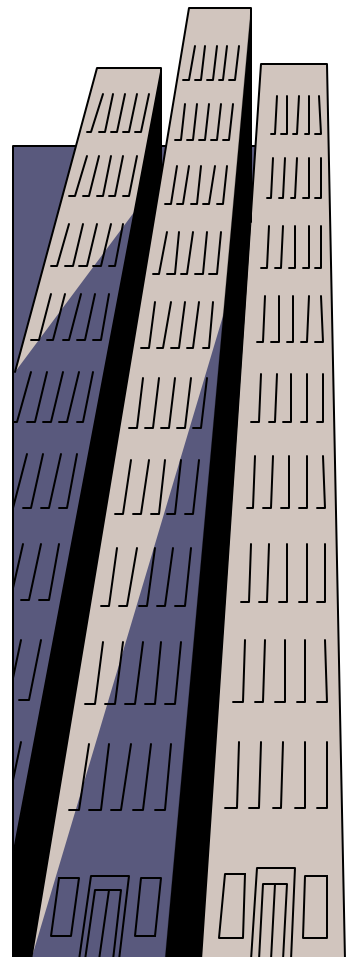

Commercial Office Building Recycling Program Final Report

Project completed by:



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1. Introduction

OEMC Challenge

Increases in recycling in commercial office buildings can reduce the need for virgin products and other materials.

The Colorado Governor's Office of Energy Management and Conservation (OEMC) understands that increases in recycling in commercial office buildings can have a major impact on overall recycling rates. OEMC created the *Commercial Office Building Recycling* program to assist with efforts to increase recycling and reduce the amount of waste going to landfills.

The OEMC provided funding to Lighthouse Environmental, LLC, to research and implement practices to increase recycling in commercial office buildings. For its case study, this project featured The World Trade Center, two 29-story office towers at the southeast end of Denver's 16th Street Mall downtown.

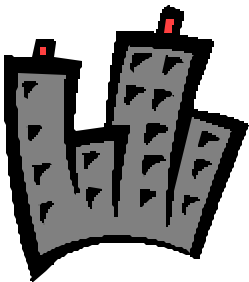
The primary objective of the project was to study the economic factors affecting recycling in commercial office buildings, including tenant outreach methods, collection and processing systems and technologies and local markets for recycling. A further goal of the study was to produce guidance materials to begin or improve office building recycling programs.

For more information on the OEMC Commercial Office Building Recycling program, contact the OEMC at 303-894-2383 or 1-800-632-6662; or www.state.co.us/oemc.

So, how much office waste is really trash.

According to the United States Environmental Protection Agency, nearly 80 percent of waste from office buildings can be reused, remanufactured, or recycled. White paper and mixed paper make up about 60 percent of office total waste.¹ Both of these are recyclable in nearly every recycling program across the country. Colorado's commercial dumpsters also contain many other recyclable items such as aluminum cans, corrugated cardboard, food, glass, metals, plastic bottles, steel cans, and much more.

Some waste generated in commercial office buildings, such as batteries, computers, fluorescent light bulbs, and toner cartridges should not be placed in dumpsters because they can harm your tenants, custodians and the environment. These



items are recyclable. See Appendix D for more information on how to properly manage them.



Contents of a typical office building dumpster.

Office building waste studies conducted by the City of San Francisco showed nearly 75 percent of the garbage from the downtown office buildings was some type of paper. In 1997, less than half of that paper was recycled. In 1998, the San Francisco Building Owners and Managers Association (BOMA) surveyed 25 percent of their membership and learned that 95 percent of those surveyed had recycling programs for white paper, but very few programs recycled anything else.²

More facts about office paper

- ✓ Eliminating office paper from your waste may reduce your waste bill by as much as 50 percent.
- ✓ Recycling one ton of paper saves about 6.7 cubic yards of landfill space.
- ✓ Commercial and residential waste paper accounts for more than 40 percent of landfill waste.
- ✓ Typical offices generate about 1.5 pounds of waste per employee each day. Financial and legal offices may generate more than 2 pounds per day per person.

(U.S. EPA Figures)

Is there value in your waste?

Many commercial office buildings are finding that recycling makes economic and environmental sense. Since most buildings pay for waste disposal based on the size and type of containers used, and frequency of pickup, when waste is reduced, disposal costs can also be reduced. As you decrease the amount thrown away, you may be able to switch to smaller trash containers in your storage area, reduce the frequency of the container pickups, or both. Try to reduce the frequency of pickups first, since hauling costs make up the majority of waste disposal costs.

According to the US EPA, nearly 80 percent of waste from office buildings can be reused, remanufactured, or recycled.

Eliminating office paper from your waste may reduce your waste bill by as much as 50%.

Commercial and residential waste paper accounts for more than 40 percent of landfill waste.



Recycled materials do have market value. But, as commodities, their value fluctuates. Traditionally, white copy, bond, laser and computer paper has the highest value of all the paper grades. There were, however, very dramatic high and low prices during the 1990s. Oftentimes, when prices are high, recycling companies may provide rebates to office buildings for some recyclables, such as white paper. During the low points, you're more likely to be charged for the collection of your materials and receive no rebate; as the recycler is unable to recoup their full costs from the sale of the recyclable materials.

As you increase the amount recycled, you decrease the amount thrown away.

As you decrease the amount thrown away, you may be able to switch to smaller trash containers, reduce the frequency of the container pickups, or both.

1. San Francisco Recycling and Hazardous Waste Guide for Commercial Property Owners and Managers.
2. San Francisco Recycling and Hazardous Waste Guide for Commercial Property Owners and Managers.

This document printed on 30% post-consumer content recycled paper.

2. Before You Start

Involve Key Players and Secure Their Support

Involve key players and secure their support early in the planning process.

Involve key players and secure their support early in the planning process. Key players may include:

- ✓ **Property Managers and Owners**
- ✓ **Recycling Companies**
- ✓ **Custodians and Janitors**
- ✓ **Tenants**

Property Managers and Owners

Throughout Colorado, property managers and owners are in a position to make a huge difference in how much is recycled in Colorado. Recycling efforts from property managers can reduce the amount of office waste landfilled by more than 50 percent. While some property managers and owners have excellent programs, there is still room for improvement.

Recycling in multi-tenant office buildings present challenges due to the coordination needed among different companies. Management support is vital to the success of any recycling program. For this project, the support needed to come from the property managers that handle all aspects of the facilities from heat, electric, lighting, to cleaning and trash disposal. Since 1990, the property managers (Brookfield Properties of Colorado) have provided the opportunity for recycling and handled the logistics of recycling for the 110 tenants at the World Trade Center (WTC) buildings.



The consultants did some homework prior to writing the project proposal. Before the grant proposal was submitted, the contractors met briefly with Brookfield, the property managers of the WTC buildings, to explain the project goals and benefits of participating in the project study. The property managers expressed interest in participating, provided the project did not increase their costs for recycling or custodial services. The property managers said they had not done any additional program education since the beginning of their program and would welcome the opportunity to have someone else educate the tenants in order to improve the program.

When the project grant was awarded to Lighthouse Environmental from the Office of Energy Management and Conservation, and early on in the program, the consultants visited with the assistant property manager and

developed a good relationship with him. After a brief delay in the project start due to the assistant property manager's other duties related to Year 2000 (Y2K) possible building complications such as computer and electric-related operations that could affect the tenants, the program was underway.

The consultants and the assistant property manager developed a Letter of Understanding (LOU) between the consultants and Brookfield Properties, who are the managers of the World Trade Center Buildings. The LOU briefly detailed the project goals and responsibilities. However, a few months into the project the assistant property manager (who was the project champion) was promoted to a position in another building. Due to reasons stated later in "Potential Barriers" section, as well as staffing shortages, the property manager was reluctant to implement any major recycling program changes. The program was again put on hold, for about four months, while Brookfield hired and trained a new assistant property manager. Rebuilding support for the program took extra time and again set the project back.

Once support was regained for implementing an improved recycling program, things moved rather quickly. Brookfield and the consultants were able to assist with securing a new contract with the recycler, develop tenant education pieces, obtain recycling containers and train the tenants within a two-month period. Brookfield participated in these processes and was cooperative and flexible during the implementation process.

Below is a sample of a very simple Letter of Understanding.

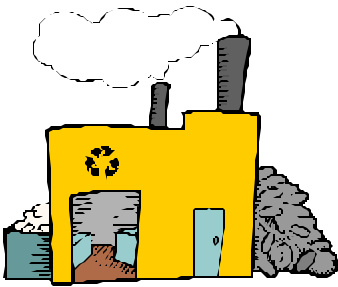
Recycling Consultant/Contractor Letterhead	
Letter of Understanding	
Commercial Office Building Recycling Program	
Property Manager Build Management Company Address City, State Zip code	
Dear <u>Property Manager</u> ,	
As a prerequisite of the grant program, I am asking you to sign and return this Letter of Understanding. This Letter of Understanding serves to clarify the partnership between <u>Recycling Consultant/Contractor</u> (above) and <u>Property Management Company</u> <u>Address, City, State Zip Code</u> , in a commercial office building recycling program sponsored by the Colorado Governor's Office of Energy Management and Conservation. The program is scheduled to be completed by <u>date</u> .	
The goals of the program are to develop ways for commercial building owners/operators to increase the collected output of recyclable material, reduce landfill materials, reduce recyclers' costs, gather relevant recycling information and make recycling a sustainable activity.	
Maximizing the resources of the two partners listed above is critical to the success of the program. Program development, evaluation and outreach products will be performed or designed by representatives of <u>Recycling Contractor</u> . <u>Property Management Company</u> will provide reasonable tenant and building access, as well as waste collection data and other relevant information as available.	
Signed:	
Property Manger Property Management Company	Consultant/Contractor Recycling Consultant/Contractor
Date	Date

Key players for planning include: property managers, recycling companies, custodians, and tenants.

Custodians and janitors are not handling more waste materials, they are simply handling the same materials differently.

Lesson Learned: Although it's not likely another recycling contractor or consultant will face delays due to Y2K issues, they may face delays due to property managers' periodic shifting of priorities. In addition, it may be more beneficial to develop a Memorandum of Understanding or a brief contract to help ensure that the property managers' recycling priorities remain high on the list.

Recycling Companies



It is especially important to involve the recycling company early, especially if you already have a program in place and are making changes to that program. Most recycling companies are eager to offer you their services and help you assess your current operations, meet your new goals, adjust the program as needed. Many recycling companies will also furnish recycling equipment and with educating tenants and custodians.

For the purposes of this program, WTC was using Weyerhaeuser Recycling in Denver. The consultants involved Weyerhaeuser early on in the program. This relationship allowed the consultants and WTC to gain valuable insight on proposed program changes and learn what were the best methods and practices for WTC to improve their recycling programs and collect more and cleaner, less contaminated recyclables. This established relationship also helped in the recycling contract negotiation phase. Weyerhaeuser also provided an in-kind donation of recycling containers for this study.

Custodians and Janitors

It's very important to include the custodians or janitors in the office recycling process. While most tenants in office buildings are required to empty their own deskside recycling containers, it is the custodians who empty the centralized recycling bins. The custodians transfer the recyclables to a storage area where they are held until the recycling collector picks them up.



When introducing or improving a recycling program, point out that the custodians are not handling more waste materials, they are simply handling the same materials differently. The custodians can also be very helpful in determining the frequency needed for emptying the centralized recycling bins. They may only need to empty the centralized recycling bins every second or third day because the recyclables are generally clean and dry. It will depend on the volumes generated.

At WTC, Brookfield and the consultants kept the custodial supervisors apprised of the possible changes early on in the program. As a result, the custodians were extremely helpful during both waste assessments and provided valuable anecdotal information on the existing recycling procedures and containers. The custodial supervisors also attended training on the new program before the improvements were implemented. They in turn, provided bi-lingual training for the custodians.

This cooperation was crucial to the success of the new and improved recycling program.

Tenants

You should involve the tenants in the office building too. They can be very helpful in gathering information to improve an existing recycling program. If you don't already have a building-wide recycling program, you may find some tenants already have their own recycling programs. You can develop a tenant survey to gain information of how a building recycling program can help them.

Many tenants are eager to recycle at work. They may already recycle at home and a work program would extend those efforts. The most important way to involve the tenants is by educating them on the dos and don'ts of the program. They will find recycling at work is not the same as recycling at home, so the more education and awareness the tenants receive, the more successful the program will be.



Other Key Players

Others you may want to include in the planning process, are landscape contractors, cafeteria and restaurant personnel, retail store personnel, construction contractors and, if appropriate, local municipal staff.



Many tenants are eager to recycle at work. They may already recycle at home and a work program would extend those efforts.

More possible key players:

- ✓ **Landscape personnel**
- ✓ **Cafeteria personnel**
- ✓ **Restaurant personnel**
- ✓ **Retail store personnel**
- ✓ **Construction contractors**
- ✓ **Local municipal staff**

3. Evaluate Your Waste

Conduct a Baseline Study with a Waste Assessment

Determine disposal costs & volumes:

Know size of containers

Frequency of pickups

Cost of collection service

If you are a property manager, you must do your homework before you implement a recycling program or make changes to an existing program. You will need to determine disposal volumes and costs. This will include:

- ✓ Knowing the size of your trash containers
- ✓ Frequency of pickups
- ✓ Cost of the trash collection service

You will also want to quantify and identify the materials generated by tenants in the office buildings. This will require performing a waste assessment.

Waste Assessments/Audits

A waste assessment, or audit, will let you know what is in your trash. Waste assessments are sometimes called waste characterization studies, as they characterize what is in your waste. The assessments can be formal or informal. The formal waste assessments, called waste audits or waste composition studies, identify the materials in your trash by sorting the trash into various categories and actually weighing the trash to determine the percentage each category comprises of the waste generated. Informal waste assessments can be done by simply walking through the buildings and visually inspecting the trash and recycling bins. You may also learn valuable information by talking with the custodians and dock staff.

Waste assessments, or audits, identify materials in your trash by sorting it into various categories and weighing it to determine the percentage each category comprises of the waste generated.



Weighing office paper during waste audit before new program was implemented.

Initial Observations

During a random, confidential visit to tenant offices with the custodial supervisors, it was discovered that a large majority of tenants were not recycling at all. This “walk through” additionally revealed many of those who were recycling were not recycling properly.

Most of the tenants who were recycling used cardboard boxes situated underneath their desks, even though properly marked desk-side containers provided by Weyerhaeuser, were available from the property manager.

Potential Barriers

After meeting with WTC staff and conducting an initial walk through of the buildings, consultants determined the following items might be potential barriers to the success of improving the recycling program.

- ✓ *The custodians are employees of an outside service company contracted with Brookfield for WTC. This makes coordinating changes in collection systems a little more difficult, especially if the changes will affect labor duties and costs.*
- ✓ *Trash collection is a relatively small budget item for Brookfield at WTC. Therefore, trash collection was seen as a low priority for the property management company.*
- ✓ *Recycling was regarded as “something nice to do for the tenants, but a hassle.” It was not looked at as a method to reduce disposal costs.*
- ✓ *Brookfield was not satisfied with the recycling collection accounting data and the level of feedback provided by the recycling contractor before the new program was implemented. (Brookfield would try to remedy this situation, rather than find a new recycling contractor.)*

Most of the tenants who were recycling used cardboard boxes situated underneath their desks.

Trash collection may be a low priority item for many large building property managers.

Lesson learned: Trash collection and related costs may be seen as a low priority at many buildings. There is also the “if it ain’t broke, don’t fix it” attitude. Property managers have a wide variety of items to deal with daily. You must have a sound economic discussion prepared to justify changing current methods.

WTC Baseline Study

The consultants provided both formal and informal waste assessments at WTC. In order to plan future efforts and to be able to evaluate and

measure success, the first formal waste assessment was performed early on to determine what was in the trash. The results provided valuable information in designing the improved recycling program. The consultants also did a walk-through, or informal waste assessment, of the offices with the custodial supervisors. The walk-through provided information on current recycling collection practices, tenant participation levels, containers used, and frequencies of collection for specific items.

WTC's trash hauling costs were more than \$17,000 per year.

The baseline study also consisted of:

- ✓ *Meetings with property managers to determine problem areas and their interest in improving the program;*
- ✓ *A survey to measure tenant attitudes and recycling activities;*
- ✓ *Review of waste and recycling hauling contracts, methods and costs;*
- ✓ *Review of waste and recycling handling methods;*
- ✓ *Inspection of offices to gauge current recycling participation; and,*
- ✓ *A waste audit to see what materials could be diverted and to measure diversion rates.*

General findings of the baseline study included:

- ✓ *The recycling participation rate was under 50 percent for the existing recycling program. This is based on the number of occupied desks having recycling bins.*
- ✓ *The first waste audit revealed that 53 percent of the material in the trash was recyclable.*

Lesson learned: Walk-throughs with custodians provide valuable anecdotal information about recycling practices that property managers may be unaware of, such as number of times specific recycling bins are emptied per week, which bins may be regularly contaminated with non-recyclables, and which offices may need more recycling bins.

The first waste audit revealed that 53 percent of the material contained in the tenant trash was recyclable.

Existing Program Narrative

The existing program at WTC began in 1990 with little additional monitoring or outreach since it's inception. Paper collections were steadily declining, and contamination was steadily increasing.

The population of the building was 110 tenants totaling approximately 1,500 people. The office building recycling program consisted a contradictory and confusing process whereby custodial staff collected

white ledger and colored ledger paper. But, tenants were required to collect and deliver ONP to the dock.

Once in the dock area, the recyclables were separated into large metal bins, called maggies. There was one maggie for newspapers, one for colored paper, and two for white paper. A rolling canvas container stored the aluminum cans.

Trash was collected by the custodians Sunday through Thursday evenings and delivered to the same dock area. WTC owns a horizontal trash compactor and four 6 cubic yard compactor boxes. All four compactor boxes are hitched each weekday morning to a recently purchased Jeep CJ-7, and hauled 200 feet up a ramp to street level, where they are emptied by a front-loading trash truck at a cost of \$1,400 per month, or \$16,800 per year. This daily exercise takes the dock manager about one hour per day, not including the wait for the trash truck.

Corrugated cardboard (OCC) seems to be a large contributor to the existing trash. Many times, there is so much it must be piled next to the dumpsters, as there is not enough room to put it inside them. Consultants estimated as much as 75 percent of the building's waste, by volume, is OCC.



