion of the order on which shipment was postponed. Buyer shall promptly notify seller of option selected.

## 8. Outthrows

- a. Outthrows shall be understood to be all papers that are so manufactured or treated or are in such form as to be unsuitable for consumption as the grade specified.

## 9. Prohibitive Materials

- a. Any materials which by their presence in a packing of paper stock, in excess of the amount allowed, will make the packing unusable as the grade specified.  
b. Any materials that may be damaging to equipment.

## FOR EXAMPLE

It is important to note in connection with Items 8 and 9 above that a material can be classified as an

"Outthrow" in one grade and as a "Prohibitive Material" in another grade.

Carbon paper, for instance, is "UNSUITABLE" in #2 Mixed Paper and is therefore classified as an "Outthrow"; whereas, it is "UNUSABLE" in White Ledger and in this case is classified as a "Prohibitive Material."

## V. Arbitration

- In the event of a total disagreement between buyer and seller, the dispute should be submitted to arbitration by a mutually satisfactory third party.
- In all cases the cost of arbitration shall be borne by the party found to be at fault.

## VI. Grade Definitions

The grade definitions described are definitions intended to define grades as they should be packed and graded. CONSIDERATION SHOULD BE GIVEN TO THE FACT THAT PAPER STOCK AS SUCH IS A SECONDARY MATERIAL PRODUCED MANUALLY AND MAY NOT BE TECHNICALLY PERFECT.

Any reference in these definitions to the word "soft" shall refer to short fibered stock consisting of predominantly soda pulp and/or hardwood fibres.

Any reference to the word "hard" shall refer to long fibered stock predominantly sulphite or sulphate made of softwood fibres.

## OUTTHROWS

The term "Outthrows" as used throughout this section is defined as "all papers that are so manufactured or treated or are in such a form as to be unsuitable for consumption as the grade specified."

## PROHIBITIVE MATERIALS

The term "Prohibitive Materials" as used throughout this section is defined as:

- Any materials which by their presence in a packing of paper stock, in excess of the amount allowed, will make the packing unusable as the grade specified.
- Any materials that may be damaging to equipment.  
(See example under Section 9, Article IV)

Note: The maximum quantity of "Outthrows" indicated in connection with the following grade definitions is understood to be the TOTAL of "Outthrows" and "Prohibitive Materials."

## (1) #2 — MIXED PAPER

Consists of a mixture of various qualities of paper not limited as to type of packing or fiber content.

202	Prohibitive materials may not exceed.....2%
	Total Outthrows may not exceed.....10%

(2) #1 — MIXED PAPER

Consists of a baled mixture of various qualities of paper containing less than 25% of groundwood stock coated or uncoated.

Prohibitive materials may not exceed.....1%  
 Total Outthrows may not exceed.....5%

(3) SUPER MIXED PAPER

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

Prohibitive materials may not exceed...1/2 of 1%  
 Total Outthrows may not exceed.....3%

(4) BOXBOARD CUTTINGS

Consists of baled new cuttings of paperboard such as are used in the manufacture of folding paper cartons, set-up boxes and similar boxboard products.

Prohibitive materials may not exceed... 1/2 of 1%  
 Total Outthrows may not exceed.....2%

(5) MILL WRAPPERS

Consists of baled wrappers used as outside wrappers for rolls, bundles or skids of finished paper.

Prohibitive materials may not exceed... 1/2 of 1%  
 Total Outthrows may not exceed.....3%

(6) #1 — NEWS

Consists of baled newspapers containing less than 5% of other papers.

Prohibitive materials may not exceed...1/2 of 1%  
 Total Outthrows may not exceed.....2%

(7) SUPER NEWS

Consists of baled sorted fresh newspapers, not sunburned, free from papers other than news, containing not more than the normal percentage of rotogravure and colored sections.

Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

(8) SPECIAL NEWS DE-INK QUALITY

Consists of baled sorted, fresh, dry newspapers, not sunburned, free from magazines, white blank, pressroom over-issues, and paper other than news, containing not more than the normal percentage of rotogravure and colored sections. This packing must be free from tare.

Prohibitive materials.....None permitted  
 Total Outthrows.....1/4 of 1%

(9) OVER-ISSUE NEWS

Consists of unused over-run regular newspapers printed on newsprint, baled or securely tied in bundles, containing not more than the normal percentage of rotogravure and colored sections.

Prohibitive materials.....None permitted  
 Total Outthrows.....None permitted

(10) SOLID FIBRE CONTAINERS

Consists of baled solid fibre containers having liners of either jute or kraft.

Prohibitive materials may not exceed.....2%  
 Total Outthrows may not exceed.....5%

(11) CORRUGATED CONTAINERS

Consists of baled corrugated containers having liners of either jute or kraft.

Prohibitive materials may not exceed.....1%  
 Total Outthrows may not exceed.....5%

(12) NEW CORRUGATED CUTTINGS

Consists of baled corrugated cuttings having two or more liners of either jute or kraft. Non-soluble adhesives, butt rolls, slabbed or hogged medium, and treated medium or liners are not acceptable in this grade.

Prohibitive materials may not exceed.....1%  
 Total Outthrows may not exceed.....5%

(13) NEW DOUBLE KRAFT LINED CORRUGATED CUTTINGS

Consists of baled corrugated cuttings having all liners of kraft. Non-soluble adhesives, butt rolls, slabbed or hogged medium, and treated medium or liners are not acceptable in this grade.

Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

(14) NEW KRAFT CORRUGATED CUTTINGS

Consists of baled corrugated cuttings having all liners of kraft. The corrugated medium must be either semi-chemical or other similar uniform medium. Non-soluble adhesives, butt rolls, slabbed or hogged medium, and treated medium or liners are not acceptable in this grade.

Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

(15) #1 — USED BROWN KRAFT BAGS

Consists of baled brown kraft bags free of objectionable liners or contents.

Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....1/2 of 1%

(16) MIXED KRAFT BAGS

Consists of baled used kraft bags free from twisted or woven stock and other similar objectionable materials.

Prohibitive materials may not exceed.....2%  
 Total Outthrows may not exceed.....5%

(17) SORTED BROWN KRAFT

Consists of baled clean sorted brown kraft papers free from twisted or woven stock, sewed edges and heavy printing.

Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

**(18) NEW COLORED KRAFT**

Consists of baled new colored kraft cuttings, sheets and bag waste, free of sewed or stitched papers.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1%

**(19) NEW BROWN KRAFT CUTTINGS**

Consists of baled new unprinted brown kraft cuttings or sheets entirely free from sewed edges, twisted or woven stock.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1%

**(20) NEW BROWN KRAFT BAG WASTE**

Consists of new brown kraft cuttings and sheets, including misprint bags. Stitched or sewed papers are not acceptable in this grade.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1%

**(21) NEW BROWN KRAFT ENVELOPE CUTTINGS**

Consists of baled new unprinted brown kraft envelope cuttings or sheets.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1%

**(22) MIXED SHAVINGS**

Consists of baled trim of magazines, catalogs and similar printed matter, not limited with respect to groundwood or coated stock, and may contain the bleed of cover and insert stock as well as beater-dyed papers and solid color printing.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....2%

**(23) #1 — GROUNDWOOD SHAVINGS**

Consists of baled trim of magazines, catalogs and similar printed matter free from beater-dyed papers, and may contain not over 5% of solid color printing.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1%

**(24) WHITE NEWSBLANKS**

Consists of baled unprinted cuttings and sheets of white newsprint paper or other papers of white groundwood quality, free of coated stock.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1%

**(25) SUPER WHITE NEWSBLANKS**

Consists of baled unprinted cuttings or sheets of white newsprint of uniform brightness and quality, free of coated stock.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1/2 of 1%

**(26) PUBLICATION BLANKS**

Consists of baled unprinted cuttings or sheets of white coated or filled white groundwood content paper.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1%

**(27) #1 — FLYLEAF SHAVINGS**

Consists of baled trim of magazines, catalogs and similar printed matter. It may contain the bleed of cover and insert stock to a maximum of 10% of dark colors, and must be made from predominantly bleached chemical fibre. Beater-dyed papers may not exceed 2%. Shavings of novel news or newsprint grades may not be included in this packing.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1%

**(28) #1 — SOFT WHITE SHAVINGS**

Consists of baled shavings and sheets of all-white sulphite printing papers, free from printing. This grade may contain sulphite and sulphate papers having a small percentage of groundwood.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1%

**(29) SUPER SOFT WHITE SHAVINGS**

Consists of baled shavings and sheets of all-white sulphite and sulphate printing papers of reasonably uniform brightness free from printing, but may contain not more than 5% of coated papers.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1/2 of 1%

**(30) HARD WHITE SHAVINGS**

Consists of baled shavings or sheets of all untreated white bond ledger or writing papers. Must be free from printing and groundwood.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1/2 of 1%

**(31) HARD WHITE ENVELOPE CUTTINGS**

Consists of baled envelope cuttings or sheets of untreated hard white papers free from printing and groundwood.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1/2 of 1%

**(32) SUPER HARD WHITE ENVELOPE CUTTINGS**

Consists of baled cuttings or sheets of untreated white envelope papers of reasonably uniform brightness free from printing, groundwood and coated stock.

Prohibitive materials.....None permitted  
Total Outthrows may not exceed.....1/2 of 1%

**(33) NEW COLORED ENVELOPE CUTTINGS**

Consists of baled untreated colored envelope cuttings, shavings or sheets of bleachable colored papers, predom-

inantly sulphite or sulphate, free from all printing.  
 Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

**(34) SEMI BLEACHED ENVELOPE CUTTINGS**

Consists of baled envelope cuttings, shavings or sheets of manila-colored papers predominately sulphite or sulphate, free from all printing.  
 Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

**(35) SUPER SEMI BLEACHED CUTTINGS**

Consists of baled cuttings and sheets of untreated sulphite or sulphate papers free from printing.  
 Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....1/2 of 1%

**(36) COLORED TABULATING CARDS**

Consists of printed colored or manila cards predominantly sulphite or sulphate which have been manufactured for use in tabulating machines. Unbleached kraft cards are not acceptable.  
 Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....1%

**(37) MANILA TABULATING CARDS**

Consists of printed manila-colored cards, predominantly sulphite or sulphate, which have been manufactured for use in tabulating machines. This grade may contain manila-colored tabulating cards with tinted margins.  
 Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....1%

**(38) #1 SORTED COLORED LEDGER**

Consists of printed or unprinted sheets, shavings, and cuttings of colored or white sulphite or sulphate ledger, bond, writing, and other papers which have a similar fibre and filler content. This grade must be free of treated, coated, padded, or heavily printed stock.  
 Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

**(39) MANIFOLD COLORED LEDGER**

Consists of sheets and side trim of new printed or unprinted colored or white sulphite or sulphate papers such as are used in the manufacturing of manifold forms, continuous forms, register forms, and similar printed papers. Those forms used once for machine data processing may be included. All stock must be untreated and uncoated.  
 Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

**(40) #1 SORTED WHITE LEDGER**

Consists of printed or unprinted sheets, shavings, and cuttings of white sulphite or sulphate ledger, bond,

writing, and other papers which have a similar fibre and filler content. This grade must be free of treated, coated, padded, or heavily printed stock.

Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

**(41) MANIFOLD WHITE LEDGER**

Consists of sheets and side trim of new printed or unprinted white sulphite or sulphate papers such as are used in the manufacturing of manifold forms, continuous forms, register forms, and similar printed papers. Those forms used once for machine data processing may be included. All stock must be untreated and uncoated.  
 Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

**(42) #1 GRADED MAGAZINES**

Consists of a mixture of dry, clean magazines only; free from newsprint magazines, pulpy magazines, novel news, comic books, pocket books, and all coarse or shivy papers. Movie magazines, television magazines, detective magazines and similar publications are not acceptable.  
 Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

**(43) #1 BOOK STOCK**

Consists of bleached sulphite or sulphate papers, printed or unprinted in sheets, shavings, guillotined books, or quire waste. A small percentage of papers containing fine groundwood adulteration may be included.  
 Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....2%

**(44) PRINTED BLEACHED SULPHATE CUTTINGS**

Consists of printed bleached sulphate cuttings free from misprint sheets, printed cartons, wax, greaseproof lamination, gilt, and inks, adhesives or coatings that are non-soluble.  
 Prohibitive materials may not exceed...1/2 of 1%  
 Total Outthrows may not exceed.....2%

**(45) MISPRINT BLEACHED SULPHATE**

Consists of misprint sheets and printed cartons of bleached sulphate free from wax, greaseproof lamination, gilt, and inks, adhesives or coatings that are non-soluble.  
 Prohibitive materials may not exceed.....1%  
 Total Outthrows may not exceed.....2%

**(46) UNPRINTED BLEACHED SULPHATE**

Consists of unprinted bleached sulphate cuttings, sheets or rolls free from any printing, wax, greaseproof lamination or adhesives or coatings that are non-soluble.  
 Prohibitive materials.....None permitted  
 Total Outthrows may not exceed.....1%

### SPECIALTY GRADES

The grades listed below are produced and traded in carload and truckload quantities throughout the United States and because of certain characteristics (i.e. the presence of wet strength, polycoatings, plastic, foil, carbon paper, hot melt glue) are not included in the regular grades of paper stock. However, it is recognized that many mills have special equipment and are able to utilize large quantities of the grades listed below. Since many paper mills around the world do use these specialty grades, they are being listed below with appropriate grade numbers for easy reference.

The Paper Stock Institute is not establishing specific specifications, which would refer to such factors as the type of wet strength agent used, the percentage of wax, the amount of polycoating, whether it is on top of or under the printing, etc. The specification for each grade should be determined between buyer and seller, and it is recommended that purchase be made based on sample.

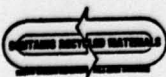
These specialty grades are as follows:

- 1—S White Waxed Cup Cuttings
- 2—S Printed Waxed Cup Cuttings
- 3—S Plastic Coated Cups
- 4—S Polycoated Bleached Kraft—Unprinted
- 5—S Polycoated Bleached Kraft—Printed

- 6—S Polycoated Milk Carton Stock
- 7—S Polycoated Diaper Stock
- 8—S Polycoated Boxboard Cuttings
- 9—S Waxed Boxboard Cuttings
- 10—S Boxboard Cuttings containing Foil
- 11—S Waxed Corrugated Cuttings
- 12—S Wet Strength Corrugated Cuttings
- 13—S Asphalt Laminated Corrugated Cuttings
- 14—S Beer Carton Waste
- 15—S Kraft Carrier Cuttings, Wet Strength Treated
- 16—S White Wet Strength Waste
- 17—S Brown Wet Strength Waste
- 18—S Printed and/or Colored Wet Strength Waste
- 19—S White Glassine
- 20—S Chocolate Glassine
- 21—S Red Glassine
- 22—S Printed and/or Mixed Colored Glassine
- 23—S Flyleaf Shavings containing Hot Melt Glue
- 24—S Manifold Ledger containing Carbon Paper
- 25—S Books with covers
- 26—S Manila and Colored Tabulating Cards in small boxes on skids—unsorted (rubber bands, clips, and correction stickers not removed; percentage of manila cards to be predetermined by buyer.)



Official Copies of this Classification always carry the Association's Seal



APPENDIX G  
IMPLEMENTATION TOOLS

HIGH-GRADE PAPER

1. Sample Kick-Off Memo



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OCT 31 1975

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SUBJECT: USE IT AGAIN SAM program

DATE: November 18, 1975

FROM: Program coordinators USE IT AGAIN SAM  
Technology and Markets Branch, RRD (AM-463)

SUBJECT: PAPER RECYCLING AT WATERSIDE MALL  
FROM: Russell E. Irwin  
TO: All EPA Employees

THE ADMINISTRATOR

TO: Program Monitor(s)  
Room(s)

This is your office's recycling station. These boxes are temporary containers that may be replaced by permanent containers after the program has been operating for about 3 months.

These recycling stations may be relocated if a more convenient location can be found. In order to facilitate daily pick-up of the wastepaper from these stations, they should be next to or near a door leading into the public hallway. Each station is intended to serve approximately 20 people. Thus, as a rule, no station ought to serve less than 10 people or more than 35 people. Should you make any change in location, please inform the program coordinators of this decision.

Your program coordinators are: Steve Howard and Marie Louise Holmes at 755-9140.

For those of you who did not attend the scheduled program monitor meetings last week, this will briefly describe your role:

- a.) to answer employees' questions about the operation of the program;
- b.) to know what the acceptable and unacceptable items are for the program;
- c.) to monitor the recycling stations for contaminants.

Questions you may have about the these three responsibilities may be addressed to your program coordinators.

We would appreciate your help in getting your co-workers to attend one of the USE IT AGAIN SAM educational sessions this week (copy attached).

Our Agency will soon initiate at Waterside Mall the first Federal paper recycling program in the Washington, D.C. area. The object of this program is to recycle all the high-grade white and off-white wastepaper we generate at Waterside Mall. As you may know, EPA has proposed that all Federal agencies recycle their high-grade wastepaper. We hope our program will serve as an example for these agencies. As we approach the Agency's fifth anniversary, it is significant that this program presents a rare opportunity for every individual to contribute personally and tangibly to a collectively significant environmental improvement effort.

By recycling our high-grade wastepaper, we can recover over half of all the waste that leaves EPA's buildings. A contract recently signed for sale of our paper will bring revenues of approximately \$50 per ton to the U.S. Treasury. This is in addition to the facts that recycling conserves energy and natural resources and protects our land from overburdens of waste.

The recycling program at Waterside Mall will be simple; only small changes in our daily habits are required. Each employee will have a desk-top container into which he or she will place white and off-white wastepaper. When the container is filled, about once a week, the employee will empty the accumulated paper into a designated box at conveniently located recycling stations on each floor. These stations will be clearly marked with our USE IT AGAIN, SAM slogan and will be located at a place which each employee frequents in the course of his or her normal business day.

A series of slide shows will be given to acquaint each employee with the program. A schedule of these will be distributed within the next two weeks. I urge each of you to attend. In addition to the slide shows, the Office of Solid Waste Management Programs will provide assistance as required.

Within the next week, program coordinators from that Office will identify convenient recycling station locations and answer questions.

The success of this program depends upon everyone's cooperation.

## 2. Sample In-House Publicity

# USE IT AGAIN, SAM!



Save high-grade white paper for Uncle Sam.

This is the goal of EPA Headquarters employees, who are shunting all high-grade scrap paper into special desk-top containers instead of the wastebaskets.

The paper is collected and sold for recycling into more bond paper. The U.S. Treasury should get about \$50 for every ton collected. Agency employees get the satisfaction of knowing they have (1) reduced disposal problems and costs, (2) saved resources and energy, and (3) practiced what EPA is preaching to others.

High-grade white paper is saved for recycling in the program that began in November when white plastic containers were issued for every desk in Waterside Mall. The containers, supplied by the recycling contractor, Shade, Inc., Green Bay, Wisc., list the types of paper desired: stationery, letterheads, tabulating machine cards, and paper from copying machines and computer printouts.

When the desk-top container is filled, each employee takes it to a nearby collecting station, drops off the accumulated waste paper, and starts over again. The collecting stations are emptied

daily by the building maintenance staff, and the scrap paper stored until there is enough for the contractor's truck to pick up and ship to the paper mill in Wisconsin.

The program follows the guidelines proposed by EPA in September for all Federal agencies. The guidelines urged that Federal agencies take the lead in programs to separate recoverable waste from other types as close as possible to the point of origin. Recovery and recycling of high-grade paper is a first step in this direction. The Agency hopes that similar systems will be started early next year in at least one Federal office in each of the ten Federal regions.

Paper recycling was attempted once before at Waterside Mall, but without success. In mid-1973, EPA made an ambitious attempt to recycle *all* wastepaper at headquarters, segregating it into three categories and placing each kind in a different container. The program soon collapsed because many employees were either unwilling or confused about how to make the separation and because buyers could not be found for the paper that was collected.

The Shade, Inc. system is simpler and has proved effective in more than 300

Instead of throwing paper into the wastebasket, Administrator Russell E. Train, like other Headquarters employees, puts it in his desk-top container for recycling.

commercial and government office buildings around the country, including the old K St. quarters of EPA's Office of Solid Waste Management Programs.

There are no complex instructions to remember. The kinds of paper accepted are listed on all the desk-top containers. A cooperative attitude and a slight change in one's office routine are all that is needed to make the system work.

The program coincides with a separate attempt by EPA Headquarters to buy and use recycled paper for its everyday office needs. As of this writing, the Agency has purchased and is using recycled paper for its copying machines.

The United States recycles a smaller percentage of its wastepaper than any other developed country. Sweden recently passed a law requiring the implementation of a national paper recovery program by 1980. □

3. Sample Invitation For Bids (IFB)

ENVIRONMENTAL PROTECTION AGENCY  
HIGH GRADE WASTEPAPER  
3 FWS-TC-76-62

Sealed Bid

3 FWS-TC-76-62

Sale No.

