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MODEL ANNUAL WASTE REDUCTION WORK PROGRAM FOR LOCAL GOVERNMENT

YEAR 1

OF A FIVE YEAR PLAN

1990 - 1995

METROPOLITAN SERVICE DISTRICT

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EXECUTIVE SUMMARY

The regional "reduce, reuse, recycle, recover" standards and Model Annual Waste Reduction Work Program sets down expectations and guidelines for local government participation in regional waste reduction goals consistent with state law and Metro's Regional Solid Waste Management Plan. Local governments are to submit their work program to Metro before July 1990 for fiscal year 1990-1991. This program is consistent with the Department of Environmental Quality Guidelines and is the result of enabling ordinances passed by the Council of the Metropolitan Service District.

Every local government shall annually submit to Metro an annual work program that demonstrates adherence to regional goals. In the first year the local program must include at a minimum the following activities:

1. Identify revenue sources to finance programs;

2. Implement weekly recycling collection in residential neighborhoods;

3. Prepare and schedule the implementation of a recycling container collection system;

4. Implement by ordinance, resolution or administrative rule, an institutional purchasing policy;

5. Cooperate in reaching other regional goals as they are developed in yard debris collection, material recovery, and other resource recovery activities; and

6. Hire or designate staff to serve as a waste reduction coordinator.

Failure to submit a plan as required within the timelines noted here will cause the initiation of more stringent enforcement mechanisms by Metro.

Local governments may work cooperatively with other neighboring local governments to share staff, equipment and other resources. Such arrangements shall be documented by intergovernmental agreements submitted along with the individual local plan. Where staff is shared it shall be necessary to designate at least one contact person in the respective local government who will be familiar with the cooperative system.

Those activities that are contemplated for implementation in the subsequent five year period shall be noted in the current year as future projects with programmed completion times.

This report presents a model from which a local government can develop an annual work program to reduce, reuse, recycle, and recover material once destined for the landfill. It is based upon actual operating experience of recycling programs both in the Metropolitan Service District and in other states. The information guide provides a framework for municipalities to attain locally-stated recycling goals and is designed to help publicly or privately operated programs achieve maximum effectiveness and efficiency in their recycling efforts.

The standards that will be used as the primary evaluation criteria and must be adopted within the local work plan are outlined in detail. The acceptability of each local annual work program will be determined by adherence to the standards. Failure to adopt these requirements will result in a substandard and therefore unacceptable local program. Each local government is asked to clearly outline in their program how and when each standard will be met. Plans which contemplate systems that do not adhere to specific standards must be thoroughly documented by the respective local government.

A Five Year Model Forecast of Local Government achievements that outlines probable major waste reduction accomplishments that will occur as a result of the local government plan is provided at the end of the Model Work Program Section. This forecast is designed to demonstrate actual outcomes over a five year period as the standards are applied to each local environment. It serves to emphasize the incremental nature of the task ahead. The minimum requirements are met in Year 1 and other accomplishments follow.

An informational guide is presented which provides a discussion of various waste reduction systems including drop-off centers, curbside recycling, yard debris composting, source reduction, purchasing policies, and commercial recycling. Several appendices provide summary data concerning waste reduction systems and institutional purchasing policy ordinances. A glossary is included to provide source reduction related definitions of terms found in the Model Work Program and Standards.

INTRODUCTION

Waste disposal is becoming an increasingly important public issue. Waste reduction is an essential component of solid waste management systems for each local government. This report is designed to provide Metropolitan area cities and counties with a guide to plan effective local solid waste reduction programs. It also sets down regional standards by which local government waste reduction programs will be evaluated by Metro.

The residential component of the municipal solid waste stream is commonly regulated through franchise and licensing agreements of local government and is the focus of the first year work program. Commercial and industrial waste streams also provide significant opportunities for materials recovery. High-grade office paper and corrugated cardboard collection and recycling will be discussed in the waste consultation and commercial recycling sections.

This report illustrates several operational experiences of existing solid waste reduction programs to guide local governments in the creation and/or expansion of their local program. Critical factors such as cost and waste stream composition vary considerably from city to city. This guide provides a framework for individual local governments to assess the economics and waste stream impact of specific local recycling and solid waste reduction programs.

Markets

Local market conditions are undoubtedly the most influential factor in the scope and success of a recycling collection program. The availability of buyers for materials dictates which materials can effectively be included in a recycling program. Market price fluctuation will affect the financial and operational viability of a local program. It is rare that any segment of the recycling system pays for itself. Waste reduction programs require a financing system that extends beyond garbage collection fees charged by haulers.

The following considerations are essential to facilitating and delivering secondary materials to market:

- The availability of secondary material markets.
- The current and historical value of those materials.
- Processing requirements such as color sorting, crushing, baling, grinding, acceptable contamination levels, etc. and transportation requirements.

- Quantity requirements which determine whether materials must be stockpiled until an adequate quantity is amassed or be shipped on an "as-collected" basis.

- Availability of long-term contracts that may include price floors and ceilings.

- Allowances for transportation and advertising costs.

Local governments can play an important role in helping arrange cooperative marketing strategies among the several private haulers in each regional wasteshed.

Separate collection of a portion of the waste stream is not, by itself, recycling. Those collected materials must be purchased, or accepted by industries that will process them for another end use. Although market development programs usually involve state and federal-level issues, local governments can play a critical role in "closing the recycling loop" by purchasing recycled-content materials and encouraging the use of these materials by local residents and businesses.

REGIONAL

REDUCE, REUSE, RECYCLE, RECOVER

STANDARDS

YEAR 1

OF A FIVE YEAR PROGRAM

1990 - 1995

REGIONAL REDUCE, REUSE, RECYCLE, RECOVER STANDARDS - 1990-1995

I. Administration and Coordination

A. Local governments shall exercise their authority under the franchise, license or permit system to regulate the type and quality of recycling collection service.

B. Local governments shall comply with the standards by utilizing several options including grants, loans, technical assistance and consultation service with assistance from Metro.

C. Subsequent changes in standards shall be the result of an initial consensus by the five wasteshed representatives in Washington County, Clackamas County, Multnomah County, Portland and West Linn.

D. Local governments shall have a direct voice in the formulation of standards through their respective wasteshed representatives.

E. Each local government shall monitor their waste reduction activities and report to their wasteshed representative on each program in the local government by collecting hauler reports, by performing site visits and by compiling and providing copies of all local ordinances, resolutions, budgets and franchise or license agreements that demonstrate compliance with the standards.

F. Each local government shall employ or share a recycling coordinator who shall act as liaison between individual local government and the wasteshed representative as well as providing local representation to regional groups that are established to address new trends in waste management issues.

II. Curbside Programs

A. Each local government shall provide through franchise or license agreements or other means at least weekly curbside collection of the principal recyclables in their wasteshed.

B. Each local government shall provide through franchise or license agreements or other means collection of recyclables on the same day every week in a consistent schedule.

C. Each local government shall provide through the franchise or license agreements or other means a container to each residential unit (single-family, duplex, triplex, fourplex and any unit that has direct curbside street level access) to be used for the weekly storage of recyclable materials that is at least equivalent to a 14 gallon single bin container.

D. All weekly programs shall be supported with local media advertising to promote recycling within the local government or hauler zone on at least a semi-annual basis.

E. Local governments shall assist individual haulers develop an effective campaign to promote their curbside program that includes the following elements.

1. Visible and attractive logos or signs attached or painted on all collection vehicles that promote the weekly curbside collection program and lists a telephone number to call for more information.

2. All containers shall have the hauler name and telephone number printed on one side.

3. Each curbside container shall display preparation methods and collection schedule for proper recycling.

4. Each hauler shall carry check lists to be left with the containers in the event the recyclable material is not properly set out.

5. The distribution of informational material on at least a semi-annual basis within the urban service area of each hauler zone.

6. Participation in other promotional efforts including school visits, parades, community events and service organization activities.

F. All equipment used by individual haulers for the collection of curbside recyclables shall be maintained in good operating condition.

G. The cost of the containers, collection equipment, promotion, distribution and labor shall be a recognized cost for the purpose of rate reviews. The recycling service cost shall be absorbed by individual users and added to the approved collection fee.

H. Each curbside collection service provider shall maintain a complaint resolution system that utilizes 24-hour telephone answering. Complaints shall be resolved the next business day.

I. Each local government shall use standard reporting forms provided by Metro that will replace current DEQ reporting forms.

J. Each local government shall participate in all survey and system measurement tasks on a regular basis.

K. Each local government shall develop a rate structure for refuse collection that is based on volume and weight.

L. Local governments shall comply with standards related to the type and quality of collection service as outlined in this document and shall amend franchise/ license ordinances or agreements to incorporate the collection standards embodied in the Regional Reduce, Reuse, Recycle, Recover Standards.

M. Each local government shall hold regular meetings with haulers in their jurisdiction to review program results and goals.

III. Commercial

A. Each local government shall complete at least ten waste audits for at least one percent of the businesses each year in the commercial sector designed to enhance high grade and building/construction material source separation and recycling.

B. All building/construction material disposal and all commercial routes shall be reviewed annually to encourage source separation where practical.

C. In cooperation with local service providers each local government shall encourage a route system that shall facilitate the aggregation of clean source separated loads.

D. Each local government, with Metro assistance, shall make available lists of local and regional brokers of recyclable materials to their service providers and citizens.

E. Where practical, building/construction material used and disposed of by the local government in public works

applications shall be reduced, reused or recycled. It will be the responsibility of each local government to include in the annual work program submitted to Metro data on the effectiveness and extent of reduce/reuse/recycling activities in this area.

F. Local government shall participate in regional plans to investigate alternative technologies that will be developed in succeeding years in the area of waste recovery and where applicable provide for the coordination and implementation of any such recovery system as deemed suitable by the region within the local system.

IV. Markets and Procurement

A. Each local government shall develop programs to effect source reduction and in-house institutional recycling programs through an analysis of purchasing policies, office paper programs and other reduction techniques.

B. Each local government shall implement a purchasing policy that provides a preference for recycled products or directly specifies recycled products.

V. Yard Debris

A. As the regional yard debris plan is developed, each local government shall cooperate in the implementation of systems that match the regional plans and goals.

B. Yard debris compost shall be used in parks, and at other public facilities and public works applications where soil amendments are used.

C. As practical, local governments shall encourage the recycling and use of recycled products by contractors that are under the control or influence of the local government through the use of proactive education and promotion programs.

D. Each local government shall establish a program to assist residents in building, maintaining and using a home yard debris compost system.

E. Local governments shall provide for the development and support individual household, properly managed, compost operations by determining that no exclusionary language exists in ordinances and resolutions of the local government; should exclusionary language exist, it shall be removed.

VI. Multi-family Residential

A. Local governments shall develop a plan to install multi-material containers collection systems in multi-family locations in cooperation with the service provider and the property owner.

MODEL WASTE REDUCTION WORK PROGRAM

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MODEL WASTE REDUCTION WORK PROGRAM

MODEL WORK PROGRAM

A detailed model work program has been formulated to guide the local governments in preparing their own waste reduction program. This model work program sets forth major work tasks to be performed and the purpose, methodology and products of each task. It is anticipated each city shall submit their program for review by the Waste Reduction Division at the Metropolitan Service District by July 1, 1990. Content will be evaluated to determine compatibility with the stated goals and objectives of the Regional Solid Waste Management Plan, and specifically the plan's Waste Reduction Chapter before any program is actually initiated. Each local government is encouraged to review all aspects of Metro's Regional Solid Waste Management Plan to better understand the rationale for the waste reduction tasks.

It is anticipated that each local government shall review the "Model Annual Waste Reduction Work Program for Local Government" with the appropriate local officials, service providers, and citizens. By February 1990, Metro will contact each local government to determine if there are any questions or inconsistencies that need answers or clarification. After contacting each local government, Metro will hold open meetings in each wasteshed to again address questions regarding the development of the local government program. Throughout this early development phase Metro will designate a project manager who will be available to answer day-to-day questions about the model program and the standards. Finally, after the individual programs are submitted by July 1, 1990, Metro will maintain continuous contact with the local governments for review, revision and ultimate implementation of the individual programs.

It is acknowledged that there is great variability among the 27 local governments responsible for the implementation of the programs outlined in this Model Waste Reduction Work Program. Many local governments and haulers already have some elements of the program in place and have initiated planning to move into other more complex areas of the program. Those successes and anticipated programs should be reflected in the local government's plans as submitted by July 1, 1990.

Other communities may not be as intimately involved in waste reduction. For them it may be prudent to submit a plan that acknowledges a greater need to emphasize the fact finding, investigatory aspects of the model. However, every local government shall be expected to submit plans that demonstrate adherence to regional goals with activities including the following: 1) identify revenue sources to finance the program; 2) implement weekly recycling collection in residential neighborhoods; 3) prepare and schedule the implementation of a recycling container collection system to every single family residential unit in the community, 4) implement by ordinance,

resolution or administrative rule an institutional purchasing policy, 5) cooperate with other regional goals as they are developed in yard debris collection, material recovery, other resource recovery and intergovernmental participation, and 6) hire or designate staff to serve as a waste reduction coordinator. These minimums when coupled with an overall awareness of the critical state of solid waste reduction systems in the region will afford each local government with an excellent start toward a system that is regional in scope but controlled at the local level.

In future years these minimum standards will be maintained and, with each successive annual plan, will be augmented with more sophisticated programs. By the end of the first five years all local governments shall be in compliance with all Regional Solid Waste Management Plan standards.

Again, use the model as a guide to stimulate individual thoughts about specific local concerns. Metro staff will be available to assist each local government as necessary throughout the six month preparation period (January-June, 1990).

PLAN

TASK 1
Inventory Existing Waste Reduction Programs, Operations and Facilities

Purpose

To establish an information base to:

1. assess current and future services and operational needs of local waste reduction systems and services;

2. identify current facility needs and problems;

3. determine operating relationships among various haulers, public interest groups, the media, citizens and local officials involved in solid waste; and

4. compile a mailing list of service providers and industry contacts across the complete spectrum of waste reduction.

Methodology

Various fact collection approaches shall be taken to thoroughly document the operating characteristics of solid waste management services in the local governments. These include:

- Interviews with appropriate City/County staff and officials.
- Analysis of existing collection data and rates.
- Review of documents such as budgets, local ordinances, state law, franchise agreements, license agreements, regional work plans, industry data, and Metropolitan Service District standards and requirements.
- Review of pending and proposed state legislation.
- Site visits to all existing service providers to review equipment, service delivery methods and operational plans.
- Analysis of equipment inventories and existing facilities.
- Development of historical data from media sources and appropriate public documents about solid waste service providers to outline apparent trends in the activity.
- Completion of a public-facility waste audit.

Product

The product of this initial work task will consist of written narrative and statistical profiles which describe:

1. Program objectives and service levels of local waste reduction service providers.
2. System capacity and trends in service provision.
3. Organizational structures and working relationships among solid waste management service providers.
4. Staffing, equipment and facility inventories and trends for all related systems.
5. Current maps outlining location, size and layout of existing waste reduction systems.
6. Waste generation from audits by type and quantity for all local public facilities -- City Hall, Police, Fire, Library, park, and community centers.
7. Plans related to near and long-term strategies to change waste reduction systems by any of the relevant groups to comply with all waste reduction standards and requirements of the region.

ORGANIZE

TASK 2
Identify and Review Major Local Planning Issues Which Can Effect Long-Term Facility Needs

Purpose

To identify and obtain agreement on key issues or factors which will affect the type, size, routes, zones, location, cost and financing of new or expanded solid waste management systems.

Methodology

To make certain important planning issues are clearly identified and considered which affect the long-term requirements for solid waste management systems the following steps will be taken:

- Analyze statistical data and trends accumulated in Task 1.
- Review programs in neighboring local governments for compatibility with cooperative systems.
- Evaluate trends and changes in waste reduction service delivery technology.
- Identify alternative funding sources for programs.
- Document existing funding availability.
- Delineate any constraints on funding which may exist.
- Review land uses and zoning in the local waste shed which may be affected by changes in waste reduction service systems.

Product

The product of this work task will be a written list of the planning issues which must be resolved and factored into the local waste reduction program. This issue list will address such factors as:

1. Potential changes in how waste reduction service systems might be delivered, and how the activities will be integrated with regional objectives.
2. Major political, policy, land use, zoning, site, financial and other constraints which must be considered in developing a waste reduction program.

3. Public needs which are not now adequately provided for by existing facilities and systems.

4. Waste reduction activities that can benefit from a regional cooperative approach.

5. Work plans to develop guidelines to encourage through the building permit and inspection process provisions for the storage and collection of recyclables in existing and new multi-family and commercial developments.

This issue list will be reviewed with local government staff, elected officials, service providers and citizens to ensure its validity and completeness.

FORECAST NEEDS

TASK 3
Forecast System and Equipment Needs for the Waste Reduction Systems

Purpose

To project system and equipment levels which can be expected for each of the next five years and for a twenty year forecast for all waste reduction activities and facilities.

