A STATUS REPORT ON MATERIALS RECYCLING ACTIVITIES IN NEW YORK CITY

December, 1985

City of New York
Department of Sanitation

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December 31, 1985

The Board of Estimate
City Hall

Honorable Members of the Board:

I am pleased to submit the attached Status Report on Materials Recycling Activities in New York City, which documents the steps taken by the Department of Sanitation during the past year to address the City's pressing waste disposal needs through a program of recycling initiatives.

The activities described in this report should be viewed as one element in the Department's comprehensive citywide strategy to develop new waste disposal capacity and waste reduction techniques to reduce New York's dependence on the Fresh Kills landfill on Staten Island. As of January 1, 1986, Fresh Kills will be the City's only remaining major waste disposal facility. Despite our vigorous and repeated efforts to convince the federal Department of the Interior to allow us to continue to operate the Fountain Avenue landfill in Brooklyn, that facility must close permanently on December 31, and literally overnight the City will lose nearly 40 percent of its daily disposal capacity.

In addition to these recycling efforts, the Department -- following the Board of Estimate's policy directives -- has, within the past year, completed the environmental review and ULURP process for the Brooklyn Navy Yard resource recovery facility and submitted applications to state and federal regulatory agencies for construction and operating permits, begun environmental impact analyses for four additional resource recovery facilities in the other four boroughs, and completed a series of construction projects designed to allow the Fresh Kills landfill to become the major repository for the City's waste without creating disruptions, due to the closing of the Fountain Avenue landfill, to one of the City's most vital and logistically complex health maintenance systems.

The attached report responds to a specific request by the Board of Estimate, as embodied in a resolution adopted by the Board last December. The resolution accepted the Department of

Sanitation's preliminary recommendations for a citywide waste disposal strategy and directed the Department to proceed with citywide resource recovery planning efforts in conjunction with a complementary program of aggressive recycling initiatives designed to achieve an additional 15 percent reduction in the City's waste stream (amounting to approximately 4000 tons per day) through source-separation recycling by 1991.

The report, prepared by the newly created Office of Recycling Programs and Planning, under the directorship of Joan Edwards, details the actions taken this year, and the programs planned for implementation next year as steps toward our 15 percent goal. The report provides an overview of some 20 individual programs that we have already initiated or are planning in accordance with the fundamental premise behind our planning and implementation efforts: that the enormously complex logistics of recycling -- which involve the voluntary participation of different types of waste-generating sectors (high-rise residential, low-rise residential, commercial, institutional), and diverse materials, markets, collection and processing methods in a city that is in many ways unique compared to the municipalities elsewhere in this country that have developed successful recycling programs -- are best served through a multiplicity of pilot efforts designed to achieve, in an organic way, incremental, systemic progress toward our recycling goals.

Some of the highlights of this first year's efforts, which are described in detail in the attached report, include:

- establishment of a new Office of Recycling Programs and Planning to spearhead the Department's recycling initiatives and to coordinate activities of other City agencies as they relate to recycling activities;

- development of five specific residential recycling strategies aimed at testing different approaches for separating and collecting recyclable materials in low-, medium- and high-density neighborhoods;

- major expansion of public- and private-sector office paper recycling programs;

- preparations for the development of an intermediate processing facility for source-separated materials collected in the Department's residential recycling programs;

- continued efforts to improve the effectiveness of the two-year-old Returnable Container Law and thereby optimize the significant waste-reduction potential of the deposit system;

- market development studies and initiatives, including examination of potential public-sector procurement

policies that might help stimulate markets for secondary materials;

- preliminary steps in developing a legislative agenda to encourage more recycling and waste reduction; and

- general public information and education program developments to promote public participation in new and existing recycling efforts.

In addition, as a result of having exceeded our initial projections for budgeting new pilot recycling programs, we have reached agreement with the State Department of Environmental Conservation to allocate an increased proportion of a $3 million State matching grant for waste management planning to the City's recycling efforts in the coming year. Originally, we had anticipated using two-thirds of the grant for resource recovery environmental studies and one-third for recycling projects. This allocation is being revised in view of the accelerated pace of our recycling efforts. We now expect to fund most or all of the environmental impact studies through the City's capital budget.