September 22, 1975

Bid Opening

GENERAL SERVICES ADMINISTRATION (3FWS)  
SURPLUS SALES CENTER  
BUILDING 197, NAVY YARD ANNEX  
2ND & M STREETS, SE  
WASHINGTON, DC 20468

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID					IFB NUMBER	PAGE	
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.
					DOLLARS	CTS	
	<p>Accumulation of surplus personal property consisting of high-grade wastepaper which has been source separated through a recycling program provided by the bidder as specified herein from the Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, during the period of October 1, 1975 through June 30, 1976. This contract does not include the purchase and removal of records that may be disposed of under the provisions of the Act of July 7, 1943 (67 Stat. 380), as amended, but the Contracting Officer may, at his option, call on the contractor for such purchase and removal in accordance with the terms of this contract, and the contractor shall not resell or use as records or documents any such records that he may be called on to purchase or remove. Nothing herein shall be construed as requiring the disposal hereunder of new and additional grades of wastepaper developed during the period of this contract.</p>						
BID NO.—TO BE FILLED IN BY SALES OFFICE		NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)					

BUDGET BUREAU  
NO. 29-80022

(FORM CONTENT COMPLETELY REVISED)

STANDARD FORM 1148  
JAN. 1970 EDITION  
General Services Administration  
PPMB (41 CFR)101-45.3  
114-308

GPO : 1970 OF-400-534

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID					IFB NUMBER	PAGE	
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.
					DOLLARS	CTS	
	<p>The tonnage of high grade wastepaper stated below represents the Government's best estimate of the per month amount to be generated.</p> <p>The Government in no way guarantees these estimates and payment must be based on the actual tonnage delivered.</p>						
		Full Average Market	Full Average PWS	Full Average Minus			
1.	<p>A. High Grade Paper as follows: White Ledger-Source separated and packaged by the holding agency, estimated to total 14 Tons monthly. Contamination not to exceed 1.5% of the boxed weight less skid weight.</p>	Per Ton					
	<p>B. Tabulating Cards-Manila To be delivered in cardboard boxes furnished by the holding agency, estimated to total 1 ton monthly. Contamination not to exceed 1.5% of the boxed weight less skid weight.</p>						
	Bidders are required to bid on each of the above two sub-items.						
	<u>RECYCLING PROGRAM:</u>						
	<p>In order to be eligible for this offering, the offerors must submit, with his bid, a complete program for the recovery of source separated high grade wastepaper produced in the daily operation of the Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460. Award made under this category does not grant the contractor exclusive rights to all wastepaper products generated in the awarded location.</p> <p>Under this program, the contractor agrees to provide the following:</p>						
BID NO.—TO BE FILLED IN BY SALES OFFICE				NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)			

BUDGET BUREAU  
NO. 29-00022

(FORM CONTENT COMPLETELY REVISED)

GPO : 1976 OF-000-336

STANDARD FORM 114B  
JAN. 1976 EDITION  
General Services Administration  
FORM (01 CFR) 101-11.5  
114-500

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID					IFB NUMBER	PAGE	
ITEM NO	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NC
					DOLLARS	CTS	
	<p><u>RECYCLING PROGRAM:</u> (Continued)</p> <p>a. Desk-top collection devices requiring (empty) no more than forty (40) square inches of desk space. These devices shall be provided to all the approximately 2,700 employees housed at the above location (one per employee). Additional devices shall be provided at the contractor's expense in the event of theft, breakage, or the addition of new employees. The Government will not be responsible for loss, breakage, or theft of any collection devices which will remain the contractor's property.</p> <p>b. A definitive separation and collection system consisting of written procedures for and technical assistance in establishing and maintaining the program. The system procedure shall delineate material flow patterns within the building which will optimize labor usage and high-grade wastepaper recovery. Government employees will operate the system.</p> <p>c. An educational and training program package to consist of presentations and written procedures to be presented to all participating Government personnel at the outset of the program.</p> <p>d. Continuing promotional material to include posters, announcements, and other educational devices as deemed necessary by the Government to maintain program performance.</p> <p>e. Labor and equipment to load wastepaper into the rear of truck at the loading dock.</p> <p>f. Necessary pallets initially and, thereafter, on an exchange basis as required. Pallets will remain property of the contractor and the Government will not be responsible for loss, breakage, or theft thereof.</p> <p>The holding agency shall provide the following:</p> <p>a. Boxes in which the paper will be stored.</p> <p>b. Interim storage space before collection by the contractor.</p> <p>c. Labor and equipment associated with boxing and moving wastepaper around the building, palletizing the boxes, and delivery of the wastepaper to the rear of the truck at the loading dock.</p> <p>d. Participation and cooperation in all administrative and education activities.</p>						
BID NO — TO BE FILLED IN BY SALES OFFICE		NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print.)					

BUDGET BUREAU  
NO. 29-80022

(FORM CONTENT COMPLETELY REVISED)

GPO 1970 OF - 400-334

STANDARD FORM 114B  
JAN. 1970 EDITION  
General Services Administration  
GPO (41 CFR) 101-42.3  
114-308

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID					IFB NUMBER	PAGE	
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.
					DOLLARS	CTS	
	<p><b>METHOD OF ESTABLISHING MONTHLY BILLING PRICES:</b></p> <p>Using the average of the highest prices quoted for Manila Tabs for the Eastern Market and White Ledger for the New York Market in those issues of the "Official Board Market" dated within the month in which the paper is removed, the successful bidder will pay the Government for Item #1, A &amp; B, in the various types of packing, the price determined by applying the price differential per ton entered in the appropriate column opposite thereto. IN NO EVENT SHALL THE MINIMUM PRICE TO BE PAID TO THE GOVERNMENT FOR WASTEPAPER DISPOSED OF UNDER ITEM #1, A &amp; B, BE LESS THAN \$30.00 PER TON.</p> <p><b>INSTRUCTIONS TO BIDDERS</b></p> <p>Bidders desiring to bid Average Market with no differential will so indicate by placing an 'X' in the appropriate column. Bids shall be prepared on the forms provided by the Government and strict compliance is necessary with the requirements of the invitation. Bidders must make their own estimates of the facilities including local conditions, uncertainty of weather, and all other contingencies. Erasures or other changes in the bid must be explained or noted over the signature of the bidders.</p> <p>Each bid must give full business address of the bidder and be signed by him with his usual signature. Bids by partnerships must be signed with the partnership name by one of the members of the partnership or by an authorized representative, followed by the signature and designation of the person signing. Bids by corporations must be signed with the name of the corporation followed by the signature and designation of the president, secretary, or other person authorized to bind it in the matter. The names of all persons signing shall also be typed or printed below the signature. A bid by a person who affixes to his signature the word "President" "Secretary" "Agent," or other designation without disclosing his principal may be held to be the bid of the individual</p>						
BID NO.—TO BE FILLED IN BY SALES OFFICE				NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)			

BUDGET BUREAU  
NO. 29-80022

(FORM CONTENT COMPLETELY REVISED)

STANDARD FORM 1146  
JULY 1973 EDITION  
General Services Administration  
GPO (01 CPB)101-48.3  
116-000

GPO : 1975 OF-500-224

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID																															
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID					IFB NUMBER	PAGE																									
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.																								
					DOLLARS	CTS																									
	<b>INSTRUCTIONS TO BIDDERS:</b> (Continued)																														
	<p>signing. When requested by the Government, satisfactory evidence of the authority of the officer signing in behalf of the corporation shall be furnished. <u>ENVELOPES CONTAINING BIDS MUST BE SEALED AND MARKED ON THE UPPER LEFT CORNER WITH THE NAME AND ADDRESS OF THE BIDDER, THE DATE AND HOUR OF OPENING, AND THE INVITATION NUMBER.</u></p> <p>Bids shall be mailed or delivered in time to reach their destination prior to the time set for opening. They shall be addressed to:</p> <p style="padding-left: 40px;">General Services Administration, Reg. 3 Federal Supply Service Personal Property Division 2nd &amp; M Streets, SE Washington, DC 20468</p>																														
	<b>EXAMPLE OF COMPUTATION AND EVALUATION OF BID</b>																														
	<p>Bids will be evaluated by applying the estimated quantities specified against the sub-item quotations and determining the resulting total of each item as illustrated by the following example.</p> <p><b>EXAMPLE OF BID:</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"></td> <td style="width: 16.5%; text-align: center;">Full Average Market</td> <td style="width: 16.5%; text-align: center;">Full Average Plus</td> <td style="width: 16.5%; text-align: center;">Full Average Minus</td> <td style="width: 16.5%;"></td> <td style="width: 16.5%;"></td> <td style="width: 16.5%;"></td> <td style="width: 16.5%;"></td> </tr> <tr> <td style="padding-left: 20px;">1. High-Grade Paper as follows:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 40px;">A. White Ledger-Source separated and packaged by the holding agency, estimated to total 14 tons monthly.</td> <td></td> <td></td> <td></td> <td style="text-align: right; vertical-align: bottom;">\$ 3.00</td> <td></td> <td></td> <td></td> </tr> </table> <p>Example of computation of above bid:</p> <p>Item 1</p> <p style="padding-left: 40px;">a. 14 multiplied by plus \$3.00 = \$42.00</p>								Full Average Market	Full Average Plus	Full Average Minus					1. High-Grade Paper as follows:								A. White Ledger-Source separated and packaged by the holding agency, estimated to total 14 tons monthly.				\$ 3.00			
	Full Average Market	Full Average Plus	Full Average Minus																												
1. High-Grade Paper as follows:																															
A. White Ledger-Source separated and packaged by the holding agency, estimated to total 14 tons monthly.				\$ 3.00																											
BID NO.—TO BE FILLED IN BY SALES OFFICE				NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)																											

BUDGET BUREAU  
NO. 29-80022

(FORM CONTENT COMPLETELY REVISED)

STANDARD FORM 114B  
JULY 1970 EDITION  
General Services Administration  
GPO (41 CFR) 101-45.3  
114-305

GPO : 1970 OF-200-334

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID						IFB NUMBER	PAGE
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE B/D		ITEM NO.
					DOLLARS	CTS	
<b>EXAMPLE OF METHOD USED TO COMPUTE CONTRACT PRICE</b>							
If the price quoted was Full Average Market plus \$3.00, the price paid to the Government for White Ledger removed during the month of March, 1975 would have been computed as follows:							
	March 3		\$ 75.00 per ton				
	March 10		75.00 per ton				
	March 17		75.00 per ton				
	March 24		75.00 per ton				
	March 31		75.00 per ton				
			$\$ 75 \div 5 \text{ (number of issues of the publication during the month)} =$ $\$75.00 \text{ Average price.}$				
			\$75.00 plus \$3.00 equals \$78.00 per ton. Price to be paid to the Government.				
<b>SPECIAL SALE TERMS AND CONDITIONS</b>							
1. Method of Award:							
Award will be made in the aggregate on the basis of the highest monetary return to the Government consistent with minimizing disruption to Government operations caused by removal activities.							
To be considered for award offeror must be regularly engaged in the wastepaper removal or paper recycling business. The offeror must have adequate financial responsibility to carry out all the special terms and conditions of the contract, or must satisfy the contracting officer that such criteria will be met prior to commencement of the contract.							
The contractor's facilities, management, proposed required collection program, collection devices, and financial responsibility to include those of any sub-contractor, will be subject to preaward inspection. The contractor must submit a list of sub-contractors, if any, with his bid.							
BID NO.—TO BE FILLED IN BY SALES OFFICE				NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (per or print)			