Methodology

System forecasts for waste reduction services will be based primarily on projected waste generation levels and recycling activities in the target period. Types and size of systems will be based on anticipated service requirements within each local government using regionally agreed to standards and requirements as a baseline guide. The specific method to be used to forecast needs for each waste reduction function include:

- Determine geographical area and route to be serviced by the service provider.
- Determine types and number of companies needed.
- Determine route schedules for recycling, garbage, and yard debris collection.
- Review special circumstances, if any, of the local government that may affect the system.
- Determine number of staff needed to monitor system based on anticipated workload and geographic area to be serviced.

- Determine minimum service levels for all waste reduction activities based on regional guidelines for individual service providers.

- Make provisions in all operational components for possible adjustments to reflect possible changes in standards and requirements in solid waste management systems.

- Determine how citizen complaints and adjustments will be handled.

- Determine response time for complaint resolution.

Product

The product of this third work task will be a series of tables and a narrative for waste reduction service providers which display:

1. Types and number of systems forecasted for the next five years and for the year 2010.

2. Types and numbers of vehicles, equipment and specialized support material projected for the period through the year 2010.

3. Types, number and size (by capacity) of waste reduction system companies for the period through the year 2010.

4. Service level guidelines and dispute resolution methods.

In addition the local government shall:

1. develop a report on the costs/benefits of a waste reduction system which embodies the standards and requirements promulgated by the regional government; and

2. prepare a written methodology for determining and validating waste reduction system needs in the future.

It should be noted that where options exist to consolidate local programs due to possible changes in service delivery needs, approaches, and operating practices, they should be proactively pursued by the effected local governments.

BUDGET

TASK 4
Project System Costs and Develop a Budget Plan

Purpose

To project waste reduction activity costs over the next 20 years on an annual basis for both private and public functions and facilities and reach agreement on budget expenditures and rate structures.

Methodology

Current system costs for waste reduction services will be based on data collected in Task 1 and projected system costs will be based on Task 3 forecasted service level requirements. Where both public and private systems exist, distinctions will be clearly outlined. Where a public role is forecast, the local government will budget accordingly. Where a private role is forecast, the rate structure needed to support the activity will be outlined. To make certain important budgeting and rate setting issues are clearly identified and considered the following steps will be taken:

- Analyze cost and rate data accumulated in Task 1.
- Establish waste reduction program budget review timelines with local elected officials.
- Develop FY 1990-91 budget program changes in accordance with regional standards and requirements.
- Review budget program changes with appropriate interest groups in the local government.
- Obtain approval of budget program changes from department heads, City Manager, and City Council.
- Coordinate the exchange of information between local governments and the local service providers.
- Forecast future budget and rate structure needs for FY 1991-1995.

Product

The product of this fourth work task will be an authorized waste reduction budget and rate structure which includes the following:

1. Provision of services to the local resident as outlined in the regional standards and requirements.

2. Staff to develop and implement the waste reduction program.

3. Means to pass through documented system costs to the solid waste generator.

4. Identification of a stable funding source.

5. A long-term budget forecast and rate structure.

IMPLEMENT

TASK 5
Implementation of the Local Waste Reduction Program

Purpose

To carry out the local waste reduction program in FY 1990-91 as outlined in Task 1-4 and 6.

Methodology

Several implementation tasks, activities and strategies need to be emphasized to make the local solid waste management plan operational. These include:

- Formulate timelines for specific tasks within the work plan that delineate the expected products that will meet the standards set forth in this guide. (See sample timeline attached in Appendix E.)

- Adopt by resolution the solid waste management plan which shall acknowledge the established waste management hierarchy of reduce, reuse, recycle and recover.

- Passage of budget authority.

- Adopt appropriate enabling ordinances in the areas of solid waste management, purchasing, personnel, and zoning, building codes and land use.

- Passage of specific ordinances to enforce anti-scavenging and flow control mandates.

- Develop periodic service provider meetings with specific agenda for solid waste management system activities.
- Develop contacts with solid waste industry leaders at both the front end manufacturing level and at the back end recycling/disposal level.
- Distribute individual containers at residential units and in neighborhood zones.
- Support for periodic and frequent education and advertising of the solid waste management system funded in an amount not less than $1.00 per person per year in the service area.
- Hire or designate a solid waste management coordinator.
- Complete waste audit for local public facilities.
- Establish waste management hierarchy policy in all public facilities.
- Include reduction, reuse, recycling, and recovery in any local government mission statement.
- Establish internal reporting procedures for City Manager's/Mayor's and/or City Council review on a quarterly schedule.
- Membership in solid waste associations active at the local, regional, state, and national level.
- Support for consideration of solid waste issues within current association memberships.

Product

The product of this fifth work task will be a solid waste management system that includes the following elements:

1. Recognition of the regional plan.
2. Local acceptance of the state, regional and national hierarchy of waste management standards.
3. Minimum service levels and standards compatible with the region.
4. Adherence to regional standards at the local level in solid waste management systems.

REVIEW

TASK 6
Ongoing Review and Control of Local Waste Reduction Program

Purpose

To establish a system to review, control, modify and supplement solid waste management plan objectives to assure compliance with local and regional goals.

Methodology

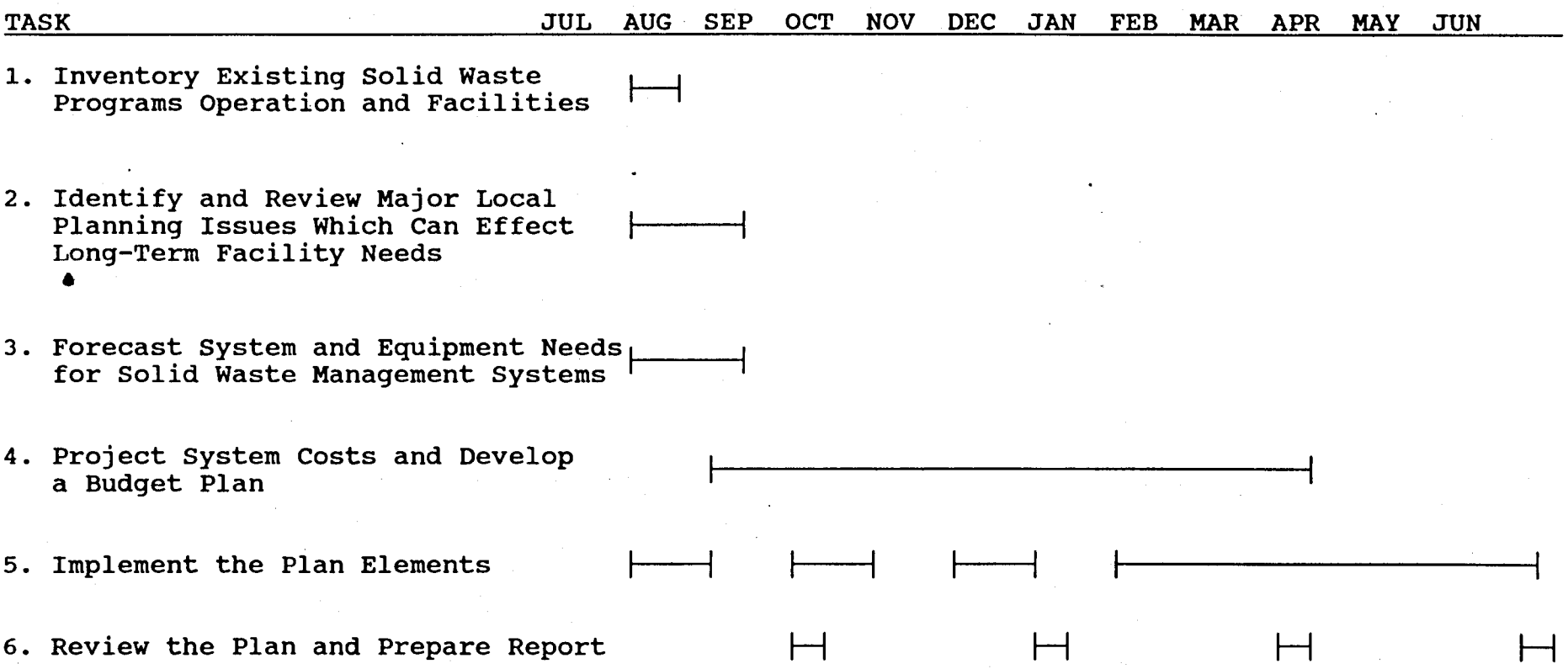
To ascertain that all facets of the solid waste management plan are supporting or evolving toward the stated regional goals of waste reduction, reuse, recycling and recovery the following monitoring devices will be established:

- All regional report requirements will be distributed internally to local government staff prior to final submission to Metro.
- A schedule of on-site system tours and inspections will be maintained.
- All local waste audits will be reviewed for effectiveness and functionality.
- Staff review of the solid waste budget and solid waste timelines to determine adherence to stated objectives.
- Samples of all promotional items shall be provided to Metro.
- All documentation, budget reports and resolutions concerning solid waste shall be provided to Metro.
- All required reports will be completed on time and subject to public review and distribution.
- The local government shall encourage and participate in Metro initiated site visits and audits and respond to all requests from state and regional agencies in a prompt, professional manner.

Product

The product of this sixth work task will be a dynamic solid waste management system. As such it will not be prone to system failure due to rapidly changing circumstances. It will be responsive to public needs at an appropriate cost borne by the system user. Most importantly the system will be compatible with regional plans and objectives and will function as a cooperative element of that regional system.

TIMELINE FOR SOLID WASTE MANAGEMENT WORK PLAN FY 1990-91



A FIVE YEAR MODEL FORECAST
of Local Government Achievements

YEAR	MAJOR WASTE REDUCTION ACCOMPLISHMENTS AS REFLECTED IN EACH YEAR'S ANNUAL WORK PLAN
1 FY 90-91	- A waste reduction coordinator responsible for the individual local government plan starts work. - All city buildings start office paper recycling programs. - The local government implements purchasing policies for recycled content and recyclable products. - A consistent and reliable funding mechanism is adopted. - All rates are regulated through either franchise or license agreement. - Weekly recycling collection is started. - Variable rate/mini can rates are incorporated in franchise license agreements. - Plans are completed for the provision of curbside recycling collection containers to each single family residence. - A system is developed to participate and cooperate with other regional waste management goals as they are formulated and to make timely reports to Metro. - Second year work plan is written and submitted on time.
2 FY 91-92	- Waste audits for at least one percent of the businesses in the community are completed. - Curbside containers are distributed. - Regional yard debris plans are incorporated into the local operating system. - Intra-regional agreements are authorized to share program administration and facilities. - Multi-family collection containers are distributed. - Third year Work Plan is written and submitted on time.

	- The local government is in compliance with all curbside standards.
3 FY 92-93	- Waste audit program becomes a regular service provided by the local government in a public-private partnership agreement. - All generators are source separating clean loads for commercial collection. - Plastic collection at curbside is started. - Local garden association achieves 50 percent yard debris reduction with individual compost bin program assisted by Metro and local government. - Public works department completes phased-in purchasing, reclamation and recycling program for all city properties, the fleet and streets applications. - Fourth year Work Plan is written and submitted on time.

	- All buildings/construction material for disposal in the local area is directed to recycling facilities for reuse or recycling.
4 FY 93-94	- Toxic source reduction becomes a part of the waste audit system. - All franchise agreements are amended to reflect regional requirements in solid waste management. - Next phase of the yard debris regional plan is adopted. -Fifth year Work Plan is written and submitted on time.

	- A five year report is written and distributed.
5 FY 94-95	- Next five year forecast is completed. - Intra-regional agreements are renewed following and intergovernmental strategy session. - All new construction has recycling centers built-in; all old structures have been successfully retrofitted.

INFORMATION

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A discussion of operational strategies, waste stream diversion, and program economics is presented for each type of program. Specific program economics are very dependent upon local conditions. Most local recycling programs are not revenue producers under the current economic condition of fluctuating market prices and relatively moderate tipping fees. Long-term planning for these programs must take into account both the historical fluctuations of market prices and the projected increases in tipping fees. An example of how residential recycling programs would effect a hypothetical community of 30,000 people is presented in Table 1.

Drop-off centers represent the traditional form of community recycling efforts. Although these programs only divert one to seven percent of the residential waste stream, they are viewed as a good starting point toward the implementation of comprehensive plans. Drop-off programs can range in scope from a limited, Saturday-only operation to full-scale 24 hour per day, seven day per week service. They typically achieve participation rates of 5-20 percent and can collect from five to 40 tons of recycled material for every 10,000 residents per month. Drop-offs can play an important role in comprehensive recycling programs by serving multi-family residences and less-dense single-family or rural areas.

Curbside collection of recyclables in most instances is considered the most convenient, and therefore most effective, form of recycling for single-family residences. Curbside programs are currently being operated by municipalities through franchise or licensing agreements, private haulers, not-for-profit organizations, or some combination of the three.

There is a direct relationship between convenience for the homeowner and effectiveness of the curbside program. The key convenience factors include weekly collection on the same day as regular trash pick-ups, frequent promotion and advertising, and the use of containers to store recyclables during the week and to transport them to the curb. Successful programs may achieve 70-80 percent participation rates and collect as much as 65 pounds of material per household per month.

Yard waste composting is an attractive program since yard waste represents a sizeable (13.6 percent; 1988 estimate) portion of the total waste stream and these materials are already, in most cases, being source separated. The average single-family residence generates an estimated 750 pounds of grass clippings and 200 pounds of leaves per year (based on national survey data). Pruning waste from residential, municipal, and commercial sources can also be included in these programs and will result in

an estimated additional 200 pounds of material per year per residence. Leaves and trimming waste can be collected by bulk pick-up using vacuum trucks or "scooping" methods. The development and availability of degradable kraft bags may improve the convenience of yard waste collection and increase the efficiency of composting operations. Yard debris drop-off sites or mobile collection vehicles are other typical operating methods currently in use.

Although several capital-intensive mechanical composting systems have been demonstrated, the most common technique is the simple windrow system where the raw material is formed into long piles and occasionally turned and watered until the decomposition process produces compost. The finished material is a soil conditioner for which markets exist.

Source reduction is an important, but often overlooked mechanism to help reduce the amount of waste generated. It has two components. First, it is possible to evaluate waste flows in commercial and residential environments with a goal of creating less waste. This can be accomplished through purchasing decisions, different delivery systems and changes in needs. Secondly, what is discarded can be evaluated to determine if it is recyclable or reusable. Metro offers waste consultation seminars for local governments to help train local officials in these evaluative skills.

Commercial recycling is a growing segment of the recycling business because it provides opportunities to gather larger quantities of "high grade" material at lower collection costs. Like other types of recycling, commercial collection works best when it is convenient and some sort of containers are supplied to the generator.

Each unit of government can help complete the recycle loop by developing and passing local procurement ordinances that recognize the need to give preference to recycled products. Metro offers technical assistance to help create local ordinances.

DROP-OFF CENTERS

A. OVERVIEW

The multi-material drop-off center historically was the most common type of residential waste recycling program. These centers offer the simplest form of recycling operation: area residents and businesses bring separated materials to the center and deposit them in appropriate containers. There are currently at least 12 drop-off centers throughout the Metro area. Additionally there are more than 200 (newsprint, milk jug) drop sites in the area that collect one to four types of material.

Drop off centers are typically viewed as the first phase of a comprehensive community recycling program. They allowed local haulers and processors to become familiar with material handling techniques and market arrangements on a small-scale before embarking on more complex mandated curbside collection and yard waste composting programs. Metro has encouraged this learning process through the pilot programs and the One Percent For Recycling grant system. Drop-off centers are also effective in less-densely populated areas unable to support full-scale curbside programs.

A variation on the drop-off center is a buy-back program, where participants are paid for the value of certain materials, commonly newspaper, other paper goods, glass, and metals. By-back operations provide an incentive for increased community participation, but also reduce net revenue to the center and require greater staffing levels.

B. OPERATIONS

The operational aspects of drop-off centers are highly dependent on local resources. Characteristics of drop-off programs vary widely from one community to the next. The key components to successful programs are as follows:

Type of Material Accepted

The most commonly collected materials are newspaper, glass food containers, and tin and aluminum cans. These items are easily marketed and have significant economic value. Other materials which may be accepted include corrugated containers, high-grade ledger paper, mixed paper (such as chip board, magazines, and telephone directories), certain types of plastic (milk jugs), motor oil, scrap metals, and wood waste.

Periods of Operation

Many drop-off centers are open five to six days per week, usually including Saturdays, when staff is present to assist patrons in unloading and sorting materials. Other programs provide public access 24 hours per day, seven days per week, but are staffed only at regular hours. Longer hours of operation increase public convenience, and therefore participation, but must be balanced by staffing and security requirements. Single item drop sites are usually unattended and located in high traffic areas.

Site

Common elements of drop-off sites include a parking area for the public, bins in which citizens can place recyclables, a materials storage and processing area, and an office. Signs which clearly explain processing and sorting requirements help to reduce contamination problems, maintain site cleanliness, promote an orderly flow of traffic, and prevent any public confusion.