Typical Office Paper Recycling Collection

Construction and Demolition Waste

A large portion of the waste stream in any multi-tenant office building is generated during tenant build-out and remodeling. Much of this waste is usually hauled by the construction contractor.



At WTC, it was noted, however, that many new tenant build-outs are required to provide their own methods construction waste removal. Also, odd items, such as furniture or cubical partitions were kept aside and delivered up to street level by the dock employees.

Summary of Current Practices

There was a significant problem with reported contamination due to lack of information and training.

- ✓ *Recycling service provided by Weyerhaeuser Recycling (Weyerhaeuser) at no charge since 1990.*
- ✓ *Recyclables were collected twice a week in 3 to 4 maggies stored near the trash compactor. Weyerhaeuser weighed and graded the material and then sent monthly reports to WTC, along with any appropriate rebates for materials.*
- ✓ *The average price paid per ton of materials from January 1998 to October 2000 was \$10.*
- ✓ *During that same time-period, WTC recycling collections averaged 8.1 tons, or 16,200 pounds per month.*
- ✓ *There was a significant problem with reported contamination; Nearly 34 percent of the paper from January 1998 to October 2000 was graded as contaminated and therefore earned zero dollars in rebates.*
- ✓ *Contamination was due to lack of information and training. And, the open-topped maggies were located very close to the trash compactor, which caused some to mistake the recycling containers for trash containers.*
- ✓ *Custodial services, including cleaning, trash and recycling collection, were provided by an outside service company.*
- ✓ *Property management ensured the trash contract did not automatically renew year after year, as is an industry standard. In addition to preventing automatic price increases, this allowed WTC an opportunity to reduce trash service levels as recycling increased.*

Typical day in WTC's compactor box.

The custodial services, including cleaning, trash and recycling collection, were provided by an outside service company.



Tenant Survey

The consultants distributed a recycling survey to the tenants. The purpose of the survey was to determine attitudes toward the current recycling program and identify ways to increase waste diversion activities. The actual survey and results may be found in Appendix A of this report.

To increase survey response, the consultants offered small prize incentives to tenants who completed and returned their surveys by a certain date. . The prizes included restaurant and retail gift certificates, as well as recycled products provided by Future Solutions, Inc.

Survey Results Summary

- ✓ 27 percent of the tenants responded to the survey
- ✓ Less than 50 percent of individuals who responded had a recycling bin at their desk (which is close to the estimated 39% rate seen in the initial walk through)
- ✓ 43 percent of survey respondents said that there were “no convenient containers”
- ✓ 57 percent of the respondents said recycling is very beneficial
- ✓ 30 percent of the respondents said recycling is somewhat beneficial
- ✓ 73 percent of the respondents said they would be “very willing” to switch to a more convenient office pack recycling program
- ✓ 45 percent of the respondents said they would assign someone to take recyclable materials to the dock storage area to be recycled, if necessary

57 percent of the respondents said recycling is very beneficial

30 percent of the respondents said recycling is somewhat beneficial



The consultants also encouraged the tenants to drop-off their completed surveys at an outside educational display event in the courtyard between the two WTC buildings. A drawing was held to determine which tenants would receive prizes.

(Left – Tabletop outreach display.)

Pre-Implementation Waste Audit

Consultants performed a waste audit by sorting and weighing trash from six floors, or about 10 percent of the floors, in the two WTC buildings. The participating floors were randomly selected by computer.

It is important to note, the waste sorts were performed only on the trash collected from each office at night by the custodial staff. The sort did not include daily trash brought to the dock area and trash compactor by tenants, contractors, and facilities staff during normal office hours. Nor did this include trash generated by the retail convenience store located in WTC.

The consultant worked with the custodians to ensure the proper trash was delivered to the sort area and kept separate from the rest of the nightly trash for sorting. The trash was then sorted, one floor at a time, into more than 30 categories. See Appendix B for forms, and complete results.

Lesson Learned: One disadvantage to this method of random selection is lack of tenant stability. Consultants estimate tenant turnover averages about 20% at WTC. As a result, one of the randomly selected floors for the audit had to be changed as it was temporarily vacant at the time of the first waste sort.

Before and After Waste Audit Comparison

Pounds per Day

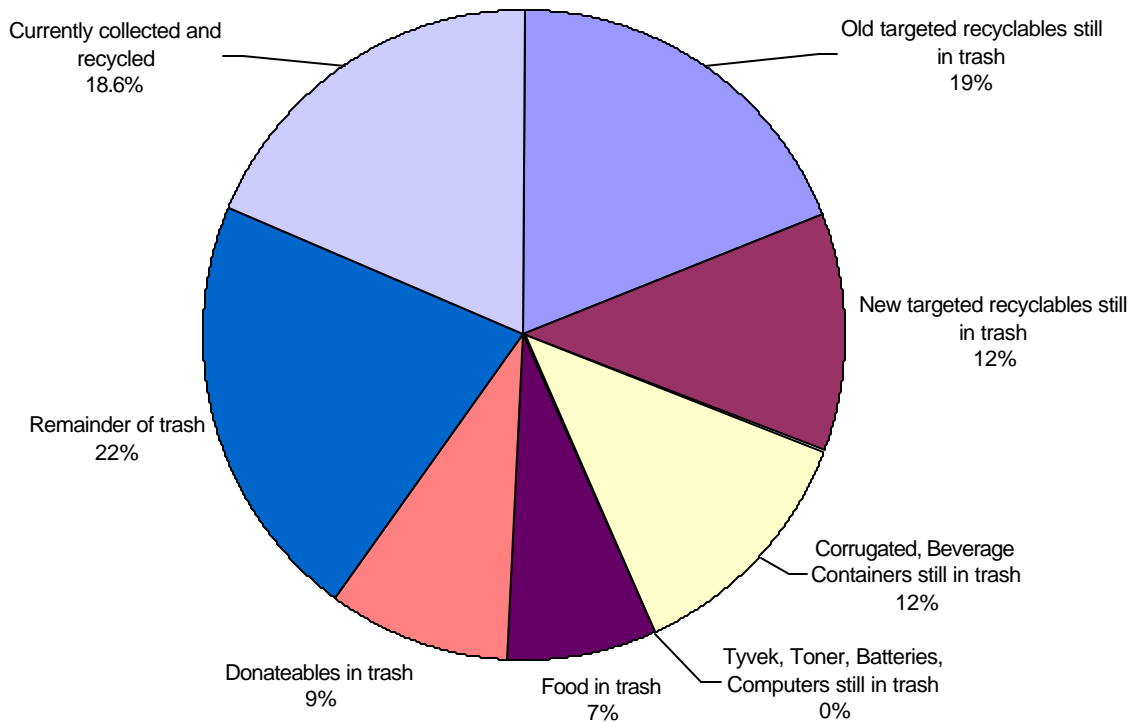
	Pre-Program Audit	
	Lbs.	%
Targeted recyclables in trash	1,240	30.8%
Other recyclables in trash	509	12.6%
Remainder of trash	1,527	37.9%
Recyclables collected by Weyerhaeuser	751 ¹	18.6%
Total daily office discards	4,027	100%

1. Based on average tonnage reported by recycling contractor 1/98 – 10/00 = 8.14 tons/month

Waste sort showing multiple categories.



Audit 1 - Before Program Implementation
Discards = 4,027 lbs. Per day





A look into a compactor box on waste sort night.

4. Designing the Program

Working with Property Manager to Design Program

The consultants met with WTC property management to review results of the baseline study and audits, brief them on best practices, agree on recycling program goals, and re-design the program. The purpose of the new program is to increase recycling and reduce waste disposal costs at WTC. The consultants recommended keeping the program as simple as possible to maximize participation. The tenant survey confirmed this would help to improve the program.

The following recommendations were made.

New Program Recommendations

1. Negotiate new contract with recycler.
2. Implement OCC recycling.
3. Implement office pack recycling program.
4. Collect more materials.
5. Provide training.
6. Provide equipment.
7. Streamline collection systems.
8. Monitor results.

1. Negotiate a new recycling contract with more advantageous terms, including:

- ✓ Pricing or rebates that track markets including revenue boosters during good markets.
- ✓ Improved service including reliable service.
- ✓ Ability to bid cooperatively with other Brookfield owned properties in the future.
- ✓ More accurate shipment tracking, including materials inspection and recording by WTC dock manager and recycling collector, with immediate grading feedback from recycling collector.
- ✓ Improved outreach, education and troubleshooting by recycling contractor.

2. Implement recycling of old corrugated cardboard (OCC). Using a baler to recycle OCC would reduce trash hauling costs by 50 percent or more.

3. Implement a mixed office paper (office pack) recycling program, instead of the existing separated white paper and colored ledger recycling program.

- ✓ Office Pack (OP) recycling includes mixed white and pastel ledger grades including window envelopes, pastels, and glossy advertising paper.
- ✓ OP is more convenient for tenants and custodians. OP would end a confusing program that required separate containers for white paper and colored paper.
- ✓ OP would increase the amount of paper collected for recycling because more materials are allowed and it is simpler and more convenient.

4. Collect more materials.

- ✓ *Consultants recommended that WTC provide collection of materials for recycling such as newspapers, magazines and beverage containers.*

1. Provide recycling program training.

- ✓ *Train property management and facilities staff.*
- ✓ *Train tenants.*
- ✓ *Train custodians.*

2. Provide equipment to tenants.

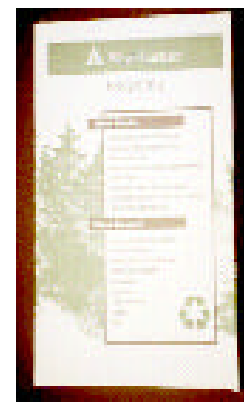
- ✓ *Distribute new desk-side recycling containers with “dos and don’ts” pre-printed on the containers.*
- ✓ *Distribute sufficient properly signed central collection containers for OP, and any other recyclables to be collected.*

3. Streamline collection systems.

- ✓ *Work with custodial staff to make central collection as easy as possible.*
- ✓ *Work with recycling collector and dock personnel to reduce contamination of recycling bins on the dock with proper signage and monitoring.*

4. Monitor results.

- ✓ *Track trash and recycling costs and volumes including labor, rebates and contamination.*
- ✓ *Tracking the above will assist WTC in making future changes to improve efficiency and lower costs.*



Weyerhaeuser's desk-side recycling box listing dos& don'ts

Choosing a Recycling Collector

It is recommended that property managers educate themselves about recycling and waste reduction best practices by researching successful programs. After performing a waste assessment, property managers should consult with more than one local recycling collector to determine if they collect the types of materials you wish to recycle and the range of services they provide. If your waste assessment shows your facility will consistently produce high volumes of recyclables, you may want to solicit bids for recycling services.

Newspapers
and
Magazines
Only

Aluminum
Cans
Only

Bid specifications should address the following considerations and questions:

- 1) What grades or types of paper or other material do they collect, and how must they be prepared or separated?
- 2) What are the allowable contaminants?
- 3) Is there a charge for the service? What is the minimum volume for pickup?
- 4) Will they help you organize the program and/or help promote, educate and train tenants and staff about the program?
- 5) Does the material need to be consolidated in one main storage area?
- 6) Will they supply collection and/or storage containers? And, if so, at what cost?
- 7) Will pickup be on a schedule or on-call?
- 8) Will they pay you, or provide rebates, for some materials? If so, how much and how is that determined?
- 9) Will they sign a contract? (One year with an option to renew is common.)
- 10) Do they provide a confidential shredding service?

Note: If no single recycling collector can handle all of the materials you wish to collect, you may need to use more than one contractor – or require the contractor to subcontract.

New WTC Contract

1. *Increased revenue*
2. *Improved service*
3. *Improved feedback*
4. *Increased training and education*
5. *More materials collected*

WTC New Recycling Collection Contract

Due to the long history with the current recycling collector, WTC elected to stay with Weyerhaeuser, rather than solicit proposals from several haulers. However, consultants found that WTC needed assistance with negotiating a new contract with Weyerhaeuser.

WTC was able to negotiate a new contract with Weyerhaeuser that included the following:

- ✓ increased revenue, based on market conditions
- ✓ improved service
- ✓ improved feedback on quality and contamination levels
- ✓ increased tenant education and training services, and
- ✓ collection of more materials.

The first priority was to obtain pricing based on a percentage of nationally published recycling prices, with additional increases during especially good market times.

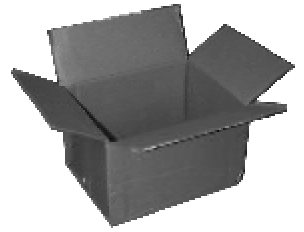
WTC also included a clause allowing Brookfield/WTC to renegotiate pricing annually, based on tonnage collected from all of Brookfield's Denver properties.

Additionally, a shipping tracking system was created, so the dock manager could assess the quality and quantity of each load, and compare that information to Weyerhaeuser reports.

Recycling OCC

WTC waste audits showed an average of at least 14 percent of the tenant trash generated was OCC. Visual estimates of trash in the compactor boxes revealed up to 75 percent of the building's waste by volume is OCC.

The higher OCC amounts were not evident in the audits because OCC is thrown away all day long by personnel from the convenience store, building engineers, delivery personnel and tenants. Further analysis showed trash costs could be reduced by 50 – 75 percent by investing in a system to bale and recycle OCC.



OCC destined for the trash on waste sort night.

The baler analysis (Appendix C) showed a 16-month payback on the purchase and use of a baler for OCC. Leasing the baler would provide a positive cash flow on only a few months. Moreover, WTC already owns a forklift that could be used to store and load completed bales as needed.

Should WTC decide to implement OCC recycling in the future, Weyerhaeuser would collect the completed bales on pallets along with the other paper during their twice-weekly collections at WTC. The contract, however, will need to be amended to allow for the collection of OCC, and to include a pricing mechanism for the OCC.



Recyclable and reusable found materials in Colorado commercial office buildings may include:

- ❑ White office paper
- ❑ Computer paper
- ❑ Mixed paper (colored or glossy paper, envelopes, and others)
- ❑ Newspapers
- ❑ Magazines
- ❑ Corrugated cardboard
- ❑ Chipboard or paperboard
- ❑ Pallets & other wood scrap
- ❑ Aluminum cans
- ❑ Certain plastic bottles
- ❑ Glass bottles and jars
- ❑ Steel cans
- ❑ Laser printer cartridges
- ❑ Ink jet cartridges
- ❑ Floppy disks
- ❑ Video tapes
- ❑ Scrap metals
- ❑ Computers
- ❑ Fluorescent bulbs
- ❑ Telephone books
- ❑ Landscape waste
- ❑ Furniture
- ❑ Office partitions
- ❑ Carpeting

Lesson learned: Even with the overwhelming economic and environmental benefits of baling OCC, property managers may be reluctant to implement an OCC recycling program. They may cite legitimate business objections including concerns about immediate and long-term financial obligations, especially related to safety and equipment training issues, as well as baler location and finished bale storage issues. It's important to show examples of other successful office building OCC baling. One such example is the Qwest building at 1801 California St. By baling OCC, Qwest has reduced their trash hauling to every other day.

Choosing the Recyclables to Collect

Considerations in Choosing Recyclables to Collect

Performing a waste audit is the best way to gather information on what items you can recycle. Some property managers may want to start out by recycling just a few basic materials. Then when the program is running smoothly, expand the program to include more materials. This is the method WTC chose to pursue.

Additionally, before choosing which recyclables to collect it is important to consider space and equipment. When evaluating what to collect and where to store the recyclables before collection by the recycling contractor keep in mind:

- ✓ Loading docks and storage areas
- ✓ The types, number and locations of containers needed such as totes, maggies and dumpsters, compactors and deskside containers
- ✓ The personnel responsible for transporting recyclables to the storage areas
- ✓ Local fire codes

Recycling Traditional Recyclables

As discussed earlier, WTC opted to start out by recycling just a few basic materials, or traditional recyclables. When the program is running smoothly, WTC consider expanding the program to include more materials.

WTC decided to switch from its confusing current system to a system whereby custodial staff would collect and deliver all materials to the dock including OP, ONP/OMG mix and aluminum cans.

The combined newspaper and magazine recycling is another convenient recycling method for tenants. This is a relatively new recycling method, resulting from changes in technology at paper mills.

As for beverage containers, only aluminum cans were added to the formal recycling program. The Denver Weyerhaeuser plant no longer has the ability to sort mixed beverage containers and would have had to make arrangements to deliver any other recyclable beverage containers collected to another recycler. This would have increased the costs of the program, so WTC opted not to collect any other beverage containers besides the aluminum cans.

Recycling Non-Traditional Items

The WTC waste stream is not just office paper and cardboard. It also contains computers and other office electronic equipment, fluorescent light bulb tubes, batteries, carpeting, laser printer toner cartridges, and beverage containers. The consultants witnessed several computers in the trash compactor, especially just before and after the Y2k event.

Dock managers also report that tenants bring furniture, shelving, dividers and other large obsolete items to the dock area every day. There is an informal reuse program, as tenants or others will occasionally take the abandoned items for home or office use.

WTC and the consultants agreed to develop educational information and resources for tenants to learn the proper methods and information on local recyclers to assist tenants in recycling the non-traditional recyclable items. The recycling and reuse information for the non-traditional recyclables can be found in Appendix D.

Universal Waste Rule (Fluorescent Light Bulb Tubes & Batteries)

Fluorescent tubes fall under a complicated regulation called the Universal Waste Rule and therefore warrant a brief description. In most cases, Colorado businesses need to treat used fluorescent tubes as hazardous waste, due to the mercury contained in the lamps. Under current Colorado hazardous waste regulations, a generator may send his/her lighting waste to a facility that uses, re-uses, or legitimately recycles the waste. Lighting waste should be packaged for storage and shipping in a manner appropriate to the waste type. For more information and regulatory requirements, review Appendix D, or call Colorado Department of Health and Environment at 303-692-3320, or visit the web site: <http://www.cdphe.state.co.us/hm/lighting99.pdf>

Combined newspaper & magazine recycling is a convenient recycling method for tenants. It's a relatively new recycling method, resulting from changes in technology at paper mills.

**To get a CDPHE
Compliance
Bulletin on Lighting
Wastes call
303-692-3320.**



Fluorescent tubes ready for recycling.