BUDGET BUREAU  
NO. 29-00022

(FORM CONTENT COMPLETELY REVISED)

STANDARD FORM 114B  
JAN. 1970 EDITION  
General Services Administration  
PSR (41 C R)101-49.3  
114-308

GPO : 1970 O7-400-300

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID					IFB NUMBER	PAGE	
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.
					DOLLARS	CTS	
	<p><b>SPECIAL SALE TERMS AND CONDITIONS: (Continued)</b></p> <p>Offeror may be rejected on grounds of responsibility if facilities, number of employees, program, collection devices, and/or financial responsibility are determined by the Government to be inadequate for proper performance of the services covered by the solicitation. Rejection may also occur if the proposed program and collection devices fail to meet specifications as described under the section entitled "Recycling Program Requirements."</p> <p><b>FAILURE TO BID ON ALL ITEMS AND ALL SUB-ITEMS MAY BE CAUSE FOR REJECTION</b></p> <p><b>2. Condition of Property:</b></p> <p>Article 2 of the General Sale Terms and Conditions is inapplicable and the following shall apply: All property listed herein is offered for sale "where is" and without recourse to the Government except that the purchaser shall not be obligated to accept any packaged wastepaper that has been determined by the Contracting Officer to be damaged so that the wastepaper has been downgraded overall below the grade (including allowable contaminants) specified in this contract. In connection with the property to be packaged, the purchaser may, upon his request, inspect the same prior to or during the process of packaging; provided such inspection does not delay the packaging.</p> <p>If the contractor alleges that the contaminants exceed 1.5%, a duly authorized representative of the Government will inspect the property at the contractor's facility to determine whether the contaminants in the wastepaper exceed the pre-determined levels.</p> <p>The reasonable cost of removing contaminants above the specified levels as determined by the contractor and the Contracting Officer will be deducted from the amount due the Government by the contractor based on the weight of the contaminants.</p> <p>The Contracting Officer shall be notified immediately by telephone, followed by a letter of confirmation within forty-eight (48) hours, of any adjustments that are claimed to be necessary.</p> <p><b>3. Performance Bond:</b></p> <p>Within ten (10) days after notice of award the successful bidder shall furnish a bond on U.S. Standard Form No. 25, for the faithful performance of the contract, in the amount of \$1,000.</p>						
BID NO.—TO BE FILLED IN BY SALES OFFICE				NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)			

BUDGET BUREAU  
NO 29-R0022

(FORM CONTENT COMPLETELY REVISED)

GPO : 1976 OF-500-354

STANDARD FORM 1148  
JAN. 1970 EDITION  
General Services Administration  
PSRR (41 CFR) 101-45.3  
114-305

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID						IFB NUMBER	PAGE
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.
					DOLLARS	CTS	
4.	<p><b>BID GUARANTEE:</b></p> <p>Article 4, of SF 114C and Special Condition A of SF 114C-2 are inapplicable and the following shall apply: "Each bid must be accompanied by a bid guarantee in the amount of \$500.00. Such bid guarantee may be in the form of a bid bond on U.S. Standard Form No. 24, or in the form of a deposit by money order, certified check, or cashier's check made payable to General Services Administration, Region 3. The bid guarantee shall be submitted with the understanding that if his bid is accepted, he will furnish a performance bond, as required within ten (10) days, after receipt by him of notice of award; and that in the event of failure to furnish the performance bond within the time specified, the bidder shall be liable to the Government for the difference between the amount specified in his bid and the amount for which the Government may otherwise dispose of the material, if the latter amount be less than the former, and the Government shall have the right to retain the proceeds of said guarantee to apply on account of such deficiency in price. Deposits of unsuccessful bidders will be returned when award is made; that of the successful bidder will be returned when performance bond is approved by the Government. If the bid guarantee is submitted on U.S. Standard Form 24, that form shall be amended by striking out the entire condition of the bond beginning with the words "NOW THEREFORE," and ending with the word "EFFECT" and by inserting the following in lieu thereof; "NOW THEREFORE," if the principal, upon acceptance by the Government of his bid identified above within the time period specified therein for acceptance (sixty (60) days if no period is specified), shall execute such further contractual documents and give such bonds, as required in the solicitation and the Principal shall pay the Government the difference between the amount specified in his bid and the amount for which the Government may otherwise dispose of the material if the latter amount be less than the former, then the above obligation shall be void and of no effect."</p>						
5.	<p><b>DELIVERY AND REMOVAL OF PROPERTY:</b></p> <p>Articles 7 &amp; 8 of the General Sale Terms and Conditions are inapplicable and the following shall apply: Title to the wastepaper shall vest in the purchaser upon delivery.</p>						
BID NO.—TO BE FILLED IN BY SALES OFFICE				NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)			

BUDGET BUREAU  
NO. 29-80022

(FORM CONTENT COMPLETELY REVISED)

STANDARD FORM 114B  
JAN. 1970 EDITION  
General Services Administration  
FPMR (41 CFR) 101-43.3  
114-305

GPO : 1970 OF-220-200

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID					IFB NUMBER	PAGE	
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.
					DOLLARS	CTS	
	<b>DELIVERY AND REMOVAL OF PROPERTY: (Continued)</b>						
	<p>Delivery shall be at the loading dock and prior to loading and removal. The purchaser shall reimburse the Government for any damage to Government property caused by removal operations of the purchaser. Furthermore: (a) if the contractor refuses or fails to comply with the terms of the contract, the Government may, by written notice to the Contractor, terminate his right to proceed with the contract or each part of the contract as to which there has been a delay. In such event the Government may have the unfulfilled portion of the contract performed by contract or otherwise, and the contractor and surety shall be liable to the Government for any loss occasioned the Government thereby; or (b) if the contractor fails to remove wastepaper and the Government again asks the contractor to remove the wastepaper and the contractor fails to remove such accumulation within twenty-four (24) hours after receipt of the second request, then the Government may, in addition to any right that it may have under subparagraph (a) above, deliver such paper by Government or other truck to the contractor's storeyard nearest the location of the accumulation or to any railroad siding and the contractor shall, in addition to the price of the paper so delivered, pay the Government \$12.00 per hour per truck used for such deliveries and any storage charges that may be incurred on account of such delay. In addition to the foregoing rights, the Government, may after the expiration of five (5) days after the date specified for removal, and upon two (2) days' written notice (calculated from the date of mailing) of the Purchaser (which two days' written notice may, at the option of the Contracting Officer, be included either partly or wholly in the five days specified above or may be in addition thereto), may resell the property applying the proceeds therefrom against the storage and any other costs incurred for Purchaser's account. Any details shall be arranged with the Contracting Officer, which arrangement shall be reduced to writing.</p>						
	<b>6. REJECTION OF PICK-UPS BEFORE DELIVERY:</b>						
	<p>In the event that the contractor shall refuse to accept and pick-up any accumulation of wastepaper or claim that the accumulation does not properly qualify for the grade nominated, the Contracting Officer shall immediately be advised of such rejection by telephone, followed by registered letter of confirmation within twenty-four (24) hours. The Contracting Officer shall provide for inspection by the Government and shall make the decision as to quality and grade, which decision shall be subject to Article 19 (Disputes)</p>						
BID NO. — TO BE FILLED IN BY SALES OFFICE				NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)			

BUDGET BUREAU  
NO. 29-R0022

(FORM CONTENT COMPLETELY REVISED)

STANDARD FORM 114B  
JAN. 1970 EDITION  
General Services Administration  
PSNR (41 CFR) 101-85.3  
114-505

GPO : 1970 OF-500-524

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID					IFB NUMBER	PAGE	
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.
					DOLLARS	CTS	
	<p><b>REJECTION OF PICK-UPS BEFORE DELIVERY:</b> (Continued)</p> <p>of the General Sale Terms and Conditions. In the event the Contracting Officer agrees that the accumulation does not properly qualify for the grade nominated, he shall attempt to negotiate an equitable price and/or grade. However, the Government reserves the right to sell such accumulation to another purchaser independent of this contract and the Contractor hereby waives any right or claim against the Government resulting either from failure of the offered wastepaper to meet the specified grade or from such sale.</p> <p><b>7. COLLECTION SCHEDULE:</b></p> <p>The Government prescribes that all accumulations of wastepaper shall be removed within three (3) working days upon notification by the holding agency. The term "working day" does not include Saturday, Sunday or legal Federal Holidays.</p> <p><b>8. PAYMENT:</b></p> <p>Payment shall be made by the contractor not later than ten (10) days following the date of the bill submitted by the Government covering each month's deliveries.</p> <p><b>9. TERMINATION FOR THE CONVENIENCE OF THE GOVERNMENT:</b></p> <p>It is understood and agreed that this contract may be terminated for the convenience of and without cost to the Government at any time during the term of the contract, upon notification in writing to the contractor by the Contracting Officer thirty (30) days prior to the effective date of such termination.</p> <p style="text-align: center;">ARTICLE E OF SE-114C-2 IS INAPPLICABLE</p> <p><b>10. INSURANCE:</b></p> <p>The contractor shall secure, pay the premiums for, and keep in force until the expiration of this contract as provided below:</p> <p>Automobile Bodily Injury Liability Insurance with limits of not less than \$50,000 for each person and \$100,000 for each accident, and property damage liability insurance, with limits of not less than \$25,000 for each accident.</p>						
BID NO.—TO BE FILLED IN BY SALES OFFICE				NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)			

BUDGET BUREAU  
NO. 29-R0022

(FORM CONTENT COMPLETELY REVISED)

STANDARD FORM 114B  
JAN. 1970 EDITION  
General Services Administration  
PPH& (41 CFR)101-45.3  
114-305