Actual facility size depends on the quantity of material being handled. Smaller centers accepting up to 20 tons per month will require approximately 3,000 to 5,000 square feet. Centers that recover 20 to 50 tons per month will commonly have space needs of 8,000 to 15,000 square feet.

A successful drop-off center must be located at a visible site with easy public access. Studies have shown that residents will patronize a center within three to five miles of their home, combining the recycling trip with other errands. Larger communities may encourage the operation of several neighborhood drop-off centers, with a larger central site to process aggregated materials.

Material Storage and Processing

Containers must be provided for public drop-off of material. Smaller centers regularly use 55-gallon steel drums for glass, metal, and miscellaneous materials. Larger drop-box bins are commonly used for glass food containers. Compartmentalized bins work especially well for separating colored glass. These bins can be purchased or leased in either standard or custom configurations, and are available in sizes ranging from 10 to 50 cubic yards. Newspaper and corrugated is generally collected in drop boxes with covers.

Many centers crush and/or bale materials to save storage space and improve marketability. Higher prices are usually

received for crushed glass and cans, baled mixed paper, etc. Depending on the size of the recycling operation, equipment used may include hand trucks, can flatteners, magnetic separator, glass crusher, conveyor system to sort and load paper, baler, and forklift truck. This equipment can be purchased new or used, donated, or in some cases provided by the material buyer.

Transportation of the collected materials to market is a major part of a recycling operation. While some larger centers own their own trucks, most rely on the material buyer or contracted hauling. A small truck or step-van can be used to make local pickups such as glass from restaurants and bars or paper waste from printers.

Estimated equipment costs are outlined in Appendix C.

Material and Labor

Recycling drop-off centers can be operated by local governments, private businesses, charitable, civic or environmental groups, or any combination of these. Private, for-profit centers are usually part of another main business such as a refuse hauler or scrap materials dealer.

Most centers are cooperative operations between not-for-profit and for-profit organizations and units of local government subject of franchise agreements. The drop-off center in not-for-profit situations could be located on municipal property and staffed by volunteers from the community group. The municipality may provide some site improvements and other overhead subsidies if such assistance is not in conflict with for-profit operations. Space may also be donated by local businesses.

Some drop-off centers are used for fund-raising by community groups. Net revenue from the sale of materials is distributed to local groups which provide staffing at the site. Municipalities may also use the recycling center as an opportunity to employ disabled or disadvantaged residents.

Standard administrative tasks include equipment purchase and maintenance, personnel management, marketing of materials, and promotion. These tasks can be provided by existing municipal staff, a paid director of a community group, or by an extremely energetic volunteer.

Participation and Effectiveness

Public participation rates are strongly dependent on convenience of location and the amount of effort devoted to promotion. Typical drop-off programs may achieve participation rates of 10 to 20 percent, and divert one to seven percent of the total waste stream average. There is evidence that in select special environments participation can be as high as 80 percent.

Centers operated by charitable groups are often patronized by people supportive of the cause. Such groups often have access to community networks to aid publicity. There are also indications that centers are used more by those with higher income and education levels and in communities with active environmental groups. Some operations increase participation by purchasing selected materials or by focusing in seasonal items such as phone books or Christmas trees.

C. MATERIAL COLLECTION RATES

The amount of material collection that can be expected from drop-off centers has been estimated by reviewing reported data from centers nationwide. An analysis of data from recycling centers found two distinct collection rates, corresponding to well-established campaigns (referred to below as "full-service program"), and less-established programs characterized by limited hours of operation, less convenient and/or attractive facilities, and the lack of effective promotion (referred to as "limited service" programs).

Collection rates for both types of programs are presented in terms of tons per year per 10,000 population, to allow for extrapolation to any community size. These rates should be viewed as rules-of-thumb only; actual material collection rates will depend on numerous demographic, economic, organizational, and subjective factors. It is likely that a full-service program will result in the collection of 128 to 457 tons per year per 10,000 population or an average of 260 tons per year. Limited service programs will result in the collection of 56 of 87 tons per year per 10,000 population or an average of 69 tons per year.

D. AMOUNT AND VALUE OF MATERIALS COLLECTED

Data on the amount of various materials collected and their value will allow recycling centers to project anticipated volumes to plan for materials handling capabilities, and revenues from material sales. Some drop-off sites,

corresponding to the limited service category in the previous section, accept only paper and/or milk jugs. Most full-service programs accept multiple materials. The value of recycled materials fluctuates due to market conditions.

E. DROP-OFF PROGRAM ECONOMICS

The data on collection rates and amount of materials presented below can be combined to determine projected material volumes and revenues. A key component of recycling program revenues is a credit for waste diversion, that is the avoided cost, or the money saved by not collecting and disposing a given amount of recyclable materials. The example below assumes avoided disposal cost of $35 per ton.

The intent of this analysis is to provide a framework for a community to calculate its own actual expenses for drop-off programs. Capital and operating costs will vary substantially from community to community. These expenses have been estimated below.

The following example of drop-off program economics and waste stream impact is for a hypothetical community of 10,000 households with 30,000 total population. The limited service program described below is open and staffed one day per week. The full-service program is available to the public 24 hours per day, seven days per week. On-site staffing is provided 40 hours per week.

1. Waste Stream Impact

	Limited Service	Full Service
Recyclable Collection Rate (tons/year/10,000 population)	69	260
Total Recyclable Collection	207 tons/year	780 tons/year
Total Residential Waste Stream*	16,972 tons/year	16,972 tons/year
Percent Recycled	1.2%	4.6%

*Residential solid waste generation is estimated at 3.1 lbs/person/day.

2. Revenues from Drop-Off Programs

a. Material Sale:

Material	Limited Service Tons	Limited Service Revenue	Full Service Tons	Full Service Revenue
Newspaper	164	$ 3,280	608	$12,160
Glass	23	1,380	51	3,060
Plastic	20	1,600	50	4,000
Corrugated	---	---	47	1,645
Metals	---	---	12	526
Used Oil	---	---	12	690
Totals	207	$ 6,260	780	$22,081
b. Avoided Costs (@ $35/ton)		$ 7,245		$27,300
c. TOTAL ANNUAL REVENUE		$13,505		$49,381

3. Expenses for Drop-Off Programs

Item	Limited Service	Full Service
Personnel*		
Staff	$ 7,200	$27,000
Supervisory	3,750	7,500
Benefits (@25%)	2,750	8,625
Total	$13,700	$43,125
Liability Insurance	$ 1,500	$ 2,500
Utilities	600	1,800
Hauling	600	1,200
Promotion	2,500	5,000
Capital Amortization**	1,000	25,000
Total	$19,900	$78,625

* Personnel levels assumed are:
Limited Service Program: 1 staff, 2 days/week; 1/8 time supervisor.
Full Service Program: 1-1/2 full-time staff; 1/4 time supervisor.

** Capital expenses may include land, building, storage containers, and site improvements. However, many of these costs are usually internalized, especially in less-established programs.

4. Summary of Program Economics

	Limited Service	Full Service
Total Revenues	$13,505	$49,381
Total Expenses	$19,900	$78,625
Net Program Cost	$ 6,395	$29,244
Cost per Ton	$ 30.89	$ 37.49
Cost per Household per Year	$ .64	$ 2.92

TABLE 1

WASTE STREAM IMPACTS AND ECONOMICS OF RESIDENTIAL RECYCLING PROGRAMS

FOR A HYPOTHETICAL COMMUNITY OF 30,000 POPULATION

	Drop-Off Programs		Curbside Collection	Yard Waste Composting
	Limited Service	Full Service		
WASTE STREAM IMPACT				
Collection Rate (Annual)	69 tons per 10,000 population	260 tons per 10,000 population	70% participation of single-family homes; 60 lbs.per household per month	950 lbs per household Leaves and grass from single-family only; 80% participation
Total Recyclable Collection	207 tons/year	780 tons/year	1,890 tons/year	2,850 tons/year
Total Residential Waste Stream*	16,972 tons/year	16,972 tons/year	16,972 tons/year	16,972 tons/year
Percent of Residential Waste Recycled	1.2%	4.6%	11.1%	25.0%
PROGRAM ECONOMICS				
Annual Revenues	$13,505	$49,381	$134,170	$154,800
Annual Expenses	$19,900	$78,625	$157,560	$171,000
Net Program Balance	$ 6,395	$29,244	($23,390)	($16,200)
Cost per Ton	$ 30.89	$ 37.49	$12.38	$ 5.69
Annual Cost per Household	$ .64	$ 2.92	$ 3.11	$ 1.62

* Residential solid waste generation is estimated at 3.1 lbs per person per day.

CURBSIDE RECYCLING

A. OVERVIEW

The basic concept of a curbside project is straightforward. Residents place their recyclable material on the curb and organized collection crews pick them up and deliver them to a processing facility.

Although curbside recycling cannot solve all of our solid waste problems, many benefits can accrue from a properly managed program. It is the most convenient method of recycling for the residents of a community, and therefore the most effective way to remove materials from the waste stream. Some of the most successful programs are diverting 12 to 15 percent of their waste stream. This section is devoted to presenting a basic guide for the smooth planning and implementation of a curbside program.

Depending upon local markets, curbside recycling systems collect newspaper, mixed or color sorted glass, aluminum cans, corrugated cardboard, brown bags, some plastics, and used motor oil. They are most effective in areas of dense population with mostly single-family residences. Curbside systems are typically administered by a public agency, and collected by a franchised or licensed garbage hauler.

Because of the wide variations in the types of curbside collection systems, a standard costing is difficult to do. Some programs have simultaneous pickup of recyclables and regular refuse, others have separate pickup on different days or weeks. Many programs provide collection containers and effectively target one or several materials. No two programs are run exactly alike. Accounting procedures are as varied as the programs; cost estimates for communities and organizations considering a curbside program will have to be done on a case-by-case basis.

Communities with the greatest potential for curbside operations are those with their own franchised solid waste collection system which directly bears the cost to dispose of the collected waste. Those communities can realize the direct savings of avoided disposal costs through the private hauler system. The total cost of waste management service will not be reduced. The amount of increase may be moderated by the avoided cost of disposal but the basic residential service either replicates service or adds additional man hours to existing routes thus increasing total service costs.

Although a standard costing has not been developed, there is a reasonably applicable/transferable process for going

about the task of whether or not to expand existing program requirements. This involves conducting a market study (collection by itself is not recycling), a survey of public attitudes to determine how the residents in the community feel about such a program, and recommending the most economical type of collection system to use. Remember that the methods, facts, and figures, presented here only represent basic information which may differ from city to city and program to program. Utilization of the Model Plan included in this guide will help point the local government in the right direction toward a logical and effective collection system.

B. OPERATIONS

Public Relations

One of the most important aspects of curbside systems is their image in the public eye. A well planned public relations effort can go a long way in circumventing negative attitudes toward the program. The public will be responsible for separating, cleaning, and bundling the recyclables. Therefore, it is essential to gain their support and communicate with them regularly. If interest levels are high, the likelihood of system success is greatly increased. If interest levels are low, the program will be meaningless because the volume of waste diverted from other forms of disposal will be too small to justify the associated costs.

A sustained educational effort is necessary to enhance the chances of a high positive response. A strong public relations campaign should be started several weeks ahead of the first collection day scheduled after the implementation of new standards and requirements and must be continued throughout the program. Do not lose contact with the public. The need for a strong public relations campaign does not end with program's start up. Mailings, door hangers, posters, newspaper articles, and telephone contact have proven to be effective at the local level to remind citizens of pickup schedules and the correct way to package their recyclables. Many existing programs across the United States budget about $1.00 per eligible household per year for promotional campaigns. Efficiencies can be achieved in franchise zones by combining advertising efforts in cooperative programs in contiguous zones.

Collection Methods

The collection method chosen is one of the first and most crucial decisions to be made. The system used to pick up recyclables at the curb can vary significantly from town to town.

The following items must be considered when choosing the most economical method for pickup.

1. The number and type of vehicles needed to collect recyclables depends upon the population of the community and the types and amounts of material expected to be collected. Proven designs include modified packer trucks, flatbeds with gaylord boxes, modified pick-up trucks, trailers or bins on a gooseneck frame, and various types of customized recycling trucks. For planning purposes, it is estimated that one collection vehicle with a one person crew can handle 350 to 400 stops per eight hour work day.

2. The most successful programs provide containers to the homeowners for materials to be stored in and placed at the curbside for collection. Possibly one of the most important aspects of having a container system is that it is an excellent means of communicating the program's availability to individual households during their distribution. They are a constant reminder, throughout the program, for homeowners to save their recyclables. Each container, when placed curbside exerts considerable peer pressure on non-participating residents in single-family areas.

3. The scheduling of pickups can be accomplished in several ways. Programs that collect on the same day as trash pickup have greater participation. That approach is the easiest for residents because they only have to remember one collection day. Weekly pickup on days other than regular trash day can be an inconvenience, but may still achieve high participation rates if substantial promotion is carried out. Monthly or bi-weekly schedules tend to be confusing and require the resident to store material for long periods of time.

Material Storage Processing

Depending upon the local market requirements, a storage site may be needed where the recyclables can be processed or baled for sale. This storage site may also house a maintenance shop for storage and repair of the collection vehicle(s). Also, it may need to be equipped with a

forklift, a baler for corrugated and newspaper, a glass crusher, shipping containers, and a can sorter-smasher. Some equipment may be supplied by the markets. To avoid these costs many programs sell their materials to an already existing recycling center or vendor rather than directly to the processors. This reduces revenues, but eliminates the cost associated with processing. Estimated equipment costs are outlined in Appendix C.

Management and Labor

Curbside recycling is a labor intensive endeavor. Crew size should be limited. In most cases two person crews are all that is needed. Data suggests that a one person crew is the most efficient but requires greater capital investment.

Labor needed for processing is directly related to the market requirements. Most programs simply utilize the collection crews to sort and upgrade the material during collection. Other, larger programs may opt to employ staff for the crushing, baling and separating of the recyclables.

Many programs make use of existing management to carry out the administrative duties. Program management involves start-up and ongoing activities. More time is involved in the beginning of a program to hire personnel, equipment procurement, and designing efficient pickup routes. Ongoing activities include accurate record keeping, accounting procedures, and market procurement. Also, managing workers, trouble-shooting problems, and resolving customer complaints will be involved in a manager's time. The most successful programs tend to have well designed complaint resolution systems in place and excellent and well publicized communication programs for their customers.

C. COLLECTION RATES

Most recycling programs rely on voluntary cooperation of citizens to participate. Participation rates vary widely across the country. With a strong promotional campaign, containers and same day as trash collection, most curbside programs can expect participation rates to exceed 50 percent of the eligible households and expect 12 to 15 percent of the residential waste stream to be diverted. Many claim to have participation rates nearing 75 to 80 percent. Although participation rates, and consequently the percentages of the waste stream recycled, are directly related to effective promotional campaigns and system design, there are also indications that curbside projects achieve higher levels of recycling in areas of higher

income and educational levels and in communities with active environmental groups.

Well run and publicized programs have an average collection of around 60 pounds/household/month.

Other factors affecting participation rates are neighborhood demographics, seasonal variations, collection frequency, and the types of material collected. Winter is usually the slowest season for many programs. The evidence indicates that programs with weekly collection attract more participants than bi-weekly or monthly collection programs. Also programs that collect on the same day as trash pickup have greater participation.

D. PROGRAM ECONOMICS

The cost of a curbside project is most often the number one concern with people considering undertaking such a program. Curbside collection is the most costly of all recycling options, but with its added costs come many added benefits. Source separation represents a unique opportunity to reduce the waste volumes requiring disposal at the landfill, as well as reduce potential capital costs of future high-tech resource recovery programs. A curbside project can be implemented almost immediately compared to the time required to locate and develop a new landfill or time necessary to develop, procure, and construct a high technology waste management facility.

The common goal in a business operation is for income to exceed expenses, so that at a minimum, it will break even. Recycling should, however, be viewed as one disposal option and as such it should not be expected to show a greater profit margin than other waste disposal services any hauler provides.

A common misconception among residents in the community at large is that revenues from the sale of recyclables should offset all program expenses. But that preconception leaves much to be desired and is almost impossible to achieve. Major components often left out of recycling cost analyses are the avoided landfill tipping fees and the future value of the saved landfill space. Also, although difficult to determine are the reduced traditional collection expenses. It is not unreasonable to expect that the volume of waste collected will drop, resulting in lower operating costs for the refuse hauler. That will result in an estimated 8 to 12 percent savings on the unrecycled portion of the waste stream.

Therefore, when recycling is viewed as a waste disposal tool, the economics of a curbside collection program can compare favorably with those of traditional waste collection and disposal. On an ongoing basis, the operating costs for recycling would be similar to those for waste collection, i.e., labor, fuel, capital depreciation, etc.

If all of the factors are considered when estimating the cost of the curbside program, the final analysis must include all of the following.