I would like to take this opportunity to briefly outline the overall approach we are following in our efforts to plan and implement a comprehensive recycling program for the City. Essentially, it begins with the basic principle that recycling is, above all, an economic enterprise. And while planners love centralized planned systems, bureaucracies hate taking risks. Since New York City is scarcely a centralized planned economy, the Sanitation Department is committed, in the early stages of its planning, to exploring the recycling options available to the City through pilot programs on many fronts designed for pragmatic analytical purposes rather than as preconceived assertions of success. And unlike some bureaucracies, we are committed to revealing, for the purposes of public and internal scrutiny, our failures as well as our successes, so that we can learn from our failures and build on our successes to achieve a citywide recycling program that adequately addresses the rich complexity of New York City's daily waste-generating life.

The Overview in Part I of the attached report contains a "Decision-Making Roadmap," which describes the analytical and programmatic rationale behind this multiplicity of pilot programs. It is intended to serve not only as an aid to your review of the document, but for your subsequent evaluation of our projects as they are implemented, and I urge you to read it carefully to fully understand our program objectives.

There are three fundamental premises behind the recycling theory that we are trying to put into practice. First, we are convinced that only a comprehensive strategy of resource recovery and recycling can adequately address New York City's waste disposal needs. Recycling alone can only handle the fraction of the City's waste that can be economically used in

the manufacture of new products; some form of waste-to-energy technology must be used to reduce the volume of the combustible portion of the City's waste that cannot be feasibly recycled. Even with a comprehensive resource recovery/recycling program, there will still be a continuing need for some limited landfilling of the remaining non-recyclable, non-combustible fraction of the waste stream.

Second, desirable as recycling is as a complementary alternative to the other forms of waste disposal, efforts to maximize the extent to which our waste is recycled depend on maintaining a firm sense of reality. Unrealistic expectations of recycling possibilities cannot contribute to the achievement of our recycling goals. Our 15 percent goal is not a limit -- we are committed to recycling as much of our waste as is feasible -- but it is our best estimate, based on extensive analysis of New York City conditions and of the results achieved elsewhere, of a realistically achievable target. If this additional 15 percent goal is achieved, supplementing the 10 to 13 percent of the waste stream that we estimate is currently recycled privately, it is clear that New York City will be among the country's recycling leaders.

Third, our goals are for long-term, stable reductions in the waste stream through recycling. We are not interested in transitory, flash-in-the-pan, electoral cycle successes that simply capitalize on temporary market highs and bring down programs when they crash. A measured pace to build incrementally on our successes, minimize the damage of our inevitable failures, and to organically expand markets rather than flooding them with an over-hasty turning on of New York's enormous tap, is of paramount importance.

In the coming year, we intend to continue the process of designing and implementing a variety of pilot programs that was begun this year, and to evaluate the results of pilots already underway to determine their long-term suitability as components of a comprehensive recycling strategy. In addition, these efforts will be fully integrated into our resource recovery planning, specifically as they might affect overall waste quantities and composition in the waste sheds that would be served by our next four proposed waste-to-energy projects.

I will, of course, continue to keep you regularly apprised of the progress of our waste reduction and disposal planning efforts, and I look forward to your continued support for programs to help solve the City's waste management problems.

Respectfully submitted,

Norman Steisel
Commissioner

TABLE OF CONTENTS

LIST OF APPENDICES

PART I: OVERVIEW

Introduction

On December 20, 1984, the Board of Estimate formally adopted a series of major policy recommendations to guide the future course of waste disposal planning in New York City. Based on its review of a preliminary planning report prepared by the Department of Sanitation, the Board adopted Resolution 61, which established the concurrent development of waste-to-energy facilities and a citywide program of materials recycling as the most feasible approach for dealing with the City's waste disposal problem.

In addition to recommending that the Department begin to undertake further study of four proposed waste-to-energy projects, the Board's resolution directed the Department to continue to investigate recycling opportunities and proceed with the planning, implementation, and evaluation of a comprehensive waste reduction program aimed at recycling a significant portion of the City's solid waste by 1991.