**To get a CDPHE
Compliance
Bulletin on
Batteries call
303-692-3320.**

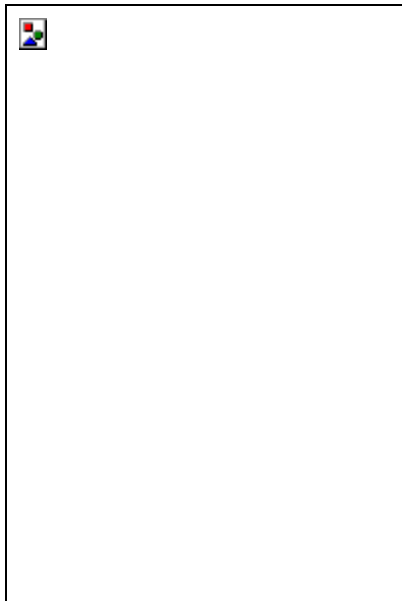
Certain batteries also fall under the Universal Waste Rule. These batteries may contain heavy metals and corrosive electrolyte solutions that are the source of their energy. There are eight metals commonly used in batteries including lead, mercury, nickel, cadmium, lithium, silver, zinc, and manganese. The preferred alternative to disposing of batteries is to recycle them.

For more information on batteries and the regulatory requirements, please call Colorado Department of Health and Environment at 303-692-3320, or visit the web site: <http://www.cdphe.state.co.us/hm/battery.pdf>. Still more batteries may be rechargeable, such as the newer nickel cadmium (Ni-Cad) batteries, commonly used in cell phones.

See Appendix D for more information on recycling fluorescent tubes and batteries.

Computers

Containing about 14 pounds of plastic and 6 pounds of lead, the average 60-pound computer is a potential environmental hazard. And, while throwing a PC in a dumpster or landfill is still legal in Colorado, it's not exactly responsible.



The Electronic Industries Alliance, a nonprofit organization based in Arlington, Va., recently launched Web sites that provides resources on electronics recycling. The sites www.eia.org and www.eiae.org, also list about 1,000 computer recycling and collection locations by state.

The state of Colorado is engaged in a study of computer recycling. Check www.state.co.us/oemc for information.



5. Education and Training

Education and awareness is one of the most important aspects necessary to make a commercial office building recycling program a success. Most tenants will support the recycling program if it is convenient and they receive the proper education about the program.

Kick-off Memos

Once a start date has been determined, it is very important to publicize that date to the tenants and all other stakeholders. Tenant outreach efforts might include staffed educational displays during lunch hours; flyers, memos, or e-mail announcements. You may even offer brief training sessions to show stakeholders how to participate. Or, you may sponsor a contest or competition with a recycling theme that tenants can watch and learn from.

Education and awareness is one of the most important aspects necessary to make a commercial office building recycling program a success.

- ✓ Property managers commitment to the program;
- ✓ How the program will benefit the tenants, staff, the community and the environment;
- ✓ The important role that cooperation plays in the success of the program.

To view the WTC kick-off brochure, see Appendix E. An excerpt is below:

**Announcing the World Trade Center's
New and Improved
Recycling Program!**

In order to serve our tenants better, and to help the environment, the World Trade Center is updating and improving its recycling program. The new program has the potential to double our recycling, up to 16 tons per month!

More Materials, Better Service

The new recycling program will be easier, accept more materials, and will provide better collection service. **And**, it's still completely voluntary. Cooperation from everyone will help this program succeed. So, we are encouraging our valued tenants to take some time to learn how to participate. Please help us, so we can help you!

Here's the Scoop! It's as Easy as 1,2,3.

1. Mixed office paper recycling

For higher grade papers, we are switching to a simpler, more convenient program. It's called "Mixed Office Paper." Along with white paper, it includes pastel colored papers, envelopes with windows, and a lot of other "junk mail" type paper. But to keep the program working, there are still some materials we have to keep out. Each office will receive directions and a detailed poster with samples.

2. Combined newspapers and magazines

Ever winced having to throw away your newspapers and magazines? Brookfield Properties will now offer collection bins and pickup service through our custodial contractor. Newspapers and magazines will be collected together in a special black container separate from the mixed office paper.

3. Aluminum cans

Did you know we Americans throw away enough aluminum every year to rebuild the entire U.S. jet fleet? Brookfield will now offer an improved program to collect cans. Just rinse and recycle in the tall black aluminum can recycling container!

Consultants worked with WTC to develop a kick-off event on America Recycles Day. The event consisted of a display in the lobby describing the new program, and provided information and samples of recycled products courtesy of Future Solutions, Inc. Information was distributed by WTC to the tenants one week before the event and signs were placed in the lobby to remind them on the morning of the event.

Training Sessions

Property managers should also hold training sessions to explain the recycling program and its benefits. The trainings should also raise awareness and enthusiasm, and detail the “dos and don’ts” of the new program.

The training sessions should provide written instructions, or how-tos for the program that the tenants may take back to their offices. A one page how-to, or poster, to put on a bulletin board in a central location is also recommended.

The training sessions should take place very soon after the program is announced by the kick-off memo. The trainings may be conducted with groups of tenants or with individual tenants. Don’t forget to provide the trainings for the custodians and other building staff too. Finally, training and how-to information should be provided during new tenant orientations.

Tenant trainings should raise awareness and enthusiasm, and detail the “dos and don’ts” of the new program.



Future Solutions president, Vanessa Morganti, demonstrates the benefits of recycled products.

55 percent of the tenants received training on the new recycling program

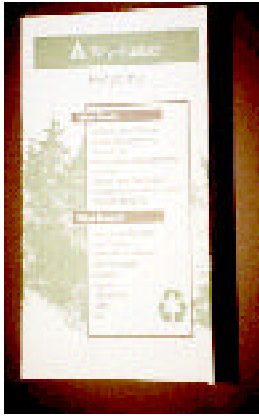
Kick-off and Training at WTC

Consultants and WTC staff provided brief group training for tenants throughout the day on America Recycles Day. In addition, on that same

day, training was provided for Brookfield/WTC staff, dock personnel and custodial supervisors. More brief group training was provided on other days throughout the month. Consultants also met one on one with some of the tenants. A total of 55 percent of the tenants received training on the new recycling program.

During the trainings, tenants received everything necessary to participate in the program including: deskside containers, containers for OP, and central containers for aluminum cans and ONP/OMG collection. All centralized containers included proper signage. The tenants received a printed list of do's and don'ts and an 11" x 17" poster that actually includes small paper samples, explaining the dos and don'ts of office pack recycling.

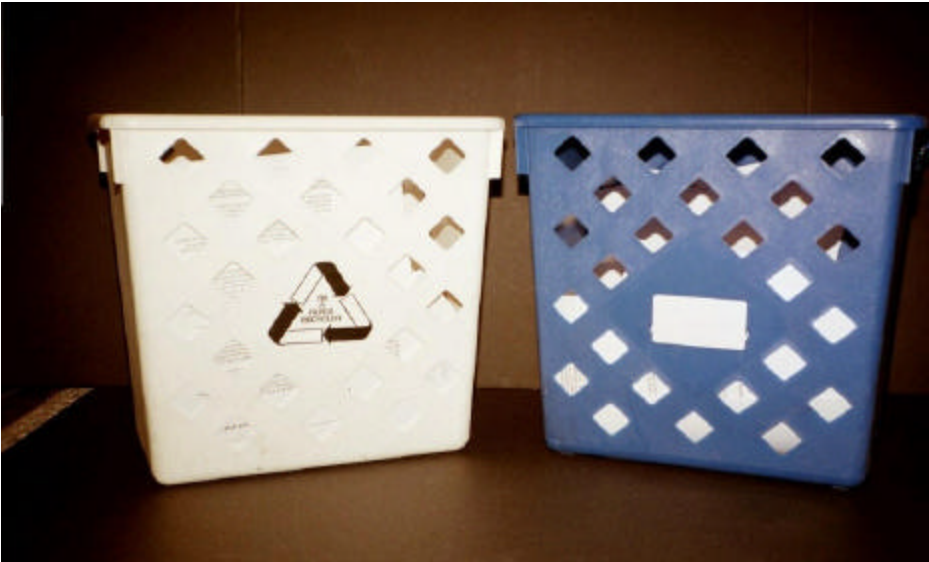
See Appendix E for more training and education information.



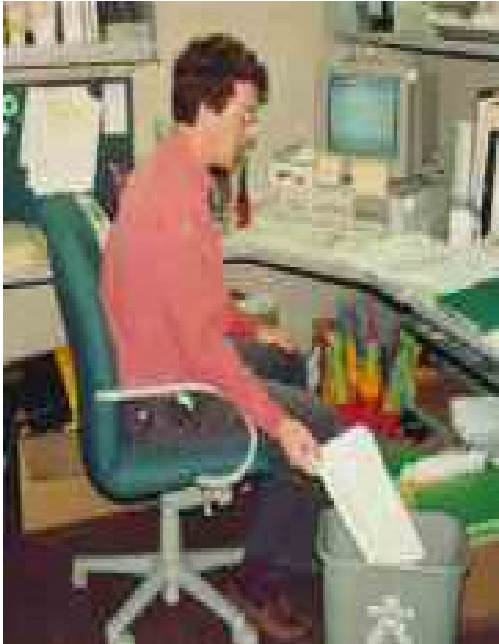
**Weyerhaeuser
deskside
recycling box with
list of dos and
don'ts.**



WTC Office pack poster with actual samples of paper attached.



Sample recycling containers.



6. Monitoring the Program

Some problems or challenges may occur during the first few weeks or months of any new recycling program. Appropriate and prompt response is necessary to keep the program running smoothly. It's recommended that the property managers keep in close contact with the custodians and the recycling contractor during program phase-in.

Property managers should keep in close contact with the custodians and the recycling contractor during program phase-in.

The property managers should also regularly evaluate the program to identify areas for improvement, and to be able to provide feedback to the tenants on the success of the program. You may need to ask tenants for their input on ways to improve the program and make it more convenient for them.

It takes concerted effort to implement a recycling program, and to train tenants to recycle. Most tenants learn the program quickly and develop good recycling habits. However, to ensure continued program success, the property manager will need to:

- ✓ Check around, and inform tenants if recyclables are ending up in the trash, or if trash is being placed in the recycling bins.
- ✓ Confirm that materials are being handled efficiently by janitorial crews, and make improvements as needed.
- ✓ Ensure collection areas are kept clean and that centralized bins are emptied regularly
- ✓ Most importantly for long-term success, property management needs to publicize how tenants are making a difference. Include the name of a property management contact person to handle questions, concerns and problems.
- ✓ Finally, publicize the success of the program. Include a property management staff person's name for tenants to contact with specific questions or concerns, or to report problems.

Remind tenants of "dos and don'ts."

WTC Program Evaluation

The consultants performed a second waste audit two months after the start of the program. Five of the six floors from the first waste audit were sampled again. Since one of the floors had been vacated, a substitute was chosen randomly. Again, custodians collected and delivered the trash to the sort area, where it was sorted into the same 31 categories and weighed.

As during the first audit, the contractors only weighed the trash from the tenants' offices, not the waste generated at the trash compactor during

the day. Therefore, again, while the sample was significant, it was not a complete picture of the waste stream.

WTC Waste Audit Summary Audit 2 – New Recycling Program	
Total daily office discards	3,013 lbs
Targeted recyclables in trash	917 lbs
Other recyclables in trash	585 lbs
Remainder of trash	953 lbs
Recyclables collected by Weyerhaeuser	557 lbs ¹
Calculated recycling rate	18.5 percent

1. Based on average tonnage reported by recycling contractor 11/00 – 1/01 = 6.03 tons per month



Accurately recording the weights during waste audits is important.

Comparing the Results

Before and After Waste Audit Comparison					
Pounds per Day					
	Pre-Program Audit		Pre-Program Audit		% Change
	Lbs.	%	Lbs.	%	
Targeted recyclables in trash	1,240	30.8%	917	30.4%	-26%
Other recyclables in trash	509	12.6%	585	19.4%	+15%
Remainder of trash	1,527	37.9%	953	31.6%	-38%
Recyclables collected by Weyerhaeuser	751 ¹	18.6%	557 ²	18.5%	-26%
Total daily office discards	4,027	100%	3,013	100%	-25%
1. Based on average tonnage reported by recycling contractor 1/98 – 10/00 = 8.14 tons/month					
2. Based on average tonnage reported by recycling contractor 11/00 – 1/01 = 6.03 tons/month					

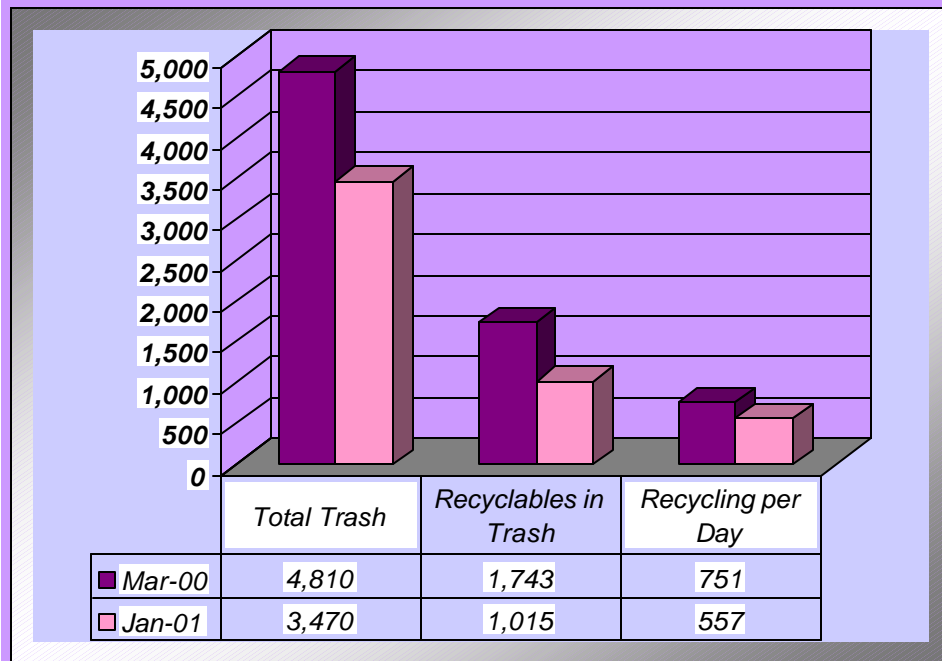
There was 25 percent per day reduction in the amount of total trash generated and a 26 percent reduction of targeted recyclable materials remaining in the trash. The recycling rate declined slightly from 16.6 percent to 18.5 percent. Several factors, however, could have skewed the results of the audits:

- ✓ The first audit was performed during a spring break for many area schools, suggesting some tenants may have been on vacation, causing a lower than normal amount of trash to be generated, and;
- ✓ Staffing levels could have changed between the two dates.

Recycling collections dropped off during the first three months of the program, from an average of eight tons per month, to six tons. The drop in recycling may be attributed to several factors:

- ✓ A very large tenant moved out of the building in early December, vacating 4 floors, or seven percent of the building.
- ✓ November, December and January are typically less active months in the workplace
- ✓ The overall slowing of the economy
- ✓ The 300 newly distributed deskside collection containers may have caused a temporary “inventory bottleneck” for the new office pack grade of paper. In other words, the tenants may have been filling up their new containers, and as those newly filled containers are emptied, recycling tonnages will return to equilibrium.
- ✓ The new recycling outreach effort, which included well-marked containers posters, and training sessions, has had its intended effect of reducing trash in the bins, thereby reducing overall weight.

Recycling an aluminum can saves up to 95% of the energy it takes to make a new one from virgin bauxite ore.



Increased Awareness

Reinforcing the new recycling habit is essential. Positive reinforcement is needed to reinforce the recycling habit among tenants. Continual reminders are critical to maintain participation and minimize contamination. You may want to consider developing a logo or slogan for the program to use in all your recycling outreach materials.

Remember to keep the tenants and custodians updated and enthusiastic about the successes of the program. Publicize program milestones such as the 100th ton of paper recycled.

It helps to report volumes of materials collected and relate that to the environmental benefits of the program such as number of trees saved, barrels of oil conserved, or air pollution prevented.

Below, we have included figures developed by the United States Environmental Protection Agency on the environmental benefits of recycling.

Every ton of waste paper recycled results in:

- ✓ **17 Trees saved**
- ✓ **3 Barrels of oil are conserved**
- ✓ **4,102 Kilowatts of electricity are saved**
- ✓ **3.3 Cubic yards of landfill space are saved**
- ✓ **60 Pounds of air pollution are prevented**
- ✓ **7,000 Gallons of water are conserved**

US EPA

Post – Program Tenant Survey

As a way to gauge the initial success of the new recycling program, we distributed a short survey to WTC’s 112 tenants five months after the program started. 18 surveys were returned, representing 19% of the building population.

Survey respondents also reported that 56% of their coworkers were very satisfied with the recycling program, and 31% were somewhat satisfied with the program.

Although this was a non-scientific, self-selected survey, we believe the responses are useful in understanding where resources might be best spent. 94% of respondents said most or all of their co-workers participate in recycling office pack, 88% said most or all of their co-workers participate in recycling magazines and newspapers, and 77% said that most or all of their co-workers participate in recycling aluminum cans.

The respondents also reported that 56% of their coworkers were very satisfied with the recycling program, and 31% were somewhat satisfied with the program.

When asked why some of their co-workers did not participate, the reason stated most often was that folks were “not informed” about the program. This was followed by “not interested,” or “too busy.” One law firm responded that they did not recycle any office papers since they shred all their paper, and shredded paper is not acceptable.

The responses to this survey demonstrated the importance of keeping tenants informed to reinforce the recycling habit.

Reported Recycling Participation Levels			
	Office Papers	News & Magazines	Aluminum Cans
Unsure		6%	
All	44%	44%	44%
Most	50%	44%	33%
Half			
Few		6%	6%
None	6%		17%

For more post-program survey information see Appendix A.