Recycling Operating Cost
(capital depreciation + operating expenses)
minus
Avoided Tipping Fees (tons recycled x local tipping fee)
minus
Avoided Refuse Collection Expenses
minus
Future Value of the Saved Landfill Space
minus
Present and Future Value of Infrastructure Saving From Lower Use
minus
Revenues From the Sale of Recyclables
equals
NET PROGRAM COST (SAVINGS)

Obviously the avoided refuse collection expense, the infrastructure savings, and the future value of the saved landfill space cannot be readily calculated, but they are very real savings.

Operating Costs

Operating cost for recycling collection will vary according to local circumstances. A successful system must be adaptable to take advantage of favorable situations. While it is difficult to form a precise economic costing, the economic analysis presented here is designed to provide some guidance in understanding the initial start-up and operating cost associated with such a program as each local government evaluates franchise requirements and rate structures.

Following are the most significant requirements. Typical figures have been taken from actual program cost, but should still be viewed as only guidelines and not as precise program expenses. In many situations capital cost can be financed over a five year period and lower the initial outlay.

1. Collection Vehicles Collection units are probably the most expensive capital outlay for a new program. Cost for new equipment can range from $15,000 to $85,000 per truck. Reserve trucks are frequently a part of most hauler's truck fleet. Existing flatbeds and boxes may be used in the start-up of new programs. For planning purposes, one collection vehicle with a one person crew can handle 350 to 400 stops per day.

2. Labor As stated earlier, labor costs will have to be figured on a case-by-case basis. Most recycling systems utilize one person crews per collection vehicle.

3. Administration On the average, for every 10,000 eligible households, administrative duties require about 25 percent of a managers time.

4. Containers There are a variety of containers available, ranging from stackable boxes to plastic buckets to poly bags. A listing of available containers currently being tested in various pilot programs in the Metro area and a recent price list is in Appendix D.

5. Fuel The type of collection vehicle chosen and the topography of the hauler zone and vehicle maintenance will determine the amount of fuel used. As fuel prices are in a constant state of flux, costs will have to be evaluated for each program.

6. Insurance Liability, comprehensive insurance and employee insurance will have to be included in the analysis of franchise costs. Recycling operations are often classed with "scrap yards." Insurance and worker's compensations are keyed to this classification, which can often times appear to be unfair. Insurance companies have no category for recycling service coverage and may have to design new policies for such operations.

7. Promotion An integral part of any recycling program is an ongoing advertising campaign. In order to keep participation rates up a sustained education effort is necessary. A general rule may be to require a budget with a minimum of $1.00 per eligible household and encourage cooperative advertising among contiguous zones.

E. EXAMPLE

The following example is for a hypothetical municipality with 30,000 population. While it is difficult to be precise, this analysis can provide some guidance in understanding the overall economics of a curbside recycling program. Collection rates are presented in terms of 10,000 households, to allow for extrapolation to any community size.

Eligible Households and Material Collected

Assuming 75 percent of the households are single-family, 7,500 of them are eligible to participate in the program. With a 70 percent monthly participation rate, 5,250 households would be setting out their recyclables. Plastic milk jugs, newspaper, corrugated, tin cans, and glass will be collected. One curbside box will be furnished to all households. With an average of 60 lbs./household/month, this hypothetical curbside operation will collect 158 tons/month, or 1890 tons/year. The range of individual stops will be between 2,187 and 5,250.

Value of Materials Collected

To avoid the added costs of processing, material will be sold at a lower price to a local vendor.

Material	% of Recycled Waste Stream	Value/Ton	Ton/Year	Total Value
Newspaper	50%	$20	945	$18,900
Corrugated	18%	$35	340	11,900
Glass	13%	$40	245	9,800
Plastic	13%	$80	245	19,600
Ferrous	6%	$45	115	5,175
Total	100%		1,890	$65,375

With an average Metro tipping fee of $42/ton this program would have avoided $79,380 in disposal cost. Total revenues equal:

Material Value	$ 65,375
Avoided Costs*	79,380
TOTAL	$144,755

* Avoided costs account for avoided tipping fees, but do not include a value for saved landfill capacity, not do they anticipate increased system costs per ton due to lower volume at the gate.

EXPENSES

CAPITAL COSTS

Collection Vehicle (2) Hydraulic dump trucks	$ 50,000	-	$160,000
Back up Unit (1) 1-ton, hydraulic bed, tow truck	10,000	-	20,000
Trailers (2) 5-ton, container trailers	10,000	-	20,000
Bins (15) 2-3 C.Y. collection bins	4,500	-	6,500
Containers 7,500 residential collection containers	37,500	-	90,000
TOTAL	**$112,000**	**-**	**$291,500**

ANNUAL OPERATING COSTS

Collectors 2 collectors	$ 32,000	-	$ 40,000
Coordinator 25% administrator's time	7,000	-	10,000
Employee Insurance	5,000	-	7,500
Vehicle Liability Insurance	2,500	-	4,000
Fuel	2,200	-	5,000
Repairs	1,800	-	2,400
Container Replacement	2,000	-	3,000
Advertising and Promotion	15,000	-	25,000
Contingency	5,000	-	10,000
TOTAL	**$ 73,000**	**-**	**$106,900**

TOTAL PROGRAM COSTS

Capital Costs*	$ 36,086	-	$ 93,921
Operating Costs	73,000	-	106,900
TOTAL	**$109,086**	**-**	**$200,821**

* Capital cost amortized at 10% interest over 5 years.

Summary of Program Economics

Total Revenues	$144,755	- $144,755
Total Expenses	$109,086	- $200,821
Net Program Balance	$ 35,669	-($ 56,066)
Cost per Ton	$18.87	-($ 29.66)
Expense per Eligible Household per month	$ 1.21	$ 2.23

Summary

A successful curbside project can operate for $1.21 to $2.23 per eligible household per month and with a 70 percent participation rate, 11.1 percent* of the residential waste stream is being diverted from the landfill. Remember, the net program balance does not take into account the displaced refuse collection expenses or the future value of the saved landfill space.

* Total residential solid waste stream is estimated at 3.1 pounds per person per day (1987 survey data).

YARD DEBRIS COMPOSTING

A. OVERVIEW

Yard debris consists of grass clippings, leaves, pruning waste, wood chips, and other landscaping debris. It accounts for 10 to 20 percent of the municipal solid waste stream, depending on local conditions. Yard debris is an attractive target for programs designed to divert materials from landfills since it is already source-separated from the waste stream by homeowners, commercial landscape services, and municipal tree trimming programs.

Separate yard debris collection can also help level seasonal peaks which occur in overall solid waste collection. As a large, readily-separated, and easily-processed component of municipal solid waste, yard debris has been banned from landfills in several states and is subject to differential rates to encourage source-separation at the landfill in many other local governments.

Composting is a relatively simple process. It describes the biochemical process whereby microorganisms decompose yard debris and other organic wastes into a relatively stable, complex organic matrix. This matrix is high in humus content and rich in some types of nutrients essential for proper plant germination and development. The resulting compost, when applied as either a surface or sub-surface treatment to soil, becomes an integrated, vital component of a healthy soil ecosystem.

Because composting is a natural process, it can be carried out with only minimal management, if desired. Commercial scale composting requires a higher level of management. The level of management in the composting process is determined by the level of technology employed. In general, there are four (4) basic levels of technological management currently utilizes. These are:

1. Minimal-level technology composting.
2. Low-level technology composting.
3. Intermediate-level technology composting.
4. High-level technology composting.

Minimal-Level Composting

Minimal-level composting represents a very low cost approach. It requires less labor and capital than other levels of technology, but is more land intensive.

It is characterized by the use of large, static pile windrows which are turned once per year (static pile windrows mean that air is not forced through the pile mechanically). There is only minimal mechanical reduction of the feed stock (yard debris), if any at all, and the total production cycle may take two (2) or more years to complete. Windrows are typically twelve (12) feet high, twenty-four (24) feet wide and of variable length (determined by the length of the available land). Typically, the centers of these windrows heat up quickly and become anaerobic as the available oxygen is consumed. This transition from aerobic to anaerobic decomposition is marked by the generation of unpleasant odors. These odors frequently require substantial buffer areas (up to 1/4 mile between the compost rows and the surrounding area) around the composting operation to prevent complaints from neighbors.

Low-Level Technology Composting

Low-level technology composting is characterized by the use of smaller windrows, typically six (6) feet high, twelve (12) feet wide and of variable length (as above). It is more labor and capital intensive than minimal-level composting, but may require less land. The use of smaller windrows allows the centers of each to remain aerobic during the entire process. This allows for smaller buffer zones and lower overall land requirements. The windrows are turned, at least, quarterly and are frequently combined with other windrows as their volumes decrease. This process takes as much as eighteen (18) months to produce a reasonably stable compost product.

Intermediate-level Technology Composting

Intermediate-level technology composting is characterized by the use of small windrows, typically six (6) feet high, twelve (12) feet wide and of variable length (as above) which are turned frequently, about once per month. This approach is significantly more labor and capital intensive than low-level composting but requires less land overall. The use of smaller windrows and more frequent turning allows the centers of each to remain aerobic and significantly accelerates the completion of the composting process. This process also typically marks the first use of large mechanical reduction equipment. The mechanical reduction equipment typically consists of one or more pieces of equipment which is designed to reduce the size of the particles to be composted. A reduction in

size greatly accelerates the decomposition process and gives a higher quality compost product at the end. The entire composting process takes from twelve to eighteen (12 - 18) months to complete.

High-level Technology Composting

High-level technology composting includes two separate composting methods. The first resembles intermediate-level technology composting with the addition of forced aeration of the compost windrows. The addition of forced aeration greatly reduces the composting time, and may be supplemented by moisture control as well. The second methodology includes open and closed reactor composting. This approach uses a reactor vessel of some type which is designed to improve the rate of mechanical size reduction thus accelerating the composting process. Both methods frequently utilize sophisticated process control systems which continuously monitor the composting process.

For the purposes of this report, it has been assumed that the higher capital costs and levels of operational sophistication required by the aerated static pile and mechanical reactor methods will preclude their widespread use in local governments in the Metro area. The remainder of this chapter will focus on the operation and economics of low-rate windrow systems.

B. COLLECTION METHODS

Residential grass clippings are typically bagged and set out for weekly trash collection. However, labor costs for emptying these bags at the composting site may be prohibitive. A community of 30,000 population, three persons per household, and 75 percent single-family houses will generate about 15,000 bags of grass clippings per week, if every household sets out two bags. It has been suggested that the bags be mechanically broken open and the resultant bag pieces be left in the finished compost. Aesthetic considerations will limit the use of this method. The resulting compost is virtually worthless in the market.

Degradable plastic and "kraft" paper bags have been developed to collect grass clippings. These bags are relatively expensive (about $.20-$.30 each, versus about $.10 for standard trash bags). Current photo-degradable plastic bags require at least four month exposure to the sun before degradation begins. Some communities are considering the use of wheeled plastic carts for grass collection. The cost of the carts can be covered by a special monthly assessment on trash bills.

Leaves are also commonly bagged, but the bags present the same problems outlined above. Some communities mechanically collect leaves, after homeowners have raked them into the gutter. Special vacuum trucks are common, although problems have been reported with the pickup of wet leaves. Some operations push the leaves into front-end loader buckets or other equipment for loading into trucks.

New designs of "leaf-harvesting" equipment that are similar to hay rake/ blower systems in use in agriculture are currently being developed by several manufacturers. Recent developments in bag technology have pointed toward a system that could be used on a neighborhood basis. These bags are 3-5 cubic yard material bags that are easily picked up, dumped, and are reusable.

Brush, pruning waste, and other materials such as Christmas trees are usually collected on separate routes and chipped, either immediately with a towed chipper, or at a central compost site and a fee, less that the landfill tipping fee, is collected.

Backyard composting by homeowners is undoubtedly the most efficient approach to yard debris diversions, since it eliminates the need for organized collection. Currently, several communities have very sophisticated programs designed to distribute to residents a home compost unit. Each resident pays for the unit either in full or at a subsidized rate and in addition to the unit, receives instructions about building a functional back yard pile of compost. The success of these programs seems to be a function of the demographics of each locale.

C. AMOUNT OF YARD DEBRIS GENERATED AND COLLECTED

The amount of yard debris generated varies greatly from community to community, depending on such factors as population density and lot size, amount of multi-family housing, age of the community, and (not surprisingly) the number of trees. Further, yard debris amounts are difficult to quantify, since volumes and tonnages depend on the amount of compaction and the moisture content of the material.

Average values which have been reported in the Northwest, and appear suitable for planning purposes, are 750 pounds of grass clippings, 200 pounds of leaves, and 200 pounds of woody trimmings per household per year.

D. COMPOSTING OPERATION

Once yard debris has been collected, pruning waste and, sometimes, leaves, are ground or shredded to reduce the overall volume of material. Smaller particle sizes also speed the composting process. The various yard debris materials are then mixed together and formed into long windrows.

The windrows must be mixed (turned) on a regular basis to provide oxygen to the entire pile. The various materials in the windrow (grass, leaves, wood chips) should be thoroughly mixed to prevent matting of the grass clippings. Wood chips and leaves serve as bulking agents for the grass and, in turn, the high nitrogen and moisture levels of the grass promote rapid decomposition of the other materials. Regular turning of the windrow also prevents odor problems, which are caused by a lack of oxygen.

Many successful local government composting programs utilize front-end loaders, borrowed from the Public Works Department, to turn the windrows. These machines, however, do not effectively mix multi-material windrows. Specialized equipment, ranging from large, self-propelled units to smaller machines that are attached to tractors, have become more common in the last two years in local government compost operations.

The proper frequency for turning the windrow depends on local climate, type of materials being composted, and windrow size. Too-frequent turning will not allow adequate temperatures to build, and an inadequate turning schedule will lead to oxygen starvation of the pile. Temperature and moisture content of the windrow must be regularly monitored, with the windrow watered, if necessary, to ensure efficient operation.

The length of time required to produce finished compost may be controlled, to a certain extent, by the size of the windrow, type of materials included, and frequency of turning. For example, the leaf-composting program in Ramsey County, Minnesota generates finished compost after 18 months by turning the windrows only 3-4 times. More frequent turning can shorten the process length to 9-12 months.

On completion of the composting process, the material is sometimes passed through a screen to separate wood chips and other partially-decomposed pieces. The amount of finished compost will represent as much as an 80 percent reduction in volume of the original material.

The amount of land required for yard debris composting can be substantial. A rule-of-thumb for leaf-only operations is 3000 cubic yards per acre for unground leaves and 4500 cubic yards per acre for ground leaves. Communities may wish to consider joining with adjacent towns to operate a cooperative centralized compost program, and thereby lessen the total number of land parcels dedicated to composting.

Pathogens and weed seeds contained in "raw" yard waste are reported to be completely destroyed if windrow temperatures of at least 150 degrees fahrenheit are sustained for a minimum of three days. Also, several programs nationwide have tested their finished compost and found no traces of insecticides or inorganic fertilizer that may have been applied by homeowners or landscaping services.

E. ECONOMICS OF COMPOSTING PROGRAMS

Operating costs and revenues have been reported from a variety of programs across the country. Unfortunately, the wide range of both local conditions and reporting formats prevents an accurate assessment of "typical" program economics.

Expenses incurred for the collection of yard debris depend on the type of containers (if any) and equipment utilized. The most commonly-reported collection costs are in the range of $40-$50 per ton.

Compost operation costs include land, equipment purchase (grinders, screens, and turning machines), and labor (which varies with the frequency that windrows are turned). Shared ownership of large composting equipment and sites with neighboring communities should be carefully considered. Reported operating costs average about $10-20 per ton when facilities and land are shared.

Revenue sources for composting programs include the value of the end-product and the avoided cost of yard debris disposal. Finished compost is often used by local governments, agricultural interests or sold to local residents. It may also be sold to landscape contractors, golf courses, cemeteries, or used as final cover in landfill and road construction projects. There is no data available that suggests an inability to distribute all of the finished product to appropriate markets.

Avoided disposal costs for yard debris, unlike other recycled materials, are difficult to calculate. These savings should be calculated on the basis of the weight and/or volume of the yard debris collected, not on the amount of the finished compost.

F. EXAMPLE

The following analysis is an example of possible program economics and waste stream impacts for a leaf, wood trimmings, and grass clipping compost program for a hypothetical community of 30,00 population. The amount of yard debris generated by commercial services and municipal tree trimming is difficult to assess and not included here. The analysis assumes 10,000 total households, 75 percent of which are single-family residences, and an 80 percent participation rate.