GPO : 1970 OF-000-000

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID						IFB NUMBER	PAGE
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.
					DOLLARS	CTS	
	<p><b>INSURANCE:</b> (Continued)</p> <p>Each policy of insurance shall contain an endorsement providing cancellation notice as follows:</p> <p>"It is understood and agreed that the Insurance Company shall notify, in writing, the General Services, Admin., Financial Services Branch, Regional Office Building, 7th &amp; D Streets, SW, Washington, DC 20407 thirty days (30) in advance of the effective date of any reduction in or cancellation of this policy."</p> <p>Within ten (10) days after execution of this contract, certified true copies of each policy, manually countersigned, including endorsements thereto, shall be forwarded to the Finance and Services Branch at the above address.</p> <p><b>11. WEIGHING:</b></p> <p>The following provisions shall be in lieu of and substituted for Article 13 of the General Sale Terms and Conditions and the weights thus determined shall govern payment. The weighing will be done on Government scales located at Fuel Handling Plant, 42 Eye Street, SE, Washington, DC or such other scales as meets the approval of the Contracting Officer, by a Government weighmaster or his authorized designee between the hours of 8:00 AM and 4:00 PM, on any day of the week except Saturday, Sunday and Federal Holidays.</p> <p>The following procedure shall be followed without deviation in connection with the weighing of the property, which procedure is set up in sequence corresponding with the movement of the truck(s).</p> <p>A. The wastepaper delivery order furnished by the Government (Form R3199) will be plainly made out in triplicate, by the contractor indicating the following:</p> <p>(a) Contract Number      (b) Truck Number      (c) Date</p> <p>B. All trucks will be weighed empty en route to buildings from which removals are to be made except those properly identified trucks regularly used by the contractor to make daily pick-ups which need only to be weighed empty on the first working day of each month.</p>						
BID NO.—TO BE FILLED IN BY SALES OFFICE				NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)			

BUDGET BUREAU  
NO. 29-RO022

(FORM CONTENT COMPLETELY REVISED)

GPO 1976 OF—000-284

STANDARD FORM 114B  
JAN. 1976 EDITION  
General Services Administration  
FPMR (41 CFR) 101-45.3  
114-305

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID						IFB NUMBER	
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.
					DOLLARS	CTS	
	<p><b>WEIGHING:</b> (Continued)</p> <p>C. The tare weight will be filled in, dated and signed by the weighmaster.</p> <p>D. All three (3) copies will then be taken by the Contractor's representative to the building where removal is to be made.</p> <p>E. The Government representative thereat will enter the number of units of each grade of paper removed, date and sign all copies.</p> <p>F. The contractor or his representative receiving the paper, will also date and sign all copies of the wastepaper delivery order form and leave the third copy with the Government representative as a receipt.</p> <p>G. The contractor's representative will take the original and duplicate copy of the wastepaper delivery order form with the loaded truck to the official scales where the weighmaster will note or stamp thereon the weight of each grade and the date and hour of weighing and sign them.</p> <p>H. It is imperative that the information on each delivery order form be completed. Weight tickets must be provided to the Government with the completed delivery order.</p> <p>12. <u>LOST ARTICLES:</u></p> <p>It is understood and agreed that any department or establishment shall have the right to require the contractor to make search of the paper collected by him for any article or thing lost or supposed to have been lost. The reasonable cost of such search will be deducted from the amount due from the contractor or paid directly by the Government upon submission by the contractor of a properly itemized and duly certified bill in substantially the following form:</p>						
BID NO.—TO BE FILLED IN BY SALES OFFICE		NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)					

BUDGET BUREAU  
NO. 29-0022

(FORM CONTENT COMPLETELY REVISED)

STANDARD FORM 114B  
JAN. 1970 EDITION  
General Services Administration  
PSHS (41 CFR)101-45.3  
114-305

GPO : 1970 OF-480-000

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID									
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID						IFB NUMBER			
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.		
					DOLLARS	CTS			
	<p>This is to certify that the actual expense incurred in search of wastepaper from Department _____, 19____, requested by _____ was \$ _____.</p> <p>_____ (Firm Name)</p> <p>Subscribed and sworn to before me this _____ day of _____</p> <p>_____ (Notary Public)</p> <p>(Affix Notarial Seal)</p> <p><b>13. SUPERVISION AND IDENTIFICATION—EMPLOYEES AND TRUCKS:</b></p> <p>The contractor in performing his functions hereunder shall supervise, in such manner as shall be approved by the Government, the removal and carting of the wastepaper to insure that total location collections arrive at the weighing depot. In addition, the contractor shall provide his employees with appropriate visual identification bearing the name of the contractor and serial number identifying the employee. Trucks engaged in the removal of wastepaper from Government premises shall bear such prominent markings as may be approved by the Government showing the name of the contractor and wording as follows:</p> <p>"United States Wastepaper Recovery Contract No. _____ (Number to be assigned by the Government). Such markings shall be securely affixed to each truck so as not to be readily removed or concealed.</p>								
BID NO.—TO BE FILLED IN BY SALES OFFICE				NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)					

BUDGET BUREAU  
NO 29-R0022

(FORM CONTENT COMPLETELY REVISED)

GPO : 1979 OF-500-524

STANDARD FORM 114B  
JAN. 1970 EDITION  
General Services Administration  
PSWS (41 CFR)101-45.3  
114-305

3. Sample Invitation For Bids (IFB), cont.

RETURN WITH BID							
SALE OF GOVERNMENT PROPERTY—ITEM BID PAGE—SEALED BID						IFB NUMBER	PAGE
ITEM NO.	ARTICLES FOR SALE	QUANTITY (No. of Units)	UNIT OF MEASURE	PRICE BID PER UNIT	TOTAL PRICE BID		ITEM NO.
					DOLLARS	CTS	
<p>IF THE BIDDER HAS ANY QUESTION OR NEED FOR CLARIFICATION REGARDING ANY PART OF THIS OFFERING, BIDDER MUST CONTACT GENERAL SERVICES ADMINISTRATION, REGION 3, FEDERAL SUPPLY SERVICE, PERSONAL PROPERTY DIVISION, SURPLUS SALES CENTER, BUILDING 197, 2ND &amp; M STREETS, SE, WASHINGTON, DC 20468 - TELEPHONE: Area Code 202-062-2596.</p> <p>PROTESTS CONCERNING SPECIFICATIONS OR TERMS OF THIS OFFERING SHOULD BE SUBMITTED IN WRITING, PRIOR TO THE BID OPENING.</p>							
BID NO.—TO BE FILLED IN BY SALES OFFICE				NAME OF BIDDER AND IDENTIFICATION NO., IF APPLICABLE (Type or print)			

BUDGET BUREAU  
NO. 29-R0022

(FORM CONTENT COMPLETELY REVISED)

STANDARD FORM 1148  
JUNE 1970 EDITION  
General Services Administration  
FORM (41 CFR) 101-43.2  
114-908

GPO : 1970 OF-225-225

USED CORRUGATED CONTAINERS

1. Sample Contamination Poster

**STOP** keep these  
contaminants  
out of waste paper

**RUBBISH**

- food scraps • dirt • rags
- chemical & cement bags
- wet strength bags & boxes
  - paper cups
  - milk cartons
- floor sweepings
- ink wads

**COATED & TREATED PAPERS**

- photographic
- blueprint • parchment
- foil • wet strength
- copy machine paper
- carbonless paper

**SHINY PAPERS**

- glassine
- wax
- lacquered
- cellophane

**BINDINGS**

- hard cover books
- metal
- plastic
- adhesives
- latex

sheet & foam **PLASTICS**

**ASPHALT & CARBON PAPERS**

- tar laminated
  - wrapping paper
- insulation bags
- multi-wall bags with black liners
- tar laminated gummed tape

**JUNK**

- wire • wood
- paper clips
- rubber bands • glass
- string • plastics • metal

**CLEAN PAPER STOCK IS GOOD BUSINESS**

Developed by Paper Stock Conservation Committee American Paper Institute

The Paper Stock Conservation Committee issues posters for handling of waste paper to aid them in reducing contamination

NEWSPRINT AND MULTI-MATERIAL

1. SAMPLE BID SPECIFICATIONS

\_\_\_\_\_ COUNTY

STATE OF \_\_\_\_\_

DEPARTMENT OF SANITATION

NOTICE

The Purchasing Agent of \_\_\_\_\_ County, \_\_\_\_\_, will receive proposals in his office, Room \_\_\_\_\_, Bldg. \_\_\_\_\_, until \_\_\_\_\_, 19\_\_\_\_ a.m./p.m. Prevailing Time:

PURCHASE OF WASTE NEWSPAPERS SEPARATELY COLLECTED  
UNDER CONTRACT FROM \_\_\_\_\_ COUNTY

Plans, specifications, and standards for this work, as well as proposal forms may be obtained in the office of the Purchasing Agent, (address) \_\_\_\_\_. The description which follows is only a summary of the specifications.

The County specifies that the contractor shall guarantee for the period specified in the contract to purchase on a daily basis, at the price as determined in the contract, all waste newspapers collected under any contract from \_\_\_\_\_ County which are delivered to a mutually agreed upon site(s) located within the legal limits of \_\_\_\_\_ County.

The exact quantity of newspapers to be sold under this contract is unknown, but is estimated for information purposes only to be about \_\_\_\_\_ (No. of) tons per month. The newspapers shall be delivered to the receiving site in an "as picked up" condition; no processing of newspapers will be done by \_\_\_\_\_ County or its collection contractors. All processing, transportation or service charges incurred after delivery of the newspapers to the receiving site shall be the obligation of the newspaper purchaser.

The price per ton (ton equals 2,000 pounds) for purchase shall be the highest marked value as determined by the "Paper Stock Prices Per Ton" for "No. 1 News" in the Market Area of the City of \_\_\_\_\_ as printed in the *Official Board Markets* ("The Yellow Sheet") less a fixed charge to the object of this bid. The purchaser guarantees to purchase all accumulated and delivered waste newspapers at a minimum price of \$ \_\_\_\_\_ per ton.

The term of the contract shall be for \_\_\_\_\_ year(s), commencing \_\_\_\_\_, 19\_\_\_\_ and be renewable for \_\_\_\_\_ year(s).

The County reserves the right to reject any and all bids.

Envelope to be clearly marked "Sealed Bid on Newspaper Purchase" in the lower left hand corner.

Signed \_\_\_\_\_  
Purchasing Agent

\_\_\_\_\_ County

## 2. Sample Invitation For Proposals

HALL'S 303 WEST CORNING - 15TH AVENUE - FULLERTON, CALIFORNIA 92731

April 19, 1973



### CITY OF FULLERTON

#### NOTICE INVITING PROPOSALS FOR THE COLLECTION AND DISPOSAL FOR RECYCLING OF WASTE NEWSPRINT

The City of Fullerton invites the submission of proposals by responsible operators for the curbside collection of waste newsprint from households and business establishments within the city for the specific purpose of recycling.

Collections are to be made to conform to the routes and schedules of the City's regular rubbish collection, with adequate, safe equipment and pick-up and hauling without litter. Proposals should be based on a price per ton collected. Depending upon the competitiveness of the proposals, it is expected that the City will be paid for each ton collected or will pay for the service based upon ton unit. Proposals should recite equipment, labor and the frequency of collections preferred. The contract will be for an initial period of one year although a longer term may be considered.

It is anticipated that the contractor will be required to use public scales to measure and verify tonnage collected, and that he will be required to provide a performance bond guaranteeing service in accordance with his contract.