Appendix A

Surveys



Recycling Survey

Sponsored by

**Colorado Office of Energy
Management and Conservation**

and

Brookfield Properties Colorado

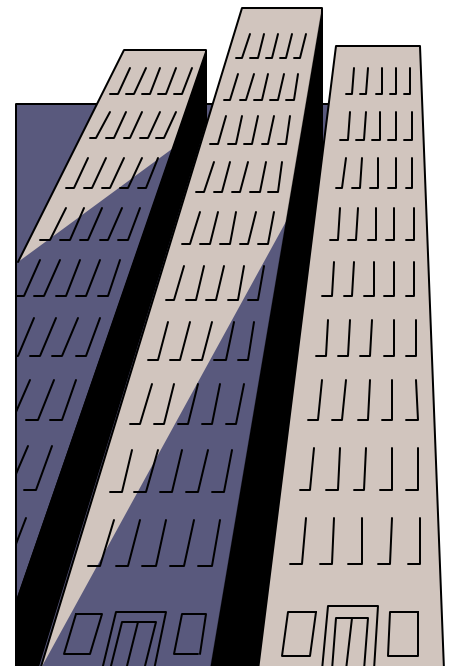
Please take a few minutes to complete this recycling survey. Answer based on your office as a whole with only one completed survey per office. This survey is being conducted by Lighthouse Environmental, a contractor for the Colorado Office of Energy Management and Conservation, with the cooperation of Brookfield Properties Colorado, to investigate and implement ways to significantly increase collection of recyclable materials from commercial office buildings. It is our hope that the World Trade Center project will serve as a statewide example of low or no cost solid waste reduction practices.

Your answers on the survey will provide a starting point and direction for our efforts. *We thank you for your time.* All answers will be held in strict confidentiality, and published in aggregate form only.

Directions: *To ensure we have as complete a picture as possible, please fill out the survey based on the office as a whole, gauging your co-workers waste reduction habits and attitudes as a whole.*

???????

***Need help completing the survey ...
Visit us at the recycling display
booth on May 3, or call Dianne Beal
at 303-838-6891, or Henry Fowler
at 303-722-7733.***



- | | | | | | | | |
|-------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------|
| <input type="checkbox"/> Plastic bottles | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| | | | | | | | _____ |
| <input type="checkbox"/> Toner cartridges | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| | | | | | | | _____ |
| <input type="checkbox"/> Batteries | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| | | | | | | | _____ |

4. Please note any other ways your office recycles or reduces waste. (i.e. We collect cans for the boy scouts", or, "We send our laser toner cartridges back for re-manufacturing," "we reuse coffee mugs, etc.) _____

Please note: We encourage you to continue and expand your existing fund-raising/recycling programs.

5. Does your office shred certain papers for security purposes? _____ Yes _____ No

If yes, what do you currently do with it? _____ Put it in the trash _____ Put it in the recycling bin

Estimate the number of large trash bags you fill with shredded paper in one week. _____

Other, please explain _____

6. In the **opinion of the majority of your co-workers**, how beneficial is recycling?

- Very beneficial Somewhat beneficial Not very beneficial Not at all beneficial Unsure

7. Which of the following would the majority in your office be willing to recycle at a **central collection area in your office, or on your floor?**

- Cardboard/boxes Mixture of aluminum and steel cans, glass and plastic bottles

8. Which of the following would the majority in your office be willing to recycle by **assigning someone in your office** to take the materials directly to a clearly marked collection site **in the dock area?** Cardboard/boxes Mixture of aluminum and steel cans, glass and plastic bottles Old computers Toner cartridges

9. Please check the reasons you believe some people do not participate in the current World Trade Center recycling program?

- Too inconvenient Too busy to take the time Not interested Service not available
 No convenient containers Not informed of program Don't believe it actually gets recycled Unsure
 Not sure what to recycle, so it's easier not to recycle at all
 Problems with current program _____

10. Please indicate approximately how many people in your office have their own paper recycling containers?

- Very few have one Some have one Most have one Everyone has one Unsure

11. Please add any personal comments on participation, or lack of participation, in your office recycling program. _____

12. How willing would the majority in your office be to switch from the current paper recycling program to an easier, more convenient program, which simply combines several types of paper - including combining white and colored paper together?

- Very willing Somewhat willing Not very willing Not at all willing Unsure

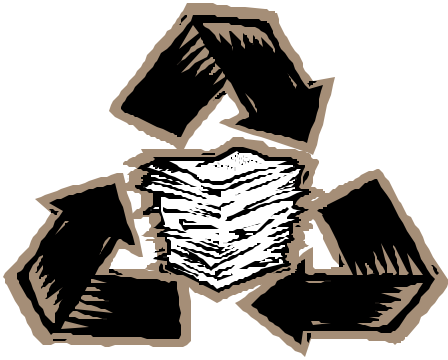
Comments: _____

13. How willing would the majority in your office be to attend a 10-minute presentation on how to reduce, reuse and recycle at the World Trade Center...in your office (at a staff meeting or other convenient time)?

- Very willing Somewhat willing Not very willing Not at all willing Unsure

or, at a central location within the World Trade Center buildings?

- Very willing Somewhat willing Not very willing Not at all willing Unsure



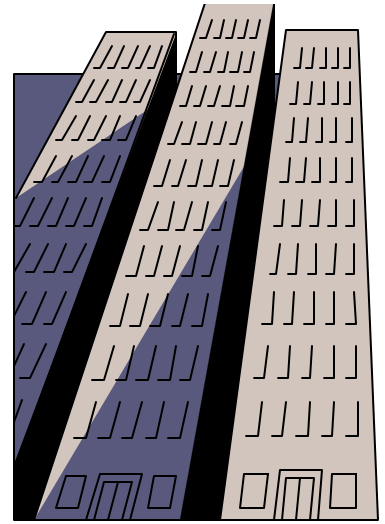
World Trade Center Recycling Survey

Sponsored by

Colorado Office of Energy
Management and Conservation

and

Brookfield Properties Colorado



Drop-off completed survey at the recycling display booth in the courtyard of the World Trade Center (if weather is bad, inside 1625 Broadway near Russell's) on May 3, 2000, from 11:00 a.m. to 1:00 p.m.

The first 20 people to return their survey at the recycling display booth on Wednesday, 5/3/00 will receive will receive a Russell's Buck good for \$1.00 off any purchase at Russell's.

All who return their survey at the recycling display on May 3, 2000, will be entered into a drawing to a receive gift certificate from Bayou Bob's, Cub Foods, Galileo, or Maggiano's Little Italy, or Odessey.

If unable to attend, please fax your completed recycling survey to 303-460-7280 or,

mail to: Lighthouse Environmental
87 Sparrow Court
Bailey, CO 80421-1858

by Friday, May 5, 2000

???????

*Need help completing the survey ...
Visit us at the recycling display
booth on May 3, or call Dianne
Beal at 303-838-6891, or Henry
Fowler at 303-722-7733.*

Lighthouse Environmental, L.L.C.

87 Sparrow Court
Bailey, CO 80421-1858

Phone: 303-838-6891 Fax: 303-838-3576
E-mail: Dianne_Beal@email.msn.com

Your beacon to pollution prevention and resource conservation.

Memorandum

To: World Trade Center Recycling Survey Respondents

From: Dianne Beal & Henry Fowler, Lighthouse Environmental
Vanessa Morganti, Future Solutions, Inc. - www.FutureSolutionsInc.com

Date: May 31, 2000

Re: Prizes for Completing Recycling Survey

Enclosed, please find your randomly selected prize for completing the recycling survey as part of the World Trade Center recycling improvement project.

Your assistance has provided valuable information necessary for improving the current recycling program.

Prizes were donated by:

Brookfield Development (Starbucks Gift Certificates)

Bayou Bob's

Café Odyssey

Cub Foods

Galileo - Heavenly Food Fast

Maggiano's Little Italy

Thank you for your continued cooperation.

Lighthouse Environmental, L.L.C.

87 Sparrow Court
Bailey, CO 80421-1858

Phone: 303-838-6891 Fax: 303-838-3576
E-mail: Dianne_Beal@email.msn.com

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Your assistance has provided valuable information necessary for improving the current recycling program.

Prizes were donated by:

Brookfield Development (Starbucks Gift Certificates)

Bayou Bob's

Café Odyssey

Cub Foods

Galileo - Heavenly Food Fast

Maggiano's Little Italy

Thank you for your continued cooperation.

World Trade Center Recycling Survey

Dear Office Manager or Interested Recycler:

In order to help us improve our recycling program, and reduce waste further, please take a few minutes to complete this recycling survey.

We are asking for one survey to be filled out per tenant (or one per floor for multi-floor tenants). To ensure we have an accurate picture, please answer based on the average participation and attitudes of your office as a whole.

Drop-off or mail your completed survey by Friday, April 13th, c/o Don Archuleta, Brookfield Property Management, 1625 Broadway, Suite 1500, Denver, CO 80202, or fax to 303-595-7016. If you return your survey by April 13th, you will be entered into a drawing to receive a recycled content gift.

- 1.** Name: _____
 Company: _____
 Address and suite/floor(s): _____
 Phone: _____

- 2.** How many people in your office participate in recycling the items listed below?

	None	Few	Half	Most	All	Unsure	Comments
Office Paper	—	—	—	—	—	—	_____
Newspaper and Magazines	—	—	—	—	—	—	_____
Aluminum Cans	—	—	—	—	—	—	_____
Other _____	—	—	—	—	—	—	_____
Other _____	—	—	—	—	—	—	_____

3.

	None	Few	Half	Most	All	Unsure	Comments
How many people have and use a mixed office paper recycling bin at their desk?	—	—	—	—	—	—	_____

- 4.** Check off some of the reasons some folks don't recycle in your office:

- Too inconvenient Too busy Not interested
 Service not available They don't have bins Not informed of program
 Don't believe it actually gets recycled Unsure
 Not sure what to recycle, so it's easier not to recycle at all
 Problems with current program – Please explain _____

5. Does your office need further training or information on how to recycle?

- Yes
- No

6. Does your office need recycling bins, boxes, or posters? Circle what you need.

- | | | |
|------------------|-----------------------------|---------------------------|
| Bin for Aluminum | Bin for Newspaper/Magazines | Boxes for office papers |
| Posters | Flyers | Labels for recycling bins |

7. In general, how satisfied are your co-workers with the new recycling program?

- Very Satisfied
- Somewhat Satisfied
- Neutral
- Somewhat Dissatisfied
- Very Dissatisfied
- They don't know enough about it
- Can't say, since many have not received any information on new program

What would you change? _____

Post Program Survey summary:

As a way to gauge the initial success of the new recycling program, we distributed a short survey to WTC's 112 tenants five months after the program started. 18 surveys were returned, representing 19% of the building population.

Although this was a non-scientific, self-selected survey, we believe the responses are useful in understanding where resources might be best spent. 94% of respondents said most or all of their co-workers participate in recycling office pack, 88% said most or all of their co-workers participate in recycling magazines and newspapers, and 77% said that most or all of their co-workers participate in recycling aluminum cans.

The respondents also reported that 56% of their coworkers were very satisfied with the recycling program, and 31% were somewhat satisfied with the program.

When asked why some of their co-workers did not participate, the reason stated most often was that folks were "not informed" about the program. This was followed by "not interested," or "too busy." One law firm responded that they did not recycle any office papers since they shred all their paper, and shredded paper is not acceptable.

The responses to this survey reinforce the importance of keeping tenants informed to reinforce the recycling habit.

Reported Recycling Participation Levels

	Office Papers	News & Magazines	Aluminum Cans
Unsure		6%	
All	44%	44%	44%
Most	50%	44%	33%
Half			
Few		6%	6%
None	6%		17%

Source: survey 2 spreadsheet for final report

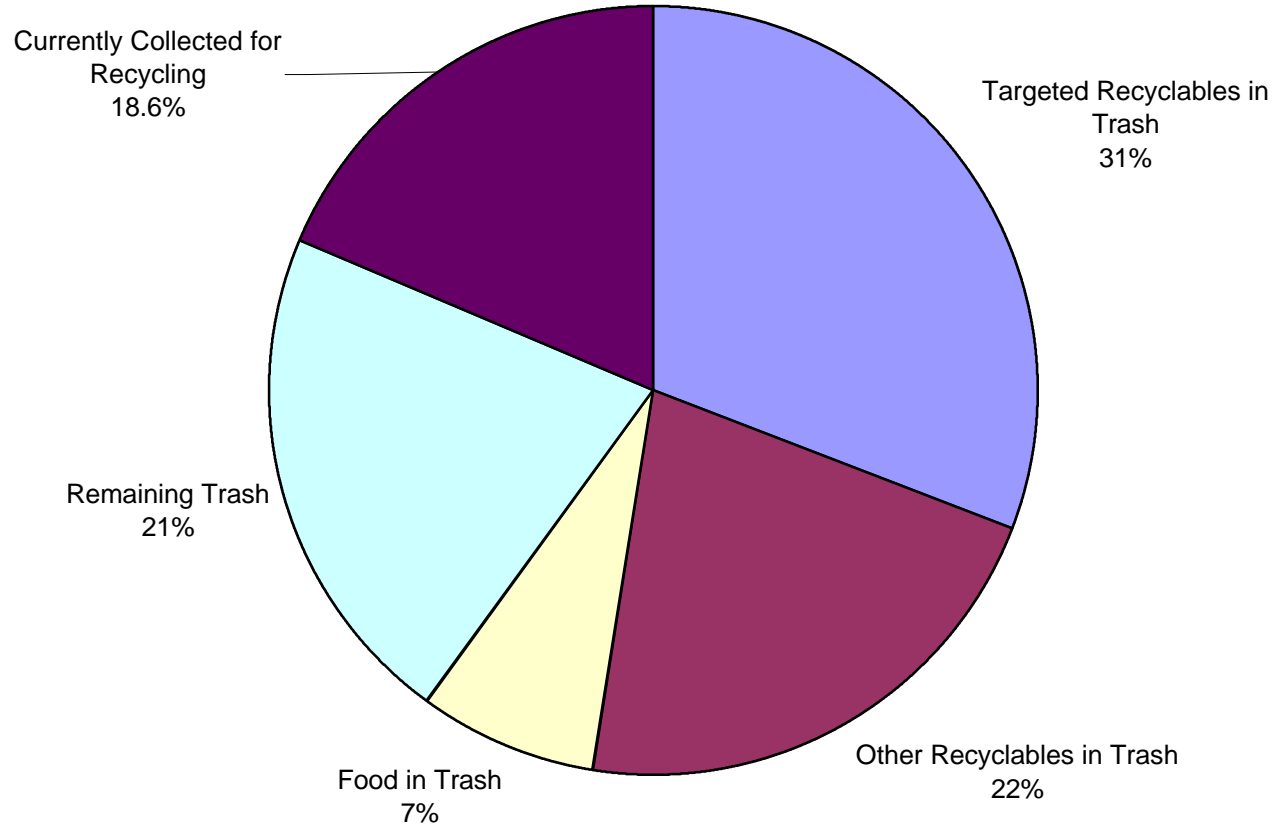
# Staff		2 - OP	ONP OMG	Alum	3 - Bin at Desk?	4 - Reason Don't Recycle	5 - used old program?	6 - Need info or training?	7 - Requests	8 - Satis faction level	Comment
4		4	4	4	4	don't believe gets recycled, not sure, so don't do it	1	2	Posters, labels	1	
7		5	5	5	5		1	2		1	has old cptrs
8		5	2	1	5		2				
7		5	5	5	4		1	2		1	working well
10		5	5	5	5	Not interested, not sure what to recycle - so they don't do it	1	2		2	
6		5	5	5	3	I think people just forget. Recycling needs to be reinforced. Keep up surveys and newsletter.	1	2		1	
8		5	5	5	4		1	2	boxes	1	
8		1	4	4	4	Since we are law office, we have to shred, and can't recycle, but wish we could!	1	2	posters	2	
18		4	5	5	4	Not interested	1	2		2	
6		4	4	5	2	They don't have bins	2	2	posters, flyers	1	
5		5	5	5	5	everyone recycles, N/A	?	2		1	Recycle glass btls
33		4	4	4	4	unsure	2	2		2	
12		4	5	1	3	need small desktop bins for testing stations. Not informed.	1	1	all - Don doing it	7	
7		4	4	4	4	too busy	1	2	boxes flyer	1	
60		5	4	2	1	no bins	1	2	boxes	2	
12		4	4	4	4	not interested	1	2			
14		4	4	1	5	too busy to recycle cans, small bins don't get emptied	2	2	large boxes	3	
60		4	6	4	2	Too busy, Unsure, Not interested	1	2		1	
280	Unsure - 6		1			yes	13	1	very satisf.	9	
1800	All - 5	8	8	8	5	no	4	16	somewhat	5	
16%	Most - 4	9	8	6	8				Neutral	1	
	Half - 3				2				somew diss	0	
	Few - 2		1	1	2				Very dissat	0	
	None - 1	1		3	1				don't know	0	
		-----	-----	-----	-----				Can't say	1	
		18	18	18	18					-----	
	Percent reporting	94%	89%	78%	72%					16	
						Percent reporting very or somewhat satisfied with program:				88%	
						Very satisfied:				56%	
						Somewhat satisfied:				31%	
					4	not interested					
					5	not sure how to do it (or forgot how) - so don't do it					
					3	lack of bins					
					3	too busy					

Appendix B

Waste Audits

Audit 1 - Before Program Implementation

Discards = 4,027 lbs. Per day



Appendix C

Baler Analysis

World Trade Center Baler Investment Analysis

February, 2001

Lighthouse Environmental has prepared this analysis to help Brookfield Properties decide whether to invest in equipment to recycle corrugated cardboard boxes (OCC) at the World Trade Center.

Executive Summary

Baling corrugated boxes by custodial and dock personnel will produce significant savings in operating costs (see summary below and the attached spreadsheets for details). Leasing is also available to reduce up front costs.

Purchase Summary		Includes Yearly	
Installed Cost:	\$11,151	Trash Cost Savings:	\$7,560
Total savings/year:	\$8,417	OCC income:	\$1,170
Payback months:	15.9	Baler Operating Costs:	(\$313)

Lease Summary	
Up Front Cost:	\$2,000
Total Cash Savings:	
Month 1 to Month 35:	\$377
Mo. 36 buyout = \$850	(\$473)
Month 37 and Ongoing:	\$701

Where the Money Comes From

Reduced Trash Costs

Most of the savings are from reduced trash hauling fees, currently at \$16,800 per year for service of 4 dumpsters per day, 5 day per week. According to dock manager, Jim Mares, each morning one or two fully compacted trash dumpsters, and two to three uncompacted dumpsters with loose trash (mostly corrugated boxes by volume) are taken up the ramp for disposal.

By baling and recycling OCC, the building **could initially reduce the number of dumpsters needing to be emptied from 20 to 7.5 per week (and from 5 day per week service to Monday, Wednesday and Friday only), reducing monthly trash hauling by 62.5 percent.** We use a more conservative 45% cost reduction for calculations.¹ If baling and other waste reduction measures reduce trash volume more than expected, payback time could be further shortened.