Annual Generation Rate	Wood	Leaves	Grass	Total
Pounds per Household	200	200	750	1,150
Cubic Yards per Household	1.0 (Compacted)	0.5	5.5	7.0
Total Yard Debris Collected				
Tons per Year	600	600	2,250	3,450
Cubic Yards per Year	6,400	3,200	32,800	42,400

Expenses	Rate	Amount
Collected (1)	$50/ton	$172,500
Compost Operation	$10/ton	34,500
Total		**$207,000**

Revenue		
Compost Value (2)	$12/yard	$101,760
Avoided Tip Fee	$42/ton	144,900
Total		**$246,660**

ECONOMIC SUMMARY

Net Program Balance (3)	$39,660
Cost per Ton	$ 29.49
Cost per Household	
per year	$ 10.18
per month	$ .85

WASTE STREAM IMPACT

Yard Debris Collected	3,450 tons/year
Total Residential Waste Stream (4)	16,973 tons/year
Percent of Waste Stream Recycled	20.3%

LAND REQUIREMENT

Rule-of-Thumb	Process Length 1 Year	Process Length 2 Years	Range (1 yr. program)
3,000 yards/acre	1.2 acres	2.4 acres	0.9-3.6 acres
4,500 years/acre	1.8 acres	3.6 acres	1.3-5.2 acres

NOTES:

(1) Collection expenses do not include cost of special containers.

(2) Compost value assumes 80 percent volume reduction occurs.

(3) Commercially-generated yard debris and residential brush could be added to the program at little additional net cost, since these items do not cost much to collect, add only minimal extra operating costs, and result in significant avoided disposal costs.

(4) Assumes generation rate of 3.1 pounds per person per day.

SOURCE REDUCTION AND PURCHASING POLICIES

A. OVERVIEW

Solid waste management legislation established a hierarchy of waste management that puts source reduction at the top of the list. While source reduction is always ranked first in priority the other ranked programs have garnered more interest and funding. There are substantive efforts underway in several states and at Metro which should result in some valuable ideas for local governments to develop waste reduction programs of their own.

Cooperative programs have been established in some states that use an intern or administrative assistant for the purpose of completing waste minimization tasks through the use of audits and waste analysis. The programs focus on the concept of waste treatment (incineration, evaporation, compaction and landfill disposal). As such the programs target waste sources, not waste production, as a primary area where real savings can be realized.

Many of these programs have evolved from the source reduction component of the waste disposal hierarchy and have been predicated on keeping disposables out of the landfill. Attention in many local governments has focussed on reduction of toxicity levels rather than volume reduction in commercial and industrial applications. While each local government shall want to recognize the utility of industrial processes that lower toxic levels in the waste stream in addition to volume reduction, such an analysis requires the expertise of an industrial process engineer or a mechanical engineer. These approaches involve the examination of the waste flow at the source during the manufacturing phase where, in order to effectuate waste reduction, the industrial process is changed. On the local level the focus may be limited to a lower technology method that attempts to change waste disposal habits by suggestions developed after waste consultations or on site visits that tend to emphasize employee habits and actions that can be adaptable to recycling procedures. However, both methods can be intertwined with existing waste exchange programs.

B. OPERATIONS

Consultations

Waste disposal audits or consultations can be one of the first steps taken toward reducing the amount of waste generated for disposal in industrial, and retail, and

commercial environments. Ultimately waste audits ought to become a part of the planning process when a new business is proposed or sited. Provisions for recycling and source separated disposal habits can be included in building permits. These site considerations often have the positive benefit of causing a re-evaluation of the production process to find ways to reduce the amount of waste generated which can in some circumstances result in toxicity reduction as well.

Businesses that are encouraged to reassess the throw away mentality are often pleased to discover that substantial savings can accrue from reduced treatment costs, lower insurance liability, lower haul fees, reduced transportation costs, longer facility life and reduced storage needs. It is important to note that not only does a successful program require in-house logistical changes, but it requires in many cases a profound attitudinal shift in the accepted norms of behavior from the top down. Delegation of these tasks to an entry level custodian is not likely to produce substantial savings or process changes.

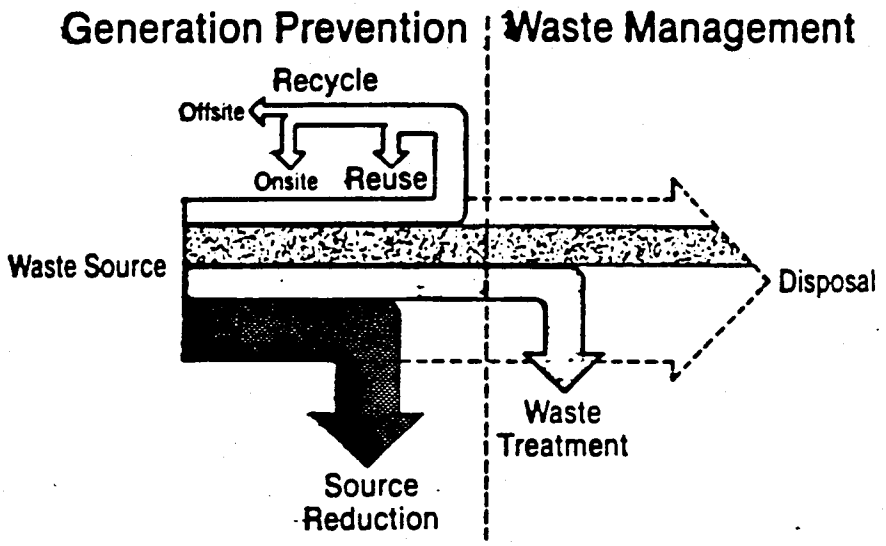
Metro provides free in-house consultations to businesses in the Metropolitan area. The consultations are strictly confidential. The consultation involves a one to two hour site visit to 1) evaluate the amount and type of wastes generated, to 2) identify recyclable materials, to 3) analyze facility layout and the origins of the waste, and to 4) review current collection and disposal procedures.

Following the site visit recommendations are made which are designed to quantify the current cost of service, reduce the amount of waste produced, establish recycling programs and reduce the cost of waste management services. The consultant also provides assistance with recycled product suppliers, implementation strategies and follow-up services to assess the savings the program generates.

Seminars

In 1990 each local government shall be invited by Metro to attend a waste consultation seminar. Waste managers will get hands-on instruction in techniques used in waste audits so the service can be distributed at the local level.

WASTE MINIMIZATION CHART



Purchasing Policies

Every aspect of waste management is ultimately dependent on "closing the loop." The collected, diverted, or reduced materials have to have either a market to be sold or a place where individuals and companies can buy them. Several local governments have passed some form of buy recycled legislation. The scope of current legislation ranges from the passive recognition of the value to society if recycled products are purchased to the more specific mandates that give preferential status to recycled content products.

Other types of related legislation include efforts to subsidize through grants and low-interest loans the development of new recycled content products that will use the material that the host local government is collecting. Tax credits and exemptions from sales and use taxes are becoming common as financial incentives for recycle industry development.

Government spending is about 20 percent of the gross national product. If each local government became a consistent end user of recycled products the increased

demand would encourage further development of recycled content industries. Metro is currently formulating model purchasing ordinances, purchasing policies, lists of suppliers and product lists that will be available to local governments in early 1990. Again, each local government shall be encouraged to participate in a series of planned workshops that will showcase recycled products. The array of items commonly used by cities and counties grows daily and includes many non-traditional commodities.

This area of waste management lends itself to substantive cooperative efforts among neighboring towns and villages to purchase, market and exchange products that at one time were destined for the landfill. Private initiatives often lag behind the public need in this endeavor because of the instability of the markets and the relative infancy of the industry. Local governments can provide the incubator for systems that will eventually become permanent partners in each community's industrial makeup.

COMMERCIAL AND HIGH GRADE RECYCLING

A. OVERVIEW

Paper and paper board account for 29 percent of the waste landfilled in the Metro region. This waste is made up of primarily four categories: corrugated cardboard (OCC); newspaper; high grade office paper (both ledger paper and computer print out); and mixed grade other paper. According to 1988 survey data 47 percent of OCC is recycled from the total waste stream, 34 percent of the high grade is recycled, and 6.6 percent of the mixed paper grades are recycled. The only bleak rate in the survey is in the newspaper category where, while 65 percent of the total waste stream is recycled, the price per ton does not cover the collection costs.

It is clear that recent landfill fee increases have augmented an already well established commercial recycling system in the Metro region. As noted earlier in the waste consultation discussion, those businesses that have clean source separated material can easily establish, in cooperation with their hauler, a simple collection system that diverts the waste paper component to a dedicated set of containers for delivery to local buyers.

The Metro waste paper recycling rate of 36.9 percent is well ahead of the national recovery rate of 29 percent. But in order to meet projected demand by the year 2000, the American Paper Institute says the United States recovery rate must be 54 percent. Therefore, as in other recycling systems, the opportunity is before each local government to coordinate local plans to assist the primary sources of waste paper to build on existing programs.

B. OPERATIONS

Type of materials

While there are over 50 identifiable waste paper grades, they can be grouped into four categories as noted above; corrugated cardboard, old newspaper, high grade, and mixed grade. Industry sources predict that the greatest increase in consumption will occur in old corrugated cardboard and newspaper.

Old newspaper is currently used in the manufacture of building products, packaging material (cereal boxbord) and newsprint. ONP use has increased an average of 11.4 percent per year for the last 16 years. To meet projected

demand by 2000 the rate of recycling will have to exceed 55 percent in the United States compared to 30 percent today. Since our local recovery rate is well above the average, the projected demand bodes well for local markets. In 1989, 360,000 tons of newsprint were made from ONP. In the next four years, with the installation of several new de-inking mills, it is expected that demand will increase by 5 to 6 million tons per year.

Old corrugated cardboard is recycled into liner board or the interior portion of cardboard box walls. Markets are growing for this component of the waste stream with 1.6 million tons of new capacity being built in the next three years.

The typical refuse from office environments makes up the bulk of what is known as high grade paper. Letterhead, copy paper, and computer printout is recycled into a variety of products including new copy paper, other printing papers, hand towels and tissue grades. These grades, when baled into their separate sort categories, can demand the highest prices. Like the other grades, demand for high grade is growing due in some part to an increased demand for recycled paper stock.

Mixed grade paper is the least recyclable paper grade at this time. The variety of types, colors and weights of these papers make them suitable for pressed mold paper products, insulation and other low impact uses. The lack of demand has caused some companies to market the mixed grades as pellets to be used as boiler or hog fuel. This grade of paper is still in demand in the export market and a modest three percent growth rate is projected over the next five years.

C. Collection Methods

As landfill costs have increased, businesses have sought to expand source separation habits. What was once delegated to the custodial staff as trash is becoming a valuable asset in today's markets. Large users of cardboard can arrange to have a dedicated collection container put in place by their waste hauler or, in some cases, by the paper buyer.

The custodial staff has to receive clear and repetitive instructions to emphasize the change in operations. Follow-up is essential after implementation to get the collection programs established. Without consistent clean

loads the material buyer will refuse shipment and the loads revert to refuse status.

Service providers who pick up from commercial and retail areas can set up routes that will result in clean high grade loads which will have a resale value at the broker's dock. Knowing the source of the material and grouping similar businesses together can accrue substantial savings to the hauler by allowing the hauler to continue to charge for the collection service but to not suffer the expense of the tip fee. In small quantities the hauler usually benefits from the revenues from the sale of material. The business will save by either a reduction in total service charges or by the avoidance of subsequent price increases. Depending on the size of the operation, arrangements can be made which benefit the customer and the hauler.

Collection of office paper material requires a more sophisticated system which involves a greater commitment by the host company. A collection container at every desk in the office encourages participation. The individual boxes can be self hauled to a central location, collected by the office recycling coordinator, or picked up separately by the custodial staff. Once accumulated in a central container the material can be baled if sufficient quantities exist or shipped loose to the paper buyer in drop boxes or gaylords.

D. Participation and Expected Results

A greater quantity of high quality material can be extracted from the waste stream by targeting commercial and retail areas at a lower increased cost than at any other point in the waste stream. The lack of progress in this area is a result of lack of information about available systems, techniques and markets. As the information void is filled, it is logical to assume that participation will increase in direct response to predicted increase in market capacity. Increased demand and a broader product line should help stabilize all paper grade prices at a significantly higher level. Better prices will make material recovery facilities more economically feasible causing broader changes in routes and diversion of high grade loads away from land disposal.

LIST OF APPENDICES

APPENDIX A

DENSITY OF COMMON RECYCLED MATERIALS

MATERIAL	DENSITY (pounds per cubic yard)
Aluminum cans, whole	74
Aluminum cans, flattened	250
Steel cans, whole	150-250
Steel cans, flattened	800-900
Glass bottles, whole	1,000
Glass bottles, slightly crushed	1,800
Glass bottles, well crushed	2,700
Newspaper, loose	500-600
Mixed paper, shredded and baled	750*
Plastic dairy bottles, whole	22
Plastic dairy bottles, ground	621
Plastic dairy bottles, baled	550*
Motor Oil	8 lbs/gallon

* Density of baled materials depends on baler specifications.

APPENDIX B

CAPACITY OF SELECTED STANDARD CONTAINERS

- 55 Gallon Steel Drum (0.27 cubic yard)

Aluminum cans, whole	20 lbs.
Aluminum cans, flattened	67 lbs.
Steel cans, whole	47 lbs.
Steel cans, flattened	230 lbs.
Glass bottles, slightly crushed	550 lbs.
Glass bottles, well crushed	800 lbs.

- 2.4 Cubic Yard Gaylord Container (approx. 4'x 4'x 4')

Glass bottles, slightly crushed	2.2 tons
Glass bottles, well crushed	3.4 tons
Plastic dairy bottles, ground	0.75 tons

- 20 Cubic Yard Roll-Off Bin (approx. 4'x 8'x 16')

Glass bottles, slightly crushed	18 tons
Glass bottles, well crushed	27 tons*
Aluminum cans, flattened	2.5 tons

- 40 Foot Semi-Trailer

Loose newsprint	18-22 tons**
Aluminum cans, flattened	8 tons

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* While this amount is possible, it may not be practical to pick up this quantity with typical roll-off equipment.

** Does not imply that the truck is full to the roof.

APPENDIX C

ESTIMATED EQUIPMENT COST FOR RECYCLING PROGRAMS

		New	Used
Gaylords	(4' x 4' x 4' containers)	$9.00	$ 4.50
Scales	Pallet Size	$ 5,000	$ 3,000
	2' x 2' Platform	$ 600	$ 250
	2' x 2' Digital	$ 1,500	$ 1,000
Glass Crusher	Bottle Buster	$ 600	N/A
	4 TPH	$ 3,000	$ 1,500
	12 TPH	$ 8,000	$ 4,500
Can Sorter/Separator		$10,000	$ 6,000
Balers	48" Downstroke	$ 7,500	$ 3,000
	60" Downstroke	$ 8,000	$ 3,500
	Small Horizontal	$40,000	$15,000
Forklift	1 Ton	$14,000	$ 7,500
	3 Ton	$20,000	$12,000
Handtruck		$ 75	$ 20
Paper Conveyor	40 feet	$15,000	$ 5,000
	8 feet	$ 3,000	$ 800

APPENDIX D

METRO SPONSORED HOUSEHOLD RECYCLING CONTAINER PROJECTS

FUNDING SOURCE AND LOCATION	CONSULTANT (HAULER)	NUMBER AND TYPE	ESTIMATED TIMELINE
I. SINGLE FAMILY HOMES			
A. PILOT PROJECT	KATHY CANCILLA		
1. CLACKAMAS COUNTY TEST - MILWAUKIE	(SUNSET)	(250) 3 BAGS	COMPLETION JANUARY 1990
2. MULTNOMAH COUNTY TEST - PORTLAND	(ALBERTA)	(250) 3 PAILS	"
3. WASHINGTON COUNTY TEST - CEDAR HILLS	(WALKER)	(250) 3 STACKERS	"
B. 1% FOR RECYCLING GRANTS			
1. PORTLAND	(TRUTTMAN, ALPINE, KAMPFER)	3,000 SINGLE BINS	DISTRIBUTE IN NOVEMBER
2. PORTLAND (PLASTICS ONLY)	KATHY CANCILLA, (PLASTICS PARTNERSHIP)	3,000 TWO BAGS	DISTRIBUTE IN _____
C. FIRST PHASE - COUNTY-WIDE DISTRIBUTION			
1. CLACKAMAS COUNTY	CARRIE HEATON (CCRDA)	60,000 SINGLE BINS	DISTRIBUTE IN APRIL 1990
II. MULTI-FAMILY HOMES			
A. PILOT PROJECT			
1. CLACKAMAS COUNTY - LAKE OSWEGO	CARRIE HEATON (ROSSMANS)	3 COMPLEX (IN OR OUTDOOR)	COMPLETION JUNE 1990
2. MULTNOMAH COUNTY - PORTLAND	ANN MCLOUGHLIN, JERRY BLAKE, (MULTIPLE HAULERS)	200 CMPLX (IN OR OUTDOOR)	COMPLETION JUNE 1990
3. WASHINGTON COUNTY - BEAVERTON	BETH ERLENDSON, JERRY BLAKE, LYNN STOKES (BEAVERTON, W. BEAVERTON SANITARY)	15 INDOOR SYSTEMS, 15 OUTDOOR SHELTERS	COMPLETION SEPTEMBER 1990
B. 1% FOR RECYCLING GRANTS			
1. PORTLAND	BOB BREIHOF (PRRO's)	50 OUTDR. SHELTERS	DISTRIBUTE IN _____
2. CLACKAMAS COUNTY (RETIREMENT AND MOBILE HOME PARKS)	CARRIE HEATON (CCRDA)	500 SINGLE BINS; 4 OUTDOOR SHELTERS, POSSIBLY BAG SYS.	DISTRIBUTE IN NOVEMBER

ESTIMATED CONTAINER COSTS

	Stackables (3)	Pails (3)	Bags (4.5)	Single Bin (17/18 gal)
5,000	R - 15.00	L^1 - 7.23	B^1 - 8.91	R - 5.59
	S - 17.25	L^2 - 8.13	B^2 - 16.91	P - 5.20
10,000	R - 14.22	L^1 - 7.17	B^1 - 8.91	R - 5.45
	S - 16.50	L^2 - 8.07	B^2 - 16.91	P - 5.05
30,000	R - 13.32	L^1 - 7.11	B^1 - 8.05	R - 5.35
	S - 15.75	L^2 - 8.01	B^2 - 16.05	P - 5.05
60,000	R - 13.02	L^1 - 7.05	B^1 - 8.05	R - 5.27
	S - 15.45	L^2 - 7.95	B^2 - 16.05	P - 4.95

KEY:

R=Rehrig Pacific (25% recycled resin)

S=Shamrock

L=Lettica; L^1=5 gal., L^2=6 gal.