This Report has been prepared by the Department to provide the Board of Estimate with details of the recycling plans and activities that have been pursued during the past year. It contains information about specific pilot programs that have been initiated and the Department's assessment of these programs as components of a citywide recycling strategy, as well as projections of further recycling potential yet to be developed and exploited.

In its resolution, the Board of Estimate asked the Department to consider the feasibility of at least eight specific recycling strategies as potential elements of a citywide waste reduction program:

a) using economic incentives to encourage recycling;
b) expanding office paper recycling programs;
c) testing residential curbside collection systems for source-separated recyclable materials;
d) developing multi-materials processing facilities;
e) establishing centers that would buy back recyclable materials from city residents;
f) recycling programs for apartment buildings;
g) composting of solid waste for use as landfill cover; and
h) market development for recycled materials.

The Department's planning during the past year has been directed at each of these specific areas. Substantial progress has been made in designing and implementing pilot programs that

will yield information about the effectiveness of these and other strategies.

Part I of this report reviews the framework within which the Department's recycling goals have been set and describes the approaches being taken to test a wide range of potentially feasible waste-reduction strategies. Part II sets forth in detail the progress made to date in investigating, designing, funding, and implementing new programs. Part III outlines plans for future recycling activities.

Establishing A Waste-Reduction Goal

In September 1984, as part of its preliminary waste disposal planning analysis, The Waste Disposal Problem in New York City: A Proposal for Action, the Department of Sanitation submitted a report to the Board of Estimate, which assessed the potential for recycling a portion of the New York City waste stream. Based on a review of recycling programs used elsewhere, an analysis of New York City's waste-generation and composition characteristics, and the unique features of the City's waste collection and disposal system, the Department concluded that New York City could feasibly reduce its disposal needs by up to 15 percent by 1991 through new recycling efforts. This initial goal was established to supplement existing private-sector recycling activities, which currently divert an estimated 10 to 13 percent from the City's waste stream.

The report documented the broad diversity of New York City's residential, commercial, and construction waste streams (see Appendix I-A to this Report), in contrast to the more homogeneous waste streams of suburban localities, from which examples of successful recycling programs are most often cited. The report also identified specific components of the City's waste stream and available quantities of selected recyclables (see Appendix I-B and I-C).

Of 36 municipal recycling programs from around the country that were surveyed, documented recycling rates were found to range from one to 39 percent. The average waste diversion rate of these programs was found to be 9 percent. A wide range of city, county and state recycling plans which set goals for future recycling were also reviewed in the study. These plans generally set recycling goals of less than 25 percent, and defined these targets to include anticipated public and private recycling activities as well as pre-existing levels of recycling.

The Department's goal of reducing waste disposal demand by an additional 15 percent is, thus, substantially higher than the average diversion rate achieved by other local government initiatives. Unlike most municipal and state goals, the City's target would be achieved, for the most part, by adding to

current levels of recycling activity. The single exception relates to reductions in the waste stream attributable to the New York State Returnable Container Law. These are included in the City's current target, since the potential return and recycling rates for beverage containers in New York City have not yet reached optimal levels.

Private sector recycling activity in the past few years has been estimated to amount to approximately 3,000 tons per day during periods when market conditions for secondary materials are favorable. This figure assumes up to 1115 tons per day of paper and up to 1600 tons per day of metal (including metal from auto recycling and demolition), as well as a portion of the 1400 tons per day of construction waste, which Department records show has been diverted from our disposal sites since 1982. A substantial portion of the estimated volume of recycled paper and metal has never appeared in any of the City's disposal figures. Appendix I-D contains estimates of recycling rates being achieved as a result of private sector activities under favorable market conditions.

The City's recycling goal, therefore, compares well with targets set elsewhere. In combination with existing levels of recycling, an additional 15 percent would raise the City's overall recycling rate in 1991 to more than 25 percent.