Income on Sale of OCC

The next largest portion is income from sales of the OCC material. We use a conservative estimate of 450 pounds per day (or 2.25 bales per week). Weyerhaeuser is now paying \$20 per ton for baled OCC picked up.

¹ Even though total dumpsters collected are reduced by 62.5 percent, the trash hauler may still only reduce the cost by 45 percent, since most of the cost of trash hauling is in the service stop, not the amount of material picked up. Firm negotiations and price shopping will be needed.

Based on the preliminary office tenant trash audit, we estimate there are approximately 324 pounds of OCC coming from the tenant trash areas each night (9.9 percent of the trash). The waste audit only measured waste material left in the office trash for custodians, and not material disposed during the rest of the day.

Studies have shown that an average office building produces 19 percent OCC (or, 622 pounds per night for the World Trade Center). According to dock personnel, a large amount of corrugated boxes show up every day for disposal (brought by construction workers, Russell's, delivery personnel and tenants).

Labor Savings

Though there is no direct cash flow benefit of using a baler, dock personnel will spend less time setting out and retrieving trash dumpsters each day. Dock personnel estimate that this process takes a minimum of one hour each morning, not including the wait for the trash truck or trash truck loading time.

Type and Placement of Baler

Lighthouse Environmental recommends the purchase of a downstroke baler with a minimum 60" width for ease of loading and to make bales that can be shipped directly to mills. Typical downstroke balers produce bales from 900 to 1,100 pounds. See **Exhibit A** for baler purchase and installation costs.

The baler should be placed immediately to the left of the compactor, to minimize staff time placing boxes in the baler. Two of the green, paper recycling maggies will need to be relocated. By reducing trash, Brookfield might be able to eliminate one of the compactor bins, freeing up space for the displaced recycling bins.

Operating Costs and Electrical Installation

Baler costs, including utilities, baling wire and maintenance are estimated at \$26 per month. Balers need three phase power to run most efficiently. Custom Electric has estimated \$1,260 to install the required 277/480 volt circuit.

Training in Baler Operation and Safety

We recommend that building management thoroughly train dock and custodial personnel in use of the baler, including safely loading, tying, ejecting and storing the bales. This will require that Brookfield provide the custodial crew access to a pallet jack or the forklift to move the bales. Baler manufacturers offer training videos and manuals in both Spanish and English. All balers come with master keys, allowing control of use.

Collection by Recycling Contractor

Weyerhaeuser has said they can collect the bales (on pallets) along with the other paper during their usual twice weekly stops at the World Trade Center.

World Trade Center Corrugated Cardboard Baler Purchase Analysis

	Costs Before Baler	Costs After Baler	Monthly Savings	Yearly Savings
Monthly Trash Removal	\$1,400	\$770	\$630	\$7,560
OCC Net Recycling Income			Monthly Income \$71	Yearly Income \$857
Dock Personnel Hours Spent on Trash and OCC	Before Baler 21.7	After Baler 13.0	Monthly Savings 8.7	Yearly Savings 104.0

Baler Purchase and Installation Costs:

Price delivered and installed	\$9,520
Electrical installation	\$1,260
Miscellaneous	\$100
Sales Tax	\$271

Subtotal	\$11,151

Yearly Cash Savings and Income \$8,417

Net Costs

\$11,151

Leasing Analysis

(36 Month lease, 2 Months Paid Up Front, 10% Buyout)

Up front costs (two months lease payment, delivery, installation and electrical)	\$2,000
Monthly lease and operating costs - Months 1 to 35	\$350
Monthly Savings and Income	\$727

Total Cash Savings - Month 1 to Month 35	\$377
Month 36: Buyout is \$850, so total outlay is \$484	-\$484
Month 37 and Ongoing Savings	\$701

The figures above are estimates based on the best information available.

Appendix D

Recycling Guidance

Appendix D – Guide to Recyclers

*The following guide does not imply an endorsement of any company.
This guide is not a complete and comprehensive resource.*

All Items

Colorado Association for Recycling - *Information only*

www.cafr.org

Colorado Governor's Office of Energy Management and Conservation – *Information Only*

www.state.co.us/oemc

303-894-2383

Colorado Recycles - *Information only*

www.colorado-recycles.org

303-237-9972

Creative Exchange, Aurora

303-391-6119

Clean and/or unusual materials used for school art project. Call for a creative audit to learn what you can divert from your dumpsters.

www.creative-exchange.org

Extra's for Education, Boulder

303-823-9460

Provides schools with needed materials such as reusable furniture, office supplies and other excess inventory items.



Aluminum

Cans

Most companies will collect them along with steel cans, glass and plastic bottles.

You may also drop them off at a local recycling center. Use any proceeds or rebates for incentives for tenants or donate to a local charity.

Visit the following web sites.

Aluminum Association www.aluminum.org

Can Manufacturers Institute www.canrecycle.org

Container Recycling Association www.cri.org

National Soft Drink Association www.nsd.org



Scrap Aluminum

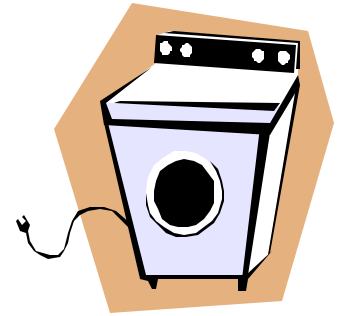
For large quantities of larger pieces of scrap aluminum such as windows, siding or chairs, you may want to get a scrap metal recycling container. They range from 4 cubic yards on up. Also check your yellow pages under scrap metal recyclers.

Visit the following web site :

Institute for Scrap Recycling Industries www.isri.org

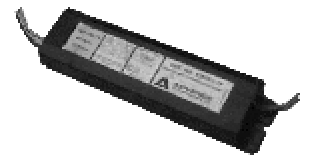
Appliances

For working appliances, check with local emergency assistance organizations or appliance repair and resale shops. For non-working appliances, check the yellow pages under appliances for repair shops, or recycle with your local scrap metal recycler.



Ballasts

Fluorescent light fixtures have a part called a ballasts that contains a small canister of oil. In older canisters, the oil contained PCBs, or polychlorinated biphenyls, which are very toxic. When replacing light fixtures, be sure to look for labels on the ballasts. If the label says "Contains no PCBs" they are not hazardous. If there is no label, or the label DOES NOT say "Contains no PCBs", you must assume they contain PCBs and manage them as hazardous waste. See Fluorescent Lights in this Appendix for information about lighting recycling and disposal companies.



Batteries

Certain batteries fall under the Universal Waste Rule. These batteries may contain heavy metals and corrosive electrolyte solutions that are the source of their energy. For more information on batteries and the regulatory requirements, please call Colorado Department of Health and Environment at 303-692-3320, or visit the web site: <http://www.cdphe.state.co.us/hm/battery.pdf>.



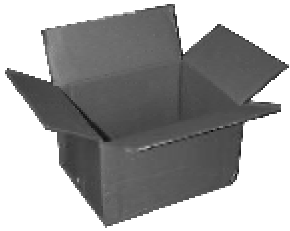
Alkaline Batteries

Visit: www.batteryrecycling.com
www.inmetco.com
<http://www.lightingresources.com/>
www.retrofitcompanies.com



Ni-Cad Batteries

For a list of local recycling locations, call the Rechargeable Battery Recycling Corporation at 800-822-8837, or visit their web site at www.rbrc.com



Corrugated Cardboard

Most office paper recyclers and many trash haulers will provide recycling programs for old corrugated cardboard (OCC). Most want it flattened and strapped on pallets or placed in separate metal dumpsters. Some also provide rental or leasing programs for balers to reduce, compact and densify the cardboard.

Visit the following websites.

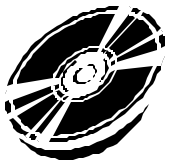
American Forest and Paper Association www.afandpa.org
National Office Paper Recycling Project www.usmayors.org
Eco-cycle www.ecocycle.org
Tri-R Recycling www.trir.com
Waste-Not Recycling www.waste-not.com
Weyerhaeuser Recycling www.weyerhaeuser.com

Carpeting



Carpets that are in good condition can be donated to nonprofit organizations. A popular new way to save on carpet replacement costs and their disposal is to use carpet squares. Ask your carpet supplier about these carpet squares. When carpets are worn in certain areas or stained, you only need to replace part of the carpet. See www.brba-recycle.org for more information.

Some carpet manufacturers have begun to recycle carpets by shredding them and making them into new products. This service is provided by some carpet manufacturers and is available to customers buying new carpets. Check with your carpet dealer.



CD-Roms

Eco Disk, Tacoma WA 253-471-1800
www.ecodisk.com or www.supercd.com

Cell Phones

The Wireless Foundation donates phones to Domestic Violence Victims as part of the Call to Protect program. Mail the phone and accessories to:

Call to Protect
c/o Motorola
1580 E. Ellworth Road
Ann Arbor, MI 48108



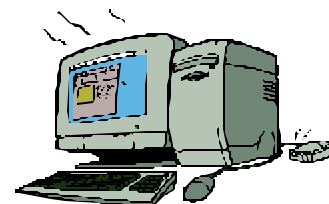
For more information visit www.wirelessfoundation.com, or www.calltoprotect.com. For a participating drop-off location near you visit www.donateaphone.com

Computers & Electronics

Containing about 14 pounds of plastic and 6 pounds of lead, the average 60-pound computer is a potential environmental hazard. In addition, while throwing a PC in a dumpster or landfill is still legal in Colorado, it's not exactly responsible.

The Electronic Industries Alliance, a nonprofit organization based in Arlington, Va., launched Web sites that provide resources on electronics recycling. The sites, www.eia.org and www.eiae.org also list about 1,000 computer recycling and collection locations by state.

Computer owners may either donate or recycle their old or unused computer equipment. Recycling generally costs anywhere from \$30 - \$100 for an entire system. The advantage of recycling is that up to 98% of the materials will be disassembled and reused to make new products. Donating computers to a collector is free, but systems have to be in working condition and can't be too outdated. (At the time of this report, generally a 486 processor or higher.) Donated computers are usually distributed to non-profit groups, schools and those in need. For a complete report on computer recycling visit <http://www.co.boulder.co.us/bcrca/electron.htm>.



List of computer & electronics recyclers (call for fees and restrictions):

Action Recycling Center	Wheat Ridge	303-424-1600
Eco-Cycle www.ecocycle.org	Broomfield	303-444-6634
Eagle Computer Tek, Inc.	Fort Collins	970-224-2868
Guaranteed Recycling Experts	Denver	303-477-2764
Retrofit, Inc. www.retrofitcompanies.com	St. Paul, MN	651-766-7422
Rocky Mountain Recycling	Commerce City	303-288-6867

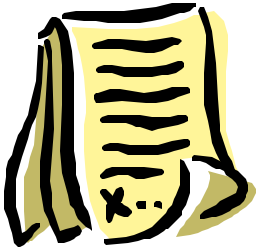


Technology Recycling, Denver www.techrecycle.com		303-766-9608 800-803-5442
Waste-Not Recycling	Greeley	800-854-9912

List of computer & electronics re-distributors (working computers only – call for restrictions):

Alpha Institute	Aurora	303-343-4114
CDB Systems	Longmont	303-444-7071
Computers for Community	Aurora	720-859-0325
Extras for Education	Boulder	303-823-9460
Gives Inc.	Aurora	303-337-1174
PC Brokers	Boulder	303-449-2267

Confidential Documents



Many companies want to recycle paper, but wonder about someone taking their confidential information, such as company secrets or legal documents. Shredded paper is not usually recyclable, unless arrangements are made with a paper recycling company to ensure quality and agree on a price. Many Colorado office paper recyclers offer their own shredding service, or partner with certified confidential data destruction (shredding) services. Check with your recycler or visit the web sites listed at the beginning of this Appendix.

Construction & Demolition (C&D) Debris, and Deconstruction Services



C&D waste is generated from construction, demolition and renovation projects. Many C&D wastes are commonly recycled such as asphalt, concrete, bricks, dirt, lumber, metal, windows and doors. For local recyclers check your yellow pages under those items. Also, look in the yellow pages under salvage. You may be able to sell or donate items to a local salvage yard.

ReSource 2000 in Boulder is a nonprofit construction reuse center. You may bring items for recycling or shop for items you need. Call 303-441-3278, for more information. ReSource 2000 is also a great resource for deconstruction information.

Drums & Barrels



Some containers that once contained hazardous materials are hazardous and must be disposed of as hazardous waste. Keep this in mind when you are determining what can go in the regular trash and what must be shipped to a hazardous waste facility:

- Large containers (bigger than 5 gallons) should be recycled through a drum reconditioner or metal recycling company.
- Containers that once held "extremely or acutely hazardous materials" or specific materials that are listed in the law are considered hazardous unless they are rinsed three times. (The rinse water or rinse solvent must be used up as product or disposed of as hazardous waste). In many cases, you need a permit to rinse containers.



Consult State regulations on "contaminated containers" or ask for assistance from local or state agencies when deciding whether you are going to manage empty containers as hazardous waste or regular trash. For more information and regulatory requirements, please call Colorado Department of Health and Environment at 303-692-3320, or visit the web site: www.cdphe.state.co.us.

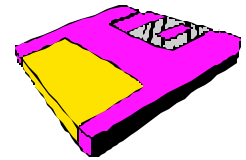
Western Container, Denver
(A PalEx Company)

303-659-5095

Floppy Diskettes

Eco Disk, Tacoma WA
www.ecodisk.com

253-471-1800



Fluorescent Tubes and Ballasts

Spent, or used, fluorescent tubes are completely recyclable. In Colorado Fluorescent tubes fall under a complicated regulation called the Universal Waste Rule and warrant a brief description. In most cases, Colorado businesses need to treat used fluorescent tubes as hazard waste, due to the mercury contained in the lamps. Under current Colorado hazardous waste regulations, a generator may send his/her lighting waste to a facility that uses, re-uses, or legitimately recycles the waste. Mercury containing lamps should be packaged for storage and shipping in a manner appropriate to the waste type. For more information and regulatory requirements, please call Colorado Department of Health and Environment at 303-692-3320, or visit the web site: <http://www.cdphe.state.co.us/hm/lighting99.pdf>



Colorado Lighting

Denver

303-288-3152

www.coloradolighting.com

Earth Protection Services

Phoenix, AZ

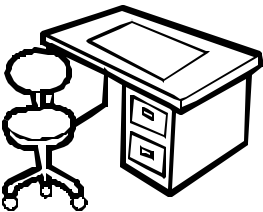
800-414-0443

www.earthpro.com

Grainger www.grainger.com	Denver/Boulder	303-371-2360
Lighting Resources, Inc.	Phoenix, AZ	800-572-9253
Superior Special Services www.superiorspecialservices.com	Bloomington, MN	800-831-2852

Foam Padding

Check with your local recycler. If they don't recycle the padding, they may keep a reference list of those who do. Your local carpet dealer may also keep a list of recyclers.



Furniture

Furniture can be reused, rather than throwing it away. Check with your local charities and human service organizations.

Extras for Education, Boulder County	303-823-9460
Office Liquidators, Denver	303-759-3375
Providers Resource Clearinghouse, Denver	303-296-8580
Colorado Materials Exchange, Boulder	303-492-4330

Glass



Generally, the only type of glass that is recyclable in Colorado is container glass (bottles and jars). Some office recyclers will collect glass containers mixed in with aluminum and steel cans and plastic bottles. The one large Colorado end market for container glass is Coors' bottle manufacturing plant in Wheat Ridge. Call your local recycler for details on how to recycle glass from your building.

#1 Recycling, Denver Metro	303-477-8639
Optimum Art Glass, Eaton	970-454-2620

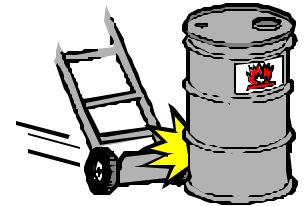
Hazardous Waste

The most common hazardous wastes generated by building owners and managers are paint and oil. You may have a variety of other chemicals to handle, depending on specific operations in your building, the type of tenants, and your arrangements with construction companies, painting and decorating contractors, and janitorial companies. Whether you generate paint, oil, or other chemical wastes in the course of managing



the building or find some of these wastes left behind, here are three options for safely managing them.

- Hire a hazardous waste firm to pick up your waste. See the CDPHE's web site below, or call your county for proper recycling & disposal options.
- Donate good paint to a nonprofit organization.
- Try to prevent hazardous materials from entering your building in the first place. Specify to contractors that only low VOC paints and finishes may be used in the building.



CDPHE Pollution Prevention

303-692-3042

<http://www.cdphe.state.co.us/hm/>.

Colorado Recycles Statewide listing of recycling centers

<http://www.colorado-recycles.org>.

Ink Jet Cartridges

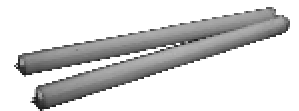
See Printer, Toner & Inkjet Cartridges

Landscaping Waste/Organic Waste

Plant trimmings, unwanted plants, or flowers from a previous landscape display can be recycled through composting. Have your landscaper take them to a green waste recycling program, or offer them to people in the building or to charitable organizations. Reduce plastic by having landscape companies use plants in compostable fiberboard containers, or ask them to return plastic pots to nurseries. Check the web sites listed at the beginning of this Appendix for more composting information.



Light bulbs (See Fluorescent Tubes)



Magazines

See Paper below.

Metal Scrap

Construction projects can result in a lot of scrap metal (for example, wall studs, window frames, wire, and rebar). Scrap metals may be valuable enough to provide a rebate. Scrap metals are usually sorted by whether or not they contain iron. Ferrous metals (contain iron) include cast iron,

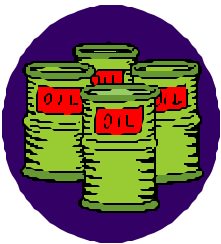


steel, and rebar. Non-ferrous metals (don't contain iron) include everything else and are generally more valuable. Rebates vary with market prices. Several scrap metal companies recycle these materials. See your local yellow pages for listings. For large quantities, you may want to get a scrap metal recycling container. They range from 4 cubic yards on up. Visit the following web site:

Institute for Scrap Recycling Industries www.isri.org

Newspapers

See Papers below.