B=Bag Connection (3 + 1.5 turn over; heavy duty);
B^1=without racks, B^2=with 2 w/m racks

P=Piper Casepro

APPENDIX E
REPORT FORMS

TO BE DEVELOPED IN JANUARY AND FEBRUARY 1990

APPENDIX F

INSTITUTIONAL PURCHASING POLICY ORDINANCES AND RESOLUTIONS

BEFORE THE COUNCIL OF THE
METROPOLITAN SERVICE DISTRICT

FOR THE PURPOSE OF ADOPTING A POLICY GIVING PREFERENCE TO THE PURCHASE OF RECYCLED PAPER AND PAPER PRODUCTS	))))	ORDINANCE NO. 89-280 Introduced by Rena Cusma, Executive Officer

WHEREAS, The Metropolitan Service District's Materials Markets Assistance Program of the 1986 Solid Waste Reduction Program identifies the need for institutions to support recycling programs through increased demand for products made from recycled materials; and

WHEREAS, When increased demand for products made from recycled materials is demonstrated, manufacturers will respond, thereby reducing disposal of these materials; and

WHEREAS, The public benefits since products made from recycled materials save virgin material resources, save energy, and reduce solid waste; and

WHEREAS, The State of Oregon ORS 279.729 to .739 and the Federal Resource Conservation and Recovery Act direct government procurement of products made from recycled materials; and

WHEREAS, Metro does not have guidelines pertaining to the agency's purchase of recycled paper products; now, therefore,

THE COUNCIL OF THE METROPOLITAN SERVICE DISTRICT HEREBY ORDAINS:

1. A new Section 2.04.075 "Purchase of Recycled Paper Products" is added to the Metro Code.

2.04.075 Purchase of Recycled Paper Products and Equipment that Uses Paper:

The following criteria and standards shall apply to the purchase of paper products and equipment that uses paper:

1. In all contracts and subcontracts the District shall prefer the purchase of recycled paper products with a 50 percent (50%) recycled content or the highest percentage of recovered material practicable, when practicable includes 1) performance in

accordance with applicable specifications; 2) availability at a reasonable price; 3) availability within a reasonable period of time; and 4) maintenance of a satisfactory level of competition.

2. The District shall allow a five percent (5%) price preference for the purchase of recycled paper products and attempt to purchase jointly with other agencies to reduce the cost of recycled paper products purchases.

3. Subject to subsection 8 below, paper product procurements for Solid Waste will specify recycled paper only.

4. The guidelines in (1), (2) and (3) above will apply in all cases except where specific printing quality requirements can not be met by recycled paper products. Joint purchases may be made with other agencies to reduce the cost of recycled paper product purchases. All recycled paper purchases shall require the manufacturer's certification and verification of recovered material content. The initiating Department shall assure compliance with the provision of ORS 279.739.

5. All recycled paper products purchases shall require the manufacturer's certification and verification of recovered material content.

6. All bids for new equipment and services shall include language that will ensure the use of recycled paper and paper products.

7. Metro shall phase in equipment and paper to facilitate the use of recycled paper products wherever practicable.

8. In instances where recycled paper and paper products may void existing warranties, service agreements, or contracts, recycled paper and paper products shall not be specified.

9. All contract printing shall allow a five percent (5%) price preference when using recycled paper.

10. The use of non-recyclable goldenrod and other very bright, hard-to-bleach colored papers shall be prohibited.

ADOPTED by the Council of the Metropolitan Service District this 9th day of February, 1989.

Sharron Kelley

Sharron Kelley, Deputy Presiding Officer

ATTEST:

A. Marie Nelson

Clerk of the Council

I certify this ordinance was not vetoed by the Executive Officer.

By: Gwen Ware-Barrett
Clerk of the Council

Date: 6/9/89

COMMITTEE REPORT

Agenda Item No. 6.1

Meeting Date Feb. 9, 1989

ORDINANCE NO. 89-280, AMENDING CHAPTER 2.04 OF THE METRO CODE TO INCLUDE A PURCHASING POLICY GIVING PREFERENCE TO THE PURCHASE OF RECYCLED PAPER AND PAPER PRODUCTS

February 1, 1989 Presented by: Councilor Gary Hansen

COMMITTEE RECOMMENDATION: At its January 26, 1989 meeting, members of the Internal Affairs Committee--Councilors Bauer, Collier, Knowles, Ragsdale and me--voted unanimously to recommend Council adoption of Ordinance No. 89-280.

COMMITTEE DISCUSSION AND ISSUES: At the Committee meeting Waste Reduction staff (D. Gorham) presented a revised ordinance from that originally introduced. The major revisions were as follows:

1. The ordinance was reformatted to comply with standards for presenting amendments to the Metro Code;

2. The "price preference" provision in subsection 2. was reduced from 10 percent to 5 percent to match State of Oregon requirements; and

3. In subsection 3 the Solid Waste Department is named specifically as a department to purchase only recycled paper except for certain circumstances.

The purpose of this ordinance is to have Metro, through its use of recycled paper, help create a demand for recycled paper products which, in turn, should lead to greater recycling efforts. The Committee inquired about Public Affairs' use of recycled paper since it does a lot of work for the Solid Waste Department. Waste Reduction staff indicated whenever practicable, Public Affairs would use recycled paper, but for certain uses such as pictures, recycled paper could not be used.

DEC:gpwb
89280

STAFF REPORT

CONSIDERATION OF ORDINANCE NO. 89-280 FOR THE PURPOSE OF ADOPTING A PURCHASING POLICY THAT GIVES PREFERENCE TO THE PURCHASE OF RECYCLED PAPER AND PAPER PRODUCTS

Date: January 25, 1988

Presented by: Bob Martin
Debbie Gorham

FACTUAL BACKGROUND AND ANALYSIS

In 1986 the Metropolitan Service District adopted the Solid Waste Reduction Program. This program includes a Materials Markets Assistance Program and an Institutional Purchasing Program, both of which encourage secondary material market development. Metro currently gives preference to goods or services that have been manufactured or produced in Oregon. Metro does not have any guidelines pertaining to the purchase of recycled products. The lack of demand for products manufactured from secondary materials (recycled) has been a disincentive to increased recycling.

Metro could support paper recycling programs and increase market demand for paper products made from recycled material by adopting a purchasing policy that gives preference to products with a 50 percent or greater recycled paper content. After Metro adopts regulations and guidelines for procurement of paper products made with a significant content of secondary material Metro can provide assistance to other institutions and agencies also wanting to purchase recycled paper products.

FINDINGS:

A comparative study of the price, availability and quality of recycled paper versus virgin paper was conducted to determine the economic feasibility of regular purchase of recycled papers. A survey of several local vendors revealed that recycled paper prices are on par with virgin paper prices. Recycled paper and virgin paper currently have similar delivery times. Recycled paper quality compares favorably with virgin paper.

The State of Oregon has successfully used recycled paper for 10 years and is one of 24 states with a purchasing preference similar to the one proposed for Metro. The Oregon Department of General Services uses recycled xerographic paper for copy machines and offset presses. This recycled paper, also available to Metro, is put on state price agreement only after testing and approval by the state printer.

Metro may purchase recycled paper on the state contract through the Multnomah County Central Stores because intergovernmental agreements are exempt from the competitive process through the Metro Code, Section 2.04.041, subsection (a) (1). Should Metro decide to purchase paper through the state contract, the recycled xerographic paper is currently less expensive than virgin paper.

EXECUTIVE OFFICER'S RECOMMENDATION:

In 1986, a committee of staff from various Metro departments executed a study of recycled versus virgin paper. The data from the 1986 study have been combined with new information and resulted in the following recommendations. I concur with these recommendations and further recommend their adoption with this ordinance.

1) Recycled paper products should be purchased if the price falls within 5 percent of the lowest bid price for acceptable virgin paper products.

2) All Solid Waste Department paper product purchases should specify recycled paper.

3) The use of recycled and recyclable material should be encouraged for RFQ, RFP, RFB and other bid respondents.

4) The use of non-recyclable goldenrod and other very bright, hard-to-bleach colored papers should be prohibited.

ATTACHMENT A: Contains the guidelines to correspond with the above recommendations.

This staff report has been printed on recycled paper that is equal to virgin paper in price, availability and quality.

ATTACHMENT A

Purchasing policy for recycled paper products. All persons purchasing supplies, materials, equipment or personal services shall:

(1) Review purchasing specifications currently utilized in order to eliminate, wherever feasible, discrimination against the purchase of recovered resources or recycled materials by:

(a) always securing a bid for recycled paper for formal contracts (purchases over $15,000).

(b) when practicable[1] , securing a bid for recycled paper for all informal contracts (under $15,000).

EXCEPTIONS to above applies to:

(a) Paper product procurements for the Solid Waste Department will specify recyled paper only, except in instances where recyled paper and paper products may void existing warranties, service agreements, or contracts.

(b) purchases where specific printing quality requirements can not be met by recycled paper products.

(2) Develop purchasing practices which, to the maximum extent practicable, assure purchase of materials that are recycled or that may be recycled or reused when discarded. This includes purchase of food containers for special functions. Where practicable, beverage containers and plates shall be made from recyclable fibers.

(3) In performance of contract work use and require contractors to use recycled paper products to the maximum extent practicable.

(a) Encourage RFQ, RFP, RFB and other bid respondents to use recycled paper to the maximum extent practicable, or paper that may be recycled or reused when discarded.

(b) Do not purchase or promote the use of goldenrod and other very bright, hard-to-bleach colors that are not recyclable.

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[1]Practicable: The EPA and Congress have provided four criteria for determining the maximum amount practicable: "1) performance in accordance with applicable specifications; 2) availability at a reasonable price; 3) availability within a reasonable period of time; and 4) maintenance of a satisfactory level of competition."

Preference for recycled materials. Notwithstanding established contract award provisions requiring Metro to enter into contracts with the lowest responsible bidder, any person charged with the purchase of materials and supplies for any public use may give preference to the purchase of materials and supplies manufactured from recycled materials.

(1) A person may give preference to materials and supplies manufactured from recycled materials if:

(a) The bids of the persons or manufacturing concerns supplying the recycled materials, or the prices quoted by them, do not exceed by more than five percent the lowest bid or prices quoted by persons and manufacturing concerns offering non-recycled materials.

(b) materials meet specifications

Guidelines and procedures to encourage paper conservation. Metro staff shall encourage paper conservation.

Departments shall develop procedures to eliminate unnecessary paper use including, but not limited to, over purchase of paper, overprinting of materials, one sided printing, purchase of too high a grade of paper, purchase of paper that is not recyclable and purchase of virgin paper when recycled paper is available in the same grade.

BEFORE THE COUNCIL OF THE
METROPOLITAN SERVICE DISTRICT

FOR THE PURPOSE OF ADOPTING A POLICY FOR THE METROPOLITAN SERVICE DISTRICT REQUIRING THE PURCHASE OF YARD DEBRIS COMPOST AND SEWAGE SLUDGE COMPOST	))))	ORDINANCE NO. 89-303 Introduced by Rena Cusma Executive Officer

WHEREAS, The Metropolitan Service District's Institutional Purchasing Program of the 1986 Solid Waste Reduction Plan identifies the need for institutions to support recycling programs through increased demand for products made from recycled waste materials; and

WHEREAS, the adoption of a procurement policy that requires the purchase of recycled waste soil amendments will provide a model for other governments and businesses in the region; and

WHEREAS, Public agencies and businesses in the region will respond to a recommended product preference for yard debris compost and sewage sludge compost by increasing their demand for these recycled waste soil amendment products and decreasing their demand for soil amendment products; and

WHEREAS, Yard debris represents 10.5 percent of the waste stream in the region; and

WHEREAS, The impact of the Environmental Quality Commission's Opportunity to Recycle Yard Debris Rule will be an increase in the supply of yard debris to processors in the region and, presumably, an increase in the supply of yard debris compost for which greater demand must be created; and

WHEREAS, Successful implementation of the regional Yard Debris Plan depends upon secure markets for yard debris compost; and

WHEREAS, Procurement policies for recycled waste soil amendments would facilitate development of recycled waste compost markets--primarily homeowners, landscapers and nurseries; and

WHEREAS, Yard debris compost and sewage sludge compost are priced roughly equal to or less than virgin soil amendments used for equivalent purposes; and

WHEREAS, Oregon Revised Statutes 279.733 and 279.739 and the Federal Resource Conservation and Recovery Act, Section 6002, of 1976,

and the Hazardous and Solid Waste Amendments of 1984 direct government to procure products made from recycled waste materials; and

WHEREAS, The Metropolitan Service District, has guidelines pertaining to the purchase of recycled waste soil amendments but lacks a purchasing policy for these products; now, therefore,

THE COUNCIL OF THE METROPOLITAN SERVICE DISTRICT HEREBY ORDAINS:

That Section 2.04.010 Definitions be amended to include the following:

(l) FUNCTIONALLY EQUIVALENT -- Refers to items having the same or substantially similar end use.

(m) FUNCTIONAL REQUIREMENTS -- Include: performance criteria, contents standards (if indicated by human and plant health considerations), quantity or proportion limits for specific uses, size and type of compost or compost blend required, cost, or any substantially equivalent method to maximize the purchase of recycled waste compost.

(n) ORGANIC SOIL AMENDMENTS -- Are products with any of the following uses: soil mix component, propagation, container mixes, field crop amendments, mulch, soil top dressing, substitute for gravel, soil structure improvement, mud control, erosion control, and landfill cover and weed control.

(o) PRACTICABLE -- Capable of being used consistent with: performance in accordance with applicable specifications, availability at a reasonable price, availability within a reasonable period of time, and maintenance of a satisfactory level of competition.

AND that Section 2.04.076 "Purchase of Soil Amendments" be added to the Metro Code as follows:

The following criteria and standards shall apply to the purchase of yard debris compost and sewage sludge compost (recycled waste compost products:

ALL METRO personnel, when purchasing organic soil amendments shall:

(1) Review organic soil amendment specifications in accordance with Yard Debris Compost and Sewage Sludge Compost Procurement

Guidelines for Business and Governments, attached hereto and included by reference herein, for the purpose of eliminating:

(a) Any exclusion of recycled compost products, and

(b) Any requirement that organic soil amendments, or functionally equivalent products, be manufactured from specific materials other than yard debris compost and sewage sludge compost, unless there is a basis for such exclusion or requirement that is related to technical considerations or proven risk to plant health or human safety.

(2) Develop specifications for recycled compost products and blends requiring the purchase of recycled compost products to the maximum extent practicable.

(3) Include recycled waste compost products in all requests for proposals and bid solicitations for organic soil amendments or functionally equivalent products.

(4) Require METRO gardeners, contractors and sub-contractors to purchase recycled waste compost products when purchasing organic soil amendments and when such product:

(a) Meets functional requirements for specific applications, and

(b) Meets acceptable content standards for the application involved when human and plant health are involved, and

(c) Contains the maximum amount of yard debris compost and/or sewage sludge compost among the choices available.

(5) Seek opportunities to purchase recycled waste compost on an annual contract basis to maximize the amount of compost purchased.

(6) Purchase recycled waste compost on a case-by-case, or experimental basis, while gathering information about recycled waste compost products under the following conditions:

(a) In cases where public and plant health and safety are not an issue and relevant content information is not available,

(b) Product is free,

(c) Product is not consistently available, and

(d) Standards for particular contents information are not established.

(7) Exert continuing effort to find appropriate uses for products excluded from procurement.

(8) Conduct annual reviews of procurement practices and eliminate those which would inhibit or preclude use of recycled compost products.

(9) Not require purchase of recycled waste compost in applications where a risk to plant or human health or safety has been established by reliable testing and test interpretation.