It is anticipated that a contract will be negotiated with the party submitting the proposal judged to be the most advantageous to the City.

Proposals will be submitted to the office of the City Clerk prior to 10:00 a.m. on the 29th of May, 1973. They will be opened in the office of the City Administrator shortly thereafter. It is anticipated that a report and recommendation thereon will be made to the City Council at their meeting of June 5, 1973.

Additional information can be obtained from Mr. Vince Jackson in the office of the City Administrator, City Hall, Fullerton up to the proposal acceptance deadline.

A specimen proposal has been attached hereto. It is not intended to be all-inclusive of all of the factors that may warrant consideration.

WILLIAM F. CORNETT  
CITY ADMINISTRATOR

Attachment

*Did also file to attached*

#### SPECIMEN PROPOSAL

I, \_\_\_\_\_, an individual, (firm, partnership, corporation, etc.) make the following proposal to the City of Fullerton.

I propose to pick up all newsprint at curbside, whenever placed, separated and bundled, immediately preceding or following the regular refuse pickup service on the first scheduled day each month within each collection zone. In performing this work, I propose to use two and a half ton stake trucks with driver and swamper. The newsprint will be weighed as required and delivered to a recycling plant in \_\_\_\_\_ He anticipate that three trips will be made each collection day. We will provide service to pick up missed collections, utilizing a local telephone relay service to our equipment so that all missed collections will be serviced the same day. We will pay to the City of Fullerton, based on their validation of our weigh ticket from public scales, on the following schedule:

10 to 20 tons per mo.	\$ _____
21 to 30 " " "	\$ _____
31 to 40 " " "	\$ _____
41 to 50 " " "	\$ _____

The proposal is made with the understanding that we will adhere to all of the state laws and ordinances governing contract services with the City of Fullerton. We will provide the City with a performance bond in the amount to be agreed upon, to guarantee service as specified in any contract negotiated with the City.

We would expect a contract for a minimum period of \_\_\_\_\_ years, commencing no later than \_\_\_\_\_, 1973.

Signed \_\_\_\_\_

Address \_\_\_\_\_

Date: \_\_\_\_\_

3. Samples of Advertising Tools

**ORDER FORM**

The following materials are available at cost to help you promote paper drives in your community.

ITEM	COST	NUMBER	TOTAL COST
Doorknob Hangers	\$1.50 per hundred	_____	_____
Posters for Store Windows		_____	_____
Trailer Location	\$ .25 each	_____	_____
Home Pick Up	\$ .25 each	_____	_____
Recycling Buttons	\$ .10 each	_____	_____
MAIL TO:			
Paper Stock Conservation Committee			
American Paper Institute, Inc.			
260 Madison Avenue			
New York, New York 10016			
Gentlemen:			
Attached is our check for \$ _____ . Please send ordered materials to:			
Name _____			
Address _____			
City _____ State _____ Zip _____			
Name of Organization _____			
*For deliveries in New York City, add 7% sales tax.			
For deliveries elsewhere in New York State, add the appropriate amount.			
			TOTAL _____
			POSTAGE & HANDLING \$ .50

The body of this book was printed on paper made from recycled paper fibers.

3. Samples of Advertising Tools, cont.


PUBLICITY MATERIAL FOR YOUR CAMPAIGN

Model  
News Release . . .

(YOUR NAME) \_\_\_\_\_  
 (PHONE) \_\_\_\_\_ GROUP PAPER DRIVE  
 TO AID ENVIRONMENT

(NAME OF GROUP) announced today that it is launching a series of paper drives to aid the environment and to raise money for \_\_\_\_\_ Drives will be conducted at monthly intervals on the (1st, 2nd, 3rd, 4th day of the month) \_\_\_\_\_ at \_\_\_\_\_ (date) \_\_\_\_\_ (time) \_\_\_\_\_ drive will take place \_\_\_\_\_ areas bordered by \_\_\_\_\_ (streets) \_\_\_\_\_ Your separately bundled old newspapers will be picked up at your house or you may drop them off at \_\_\_\_\_ (location of trailer) \_\_\_\_\_ old newspapers for this drive. By bundling your old newspapers into our income for a you can help turn your waste into the solid waste worthwhile cause and help reduce the United States volume in (city or county) \_\_\_\_\_ Last year United States paper and paperboard mills recycled 2,000,000 tons of old newspapers into packaging materials, newsprint and building products. Only newspapers will be collected - no magazines or books please. P.S. We're sure your local library or hospital would be grateful to receive your old magazines and books.

DATE \_\_\_\_\_

**THE RECYCLING BRIGADE IS COMING** 

Group Name \_\_\_\_\_  
 Please bring your boxed, bundled or bagged newspapers to: \_\_\_\_\_ (address)  
 On: \_\_\_\_\_ (date) \_\_\_\_\_ (time)  
 Help us raise money to finance important activities by recycling old newspapers.

Poster  
 (Poster pictured announces trailer location. Another poster announcing the schedule for home pick-up is also available.)

**THE RECYCLING BRIGADE IS COMING** 

Save Your Old Newspapers!  
 NO MAGAZINES PLEASE  
 Stack your bundled newspapers where we can pick them up without bothering you. Thank you.

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

Doorknob Hanger



Arlington County, Virginia  
UTILITIES DEPARTMENT  
Court House, Room 213  
Arlington, Va. 22201



Bulk Rate  
U.S. Postage  
PAID  
Arlington, Va.  
Permit No. 505

4. Sample Mass Mailing

## Newspaper Collection Guidelines

January 1974

Dear Arlingtonians,

Environmental problems seem to be constantly before us. We all are aware of our short supply of natural resources; we all want to live in a healthier environment. Recognizing that recycling of reuseable materials can help in solving both the problems of shortages and pollution, Arlington County on January 14 began separate newspaper collection. Newspapers will be collected every other week on your regular collection day and sold for recycling. A calendar showing your 1974 newspaper collection dates is on the back.

### HERE'S WHAT TO DO:

1. Keep your clean newspapers separate from other refuse. Newspapers and brown paper bags only will be accepted because the paper processing facilities which will recycle the paper into newsprint cannot handle the specially coated paper of most magazines.
2. The newspapers must be either tied in a bundle or put untied into a brown grocery bag. They can only be collected if they are bundled or bagged because the paper processing facilities have no economical way of removing anything that will contaminate the paper, other than string or twine.
3. Place your papers at curbside by 6:30 a.m. on your collection day. If it rains or snows on your trash day, still put your papers out. Much of the moisture will be squeezed out during transit.
4. If you are already giving your papers to a charity, please continue to do so, if you so choose.

Arlington private homes generate about 4,800 tons of newspaper yearly which must be hauled to the I-95 landfill at a cost of almost \$41 per ton. Not only can we eliminate this cost if everyone participates, but we can conserve the scarce landfill space for items that cannot be recycled. For every ton of paper recycled, approximately 15 trees are saved thus conserving a valuable natural resource.

ARLINGTON COUNTY DEPARTMENT OF UTILITIES

4. Sample Mass Mailing, cont.

Newspaper Collection — Route No. 7

1974

JANUARY							FEBRUARY							MARCH							
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
		1	2	3	4	5					7	8	9					7	8	9	
6	7	8	9	10	11	12	3	4	5	6	14	15	16	3	4	5	6	14	15	16	
13	14	15	16	17	18	19	10	11	12	13	21	22	23	10	11	12	13	21	22	23	
20	21	22	23	24	25	26	17	18	19	20	28			17	18	19	20	28	29	30	
27	28	29	30	31			24	25	26	27				24	25	26	27				
APRIL							MAY							JUNE							
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
	1	2	3	4	5	6				1	2	3	4							1	
7	8	9	10	11	12	13	5	6	7	8	9	10	11	2	3	4	5	6	7	8	
14	15	16	17	18	19	20	12	13	14	15	16	17	18	9	10	11	12	13	14	15	
21	22	23	24	25	26	27	19	20	21	22	23	24	25	16	17	18	19	20	21	22	
28	29	30					26	27	28	29	30	31		23	24	25	26	27	28	29	
JULY							AUGUST							SEPTEMBER							
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
	1	2	3	4	5	6					1	2	3		1	2	3	4	5	6	7
7	8	9	10	11	12	13	4	5	6	7	8	9	10	8	9	10	11	12	13	14	
14	15	16	17	18	19	20	11	12	13	14	15	16	17	15	16	17	18	19	20	21	
21	22	23	24	25	26	27	18	19	20	21	22	23	24	22	23	24	25	26	27	28	
28	29	30	31				25	26	27	28	29	30	31	29	30						
OCTOBER							NOVEMBER							DECEMBER							
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
		1	2	3	4	5						1	2		1	2	3	4	5	6	7
6	7	8	9	10	11	12	3	4	5	6	7	8	9	8	9	10	11	12	13	14	
13	14	15	16	17	18	19	10	11	12	13	14	15	16	15	16	17	18	19	20	21	
20	21	22	23	24	25	26	17	18	19	20	21	22	23	22	23	24	25	26	27	28	
27	28	29	30	31			24	25	26	27	28	29	30	29	30	31					

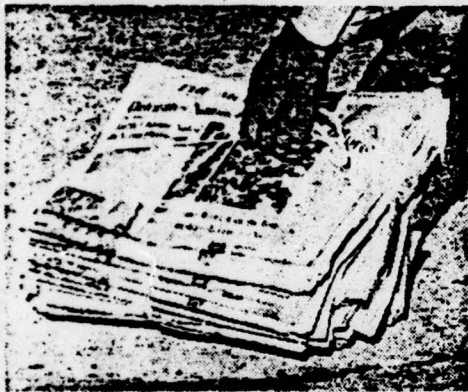
(Note. Papers will not be collected Christmas Day or New Year's Day.)

INSTRUCTIONS

1. Clean newspapers only, tied in bundles of not more than 50 pounds, or put in paper bags.
2. Put papers curbside by 6:30 a.m. on collection day.
3. Trucks collecting the paper will be blue with "Arlington County Resource Recovery Program" on the side. If unauthorized persons take your papers, please attempt to get a license number and notify the police.

# City Sets Jan. 10 Start For Newspaper Recycling

## Save a Bundle



## Simple ABCs Of Recycling

To prepare your old newspapers for collection and recycling:

- Simply stack them neatly for ease of handling.
- Tie the stack in two directions with cord or stout twine.
- Include only newspapers. Magazines and other paper products cannot be handled.
- Set your old newspapers at your curb weekly — on Wednesday nights if garbage is collected on Wednesday nights in your neighborhood, or on Thursday nights if Thursday is a collection night in your area of the city.

Shareholders and mutual funds are not the only investors who have paper profits.

Beginning Jan. 10, the City of Allentown also will have paper profits. Perhaps it would be more accurate to say profits from paper — used newsprint.