Oil

Small quantities of used motor oil and transmission and hydraulic fluids can be recycled at many service stations and do-it yourself auto stores. Call your local recycler for information on recycling larger quantities, or refer to the Colorado Recycles web site at: <http://www.colorado-recycles.org>.

Paint

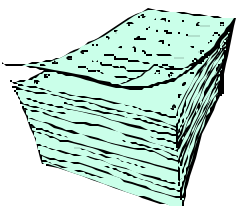
See Hazardous Waste above.

Pallets



You might be surprised how many pallets end up office building dumpsters, especially if there are printing or copying operations, restaurants, or other retail tenants. Pallets can be reused many times or recycled for scrap wood. The first step is to ask delivery personnel to take back their pallets for reuse. Check the yellow pages for pallet recyclers in your area.

Paper



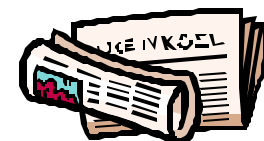
Many Colorado recycling companies will collect recyclable paper. See the web sites listed at the beginning of this Appendix for companies that can help you set up or expand a program. Or, look in the yellow pages under "recycling." Paper grades and market prices have a large impact on the services that are available and whether you will receive any money for your paper. Here are the common paper grades:

High-grades are the most valuable grades of paper; it includes white, and pastel colored bond or photocopy paper and computer paper. Usually recycling companies will pay money for high-grade paper.



OPACK or Office Pack is a mixture of white and pastel copy and bond paper, glossy high quality advertising brochures, junk mail, manila folders, and envelopes. Recycling office pack can double the amount of paper recycled compared to a program that collects only white paper.

ONP is Old Newspaper. It includes newspapers and the inserts that come with them. Old newspaper (ONP) can be a significant part of the waste stream in office buildings. Most office recycling companies accept newspaper.



OMG or Old Magazines are accepted by many paper recycling companies, but they rarely pay for them. A few large recycled newspaper mills currently accept a percentage of magazines in the mix of ONP shipped to them. Contact your local recycler for exact specifications for all paper grades.

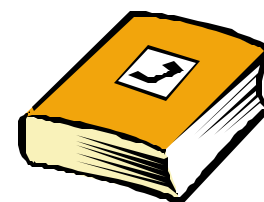


OCC is Old Corrugated Cardboard boxes and other packaging. Recycling companies sometimes don't pay for ONP or OCC, but they will often pick them up if they pick up your high-grade paper.

Mixed paper has many different "mixes" that vary by recycling company. Some mixes exclude specific materials, so check with your recycling company to learn what is allowed.

Phone Books

Due to their heavy glue binding and low value paper, telephone books are a very low value commodity. Consequently, very few recyclers will collect them. Call your local yellow page publisher for drop-off options.



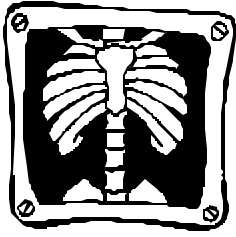
Qwest Dex Recycling, Denver

303-754-1000

Photo Waste

Photo wastes include photochemicals (fixer and developer) and film. Photochemicals should not be poured down the drain or disposed of in the garbage because they are hazardous. There are recycling companies that pick up photo wastes; they extract and recycle the silver, then neutralize the remaining liquids. Tenants who are likely to have photo wastes are those that use x-ray machines (for example, dentists, medical doctors, and hospitals) and businesses that develop film (for example, photographers, graphic design firms, advertising agencies, drug stores, and camera shops). See Hazardous Waste above for contact information





and recycling companies that pick up photochemicals and film. These companies will often provide appropriately sized drums for accumulating photo wastes and advise you on pick up schedules and prices.

Plastics

Bottles

You can set up a plastics collection program for #1 and #2 plastic bottles. Some paper recycling companies will collect plastic bottles as well as glass bottles and aluminum cans as an additional service to paper collection. Call your local recycler.



Plastic Scrap

There are many other plastics besides bottles: foam, stretch wrap, buckets, bags, bubble wrap, nylon, etc. Plastic is easiest to recycle when you have a large volume of clean material. It is unlikely that you will find a hauler to pick up small amounts. If you or a tenant produces a lot of clean plastic from a manufacturing process (or more likely from shipping and receiving areas), you might find a plastic recycling company that will pick it up. You can also drop plastic off at some local recycling centers.

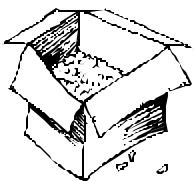
Printer, Toner & Inkjet Cartridges



It is very economical to recycle printer and toner cartridges from photocopiers, computer printers, and fax machines. Many companies in Colorado restore toner cartridges and sell them back to you or your tenants for less than the price of buying new ones. Call your local recycler or office supply company for information on this service.

Steel and Steel Cans

Steel cans may be recycled in a "mixed container" recycling program, along with aluminum cans, plastic bottles, and glass bottles. See Scrap Metal above for information on recycling steel scrap.



Styrofoam®

Many local mailing stores will allow you to drop off loose Styrofoam® peanuts (used for packaging) for reuse. **Call the Peanut Hotline at 800-828-2214.** It is a 24-hour toll free number for the public to find out which local businesses accept plastic peanuts for reuse.

Telephone Books

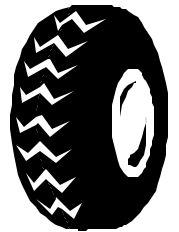
See Phone Books above.

Tires

Car and truck tires are sometimes abandoned on property or left in garages by tenants or customers. Check with the following recyclers for more information.

JaiTire, Denver
Oxford Recycling, Englewood

303-322-7887
303-762-1160



Toner Cartridges

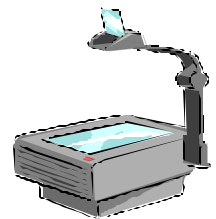
See Printer, Toner & Inkjet Cartridges above.

Transparencies

Find out about recycling plastic transparencies by calling the number below.

3M – GEMARK
3M Recycle Program
C/O Gemark 99
Stevens Lane Exeter, PA 18643

570-654-5511 ext. 21

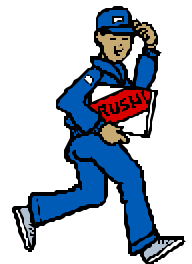


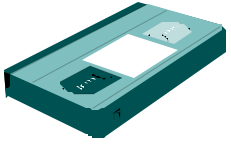
Tyvek® Envelopes

Tyvek® envelopes are usually white, impossible to tear, and made from plastic fibers. You should not include them in the paper recycling bin of a typical office recycling program. Call the number below to check into options for recycling.

Tyvek®

800-222-5676





Video Tapes

Video tapes can be reused and recorded over. Check with the following organizations for other options.

EcoMedia Anaheim, CA

800-359-4601

Tired of all that never-ending unwanted mail!

Here are a few tips to lighten your mailbox and our landfills.

On the back of this sheet is a list of the largest national direct marketing services. Send them a postcard or letter with your name address and phone numbers *each way they appear* on your unwanted mail.

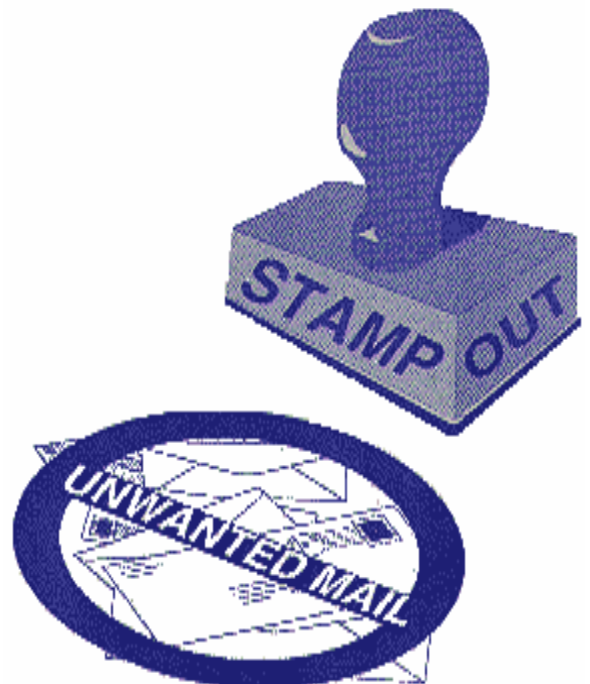
Your postcard may look like this...

Date
To Whom it May Concern:
Please remove my name from your mailing list. DO NOT rent, trade or sell my name. Doing this will save you money, preserve our natural resources and reduce the waste going to landfills.
Thank you for canceling my name from future mailings.
_____ Signature
Print name and address as it appears on the label. (Or affix label)

More tips:

- ✓ Keep a list, so you'll know where you sent your cards.
- ✓ If you're getting duplicate mailings, send the company both labels and ask them to eliminate the extra copy.
- ✓ Junk mail with first class postage can be returned. Simply write "Return to Sender" on the envelope. This does not require additional postage.
- ✓ If there is a postage paid envelope inside, such as all of those credit card mailings, write on their own flyer to remove your name, date it and send it back in their envelope - at their expense.

Special thanks to Denver Recycles (www.DenverGov.org/DenverRecycles) for this current list of marketing services.



Database America
470 Chestnut Ridge Road
Woodcliff Lake, NJ 07677-7604

Direct Mail Printing SVC Inc.
821 NW 4th Street
Oklahoma City, OK 73106-7417

Equifax Options
PO Box 740256
Atlanta, GA 30374-0256

Experian
901 W. Bond St.
Lincoln, NE 68521-9989

Axicrom
301 Industrial Blvd.
Conway, AR 72302

ADVO Inc.
Director of List Maintenance
239 W. Service Rd.
Hartford, CT 06147

Americom
10600 E. 54th Unit D
Denver, CO 80239

Carol Wright Gifts
8575 Largo Lakes Dr.
Largo, FL 33773

First Data Corporation
Attn: Database Operations
1235 "N" Avenue
Nevada, IA 50201

Hogan Information Systems
14000 Quail Springs Parkway
Ste. 4000
Oklahoma City, OK 73134

Mail Preference Service
Direct Marketing Association
PO Box 9008
Farmingdale, NY 11735-9008

Money Mailer
14271 Corporate Drive
Garden Grove, CA 92634-4994

Polk Co.
Consumer Response/Name Deletion
26955 Northwestern Highway
Southfield, MI 48034

Trans Union
Transmark Incorporated
555 W. Adams St.
Chicago, IL 60661-3601

Telephone Preference Service
Direct Marketing Association
PO Box 9014
Farmingdale, NY 11735-9014

Harte Hanks Direct Marketing
List Maintenance
3344 North Torrey Pines Ct.
La Jolla, CA 92037

InfoUSA
416 South Bell Ave.
Ames, IA 50010



Compliance Bulletin ***Hazardous Waste*** **Batteries**

Batteries may be hazardous wastes because they contain heavy metals and corrosive electrolyte solutions that are the source of their energy. There are eight metals commonly used in batteries including lead, mercury, nickel, cadmium, lithium, silver, zinc, and manganese. The preferred alternative for disposing of used batteries is to recycle them. If recycling is not an option, the batteries must be disposed of appropriately. If the used batteries are hazardous, they must be managed in compliance with the Colorado Hazardous Waste Regulations (CHWR) 6 CCR 1007-3. A used battery becomes a waste on the date it is discarded. An unused battery becomes a waste on the date the handler decides to discard it.

LEAD-ACID BATTERIES

Lead-acid batteries are most frequently used in automobiles, boats, and other vehicles. Each battery contains about eighteen pounds of lead and one gallon of highly corrosive sulfuric acid. Smaller sealed lead-acid batteries are often used in computers and cellular telephones.

Lead-acid batteries should never be thrown in the trash. These batteries are commonly recycled, but must be disposed of as hazardous waste if recycling is not an option.

Management of lead-acid batteries is specifically addressed in the Colorado Hazardous Waste Regulations (CHWR) in Part 267 Subpart G. Owners or operators of facilities that store spent lead-acid batteries before reclaiming them (other than batteries that are to be regenerated) are subject to the notification, permitting, and financial assurance requirements of the hazardous waste regulations. [CHWR 267.80(b)] While storage of lead-acid batteries prior to recycling requires a hazardous waste storage permit, the recycling

process itself does not require a permit from the Hazardous Materials and Waste Management Division (the Division) of the Colorado Department of Public Health and Environment.

A battery is “reclaimed” if it is processed to recover a useable product (recycled), or if it is regenerated (recharged) [CHWR Section 261.1(d)(4)].

Facilities that regenerate spent lead-acid batteries, or facilities that generate, transport, collect, or store spent lead-acid batteries *but do not reclaim them*, are not subject to the hazardous waste regulations under the generator, transporter, financial assurance, notification or permitting regulations. [CHWR Section 267.80(a)] Such facilities are instead responsible for storing the lead acid batteries in a way that prevents releases of hazardous chemicals to the environment, for timely remediation and proper disposal of any spills that do occur, and to ultimately get them to a legitimate recycling facility or permitted hazardous waste disposal facility.

OTHER BATTERIES

Non-household users of batteries are required by the Colorado Hazardous Waste Regulations to evaluate their wastes and determine which wastes are hazardous. [CHWR Section 262.11] Battery identification is important in determining if it is a hazardous waste and in selecting the proper disposal method. However, the type of battery often appears only on the packaging material, and not on the battery itself. It is good management practice to keep the packaging material for batteries and to minimize the variety of batteries purchased to simplify the identification and management of battery wastes.

In general, NiCad, silver-oxide, mercury-oxide, lithium, zinc-air, zinc-carbon, and alkaline batteries are hazardous wastes upon disposal. These batteries

are commonly used in pagers, cameras, and computers. Silver-oxide, mercury-oxide, zinc-air, and many zinc-carbon and alkaline batteries can contain significant amounts of mercury. NiCad batteries contain 10-15% cadmium per cell, while lithium batteries may be reactive characteristic wastes. Newer alkaline and zinc-carbon batteries may contain significantly lower amounts of mercury, generally 0.025% by weight, and may not be considered hazardous wastes upon disposal.

Recycling/Disposal

Nonhazardous batteries, such as low mercury alkaline and zinc-carbon, may be recycled or disposed of as nonhazardous solid wastes.

The preferred disposal alternative for hazardous batteries is recycling. Although many components of batteries may be recycled, the primary focus has been on metals recovery, chiefly mercury, silver, and cadmium. Mercury-oxide, silver-oxide, and NiCad batteries are the most easily recycled batteries. If the batteries are hazardous waste and are recycled, the recycler is required to obtain a hazardous waste storage permit if the batteries are stored onsite prior to entering the actual recycling process. The recycling process itself would not require a permit from the Hazardous Materials and Waste Management Division. If the batteries are not stored prior to recycling, then no permit is required from the Division, though local requirements may apply.

Batteries such as high mercury alkaline and carbon-zinc, zinc-air, and lithium contain smaller amounts of metals and are therefore not as readily recycled. If batteries are not recycled, they must be managed and disposed of as hazardous waste at a permitted hazardous waste disposal facility.

UNIVERSAL WASTE RULE

In the past, if a battery was a hazardous waste, it needed to be managed in full compliance with the hazardous waste regulations, including labeling, employee training, manifest requirements, and restrictive time limits. [CHWR Parts 260 - 268, 99,

and 100] The Colorado Hazardous Waste Commission has adopted reduced management practices for certain widely generated wastes including batteries, certain pesticides, mercury switch thermostats, and aerosol cans containing hazardous waste under the "Universal Waste Rule." [CHWR Part 273] The universal waste rule provides an alternative set of management standards in place of regulation under CHWR Parts 260-268, 99, and 100.

The universal waste rule was designed to streamline the regulatory process and encourage recycling. The primary benefits of managing a universal waste are that the waste can be shipped without a hazardous waste manifest; the waste can be shipped by common carrier instead of by a hazardous waste transporter; the waste does not count toward the monthly total of hazardous waste in determining the generator category; and the storage time limits are less restrictive. Because universal waste does not require a hazardous waste manifest, it is not considered hazardous waste under US Department of Transportation (US DOT) regulations, though other US DOT regulations may apply. Requirements for universal waste transporters are included in CHWR Part 273 Subpart D.

For ease of management, facilities that generate spent lead-acid batteries may choose to manage them under CHWR Part 267 Subpart G or along with other waste batteries under the Universal Waste Rule. [CHWR Section 273.2(a)]

Categories of Universal Waste Handlers

Under the universal waste rule, persons who generate or accumulate waste batteries are considered "handlers" of universal waste. [CHWR Section 273.6] [Note: this definition is different from that of a **generator** of hazardous waste].

There are two categories of handlers, Small Quantity Handlers of Universal Waste and Large Quantity Handlers of Universal Waste. A small quantity handler of universal waste is a universal waste handler who does not accumulate more than 5,000 kilograms of total universal waste (batteries,

pesticides, thermostats, and aerosol cans) at any one time. A large quantity handler of universal waste is a handler of universal waste who accumulates 5,000 kilograms or more of universal waste. [CHWR Section 273.6]

The designation of small quantity handler of universal waste or large quantity handler of universal waste has no relationship to a facility's hazardous waste **generator** status. Thus a small quantity generator of hazardous waste may be a large quantity handler of universal waste and a facility that is a large quantity generator of hazardous waste may be a small quantity handler of universal waste.

If, at any time during a calendar year, a facility exceeds the quantities for a small quantity handler of universal waste, they would be considered a large quantity handler of universal waste until the next calendar year when they can reevaluate their status. [CHWR Section 273.6]

Labeling

When a waste battery is generated, it must either be labeled as "Waste Battery(ies)," "Used Battery(ies)" or "Universal Waste Battery(ies)." If the battery is placed into an accumulation container, only the accumulation container needs to be labeled as containing waste batteries, not the individual batteries within it. If the individual battery is not in good condition and is leaking or shows signs that it could leak, it must be individually over-packed in a container that is properly labeled. [CHWR Sections 273.14, 273.34] If the accumulation container is not in good condition, it must be over-packed or the batteries must be removed and put into a container that is in good condition.

Accumulation of Waste

Universal waste handlers are required to manage their waste in a manner that prevents releases of the waste or waste constituents. [CHWR Sections 273.13, 273.33] There is a one year accumulation time limit and handlers must be able to demonstrate that universal waste on-site has not been accumulated

for more than one year. [CHWR Sections 273.15, 273.35] Although it is not required to be marked with the accumulation start date, this would be the easiest way to document that the waste is in compliance with the one year accumulation limit.