ADOPTED by the Council of the Metropolitan Service District this 12th day of October, 1989.

Gary Hansen, Deputy Presiding Officer

ATTEST:

Gwen Ware-Barrett
Clerk of the Council

I certify this ordinance was not vetoed by the Executive Officer.

Gwen Ware-Barrett 10/26/89
Clerk of the Council Date

HSS:aey
SW89-303.ORD
October 16, 1989

SOLID WASTE COMMITTEE REPORT

ORDINANCE NO. 89-303, FOR THE ADOPTION OF A MODEL PURCHASING POLICY FOR THE METROPOLITAN SERVICE DISTRICT REQUIRING THE PURCHASE OF YARD DEBRIS COMPOST AND SEWAGE SLUDGE

Date: October 4, 1989 Presented by: Councilor Gary Hansen

Committee Recommendation: The Solid Waste Committee voted 4 to 0 to recommend Council adoption of Ordinance No. 89-303. Voting: Councilors Hansen, Buchanan, DeJardin and Wyers. Absent: Ragsdale. This action taken October 3, 1989.

Committee Discussion/Issues: The Solid Waste Committee held a public hearing on September 19, 1989. No one from the public testified.

The Committee requested that the Solid Waste staff make Exhibit A a part of Ordinance No. 89-303 and make other changes to make the ordinance more clear.

Another public hearing was held on October 3, 1989. No one testified.

The Solid Waste staff pointed out that the proposed ordinance requires Metro gardeners, contractors and sub-contractors to purchase recycled waste compost products when purchasing organic solid amendments and when such product meets specific requirements and standards. Other public agencies and businesses are not required to follow the proposed model/guidelines but are encouraged to do so to reduce the amount of waste going to the landfill.

The Committee made Exhibit A (Yard Debris Compost and Sewage Sludge Compost Procurement Guidelines for Business and Governments) a part of the ordinance.

There were no issues or further questions raised. The Committee voted to recommend adoption of Ordinance No. 89-303.

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EXHIBIT "A"

YARD DEBRIS COMPOST AND SEWAGE SLUDGE COMPOST PROCUREMENT GUIDELINES FOR BUSINESS AND GOVERNMENTS

I. General

A. Purpose

The purpose of this guideline is:

1. To designate recycled waste compost as procurement items.

2. To assist agencies and businesses in the Metropolitan Service District with program development for recycled waste compost procurement.

3. To encourage adherence to and consistency with the meaning and intent of Section 6002 of the Resource Conservation and Recovery Act (RCRA) of 1976, the Hazardous and Solid Waste Amendments of 1984, Oregon Revised Statutes 279.733 and 279.739, and the Institutional Purchasing component of METRO's Waste Reduction Plan.

B. Designation

METRO designates yard debris compost and sewage sludge compost as items which are produced from recycled waste materials (i.e., yard debris and sewage sludge) and whose procurement by procurement agencies in the region will carry out the objectives of section 6002 of the Resource Conservation and Recovery Act (RCRA) of the United States, Oregon Revised Statutes 279.739, and the Institutional Purchasing component of METRO's Waste Reduction Plan.

C. Applicability

1. This guideline is intended as a recommendation to all procurement agencies, both public and private, within METRO's jurisdiction and all procurement actions involving organic soil amendments or conditioners.

2. This guideline applies to all contractors and sub-contractors of the Metropolitan Service District when purchasing organic soil amendments.

3. This guideline applies to purchases which are the direct result of a contract, grant, loan, funds disbursement, or agreement with a procurement agency.

D. **Definitions**

As used in this guideline:

"Compost" is a relatively stable decomposed organic material, often used for soil enrichment or conditioning.

"District" means the area or region defined by the geographic boundaries of the Metropolitan Service District.

"Functionally equivalent" refers to items having the same or substantially similar end use. Soil amendments or conditioners that are the functional equivalents of recycled waste compost products include those with any of the following uses: soil mix component, propagation, container mixes, field crop amendments, mulch, soil top dressing, soil structure improvement, mud control, erosion control, weed control. Although one compost may be preferable to another in a given application, yard debris compost and sewage sludge compost are considered to be functionally equivalent to the following product types and materials: bark dust, peat moss, soil mix, container mix, Milorganite, sawdust, mushroom compost and gravel.

"Mulch" is a covering that is spread on the surface of the soil to protect the soil from evaporation, erosion, soil crusting and freezing.

"Organic soil amendment" refers to a soil amendment derived from living or once-living organisms. See "Soil amendment" below.

"Practicable" means capable of being used consistent with: performance in accordance with applicable specifications, availability at a reasonable price, availability within a reasonable period of time, and maintenance of a satisfactory level of competition.

"Procurement agency" means any regional, city and county governmental unit, public commission, political subdivision or business located within the Metropolitan Service District boundaries.

"Recycled waste compost products" refers specifically to yard debris compost and sewage sludge compost as soil amendments made from recycled waste material.

"Sewage sludge compost" is compost made from dewatered sewage sludge, combined with sawdust, and subjected to controlled biological process for 22 days and temperatures at 65 degrees centigrade for three days, during which process it converts to compost.

"Soil amendment" is any material added to the soil which results in an improved condition of the soil chemistry or pH such as compost, mulch, peat and fertilizer.

"Soil conditioner" means any material added to the soil which results in an improvement to the physical soil structure, soil aeration, and water-holding capacity.

"Specification" means a description of the technical requirements for a material, product, or service that includes the criteria for determining whether these requirements are met. In general, specifications are in the form of written commercial designations, industry standards, and other descriptive references.

"Top dressing" is a covering of compost, fertilizer or other material that is spread on the soil without being plowed under.

"Virgin materials" are the supply of primary or natural resources, not made by man, that are used for making goods.

"Yard debris compost" means grass, weeds, leaves and woody material blended and decomposed under controlled conditions to produce a rich organic compost.

II. <u>Procurement Program</u>

A. METRO recommends that within one year of the effective date of this guideline, each procurement agency that procures organic soil amendments or conditioners establish a procurement program for the purchase of recycled waste compost to the maximum extent practicable and eliminate from its specifications any exclusion of the purchase of recycled waste compost.

B. A comprehensive procurement program would include the following:

1. Specifications;
2. Promotion program;
3. Procedures for estimation, certification, and verification;
4. Procedures to conduct an annual evaluation of the procurement program.

C. METRO is not required to develop or implement a procurement program for any agency but itself. Each business and government located and operating within the District is encouraged to develop its own procurement program. Technical assistance with procurement program development is available from METRO.

III. Specifications

A. Revisions of Existing Specifications

Metro recommends that within six months of their first awareness of this guideline, all businesses and governments within the region eliminate from their specifications any exclusion of yard debris compost and sewage sludge compost and any requirement that organic soil amendments, soil mixes, container mixes, mulch, top dressing, soil conditioners, or other functionally equivalent products be manufactured from virgin materials, unless there is a basis for such exclusion or requirement that is related to plant or human health, e.g., food crop applications involving sewage sludge compost, safety or technical considerations.

B. Development of New Specifications

1. METRO recommends that within six months after the effective date of this guideline, each procurement agency, whether public or private, develop specifications requiring the use of recycled waste compost to the maximum extent practicable without jeopardizing the intended end use of these items.

2. Specifications should include the functional requirements of the composts to be procured including:

   (a) Performance criteria, and

   (b) Contents standards (if indicated by human and plant health considerations), and

   (c) Quantity or proportion limits for specified uses, and

   (d) Size and type of compost or compost blend required, and

   (e) Cost, or

(f) Any substantially equivalent method to maximize the purchase of recycled waste compost.

3. In applications where human or plant health and safety might be significant factors, METRO recommends the establishment of contents standards based upon appropriate testing and laboratory analysis.

4. Contents standards should be based upon the following:

   (a) Maximum and minimum nutrient level,

   (b) Maximum pesticide content,

   (c) Presence of weed seeds,

   (d) Maximum pathogen content,

   (e) Presence of toxicity,

   (f) Presence of heavy metals,

   (g) Reasonable and appropriate detection limits,

   (h) And any other criteria which may be determined to have a significant impact on human or plant health and safety, and for which test results exist.

5. If particular applications involve plant or human health and safety considerations and therefore indicate a need for contents testing of the compost products, procurement agencies should either have the product(s) tested by a laboratory qualified to provide compost testing, or ask the manufacturer of the product(s) for past test results, or both.

6. If no product can be obtained that meets maximum content standards, procurement agencies should re-evaluate their maximum content standards with a view to encouraging the purchase of recycled waste compost.

7. If contents testing is desirable when specifying particular jobs and content information is not available, a case-by-case approach to testing is recommended. Under such circumstances, procurement agencies should obtain a sample of the

desired product, have it tested and analyzed by a reliable laboratory, and evaluate the purchase on the basis of such testing.

8. Procurement agencies may consult with laboratories, the Oregon State University Extension Offices, and the Metropolitan Service District relative to desirable detection limits and contents standards for particular applications.

9. Procurement agencies should document detection limits and contents standards for specific applications and incorporate them into their specifications on an on-going basis.

10. These recommendations do not assume or imply that yard debris compost and sewage sludge compost are identical in origin or content.

C. Contract Awards

1. All other things being equal, contract awards should be made when the recycled waste compost product:

   (a) Meets functional requirements for the application involved;

   (b) Meets acceptable content standards, if human and plant health considerations may affect the application involved;

   (c) Contains the maximum amount of yard debris compost and/or sewage sludge compost;

2. A contract award should not be made for a product when a risk to plant or human health has been established by reliable testing and test interpretation for a particular application.

3. In situations where there is a choice among compost product blends, it is desirable to award the procurement to the supplier of the product with the maximum amount of recycled waste compost.

4. METRO recommends that procurement agencies seek opportunities for procurement of recycled waste compost on an annual contract basis to maximize the amount of compost purchased.

5. Continuing effort should be exerted to find appropriate uses for products excluded from procurement.

D. Case-by-Case Contract Awards

1. The case-by-case approach allows a procurement agency to award a contract for a product under the following conditions:

   (a) In cases where public and plant health and safety are not an issue and relevant content information is not available,

   (b) Product is free,

   (c) Product is not consistently available, and

   (d) Standards for particular contents information are not established.

2. Case-by-case contract awards allow the purchase of recycled waste compost products on:

   (e) An experimental basis while procurement agencies gather information about recycled waste compost products and markets, and

   (f) Other than an annual contract basis.

E. Documentation

1. If a procurement agency is unable to implement one of the elements of this section, documentation of the reasons will establish a purchasing history and record of compliance for the procurement agency.

2. METRO recommends that procurement agencies record the following information for each procurement:

   (a) Type, size and quantity of compost;

   (b) Whether plant or human health and safety was involved in the application;

   (c) Documentation of test results to verify that plants or people are at risk from use of specified recycled waste compost on given application;

   (d) Cost per cubic yard;

(e) The reason for failing to procure yard debris compost or sewage sludge compost if a virgin soil amendment was procured.

F. **Acceptable Limitations**

1. Procurement agencies may elect to not purchase recycled waste compost if and when the following acceptable limitations or conditions exist:

   (a) Unsatisfactory level of competition;

   (b) Unavailability within a reasonable period of time;

   (c) Inability to meet the specifications in the invitation for bids;

   (d) Unavailability at a reasonable price.

2. In the face of acceptable limitations, it is recommended that procurement agencies continue to try to implement the terms and conditions of this guideline.

G. **Periodic Reviews**

Procurement agencies should conduct periodic reviews of procurement practices eliminate those which would inhibit or preclude use of recycled waste compost.

IV. Promotion Program

Procurement agencies should develop promotion programs to promote the preference program. The Metropolitan Service District recommends, at a minimum, use of the following methods:

A. Place a statement in a newspaper of general circulation in the region describing the preference program.

B. Describe the preference program in organic soil amendment procurement solicitations to bid.

C. Discuss the preference program at bidder's conferences.

D. Inform industry trade associations about the preference program.

V. Procedures for Estimation, Certification, Verification

To provide for awareness and fulfillment of recycled waste compost procurement policies and contracts, it is advisable to establish estimation, certification and verification procedures as follows:

A. Require vendors who supply yard debris compost and sewage sludge compost to procurement agencies to estimate the quantity (in cubic yards) to be supplied, and maintain a record of the estimates for specified jobs for a 3-year period.

B. Require vendors to sign a statement certifying the amount of yard debris compost or sewage sludge compost contained in the product supplied and the percentage of the total soil amendment products used in the job.

C. Require vendors to sign a statement certifying the maximum contents for (i) nutrients, (ii) pesticides, (iii) weed seeds, (iv) pathogens, (v) toxicity, and (vi) heavy metals, based upon the most recent contents test results available.

D. Establish reasonable procedures to verify that estimates and certifications of the quantity of recycled waste compost used on each project.

VI. Annual Evaluation

An annual evaluation of the effectiveness of the recycled waste compost preference program will facilitate the use of yard debris compost and sewage sludge compost to the maximum extent practicable. METRO recommends that the evaluation include the following items:

A. The quantity (by cubic yards) of recycled waste compost purchased.

B. An assessment of the effectiveness of the promotion program.

C. An assessment of the remaining barriers to procurement of recycled waste compost to determine whether they are internal (e.g., resistance to use) or external (e.g., unavailability, lack of acceptable product for the job to be performed).

D. Procedures to gather statistics to monitor the following:

1. Comparative price information on competitive procurements;

2. The quantity of each item procured over a fiscal year;

3. The availability of sewage sludge compost and yard debris compost to procurement agencies;

4. Type of performance tests conducted, together with the type of recycled waste compost that failed the tests, the percentages of all virgin soil amendments and recycled waste compost procured, respectively, that failed each test, and the nature of the failure.

5. Agency experience with the performance of recycled waste compost.

E. It is desirable for procurement agencies to prepare reports on the effectiveness of their procurement programs and make these reports available to the public. The reports should contain the following information:

1. A discussion of the procurement agency's approach to procurement recycled waste compost to the maximum extent practicable. Data compiled on price, availability and performance, estimate comparisons and certifications should be covered.

2. Documentation of specification revisions made during the year.

3. Documentations of changes in maximum contents standards.

4. If a case-by-case approach or equivalent alternative is used, a discussion of how the procurement agency's approach procures sewage sludge compost and/or yard debris compost to the maximum extent practicable. The basis for this review should be data compiled on content, price, availability, performance, as well as comparison of estimates and certifications provided by vendors.

5. Maximum contents standards should be evaluated in terms of the prospect of raising or lowering or remaining constant for specified uses. The basis for this evaluation should be a review of the data compiled on contents, price, availability, performance, and comparison of estimates and certifications provided by vendors.

VII. Procurement Program Implementation

Procurement agencies should:

A. Review and revise their specifications within six months of the date of their first awareness of these guidelines.

B. Establish procurement programs within one year of their first awareness of these guidelines is desirable.

C. Initiate procurement of yard debris compost and sewage sludge compost within one year of a procurement agency's first awareness of these guidelines is desirable.

D. Conduct periodic monitoring and an annual evaluation of the procurement program.

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GLOSSARY

GLOSSARY of Selected Solid Waste Terms

Aeration - The process of exposing bulk material, such as compost, to air.

Aerobic - A biochemical process or condition occurring in the presence of oxygen.

Air Classification - A process in which a steam of air is used to separate mixed material according to size, bulk density and aerodynamic drag of the pieces.

Anaerobic - A biochemical process or condition occurring in the absence of oxygen.

AOR - Association of Oregon Recyclers.

Avoided Cost - Costs not incurred because of diversion of waste from a landfill (e.g., disposal, environmental, and opportunity costs).

BACT - Best Available Control Technology.

Baler - A machine used to compress recyclables into bundles to reduce volume.

Biodegradable Materials - Waste material which is capable of being broken down by microorganisms.

Biodegradable Plastic - Plastic that can be broken down by microorganisms such as bacteria and fungi; as generally used, the term does not necessarily mean complete degradation into carbon dioxide and water.

Bottle Bill - A law requiring deposits on beer and soda containers (see Container Deposit Legislation).

Broker - One who acts as an agent or intermediary buying and selling recyclable materials.

BTU (British Thermal Unit) - The quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit.

Bulking Agent - A material used to add volume to an active agent, so it is more porous to air flow.

Bulky Waste - Large items of refuse including, but not limited to, appliances, furniture, large auto parts, non-hazardous construction and demolition materials, trees, branches and stumps which cannot be handled by normal solid waste processing, collection and disposal methods.

Buy-Back - A facility that pays individuals for recyclable materials and further processes them for market.

Capture Rate - Tonnage of recyclables collected, divided by total tonnage of municipal solid waste generated by participating households or commercial establishments.

CERCLA - Comprehensive Environmental Response, Cooperation and Liability Act. (Superfund)

Cocomposting - Simultaneous composting of two or more diverse waste streams.

Codisposal - Disposal in one area of two or more types of solid waste, for example, unprocessed municipal solid waste and incinerator ash in a landfill.

Cogeneration - Production of both electricity and steam at one facility, from the same primary fuel source.