A Framework for Action

Suburban areas characterized by relatively homogeneous population profiles, housing stock and waste streams, have been generally at the forefront of municipal recycling activity in the past decade. In contrast, there had been little government-initiated recycling in larger cities until recently, due, in part, to demographic and waste stream diversity and to the difficulties posed by a preponderance of high-rise housing. Although an increasing number of cities have instituted recycling programs, these efforts, unfortunately, do not provide New York City with many well-documented examples to follow.

In developing its recycling projects, New York City must take into account three significant constraints imposed by current market conditions for secondary materials:

1) the overall end-use capacity for recyclable materials in the region is not growing at present (except for exports);

2) the pool of recyclable materials in New York City is so large that the successful collection of any one material could overwhelm existing market capacity; and

3) surrounding localities in New York and neighboring

states are all increasing their recycling collection activities at the same time, thus increasing the pool of available materials for a limited regional market.

Thus, two major challenges confront the Department: (i) to design and implement effective recycling programs tailored to the special characteristics of New York City's neighborhoods and businesses, and (ii) to achieve sustained tonnage reductions as quickly as possible at a reasonable cost in the face of significant market uncertainties.

To meet these challenges, the Department is pursuing a planning approach in the early stages of developing a citywide recycling program that emphasizes innovation and accepts the attendant risks at the inception of such programs. During the past year, to maximize program effectiveness and minimize implementation time, the Department has focused on three basic approaches.

First, a number of relatively modest pilot programs designed to test recycling strategies targeted at specific waste streams in different types of neighborhoods in each of the five boroughs have been designed and are being implemented. Ongoing monitoring and evaluation are an integral part of these programs. Those pilots that show early promise will be expanded. As additional testing proceeds, some programs will be modified in midstream or at the end of the pilot period and then retested; others may prove to be unworkable and will be eliminated. Developing, testing and refining pilot projects along these lines will be a major component of the Department's efforts to shape a comprehensive recycling program for the City in the next few years.

Second, the Department is committed to an overall program approach that emphasizes diversity and flexibility. The City cannot rely on any single strategy, waste stream, or material to achieve meaningful waste reduction rates. For example, five alternative pilot programs aimed at the City's residential waste stream are being studied. Additional programs are being designed for the City's commercial, institutional and construction waste streams, many of which will be focused on materials that are not currently sought by the private sector due to collection, processing, or end-use market impediments. Spreading the risks and increasing the options in this way will help the City's recycling efforts adapt to market swings, and to changes in recycling technology and waste composition. It will also reduce dependence on any given waste generator or secondary materials buyer to sustain waste reduction levels.

Third, the Department recognizes that market development and expansion must support the implementation of collection and processing strategies. Recycling does not occur unless the materials diverted from the waste stream are actually reused. The Department has begun and will continue to encourage private- and public-sector initiatives to stabilize and expand markets

for secondary materials in New York City and in the region while continued testing and implemention of alternative collection strategies proceeds.

Program Objectives: A Decision-Making "Roadmap"

These are the more specific criteria which we have used in selecting our initial pilot programs, and which we will use in evaluating them:

- Flexibility. As in our resource recovery planning, our implementation approach to recycling accepts the reality that we can never fully anticipate changes in external conditions (for instance, a potential sudden increase in the use of plastic beverage containers), and therefore, it is imperative that we maintain sufficient flexibility in our planning efforts to be able to take maximum advantage of changes in technologies, markets, and so on, and avoid the pitfalls associated with changed conditions.

- Incremental implementation. Unquestionably, one of the most fundamental difficulties in establishing stable long-term, large-scale recycling programs is developing and maintaining adequate market capacity. Our recycling approach is predicated on the assumption that a reasonable way to develop markets is to allow them to respond to incremental, and reliable, increases in the available quantities of so-called "secondary materials," that is waste materials that can be used in the manufacture of new products. The alternative would be to risk sabotaging long-term program success by glutting available markets in the short-term (as the sudden surge in the supply of green glass due to the bottle law did), cause disruptions of existing and potential private and non-profit recycling operations as well as recycling programs elsewhere in the region, and to simply displace, at a lower price, the sale of currently collected secondary materials with the larger volumes generated by new programs. In addition to the indirect stimulation of market expansion through increasing the supply of available secondary materials, we will also try techniques such as changes in Sanitation Department procurement policies to directly stimulate the demand for secondary materials.