Shipment of Waste

A universal waste handler cannot dispose of universal waste and treatment by the handler is not allowed. [CHWR Sections 273.11, 273.30] Universal waste can only be shipped to another universal waste handler, a destination facility, or a foreign destination. [CHWR Sections 273.18, 273.38] Shipment to another universal waste handler is allowed to aid in consolidation of wastes. A destination facility is a facility that is permitted to treat, dispose, or recycle the waste. [CHWR Section 273.6]

The shipment of universal waste does not require the use of the hazardous waste manifest system. Therefore, universal waste is not considered hazardous waste under US DOT regulations. Some universal wastes are regulated by the US DOT as hazardous materials because they meet criteria for one or more hazard classes, but the word "waste" may not be used in the shipping name. [CHWR Section 273.52]

Notification

Small quantity handlers of universal waste are not required to notify the Division of their universal waste management activities. [CHWR Section 273.12]

Large quantity handlers of universal waste are required to notify the Hazardous Materials and Waste Management Division of their universal waste management activities and obtain an EPA identification number using EPA form 8700-12. [CHWR Section 273.32] This must be done even if the facility has previously given notification and received an EPA identification number for its hazardous waste activities. The EPA identification number would remain the same.

Employee Training

Small quantity handlers of universal waste are required to inform all employees who manage universal waste about the proper handling and emergency procedures appropriate to the types of universal waste at the facility. [CHWR Section 273.16]

Large quantity handlers of universal waste are required to ensure that personnel are thoroughly familiar with the requirements for universal waste management and emergency response relative to their level of responsibilities in dealing with the waste. [CHWR Section 273.36] There is no requirement to maintain formal training records for either category.

Spills

All handlers of universal waste are required to immediately containerize and appropriately manage any spills or residues from releases of universal wastes. [CHWR Sections 273.17(a), 273.37(a)] The waste generated from a release of universal waste would be considered newly generated waste and a hazardous waste determination would need to be made. If it is determined that any or all of the released material or residue is hazardous, it must be managed in accordance with the hazardous waste regulations and not the universal waste requirements. [CHWR Sections 273.17(b), 273.37(b)] The handler of the universal waste at the time of the release would be the generator of the newly generated hazardous waste and must adhere to all applicable requirements of the Colorado hazardous waste regulations.

Record Keeping Requirements

A small quantity handler of universal waste is not required to maintain records. [CHWR Section 273.19] However, it is strongly advisable to keep adequate records to document waste management practices and substantiate the facility's universal waste handler status.

A large quantity handler of universal waste must keep written records for universal wastes shipped to and from their facilities. These records must be kept

for at least three years and include: the types and quantities of universal waste shipped or received, the date the waste was shipped or received, and who the waste was shipped to or from. [CHWR Section 273.39]

Transporters of universal waste are required to keep records in accordance with US DOT requirements. A destination facility is subject to all applicable requirements of CHWR Parts 264-268, 99 & 100. If the destination facility recycles the universal waste without storing it, they need only notify the Department of their activity under CHWR Part 99 and keep records of each shipment. If the destination facility is a Treatment Storage and Disposal Facility (TSDF), they are required to keep records in accordance with their hazardous waste permit.

For more information please contact:

**Colorado Department of
Public Health & Environment**

**Hazardous Materials and
Waste Management Division
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530**

*Customer Technical Assistance (303) 692-3320
(888) 569-1831 toll-free*

*Division Website <http://www.cdphe.state.co.us/hm/>
E-mail comments.hmwmd@state.co.us*

11/98 CHW-008

This Compliance Bulletin is intended to provide guidance on the appropriate management of wastes based on Colorado solid and hazardous waste statutes and regulations only. The wastes described in this guidance may also be regulated under other statutes and regulations.



Compliance Bulletin *Hazardous Waste* **(Updated) Lighting Wastes**

Many commonly used lamps contain small amounts of mercury and other metals. Such lamps include fluorescent, high pressure sodium, mercury vapor and metal halide lamps. Used lamps are a Resource Conservation and Recovery Act (RCRA) hazardous waste if the material exhibits the characteristic of toxicity. If, using the Toxicity Characteristic Leaching Procedure (TCLP) test, the extract from a representative sample of the waste contains mercury at a concentration greater than or equal to the maximum contaminant concentration of 0.2 ppm (mg/l), the waste would be hazardous waste. This waste would carry the hazardous waste code D009. Many mercury-containing lamps also contain elevated levels of lead and may exhibit the toxicity characteristic for lead as well (TCLP > 5 ppm lead). Such wastes would also carry the hazardous waste code D008. According to the Environmental Protection Agency (EPA), testing of burned-out fluorescent lamps showed that a high percentage of the lamps tested exhibited the toxicity characteristic for metals, particularly mercury.

While households are exempt from the Colorado Hazardous Waste Regulations, businesses, schools and government facilities that generate hazardous wastes must follow these requirements regarding proper management and disposal of hazardous wastes applicable for their generator category. Generators of used lamps are responsible for determining if their lighting wastes are hazardous. If the lighting wastes have not been tested to show that they are not hazardous, or if the generator doesn't have other supporting data such as manufacturer's information, then the generator should assume the lights are hazardous and manage them as hazardous waste. Due to variability in TCLP testing for lamps, the EPA recommends that generators who choose to test their lamps test several lamps when making a hazardous waste determination. To use generator knowledge in making a hazardous waste determination, the generator must have information on possible hazardous constituents and their quantities in the waste. With lighting wastes, the generator may have little direct process knowledge on which to make a hazardous waste determination. The

generator, however, may base the determination on data obtained from the manufacturer, other generators, or studies such as EPA's study entitled "Analytical Results of Mercury in Fluorescent Lamps" (dated 5/15/92, available in EPA's RCRA docket).

The hazardous waste regulations apply only to lighting wastes determined to be hazardous waste. Mercury-containing lighting wastes from non-residential sources that **are not hazardous** may be disposed in a properly managed municipal solid waste landfill or sent to a legitimate recycler. Landfills and recyclers may impose their own restrictions to regulate incoming wastes in accordance with local rules or company guidelines. Lighting wastes from residential sources may be disposed in municipal solid waste landfills or recycled.

Under current Colorado hazardous waste regulations, a generator may send his/her hazardous lighting waste to a facility that uses, re-uses, or legitimately recycles the waste. A recycler for hazardous lighting waste must be permitted as a hazardous waste storage facility if the material is not recycled within 24 hours of receipt at the facility, although the recycling process itself does not require a hazardous waste permit. Alternatively, a generator may ensure delivery of the hazardous lighting waste to a permitted hazardous waste treatment or disposal facility.

Mercury-containing lamps should be packaged for storage and shipping in a manner appropriate to the waste type. Cardboard boxes originally used for shipping the new bulbs may be used to ship hazardous used lamps as long as the shipment containers meet U.S. Department of Transportation (US DOT) performance packaging requirements.

Conditionally Exempt Small Quantity Generators

Conditionally exempt small quantity generators are those that generate less than 100 kilograms of total hazardous waste and no more than one kilogram of acutely hazardous waste per calendar month AND never accumulate more than 1000 kilograms of hazardous

waste on site at one time. In Colorado, conditionally exempt generators are not excused from identifying which of their wastes are hazardous waste and must ensure that their wastes are sent to a facility that is permitted to accept it. They may not dispose of their hazardous wastes on site. Conditionally exempt generator wastes that are determined to be hazardous wastes must be sent to a permitted hazardous waste treatment, storage or disposal (TSD) facility, sent to a legitimate recycler of the waste, or sent to an out-of-state solid waste disposal facility that is permitted to accept conditionally exempt small quantity generator hazardous wastes.

There are no solid waste landfills currently permitted to accept conditionally exempt generator hazardous waste for disposal in Colorado with the partial exception of the Larimer County Landfill. This landfill accepts mercury-containing lamps and other hazardous wastes from conditionally exempt small quantity generators located in Larimer County in order to assist in consolidation of enough wastes to make it more economic for disposal. The Larimer County Landfill then ensures that all wastes are recycled or disposed of properly, dividing the cost between the generators that contributed to the waste total. They do not actually landfill hazardous wastes at their facility.

Unlike small and large quantity generators of hazardous waste, conditionally exempt generators are not required to notify the Division of their regulated waste activity or get an EPA identification number. They may transport their hazardous waste without a hazardous waste manifest under a standard bill of lading. Most common carriers are very willing to assist conditionally exempt generators understand their shipping requirements.

UNIVERSAL WASTE RULE

In the past, if a mercury-containing lamp was a hazardous waste, small and large quantity generators of hazardous waste needed to manage it in full compliance with the hazardous waste regulations, including labeling, employee training, manifest requirements, and restrictive time limits. [CHWR Parts 260 - 268, 99, and 100] The Colorado Hazardous Waste Commission has adopted reduced management practices for certain widely generated wastes including batteries, certain pesticides, mercury switch thermostats, aerosol cans containing hazardous waste, and mercury-containing lamps under the “Universal Waste Rule.” [CHWR Part

273] The universal waste rule provides an alternative set of management standards that the generator may choose to follow in place of regulation under CHWR Parts 260-268, 99, and 100.

The universal waste rule was designed to streamline the regulatory process and encourage recycling. The primary benefits of managing a universal waste in Colorado are that the waste can be shipped without a hazardous waste manifest; the waste can be shipped by common carrier instead of by a hazardous waste transporter; the waste does not count toward the monthly total of hazardous waste in determining the generator category; there are reduced notification and recordkeeping requirements, and the storage time limits are less restrictive. Because universal waste does not require a hazardous waste manifest for shipment in Colorado, it is not considered hazardous waste under US Department of Transportation (US DOT) regulations, though other US DOT regulations may apply. Requirements for universal waste transporters are included in CHWR Part 273 Subpart D.

Other states may have different requirements for wastes that are managed as universal waste in Colorado. The generator should always confirm the regulatory status of universal wastes in the destination state and in all intervening states the waste will travel through.

Categories of Universal Waste Handlers

Under the universal waste rule, persons who generate or accumulate waste mercury-containing lamps are considered “handlers” of universal waste. [CHWR Section 273.6] [Note: this definition is different from that of a **generator** of hazardous waste].

There are two categories of handlers, Small Quantity Handlers of Universal Waste and Large Quantity Handlers of Universal Waste. A small quantity handler of universal waste is a universal waste handler who does not accumulate more than 5,000 kilograms of total universal waste (batteries, pesticides, thermostats, lamps, and aerosol cans) at any one time. A large quantity handler of universal waste is a handler of universal waste who accumulates 5,000 kilograms or more of universal waste. [CHWR Section 273.6] The designation of small quantity handler of universal waste or large quantity handler of universal waste has no relationship to a facility’s hazardous waste **generator** status. Thus a small quantity generator of hazardous

waste may be a large quantity handler of universal waste and a facility that is a large quantity generator of hazardous waste may be a small quantity handler of universal waste.

If, at any time during a calendar year, a facility exceeds the quantities for a small quantity handler of universal waste, they would be considered a large quantity handler of universal waste until the next calendar year when they can reevaluate their status. [CHWR Section 273.6]

Labeling

When a waste mercury-containing lamp is generated, it must either be labeled as “Waste Lamp(s),” “Used Lamp(s)” or “Universal Waste--Lamp(s).” If the lamp is placed into an accumulation container, only the accumulation container needs to be labeled as containing waste lamps, not the individual lamps within it. Unless crushed in an allowable crushing system, individual lamps that are not in good condition or are broken must be placed in a closed packing container that is properly labeled and capable of preventing leakage or releases of mercury or other hazardous constituents to the environment under reasonably foreseeable conditions. [CHWR Sections 273.14, 273.34] If the accumulation container is not in good condition, it must be over-packed or the lamps must be removed and put into a container that is in good condition.

Accumulation of Waste

Universal waste handlers are required to manage their waste in a manner that prevents releases of the waste or waste constituents. [CHWR Sections 273.13, 273.33] There is a one year accumulation time limit and handlers must be able to demonstrate that universal waste on-site has not been accumulated for more than one year. [CHWR Sections 273.15, 273.35] Although it is not required to be marked with the accumulation start date, this would be the easiest way to document that the waste is in compliance with the one year accumulation limit.

Crushing Waste Mercury-containing Lamps

Crushing of universal waste lamps is allowed by handlers of waste mercury-containing lamps as long as it is

conducted in accordance with the requirements of Part 273.13 or 273.33 of the Colorado Hazardous Waste Regulations. Prior to crushing waste lamps, a handler must develop and implement a written procedure detailing how to safely crush the lamps. Included in this document must be the type of equipment to be used and operation and maintenance of the unit, as well as the precautions that need to be taken to protect the worker. In addition, the document must include a review of the wastes that will be generated from the crushing activities.

Handlers of universal wastes must ensure that the waste lamps are crushed in a completely enclosed system that is designed to prevent the release of any universal waste or component of universal waste to the environment (for example, a sealed tank or container that is equipped with, at minimum, a filter to capture mercury emissions). Special management procedures necessary to properly manage the waste also need to be evaluated prior to crushing. The handler must ensure that the area in which the universal waste lamps are crushed is well ventilated and monitored to ensure compliance with applicable OSHA exposure levels for mercury. Additionally, the written procedure must detail the frequency of filter change out. [Note: it may be necessary to file an Air Pollution Emission Notice (APEN) for the crushing operation and the use of control devices to capture airborne contamination]. A spill kit must be readily available in case wastes are spilled during the crushing activities.

A small or large quantity handler of universal waste who crushes universal waste lamps must determine whether the crushed lamp, its residues and/or any other solid wastes generated (e.g. filters) exhibit one or more characteristics of hazardous waste. If the crushed lamps exhibit a characteristic, they may continue to be managed as universal waste or they may be managed in compliance with CHWR Parts 260-268, 99 and 100. If the crushed lamps are no longer managed as universal wastes, then the handler is considered the generator of the newly generated hazardous waste. If the residues or other solid wastes generated during the crushing process exhibit one or more characteristics of hazardous waste, the handler is considered the generator of the newly generated hazardous waste and must comply with all applicable sections of CHWR 260-268, 99 and 100. Wastes generated during the crushing process, exclusive

of the crushed lamps themselves, may not be managed as universal wastes. If the crushed universal waste lamp, its residues, and/or any other solid wastes generated do not exhibit any characteristics of hazardous waste, the handler may dispose of them as solid wastes.

Shipment of Waste

A universal waste handler cannot dispose of universal waste and treatment by the handler is not allowed unless the lamps are crushed under the provisions of CHWR Sections 273.13 or 273.33. [CHWR Sections 273.11, 273.31] Universal waste can only be shipped to another universal waste handler, a destination facility, or a foreign destination. [CHWR Sections 273.18, 273.38] Shipment to another universal waste handler is allowed to aid in consolidation of wastes. A destination facility is a facility that is permitted to treat, dispose, or recycle the waste. [CHWR Section 273.6]

Shipment of universal waste in Colorado does not require the use of the hazardous waste manifest system. Therefore, universal waste is not considered hazardous waste under US DOT regulations. Some universal wastes are regulated by the US DOT as hazardous materials because they meet criteria for one or more hazard classes, but the word "waste" may not be used in the shipping name. [CHWR Section 273.52]

Other states may have different requirements for wastes that are managed as universal waste in Colorado. The handler should always confirm the regulatory status of universal wastes in the destination state and in all intervening states the waste will travel through.

Notification

Small quantity handlers of universal waste are not required to notify the Division of their universal waste management activities. [CHWR Section 273.12]

Large quantity handlers of universal waste are required to notify the Division of their universal waste management activities and obtain an EPA identification number using EPA form 8700-12. [CHWR Section 273.32] This must be done even if the facility has previously given notification and received an EPA identification number for its hazardous waste activities. The EPA identification number will remain the same.

Employee Training

Small quantity handlers of universal waste are required to inform all employees who manage universal waste about the proper handling and emergency procedures appropriate to the types of universal waste at the facility. [CHWR Section 273.16]

Large quantity handlers of universal waste are required to ensure that personnel are thoroughly familiar with the requirements for universal waste management and emergency response relative to their level of responsibilities in dealing with the waste. [CHWR Section 273.36] There is no requirement to maintain formal training records for either category.

Spills

All handlers of universal waste are required to immediately containerize and appropriately manage any spills or residues from releases of universal wastes. [CHWR Sections 273.17(a), 273.37(a)] The waste generated from a release of universal waste would be considered newly generated waste and a hazardous waste determination would need to be made. If it is determined that any or all of the released material or residue is hazardous, it must be managed in accordance with the hazardous waste regulations and not the universal waste requirements. [CHWR Sections 273.17(b), 273.37(b)] The handler of the universal waste at the time of the release would be the generator of the newly generated hazardous waste and must adhere to all applicable requirements of the Colorado hazardous waste regulations.

Record Keeping Requirements

A small quantity handler of universal waste is not required to maintain records. [CHWR Section 273.19] However, it is strongly advisable to keep adequate records to document waste management practices and substantiate the facility's universal waste handler status. A large quantity handler of universal waste must keep written records for universal wastes shipped to and from their facilities. These records must be kept for at least three years and include: the types and quantities of universal waste shipped or received, the date the waste was shipped or received, and who the waste was shipped to or from. [CHWR Section 273.39]

Transporters of universal waste are required to keep records in accordance with US DOT requirements. A destination facility is subject to all applicable requirements of CHWR Parts 264-268, 99 & 100. If the destination facility recycles the universal waste without storing it, they need only notify the Department of their activity under CHWR Part 99 and keep records of each shipment. If the destination facility is a Treatment Storage and Disposal Facility (TSDF), they are required to keep records in accordance with their hazardous waste permit.

PCB-containing Light Ballasts

Ballasts are small metal box-shaped devices in fluorescent lamps that control the flow of electricity to the light tube. Some metals contained in the ballasts can be reclaimed, but many ballasts contain polychlorinated biphenyls (PCBs). All fluorescent light ballasts manufactured through 1979 contain PCBs. Ballasts manufactured after 1979 that do not contain PCBs are labeled "No PCBs". If the ballast isn't labeled, the generator should assume it contains PCBs. PCBs are a hazard to human health and the environment due to their persistence, bioaccumulation in the food chain, and toxicity.