Collection - Gathering of municipal solid waste for subsequent management (i.e., landfilling, incineration, or recycling).

Collection System - The total process of collecting and transporting solid waste. It includes storage containers, collection crews, vehicles, equipment, and management and operating procedures. Systems are classified as municipal, contractor or private.

Commercial Waste - Waste materials originating in wholesale, retail or service establishments such as office buildings, stores, markets, theaters, hotels, and warehouses.

Commingled Materials - The mix of several recyclables collected in one container.

Commingled Recyclables - Recyclable materials separated from mixed municipal solid waste at the point of generation; further separation into individual components occurs at collection vehicle or centralized processing facility.

Compactor - Power-driven equipment used for compressing and distributing wastes or recyclable materials to reduce their volume.

Compost - Relatively stable decomposed organic material; the result of the composting process.

Composting - biological decomposition of solid organic materials (e.g., yard debris, paper) by microorganisms (mainly bacteria and fungi); "compost" is the humus- or soil-like product.

Construction and Demolition Waste - Building materials waste, dredging materials, grubbing waste and rubble from construction, remodeling, repair or demolition of buildings, bridges, pavements and other structures.

Container Deposit Legislation - Laws that require monetary deposits to be levied on beverage containers where money is returned to the

consumer when the containers are returned to the retailer, often called "Bottle Bills."

Contaminant - Foreign material that makes primary or secondary material impure and reduces or eliminates its recycling value.

Cost Savings - The monetary savings realized through waste reduction and recycling as a result of avoiding landfill or other disposal processes; sometimes referred to as "avoided cost."

Cullet - Clean, generally color-sorted, crushed glass used to make new glass products.

Curbside Collection - Programs where recyclable materials are collected at the curb, often from special containers, to be brought to various processing facilities.

Decomposition - Breaking down into component parts or basic elements.

Demand-Limited Materials - Secondary materials for which buyers are relatively scarce even though supplies may be available.

Densified Refuse-Derived Fuel (d-RDF) - A refuse-derived fuel that has been processed to produce briquettes, pellets, or cubes.

Detinning - Recovering tin from "tin" cans by a chemical process which makes the remaining steel more easily recycled.

Dioxins - A family of chlorinated chemicals, some of which are toxic to animals under certain exposure and dosage conditions.

Diversion Rate - A measure of the amount of waste material being diverted for recycling compared with the total that was previously thrown away.

Drop-Box Container - A large waste container that fits onto a tractor trailer that can be dropped off and picked up hydraulically.

Drop-off Center - A method of collecting recyclable or compostable materials in which the materials are taken by individuals to collection sites and deposited into designated containers.

Dump-and-Pick Operation - A type of materials recovery facility involving the manual or mechanical separation of residentially or commercially generated recyclables from waste.

Economies of Scale - The increases in production capacity that reduce the average cost per ton of output.

Energy Recovery - The retrieval of energy from municipal solid waste by converting heat from incineration or methane gas from landfills.

Enterprise Fund - A fund for a specific purpose that is self-supporting from the revenue it generates.

EPA - The United States Environmental Protection Agency.

Ferrous Metals - Pertaining to, or derived from, iron; often used to refer to materials that can be removed from the waste stream by magnetic separation.

Fixed Costs - Costs that do not vary with the level of output of a production facility (e.g., administrative costs, building rent, mortgage payments).

Flow Control Ordinances - Ordinances that require delivery of collected municipal solid waste to specific management facilities.

Food Waste - Animal or vegetable wastes resulting from the handling, storage, sale, preparation, cooking, and serving of foods.

Front-End System - A process for salvaging certain reusable materials from the waste before combustion or other processing.

Furnish - The pulp used as raw material in a paper mill.

Garbage - Spoiled or waste food that is thrown away, generally defined as wet food waste; although in common usage garbage refers to all materials that are discarded as unnecessary.

Generation - The act or process of producing solid waste.

Glassphalt - An asphalt product that uses crushed glass as a partial substitute for aggregate in the mix.

GRCDA - Governmental Refuse Collection, Disposal Association.

Green Waste - The combination of yard and food waste collected and composted together in some European Systems; sometimes refers to the combination of large brush, stumps and yard debris mulched together for compost.

Groundwater - Water beneath the earth's surface that fills the spaces and moves between soil particles and rock supplying wells and springs.

Hammermill - A type of crusher used to break up waste materials into smaller pieces or particles which operates by using rotating and flailing heavy hammers.

Hazardous Waste - Waste material that may cause a threat to human health or the environment the disposal and handling of which is regulated by federal law.

Heavy Metal - Metals of high atomic weight and density, such as mercury, lead, and cadmium, that are toxic to living organisms which may be found in the waste stream as part of discarded items such as batteries, lighting fixtures, colorants and inks.

HDPE - High density polyethylene, a plastic resin to make items such as plastic milk and detergent containers, and base cups for plastic soda bottles.

High Grade Paper - Relatively valuable types of paper such as computer printout, white ledger, and tab cards.

Home Scrap - Waste produced and reused inside a production facility.

Household Hazardous Waste (HHW) - Products used at residences that are discarded in municipal solid waste and that contains substances already regulated under RCRA as an industrial hazardous waste.

Humus - Organic materials resulting from decay of plant or animal matter.

Industrial Waste - Those waste materials generally discarded from industrial operations or derived from manufacturing processes.

Institutional Waste - Waste materials originating in schools, hospitals, prisons, research institutions and other public buildings.

Integrated Solid Waste Management - Coordinated use of a hierarchy of management methods, including waste reduction, recycling, composting, energy recovery, and landfilling.

Investment Tax Credit - A tax credit that allows businesses to subtract a portion of the cost of qualifying capital purchases from their Federal or State tax liability, thus reducing the net after tax cost of capital.

In-Vessel Composting - A method in which the compost is continuously and mechanically mixed and aerated in a contained area.

IPC - Intermediate Processing Center - usually refers to the type of materials recovery facility (MRF) that processes residentially collected mixed recyclables into a new product available for market; often used interchangeably with MRF.

Level of Service - To provide service at a level that supports solid waste collection, processing and transport efficiency for the industry and the public.

Local Governments - As referred to in this program includes cities and counties.

Magnetic Separation - A system to remove ferrous metals from other materials through the use of magnets.

Mandatory recycling - Programs which by law require consumers to separate trash so that some or all of the recyclable materials are not burned or dumped in landfills.

Manual Separation - The separation of recyclable materials from waste by hand sorting.

Materials Management - A municipal solid waste management approach that would: 1) coordinate product manufacturing with different management methods (e.g., design products for recyclability); and 2) manage municipal solid waste on a material by-material basis, by diverting discarded materials to most appropriate management method based on their physical and chemical characteristics.

Materials Recovery - Retrieval of materials from municipal solid waste.

Material Recovery Facility (MRF) - A facility for separating recyclables from mixed waste or for separating commingled recyclables.

Mechanical Separation - The separation of waste into various components using mechanical means, such as cyclones, trommels, and screens.

Methane - An odorless, colorless, flammable gas produced by solid waste undergoing anaerobic decomposition; the major constituent of natural gas.

Microorganism - Microscopically small living organisms that metabolize waste materials in composting and work in sewage treatment processes.

Mixed Municipal Solid Waste - Trash that is not sorted into categories or materials.

Mixed or Municipal Solid Waste Composting (MSW Composting) - The controlled degradation of municipal solid waste including some form of presorting to remove non-compostable inorganic materials.

Mulch - Ground or mixed yard debris placed around plants to prevent evaporation of moisture and freezing of roots and to nourish the soil.

Municipal Solid Waste (MSW) - Includes non-hazardous waste generated in households, commercial and business establishments, institutions, and light industrial wastes; it excludes industrial process wastes, agricultural wastes, mining wastes, construction and demolition wastes, and sewage sludge. In practice, specific definitions vary across jurisdictions.

NIMBY - Acronym for "Not In My Back Yard" - expression of opposition to the siting of a solid waste facility based on the particular location proposed.

Nonferrous Metals - Metals other than iron and steel that are found in municipal solid waste.

NSWAM - National Solid Waste Management Association.

OCC - Old corrugatted cardboard.

Old Scrap - Waste generated by the product's final consumer.

ONP - Old Newspaper.
Opportunity Cost - The cost of foregoing alternative uses of a resource.

Organic Waste - Waste material from substances composed primarily of chemical compounds of carbon in combination with other elements, primarily hydrogen. These materials include paper, wood, food wastes, plastics, and yard debris.

Participation Rate - A measure of the number of people participating in a recycling program compared to the total eligible.

Pathogen - An organism capable of producing disease.

PET - Polyethylene Terephthalate - A plastic resin used to make packaging, commonly use to make plastic soft drink bottles.

Photodegadable - Refers to plastics which will decompose if left exposed to the ultra-violet rays of the sun.

Plastic - Chemical - long chain polymers - made from fossil fuels and chemical additives (additives are used for reaction control, processing, stabilizers and performance).

thermoplastics:	LDPE	- low density polyethylene
	HDPE	- high density polyethylene
	PVC	- polyvinyl chloride
	PP	- polypropylene
	PS	- polystyrene
	PET	- polyethylene terephthalate
	ABS	- acrylonitrile butadiene styrene
	LEXAN	- polycarbonate
	PTFE	- polytetrafluroethylene (Teflon)
thermosets:	phenolic resin polyurethane	
laminations:	Aseptic packages; combination of aluminum and plastic in a single container for food. Multi resin; several layers of different plastic resins e.g., squeezable Ketchup bottles	

Post-Consumer Recycling - The reuse of materials generated from residential and commercial waste, excluding recycling of material from industrial processes that has not reached the consumer, such as glass broken in the manufacturing process.

Post-Consumer Waste - Waste generated by the product's final consumer.

Pre-Consumer Waste - Waste generated by the processing material or manufacturing them into final products.

Prevention/Reduction - Activities by manufacturers (e.g., modifying products) and consumers (e.g. modifying purchasing decisions) that reduce toxicity or quantity of products before they are purchased.

Price Preferences - A means by which an incentive is provided to purchase recycled goods even if they are more expensive than non recycled goods.

Primary Material - A commercial material produced from virgin materials (see secondary material).

Processing - Preparing individual or mixed municipal solid waste materials for subsequent management, using processes such as baling, magnetic removal, shredding.

Procurement - The purchase of materials and services, usually, in the case of government procurement, through awarding contracts to low bidders.

Product Fee - A tax or fee on materials or products that can be designed to add the cost of their disposal to the purchase price.

Prompt Industrial Scrap - Waste produced in an intermediate stage of processing and returned to the basic production facility for reuse.

Pyrolysis - Chemical decomposition of a substance by heat in the absence of oxygen.

Quantity Reduction - Changing the design of a product so that less municipal solid waste is generated when the product or its residuals are discarded, or so that the product is more durable or repairable.

Radials - Tires in which the cords in the fabric casing are laid at approximately right angles to the center line of the tread; often contain belts of steel or strong synthetics making separation for recycling more complicated.

RCRA - Resource Conservation and Recovery Act.

Recyclables - Materials that still have useful physical or chemical properties after serving their original purpose and can, therefore, be reused, or recycled for the same or other purposes.

Recycling - Collecting components of municipal solid waste and processing them into forms in which they can be reused as raw materials for new products.

Recycling/Recovery/Diversion Rate - The tonnage of recyclables collected and processed into new products, divided by total tonnage of municipal solid waste generated.

Refuse-Derived Fuel (RDF) - Fuel produced from municipal solid waste that has undergone processing; fuel can be in shredded fluff, or densified pellet forms.

Residential Waste - Waste materials generated in single and multi-family homes; when multi-family units exceed four, these wastes are usually collected in large containers by commercial haulers.

Residue - Materials remaining after processing, incineration, composting or recycling.

Resource Recovery - Retrieval of materials or energy from municipal solid waste, for purposes of recycling or reuse.

Reuse - Taking a component of municipal solid waste and, possibly with some slight modification (e.g., cleaning, repair), using it again for its original purpose (e.g., refillable beverage bottles).

SARA - Superfund Amendments and Reauthorization Act.

Scavenger - One who illegally removes materials at any point in the solid waste management system. A.K.A. "Mosquito Fleet."

Scrap - Discarded or rejected industrial waste suitable for reprocessing.

Secondary Material - A material that is used in place of a primary or raw material in manufacturing a product; often handled by dealers and brokers in "secondary markets."

Sensitivity Analysis - An analysis that compares changes in a dependent variable resulting from incremental changes in independent variables.

Solid Waste - Defined in Resource Conservation and Recovery Act as "garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities. . ."

- All putrescible and nonputrescible wastes, including but not limited to garbage, rubbish, refuse, ashes, waste paper, and cardboard; sewage sludge, septic tank and cesspool pumpings or other sludge; commercial, industrial, demolition and construction wastes; discarded or abandoned vehicles or parts thereof; discarded home and industrial appliances; manure, vegetable or animal solid and semisolid wastes, dead animals and other wastes; but the term does not include:

  - Hazardous waste as defined in ORS 466.005

  - Material used for fertilizer or for other productive purposes or which are salvageable as such materials are used on land in agricultural operations and the growing or harvesting of crops and the raising of fowls or animals. (ORS 459)

Solid Waste Management - The systematic administration of activities which provide for the collection, source separation, storage,

transportation, transfer, processing, recycling, treatment. and disposal of solid waste.

Source Reduction - The design, manufacture, acquisition, and reuse of materials including products and packaging. so as to minimize the quantity and/or toxicity of waste produced. Source reduction prevents waste either by redesigning products or by otherwise changing societal patterns of consumption, use, and waste generation.

Source Separation - Separation at a household or commercial establishment of municipal solid waste into different recyclable components.

Source-Separated Recyclables - Recyclable materials separated from each other and from mixed waste at the point of generation.

Special Waste - Refers to items that require special, separate handling, such as bulky wastes, tires, and used oil.

SQG - Small quantity generator of hazardous waste: less than 220 pounds or 100 kilograms.

Static Pile System - A windrow composting method in which air ducts are generally installed under or in the base of compost piles so air can be blown into or drawn through the pile.

State Hierarchy - An established state priority (ORS 459.015) for managing solid waste in order to conserve energy and natural resources. The priority methods are as follows:

- Reducing the amount of solid waste generated;
- Reusing material for the purpose for which it originally was intended;
- Recycling material that cannot be reused;
- Recovering energy from solid waste that cannot be reused or recycled, so long as the energy recovery facility preserves the quality of air, water and land resources; and
- Disposal of solid waste that cannot be reused, recycled, or from which energy cannot be recovered by landfilling or other methods approved by the Department of Environmental Quality.

Subsidy - Direct or indirect payment from government to businesses, citizens, or institutions to encourage a desired activity.

Supply-Limited Materials - Secondary materials that are not collected in sufficient amounts or are too highly contaminated for current manufacturing processes.

Tipping Fee - Price charged for delivering municipal solid waste to a landfill, incinerator, or recycling facility; usually expressed in dollars per ton.

Toxicity Reduction - Eliminating or reducing (including using benign substitutes) substances in products that pose risks when the products are discarded as municipal solid waste.

Transfer Station - A permanent, fixed, supplemental collection and transportation facility, where waste materials are taken from smaller collection vehicles and placed in larger transportation units like railroad cars, barges, or truck trailers. In some transfer operations, compaction or separation for recycling may be done at the station.

Trash - Material considered worthless, unnecessary or offensive that is usually thrown away; generally defined as dry waste material, but in common usage it is a synonym for garbage, rubbish, or refuse.

Trommel - A large revolving cylindrical screen used as a waste separation techniques.

TSCA - Toxic Substances Control Act.

Tub Grinder - machine to grind or chip wood wastes for mulching, composting or size reduction.

UBC - Used beverage container.

Variable Can Rate - A charge for solid waste services based on the volume of waste generated measured by the number of containers set out for collection with a weight limit.

Vegetative Waste - waste material of agricultural origin such as from farms, nurseries, and other green areas.

Volume Reduction - The processing of waste materials so as to decrease the amount of space the materials occupy, usually by compacting or shedding (mechanical), incineration (thermal), or composting (biological).

Waste Exchange - A computer and catalog network to redirect waste materials back into the manufacturing process by matching companies generating specific wastes as manufacturing inputs.

Waste Reduction - Reducing the amount or type of waste generated (see Source Reduction).

Waste Stream - A term describing the total flow of solid waste in an area from homes, businesses, institutions and manufacturing plant that must be recycled, burned, or disposed of in landfills; or any segment thereof, such as the "residential waste steam" or the "recyclable waste stream."

White Goods - Large, metal household appliances (e.g., stoves, dryers, refrigerators, etc.).

Windrow - A large, long pile of composting material.

Windrow System - Composting technique in which waste is placed in either aerated static piles or turned, windrowed piles to digest.

Yard Debris - Leaves, grass clippings, prunings, and other natural organic matter discarded from yards and gardens.

Yard Debris Processing Center - A facility which processes yard debris into a usable soil amendment through controlled biological decomposition.

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