That's the date when Allentown's citywide newspaper collection-recycling program gets under way. And the advantage the city will have over stock-market players is that Allentown's profit will be hopefully continual rather than occasional.

Even though the city will sell the waste paper for much-needed revenue, environmental protection is the primary purpose of the program. Allentown is seeking to avoid the prospect of burying itself, and its neighbors, in trash.

City Council recently authorized the program on a recommendation of its Ecology Advisory Committee. Mayor Clifford S. Bartholomew said yesterday the program actually begins on Jan. 8, even though collections will not be made until Jan. 10 and 11.

The recycling project follows a successful 13-week test begun in the city's West End in September. During the trial period, three tons of old newspapers were collected weekly from about 1,700 homes, or 7 per cent of the city's residences.

"I'm particularly pleased by the result of the test because it shows that Allentonians have the will to cooperate for the good of our environment," Mayor Bartholomew said.

"I feel certain that citizens in the areas of the city that this important program will now reach, will give it the same excellent support demonstrated by the residents of the test area," he added.

The mayor said he was "particularly pleased that government, private citizens and business joined together in a positive effort to improve our environment."

The Call-Chronicle Newspapers provided a \$1,000 grant to underwrite the costs of the test.

Sanford T. Beldon, ecology committee chairman, estimates that the program will result in average weekly collections of 30 tons of newsprint. Through recycling, these newspapers will be kept out of sanitary landfills and thereby slow the rate at which they are being filled.

Beldon also estimates that the program will preserve 25,000 trees annually on the basis that

Continued on Page 13, Column 2

5. Sample Newspaper Publicity, cont.

## City Sets Jan. 10 Start For Newspaper Recycling

Continued From Page 5

17 trees are required to make a ton of newsprint. papers — For a Better Tomorrow."

The Hoch Contracting Co., the Allentown firm that has a contract with the city to collect garbage and trash, will handle the newspaper collections on regular garbage collection nights.

In areas where garbage pickup is made on Monday, Wednesday and Friday nights, bundled newspapers should be placed at the curb for collection on Wednesday nights. In areas where it is picked up on Tuesday, Thursday and Sunday nights, newspapers will be collected on Thursday nights.

Newspapers will be collected from 32,000 homes in the city — one, two, three and four-family dwelling units that are serviced by the city garbage collection.

For Hoch's additional service on the newspaper program, the city has agreed to pay the contractor \$1,050 a month beyond his 40 per cent share of revenue from the sale of the paper to a waste dealer.

The revenue-sharing arrangement with Hoch was proposed by the city as an incentive to the contractor for good performance. It also enabled the city to offer a lower base price for the service.

If the city does not make a profit after expenses are deducted, officials at least expect it to "break even."

The success of the Allentown test program has attracted the interest of Elizabeth, N.J., and Huntington, W.Va.

Promotion of the citywide recycling program will begin after the New Year, when volunteers begin placing literature and posters describing the program in store windows.

Descriptive literature will be mailed by the city with real estate tax statements at the end of January. The program theme will remain the same: "Save a Bundle. Yesterday's News-

Others on the ecology committee are Councilmen Joseph S. Daddona and James W. Crawford, Donald Marushak, George Hangan, Robert Levene, Charles Hoch and Mrs. Agnes Schaffer.

Daddona was chairman of council's subcommittee on newspaper recycling.

# City's First Night Haul Of Papers — 14.1 Tons

Allentown's first night of its citywide collection of newspapers realized 14.1 tons of material for the recycling program, officials reported today, expressing satisfaction.

"We're off to an excellent start," said Sanford T. Beldon, chairman of City Council's Ecology Advisory Committee, noting the production by West End householders realized half of the anticipated weekly goal of 25 to 30 tons.

"The effort appears to be on target and it certainly pleases me, especially in view of the fact a considerable amount of the paper was picked up by others than the municipal contractor.

"We'll know full results of the first week's effort tomorrow and if the trend holds up in the future, I'm sure we'll be satisfied," he said.

The other half of the city — the East and South sides — will participate in the program tonight when their accumulated bundles of old newspapers will be placed at the curb for the special pickup project carried out by the garbage contractor.

Echoing Beldon's remarks was Donald R. Marushak, the city's environmental programs coordinator, who considered the response one of "superb cooperation."

#### Self-Supporting

He reported the city, at its contract price of \$12 a ton, received \$169.20 from Allen Waste Co., the depository for the newspapers, and said if the rate of response continues, earnings will offset the city's costs.

The collection cost to the city

is \$1,050 per month and last night's figures indicate a weekly yield in the neighborhood of \$340, or an average of about \$1,500 a month.

Despite the apparent success of the introduction, there is reason to believe there may have been unwarranted outside collections during the night and if suspicions are verified, such operations may lead to restrictive legislation on the part of the city.

Officials said the target of any legislation would not be the Boy Scouts, churches, senior citizens or handicapped individuals who long have been collecting newspapers for extra money. The legislation would be to block outside professionals who may be trying to take advantage of the program at the expense of the city's effort.

Several large trucks were discovered in the collection area last night, long in advance of the

garbage collector's rounds, and there is some reason to believe they were non-resident interests. If it is found to be the case, action will be taken, officials said.

Police Chief Carson S. Gable advised his men to take license numbers to trace source, but to otherwise not interfere.

Beldon, in a tour of the collection area between 9 and 10 p.m., reported curb placements were "spotty" and said in some sections whole blocks of streets appeared to have been "stripped" of bundles.

He recalled that during the pre-program trial period a truck from Catasauqua was discovered collecting papers and said the matter was particularly "bothersome" to officials and the citizenry alike.

A spokesman for Hoch Contracting Co., the collection contractor, also reported the night's

Continued on Page 36, Column 1

5. Sample Newspaper Publicity, cont.

## City's First Night Haul Of Papers—14.1 Tons

(Continued From Page Thirty-one)

curb production, in some areas, was "less than expected."

Beldon said he received calls today from several citizens who expressed annoyance at the fact someone other than the city or needy interests were taking advantage of the collections and said if there is too much of it, it could lead to a breakdown of the program.

"In the end, no matter who picks up the papers, recycling is accomplished. However, it makes the program appear to be not successful, when quite the opposite is true, and it could cause a lack of citizen interest," he said.

Beldon revealed that back in October, during the trial program, he suggested corrective measures that would not interfere with Scouts and similar groups, but eliminate the nuisance of big outside collectors if they prevailed.

He said an ordinance could be drafted banning private collections on the city's special collection nights — Wednesday and Thursday — but allowing pickups by charitable groups and needy individuals on other nights. "They could make arrangements with citizens for such separate collections and residents would always have the right to determine where their papers were to go, to the city or to someone else."

He said other municipalities have taken such actions, stipulating that papers placed at the curb on a specific collection night are city property.

Council President Charles D. Snelling said the city could write legislation if it determines it is necessary to bar unauthorized pickups of paper intended for

the city for its recycling program.

"We don't mind if people want to give their papers to the Scouts or some other group or individual, but if papers put out by the citizens are intended for city recycling efforts and are going astray, the legislation would be in order," he said.

Early this afternoon, Atty. William C. Wickkiser issued a statement on the problem in which he said the city is not contemplating any action at this time and expressed an opinion the difficulties will be resolved.

He said it is the city's position that when people bundle newspapers and deliver them to the curb to be picked up by the city for a specific program, they are the city's papers.

"After all," he said, "the program is put into effect at the expense to the city. It had to negotiate a contract, requiring more handling and more manpower, and it has entered the program because ecologywise it is better than disposal by landfill or by incineration."

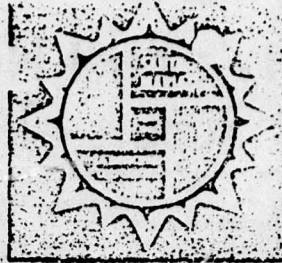
The solicitor had met with Mayor Clifford S. Bartholomew and Chief Gable, the latter having taken a dim view last night of unauthorized persons picking up bundles set out for a "public project."

Wickkiser said Gable will continue to look into the matter to see who is doing the collecting and talk with them, and it is believed such approach will resolve the problem.

"If responsible citizens realize what we have done and what we are attempting to do, I'm sure the problem will correct itself," the solicitor said. He added, however, that if complaints become chronic, "some action will have to be taken."

5. Sample Newspaper Publicity, cont.

**NEWS RELEASE**



**CITY OF  
SANTA MARIA  
CALIFORNIA**

January 23, 1974

The City of Santa Maria will commence a continuing City-wide Newspaper Pick-Up Program beginning Wednesday, February 6, 1974. The project is under the direction of the City Sanitation Division.

According to Sanitation Superintendent, Bill Martins, newspapers will be collected during the City's regular trash collections. Newspaper pick-up days, however, will only be on Wednesdays, Thursdays, or Fridays. Martins stressed that newspapers should only be put out on one of these scheduled days.

Martins also requested that residents who have accumulated over five (5) bundles of newspapers to date, call WA5-0951 Ext. 277 or 278 no later than February 5, 1974 to be scheduled for a special newspaper pick-up. This is necessary because large amounts of newspapers put out during the first week of the project would incumber the regular trash collection process.

Residents are asked to bundle their newspapers in six inch stacks and tie them securely with string. The bundles should then be placed either on top or aside of the trash can.

ONLY NEWSPAPERS are being recycled as part of this program. Magazines and cardboard should not be placed in with the newspapers. In the event of rain, it is asked that newspapers not be placed out until the following week.

The City Council will review an agreement between the City and Larabee Bros. Distributors on Monday February 4, 1974. The agreement provides that all newspapers collected by the city will be transferred to Larabee Bros. for baling. They will then be shipped to Consolidated Fiber Inc. of Pomona, California which is a paper brokerage firm. From there they will be sold to a paper recycling company.

City Administrator, Robert F. Grogan, stated that the Newspaper Pick-Up Program will not only help preserve our natural resources, but hopefully would promote long-run city savings. Grogan said that new revenues produced by the project would be used to offset increased costs and hold down collection rates as much as possible.

Citizens are urged to support this worthwhile program, being mindful of the fact that for every ton of newspaper that is collected and recycled, the lives of approximately 17 trees are saved. Such community participation will not only benefit our ecology, but will also be a tribute to the efforts of our citizenry.