PCB-containing light ballasts are regulated under the Toxic Substances Control Act (TSCA). Under these regulations, persons other than manufacturers of PCB ballasts may dispose of small, non-leaking PCB ballasts as municipal solid waste with the prior approval of the solid waste landfill. However, the EPA and the State health department recommend that non-leaking PCB-containing ballasts be disposed of at a TSCA approved incinerator, disposal facility, or recycler in order to reduce potential long-term liability for the generator. High-temperature incineration is the method preferred by many generators because it destroys PCBs. Although more costly than sending the material to a landfill, many generators are willing to accept this cost in exchange for removing the long-term liability issues of landfill disposal.

If the ballast has been punctured or otherwise damaged, an oily, tar-like substance may be exposed. If this substance contains PCBs, the ballast and all materials it contacts are considered PCB wastes. Leaking PCB-containing ballast must be sent to a high temperature incinerator in accordance with EPA regulations. Care should be taken to prevent worker exposure to the leaked material.

All leaking ballast material and waste must be properly packaged for transportation according to EPA and Department of Transportation regulations. The EPA requires generators to utilize the manifest system to track the waste and verify its proper disposal. *For more information on the proper packaging, storage, transportation, and disposal of PCB-containing wastes, call the Toxic Substances Control Act assistance information hotline at (202) 554-1404 or EPA Region VIII at (303) 312-6312.*

DEHP-containing Ballasts

Di (2-ethylhexyl) phthalate (DEHP) was used to replace PCBs in some ballasts manufactured from 1979 through 1991. Although DEHP as a pure commercial product waste is listed as a hazardous waste under the Resource Conservation Recovery Act, once it has been used in a lighting ballast, it is no longer considered hazardous waste, though other regulations still apply.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Persons who dispose of PCB wastes, mercury-containing lighting waste, or DEHP-containing wastes must notify the National Response Center (800-424-8802) if they dispose of these wastes at greater than the reportable quantity (RQ) under CERCLA. The reportable quantity under CERCLA is one pound of PCBs, one pound of mercury, or 100 pounds of DEHP in a 24-hour period. EPA estimates that small PCB-containing light ballasts contain about 0.1 lbs of pure PCBs, so anyone disposing of ten or more light ballasts may be subject to CERCLA reporting requirements. EPA estimates that it would take about 11,000 four-foot T12 fluorescent lamps to equal one pound of mercury and about 1600 fluorescent light ballasts to have 100 lbs of DEHP.

Persons who dispose of any quantity of mercury-containing lamps, small non-leaking PCB ballasts or ballasts containing DEHP in a municipal solid waste, hazardous waste, or TSCA approved landfill are not absolved from liability under CERCLA. Reporting will place the company or individual on a list of potential responsible parties in any subsequent Superfund cleanup of the landfill should a release of these constituents occur from the landfill. Failure to report is a violation of CERCLA Section 103.

For more information please contact:

**Colorado Department of
Public Health & Environment**

**Hazardous Materials and
Waste Management Division
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530**

*Customer Technical Assistance (303) 692-3320
(888) 569-1831 ext. 3320 toll-free*

*Division Website <http://www.cdphe.state.co.us/hm/>
E-mail comments.hmwm@state.co.us*

revised 12/99 CHW-003

This Compliance Bulletin is intended to provide guidance on the appropriate management of wastes based on Colorado solid and hazardous waste statutes and regulations only. The wastes described in this guidance may also be regulated under other statutes and regulations.

Appendix E

Education and Training

How To Get Started

Just call us for a 5 - 10 minute presentation in your office, and we can deliver the containers and literature at the same time! We would really appreciate coming to a staff meeting, so we can reach as many people as possible. Call Don Archuleta, the World Trade Center Assistant Property Manager, 303-595-7025, to set it up. Or see below for group training times.

Prizes! All tenants that receive a training session by November 25, 2000 will be eligible for door prizes. You can also pledge to recycle or buy recycled and be entered into a drawing for America Recycles Day raffle prizes, including the \$200,000 "American Green Dream Home!"

Lobby Lunchtime Exhibit - November 15 America Recycles Day!

On Wednesday, the 15th, visit us in the lobby of 1625 (or in the plaza in front of Russell's, weather permitting) from 11:00 a.m. to 1:00 p.m. We'll have more details about the recycling program. There you can pledge to recycle or buy recycled, and you will be entered in the free raffle for Colorado prizes and the "American Green Dream Home."

Group Training Sessions

When: Wednesday, Nov. 15, 10:30 am and 1:30 pm
Where: 1625 Broadway, Conference Room, Suite 850
How Long: 20 minutes - space limited, please RSVP
Why: To learn how to participate in the new recycling program
Sign up for: America Recycles Day Prize Raffle!



Announcing the World Trade Center's New and Improved Recycling Program!



More Materials Collected!

Better Service!

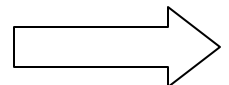
**Keep eight more tons of valuable
resources out of the landfill
each month!**

Just call Don Archuleta, the World Trade Center Assistant Property Manager, to schedule a brief training session for your office.

303-595-7025

Schedule a training session for your office by November 28th, and your office will be eligible for door prizes. You can also pledge to recycle or buy recycled and be entered into a drawing for America Recycles Day raffle prizes, including the \$200,000 "American Green Dream Home!"

Open here to find out more



How to Recycle Office Wastepaper



Yes, Recycle These!

No, Don't Recycle These!



PAPER

White or pastel photocopy/office paper
Letterhead
Computer paper
Carbonless paper (NCR®, i.e. expense reports)
Legal pad/loose leaf paper
Post-it® Notes
Adding machine tapes

Paper ream wrappers
Carbon paper
Newspaper and magazine type papers
Dark or fluorescent colored paper
Non-water soluble adhesives
(stickers, glue tape, and pressure sensitive labels)

ENVELOPES

White or pastel
(with or without windows)
(remove adhesive labels)

Labels
Tyvek® (FedEx type: call 1-800-44-TYVEK)
Kraft envelopes (golden brown)

FOLDERS

Manila or pastel only

Hanging file folders (please reuse)
Brightly colored folders (please reuse)

MAIL

Direct mail
(slick/glossy pamphlets, brochures
booklets, flyers, or postcards, but,
nothing with glue bindings)

Labels
Stickers, adhesive labels and tape
Kraft paper

MISCELLANEOUS

Index cards
Business cards

Trash (tissues, food wrappings, paper towels, and
cups, Styrofoam®, plastic bags etc.)
Blueprints
Cardboard
Catalogs (if less than ¼" thick recycle with magazines)
Magazines (recycle in appropriate containers)
Newspapers (recycle in appropriate containers)
Overhead transparencies (call 1-800-952-4059)
Plastic coated paper (test: it's hard to tear)
Phone books (call 1-800-422-1234)

REMINDERS:

Staples and paper clips do not need to be removed.
Please reuse rubber bands and other metal Fasteners.

Questions? Find answers on the OEMC web site at www.state.co.us/oemc.

Special thanks to Brookfield Properties, Denver Recycles, Governor's Office of Energy and Management (OEMC), Environmental Solutions (Henry Fowler), Future Solutions Inc., Lighthouse Environmental LLC (Dianne Beal), and Weyerhaeuser.

Project sponsored by:



Announcing the World Trade Center's New and Improved Recycling Program!

In order to serve our tenants better, and to help the environment, the World Trade Center is updating and improving its recycling program. The new program has the potential to double our recycling, up to 16 tons per month!

More Materials, Better Service

The new recycling program will be easier, accept more materials, and will provide better collection service. And, it's still completely voluntary. Cooperation from everyone will help this program succeed. So, we are encouraging our valued tenants to take some time to learn how to participate. Please help us, so we can help you!

It's as Easy as 1,2,3!

1. Mixed office paper recycling

For higher grade papers, we are switching to a simpler, more convenient program. It's called "Mixed Office Paper." Along with white paper, it includes pastel colored papers, envelopes with windows, and a lot of other "junk mail" type paper. But to keep the program working, there are still some materials we have to keep out.

How: Each office will receive directions and a detailed poster with actual paper samples included on the poster. And, to make it even easier, the mixed office paper recycling containers have the directions printed right on the containers.

2. Combined newspapers and magazines

Ever winced having to throw away your newspapers and magazines? Rest easy, Brookfield Properties will now offer collection bins and pickup service through our custodial contractor.

How: Newspapers and magazines will be collected together in a special black container separate from the mixed office paper. Inserts to the newspapers and magazines may be included in this container.

yh

3. Aluminum cans

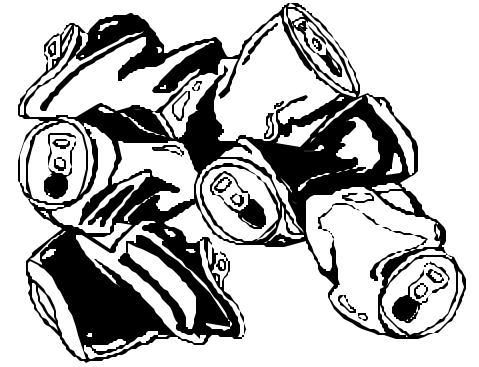
Did you know we Americans throw away enough aluminum every year to rebuild the entire U.S. jet fleet? Brookfield will now offer an improved program to collect cans

How: Brookfield will now offer an improved program to collect cans. Just rinse and recycle in the tall black aluminum can recycling container!

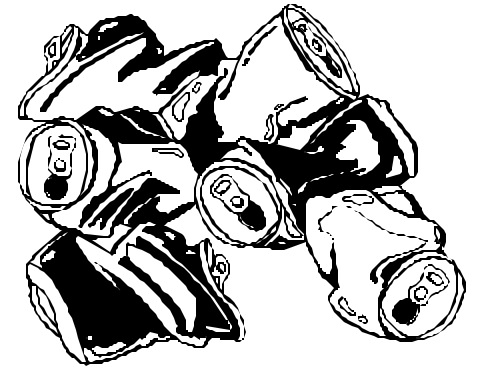
For more details or to schedule a brief training session for your office, call Don Archuleta, World Trade Center Assistant Property Manager at 303-595-7025.



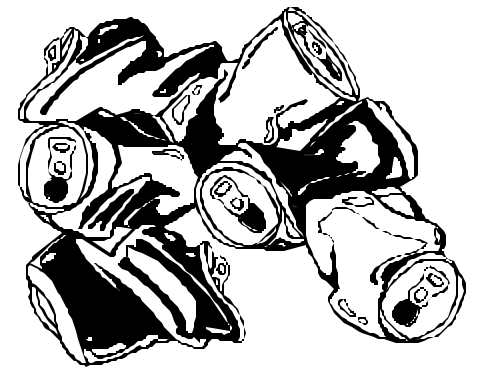
**Aluminum
Cans Only**



**Aluminum
Cans Only**



**Aluminum
Cans Only**



Office Manager: Please See Survey Inside

Congratulations, World Trade Center Tenants!

During the months of
November, December, January
and February you recycled:

25,210 Pounds of Office Papers
14,860 Pounds of Newspapers and Magazines
335 Pounds of Aluminum Cans

*By feeding these materials back into our economy,
instead of the landfill, you saved the equivalent of:*





Spring Program Update

Recent Results

Many thanks to World Trade Center tenants, custodians and staff for your support of the new recycling program. Here are a few of our recent accomplishments:

- Overall office trash has decreased, along with the amount of recyclable items remaining in the trash.
- Recycling program participation has increased.
- Contamination of the recyclables decreased to 0% from an average of 30%, improving program sustainability.

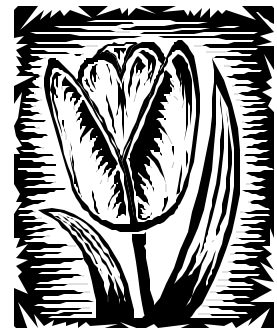
Over the past year, Brookfield Properties began a process to redesign and revitalize the recycling program at the World Trade Center. So far, over half the tenants have received training sessions, new collection boxes, and posters showing office recycling “do’s and don’ts.” As a result, we now have an easier, more convenient, and more comprehensive recycling program. And tenants, staff and custodians now have increased awareness of

waste reduction techniques. This program was funded by the State Office of Energy Management and Conservation, with assistance from Weyerhaeuser Recycling.

feedback, request recycling bins or posters, or participate in our survey. As always, we welcome your advice and suggestions!

Help Us Improve Our Recycling Service

If you would like to help us improve the recycling program here at the World Trade Center, call Don Archuleta at 303-595-7026 to give us your



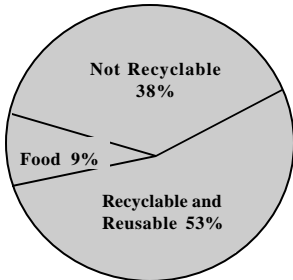
What to Do With That Old Computer

Did you know that more than 20 million computers became obsolete in 1998, but only 2.3 million were recycled? The National Safety Council also predicts that about 60 million computers will



become obsolete each year by 2005 (Denver Post, 2/18/01). For information on where and how to donate or recycle your old computers, check out: www.nsc.org or www.eiae.org.

World Trade Center Waste Audit



The two office trash audits done at the World Trade Center showed what remained in office trash after recycling:

Recyclable Materials:	47%
Reusable Materials:	6%
Food Waste:	9%
Not Recyclable:	38%

The current recycling rate for office waste is 18%.



Waste Audit—January 2001

Why Recycle?

The ecological and economic premise of recycling is sound: because the processes used to make consumer goods from recycled material are so much more efficient, it just makes sense to reuse resources over and over again after they have been mined from the earth. For example, recycled paper uses 60 to 70% less energy than virgin pulp, and 55% less water.

Simply put, making paper

from paper, cans from cans and plastic from plastic is much kinder to the earth than clear cutting a forest in the Pacific Northwest, or strip mining for bauxite ore in the tropics.

Recycling also provides valuable raw material for manufacturers, and reduces pollution from landfilling. Reducing waste is not only good for the environment and our economy, but property managers and tenants will see trash

reduction benefits as well.

So How Much Is Really Trash?

According to the EPA, nearly 80% of waste from office buildings can be reused, remanufactured, or recycled. White paper and mixed paper make up about 60 percent of an office's waste stream. Both of these are recyclable in nearly every recycling program across the country.

How to Participate

Our new recycling program now accepts the following:

1. Office Paper

Office paper includes white paper, lightly colored pastel papers, envelopes with windows, and a lot of other "junk mail" type paper. But there are some materials we need to keep out, including stickies (self-adhesives, labels, etc); deeply dyed

paper (fluorescents, construction paper, etc.); and low grade papers (like cardboard, newspaper, magazines, etc.).

2. Newspapers and Magazines

Newspapers and magazines are collected together in a container separate from the office paper.

3. Aluminum cans

Did you know we Americans throw away enough aluminum every three months to rebuild the entire U.S. jet fleet? Brookfield now offers an improved program for cans. Just rinse, drain, and recycle! Please call 303-595-7026 for further information or to set up your office program.

Don't Forget to Buy Recycled!

In order to "complete the cycle," we must make sure to purchase high quality, **post-consumer** recycled content products. Most paper companies sell excellent copy and bond paper

with 30% or higher post-consumer content. Your current paper vendor can help you find these brands. Or check www.ecocycle.org or www.cafr.org (the Colorado Association for

Recycling) to find Colorado vendors.

Remember:

**"IF YOU'RE NOT
BUYING RECYCLED,
YOU'RE NOT
RECYCLING"**

Appendix F

Glossary

Appendix F - Glossary

Glossary of Terms

Baler - Machine used to compress and bind materials together to reduce volume, and to create a readily stackable, storable and shippable unit.

Brookfield - Brookfield Properties is the owner and property manager of the World Trade Center.

Chipboard, paperboard, boxboard - Paper material used to make folding cartons, for example shoe boxes, and food containers for products like cereal and crackers.

Construction and Demolition Waste - Concrete, brick, asphalt, lumber, wallboard, plumbing, and other such building materials generated and discarded in construction and remodeling activities.

Contaminants - Any material that will cause a downgrade in quality of recycled material. Recycling service providers will not pay for material that exceeds a certain level of contamination.

Disposal - Hauling and landfilling of solid waste.

Diversion - Directing material away from a disposal facility. Usually refers to material recovered for reuse, recycling, and/or composting.

Hazardous Waste - Waste material that may pose a threat to human health or the environment, by definition, disposal and handling of which is governed by law.

High-grade papers - The most valuable grades of office papers. It includes white and pastel colored ledger, bond, xerigraphic and laser printer paper, and computer paper.

Landfilling - Disposal of solid waste at engineered facilities to prevent nuisances. Modern landfills are required to be engineered with synthetic or clay liners to prevent releases to ground water.

Maggie - One to two cubic yard metal or plastic rolling container for storage and collection of loose paper from large generators.

Market - Where a material changes hands between a willing buyer and seller, and reaches intermediate and end users. In the case of recovered paper destined for use in recycled content paper, the "market" could be the processing facility, the paper mill, the converting plant, and the copy paper purchaser.

Municipal Solid Waste (MSW) - Waste generated in households, commercial establishments, institutions, and businesses. MSW does not include industrial process waste, agricultural wastes, mining wastes and sewage sludge.

Participation Rate - The percentage of tenants participating in recycling compared to the total number of tenants served by the recycling program.

Recovery - The removal of materials from the waste stream for the purpose of recycling, composting, or other useful purpose.

Recyclable - Products or materials that can be collected, separated, and processed to be used as raw materials in the manufacture of new products.

Recycling - Separating, collecting, processing, marketing, and ultimately using a material that would have been thrown away.

Reuse - The use of a product more than once in its same form for the same or different purposes.

Tip Fee - A charge for the unloading of materials at a transfer station or landfill. It is a part of the total cost of disposing materials.

Waste Compactor - Device used to compress materials into containers ranging in size from 2 to 40 cubic yards, reducing hauling frequency.

ABBREVIATIONS

AL - Aluminum cans

CL - Colored ledger paper

CPO - Computer print out

EPA - U.S. Environmental Protection Agency

HDPE - High density polyethylene - Plastic milk jugs with a #1 on the bottom are an example.

OCC - Old Corrugated Cardboard boxes and other packaging with a corrugated medium between two liner sheets.

OMG - Old Magazines

ONP - Old Newspapers and the inserts that come with them.

OP (Opack or Office Pack) - A mixture of white and pastel copy and bond paper, glossy high quality advertising brochures, junk mail, manila folders, and envelopes.

OTB - Old telephone books

PET - Polyethylene Terephthalate - plastic soda bottles with a #2 on the bottom are an example.

WTC - World Trade Center