APPENDIX H  
SUGGESTED READINGS

1. Department of Defense (DDP)
2. Defense Research Agency (DRA) Report
3. DRA Technical Manual (TM) 2-002  
"Design Criteria and Standards for Facilities"  
Washington, DC, July 1972
4. Army Research Office (ARO) Report AR 430-77  
"Design and Construction of Facilities"  
Washington, D.C., 18 April 1967
5. DRA Technical Manual (TM) 2-002  
"Design Criteria and Standards for Facilities"  
Washington, DC, July 1972
6. DRA Technical Manual (TM) 2-002  
"Design Criteria and Standards for Facilities"  
Washington, DC, July 1972
7. DRA Technical Manual (TM) 2-002  
"Design Criteria and Standards for Facilities"  
Washington, DC, July 1972
8. DRA Technical Manual (TM) 2-002  
"Design Criteria and Standards for Facilities"  
Washington, DC, July 1972
9. DRA Technical Manual (TM) 2-002  
"Design Criteria and Standards for Facilities"  
Washington, DC, July 1972
10. DRA Technical Manual (TM) 2-002  
"Design Criteria and Standards for Facilities"  
Washington, DC, July 1972
11. DRA Technical Manual (TM) 2-002  
"Design Criteria and Standards for Facilities"  
Washington, DC, July 1972
12. DRA Technical Manual (TM) 2-002  
"Design Criteria and Standards for Facilities"  
Washington, DC, July 1972

Department of Defense (DOD)

1. Defense Disposal Manual (Restructured) with latest revisions
2. DOD Directives:
  - 6050.3
  - replaced by 4165.60 (latest draft - final)
3. DA Technical Manual TM 5-634  
"Refuse Collection and Disposal: Repairs and Utilities,"  
Headquarters, DA, July 1958.
4. Army Regulation AR 420-47  
"Repairs and Utilities, Refuse Collection and Disposal,"  
Headquarters, D. A., 18 Sept. 1967.
5. DSA Pamphlet: "Sale by Reference; Instructions, Terms, and  
Conditions Applicable to DOD Surplus Personal Property Offered  
by Defense Surplus Sales Offices;" DSA, Defense Logistics Services  
Center, February 1971.
6. Sample DPDS procurement documents and contracts, both for waste  
paper and other surplus.
7. AAFES Memoranda: concerning baler purchase criteria, installation  
instructions, etc., listings of balers installed in CONUS, etc.
8. Commissary Memorandum: baler purchase criteria.
9. "Facilities Engineering: Annual Summary of Operations, Fiscal  
Year 1975," D.A., OCE.
10. "Status: Family Housing Programs, Department of the Army," as of  
31 March 1976.
11. DA Pamphlet 210-1: "U. S. Army Installations and Major Activities  
in the Continental United States," December 1973.
12. "Logistic and Economic Factors Affecting the Reclamation and  
Recycling of Waste Materials and By-Products: Measurement and  
Description of the DOD Solid Waste Problem (Interim Report),"  
by H. J. Boisseau, Jr., Logistics Management Institute, March 1976.

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

13. Report SW-128, "Separating Paper at the Waste Source for Recycling," by Stephen Lingle, 1974.
14. "Residential Paper Recovery: A Municipal Implementation Guide," by Penelope Hansen; SW-155, 1975.
15. "Resource Recovery and Source Reduction: Second Report to Congress," by OSWMP, SW-122, 1974.
16. "Resource Recovery and Waste Reduction: Third Report to Congress," by OSWMP; SW-161, 1975.
17. "Optimization of Office Paper Recovery Systems," by SCS Engineers, Inc. for OSWMP, May 1976.
18. "Analysis of Source Separate Collection of Recyclable Solid Waste - Separate Collection Studies and Collection Center Studies," by SCS Engineers, Inc. for EPA, 1974; NTIS publications PB-239 775 and PB-239 776.

Industry, Others

American Paper Institute Publications:

19. "Waste Paper Recycling: A Proven Way to Reduce Solid Waste "
20. "Office Waste Paper Recycling: A Proven Way to Increase Profits by Reducing Disposal Costs, Increasing Value of Office Waste Paper."
21. "Waste Paper Recycling: How Commerce and Industry Can Improve Profits by Reducing Disposal Costs."
22. "Waste Paper Recycling," (booklet) 1975.
23. "Paper Recycling: the Art of the Possible, 1970-1985," by Midwest Research Institute for the Solid Waste Council of the Paper Industry, 1973.
24. "Paper Recycling: the Impacts of Contaminants," same as above, 1975.
25. "Official Board Markets," weekly.
26. "Mill Trade Journal," weekly.

27. "Pulp, Paper, and Board: Quarterly Industry Report," U. S. Department of Commerce, Domestic and International Business Administration; Bureau of Domestic Commerce.
28. "National Buyers Guide to Recycled Paper," by Sally Dane, Environmental Educators, Inc., 1973.
29. "Paper Recycling: a Business Perspective," by Michael Belknap, New York Chamber of Commerce, 1972.
30. "Paper Stock Standards and Practices," Circular PS-74, effective Jan1, 1974, Paper Stock Institute of America, Division of National Association for Recycling Industries.
31. "Post's 1975 Pulp and Paper Directory," Miller Freeman Publications, Inc., 1974.
32. "Planning a Separate Used Newspaper Collection System for Your Community," Garden State Paper Co., Garfield, N.J.
33. "Newspaper Recycling: A Manual for Community Action," Garden State Paper Co.

CERL DISTRIBUTION

West Point, NY 10996  
ATTN: Library

HQDA (SGRD-EDE)

Chief of Engineers  
ATTN: DAEN-ASI-L (2)  
ATTN: DAEN-FEB  
ATTN: DAEN-FEP  
ATTN: DAEN-FEU-S/A. Norwood (10)  
ATTN: DAEN-FEZ-A  
ATTN: DAEN-RDL  
ATTN: DAEN-ZCE

Aberdeen Proving Ground, MD 21005  
ATTN: AENA/COL Grodt (2)

Ft Belvoir, VA 22060  
ATTN: Kingman Bldg, Library

Ft Monore, VA 23651  
ATTN: ATEN  
ATTN: ATEN-FE-E  
ATTN: ATEN-FE-U

Ft Lee, VA 23801  
ATTN: DRXMC-D (2)

Ft McPherson, GA 30330  
ATTN: AFEN-FED  
ATTN: AFEN-FEU

USA-CRREL

USA-MES  
ATTN: Library

US Army Engineer District  
Baltimore

ATTN: Library

Norfolk  
ATTN: Library  
ATTN: Chief, NAOEN-D

Savannah  
ATTN: Library

Mobile  
ATTN: Library  
ATTN: Chief, SAMEN-C

Fort Worth  
ATTN: SWFED-D  
ATTN: SWFED-MA/MR

Sacramento  
ATTN: Chief, SPKED-D

Alaska  
ATTN: Library  
ATTN: NPADE-R

Omaha  
ATTN: Chief, Engr Div

US Army Engineer Division  
New England  
ATTN: Library (2)  
ATTN: Chief, NEED-D

Facilities Engineer

Ft Bragg, NC 28307  
Ft Campbell, KY 42223  
Ft Carson, CO 80913  
Ft Devens, MA 01433  
Ft Hood, TX 76544  
Ft Lewis, WA 98433  
Ft Ord, CA 93941  
Ft Polk, LA 71459  
Ft Riley, KS 66442  
Schofield Bks, APO CA 96557  
Ft Stewart, GA 31313  
Ft McPherson, GA 30330  
Ft Meade, MD 20755  
Ft Shafter, APO CA 96558  
Ft Sheridan, IL 60037  
Presidio of San Francisco, CA 94129  
Ft Richardson, APO Seattle, WA 98749  
Ft Wainwright, APO Seattle, WA 98731  
Anniston Army Depot, AL 36201  
Corpus Christi, TX 78419  
Letterkenny Army Depot, PA 17201  
Lexington Blue-Grass Army Depot, KY 40507  
New Cumberland Army Depot, PA 17070  
Pueblo Army Depot, CO 81001  
Red River Army Depot, TX 75501  
Sacramento Army Depot, CA 95813  
Savanna Army Depot, IL 61074  
Seneca Army Depot, NY 14541  
Sharpe Army Depot, CA 95330  
Sierra Army Depot, CA 96113  
Tobyhanna Army Depot, PA 18466  
Tooele Army Depot, UT 84075  
Holston Army Ammunition Plant, TN 37662  
Lone Star Army Ammunition Plant, TX 75501  
Iowa Army Ammunition Plant, IA 52600  
Sunflower Army Ammunition Plant, KS 66044  
Lake City Army Ammunition Plant, MO 64056  
Louisiana Army Ammunition Plant, LA 71130  
Milan Army Ammunition Plant, TN 38358  
Longhorn Army Ammunition Plant, TX 75670  
Radford Army Ammunition Plant, VA 24141  
Scranton Army Ammunition Plant, PA 18503  
Volunteer Army Ammunition Plant, TN 37401  
Twin Cities Army Ammunition Plant, MN 55440  
Detroit Arsenal, MI 48089  
Frankford Arsenal, PA 19137  
Michigan Army Missile Plant, MI 48089  
Picatinny Arsenal, NJ 07801  
Pine Bluff Arsenal, AR 71601  
Redstone Arsenal, AL 35809  
Rock Island Arsenal, IL 61201  
Rocky Mountain Arsenal, CO 80240

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Tarheel Army Missile Plant, NC 27215  
Watervliet Arsenal, NY 12169  
Aberdeen Proving Ground, MD 21005  
Dugway Proving Ground, UT 64022  
Ft Monmouth, NJ 07703  
Harry Diamond Laboratories, MD 20783  
Jefferson Proving Ground, IN 47250  
Natick Development Center, MA 01761  
St Louis Area Support Center, IL 62040  
White Sands Missile Range, NM 88002  
Yuma Proving Ground, AZ 85364  
Fitzsimons Army Medical Center, CO 80240  
Walter Reed Army Medical Center, DC 20012  
Tripler Army Medical Center, APO San Francisco, CA 96438  
Ft Sam Houston, TX 78234  
Ft Detrick, MD 21701  
Ft McNair, DC 20319  
Ft Myer, VA 22211  
Cameron Station, VA 22314  
Bayonne Military Ocean Terminal, NY 07002  
Oakland Army Base, CA 94626  
Sunny Point Military Ocean Terminal, NC 28461  
Arlington Hall Station, VA 22212  
Vint Hill Farms Station, VA 22186  
Ft Ritchie, MD 21719  
Ft Huachuca, AZ 85613  
Selfridge National Guard, MI 48045  
Ft Belvoir, VA 22060  
Ft Benning, GA 31905  
Ft Bliss, TX 79916  
Carlisle Barracks, PA 17013  
Ft Dix, NJ 08640  
Ft Eustis, VA 23604  
Ft Gordon, GA 30905  
Ft Benjamin Harrison, IN 46216  
Ft Jackson, SC 29207  
Ft Knox, KY 40121  
Ft Leavenworth, KS 66027  
Ft Lee, VA 23801  
Ft McClellan, AL 36201  
Ft Rucker, AL 36362  
Ft Sill, OK 73503  
Ft Leonard Wood, MO 65473  
Ft Monroe, VA 23651  
West Point Military Academy, NY 10996

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