- Compatibility with existing and potential private and non-profit efforts. Recycling in New York City is best seen as a complex system of interacting parts. The introduction of new programs poses the potential for disrupting useful subsystems in this organic whole. Our goal is not to compete with current private and non-profit recycling efforts, but rather, to establish complementary programs that encourage the expansion of non-Department of Sanitation recycling through incremental stimulation of markets, public awareness of recycling needs and opportunities, as well as through more direct stimuli, such as

economic incentives or subsidies to spur additional recycling.

• Compatibility with existing Department of Sanitation collection and disposal systems. The process by which some 22,000 tons of waste each day is collected, transported to and eventually disposed of at City facilities involves a vast and costly network of equipment, facilities and manpower. Because of the need for flexibility, redundancy, and robustness in this waste collection and disposal system to maintain reliable service, one of our planning criteria for the incremental expansion of recycling programs is that they not disrupt more than necessary working in-place waste-handling systems.

• Public awareness. Increased public awareness of New York City's waste disposal problem and the need for alternatives to landfilling is in itself a useful goal. Therefore, establishing recycling programs which also accomplish this corrollary objective are among our priorities.

• Maximum tonnage reductions of additional material. A goal of our recycling efforts is to achieve maximal tonnage collection and sale of secondary materials that are not currently being collected by existing private and non-profit recyclers.

• Immediacy of implementation. Minimum implementation time is a priority. The immediacy of our waste disposal problem demands that reductions in the flow of waste to our last remaining landfill be achieved as quickly as possible. In contrast to the minimum 6 to 8 year planning and implementation schedule for new resource recovery facilities, effective recycling programs offer the opportunity for expedited waste reduction with more immediate effects on landfill life.

• The variety of pilot programs must be sufficient to address the complexity of New York City's range of waste-generating sectors, secondary materials, markets, and collection and processing logistics. We must recognize that no one program or narrow set of efforts is suited to the range of conditions posed by New York's widely divergent neighborhoods, residential and commercial waste generators, and dense urban logistics. A multiplicity of pilot efforts is therefore needed to provide enough successful experiments upon which to build expanded programs, and to generate useful data for developing more refined programs.

• Research for data-gathering and analytical purposes is among the objectives of our pilot programs. The fear of failure is endemic among bureaucracies. The pursuit of our objectives, however, demands that we be willing to assume the risk of failing with some of our pilots in order to discover how best to efficiently expand our recycling programs to achieve the greatest tonnage reductions in the shortest time at the lowest cost. We intend, therefore, to scrutinize our failures as well as our successes, and to develop pilots designed to tell us as

much as possible about the complex environment in which we must work.

Analysis of Existing Conditions.

The programs described in Part II of this report are based on our understanding of the following factors:

- Waste-generating sectors. Most of the existing recycling that takes place in the City (estimated, as detailed in the attached report, at 10 to 13 percent) involves non-residential waste. Because some secondary materials are easily segregated in concentrated quantities at commercial waste sources, and because commercial waste-generators are charged a per-unit collection and disposal fee, the commercial waste-generating sector offers some of the greatest opportunities for cost-effective recycling programs without direct Sanitation Department operational involvement. Such commercial recycling efforts are susceptible to expansion through carrot-and-stick economic incentives and penalties. However, since the majority of Sanitation collections are residential and the majority of the waste stream is generated by the residential sector, our current pilot programs concentrate on the residential waste stream. For next year, we will add programs aimed at the institutional and commercial waste streams.

- Population density. In designing programs to divert secondary materials from the residential waste-stream, a primary factor is whether an area is low-density, comprised primarily of single-family homes, or predominantly high-rise apartments in which building maintenance personnel are intermediaries in the flow of garbage from tenant to curb. The type of curbside-collection source-separation program commonly used elsewhere is best suited to low-density areas. High-rise areas require other strategies. Our current plans include pilot programs for both types of residential areas.

- Secondary materials. Our analysis of New York City's waste stream, markets, and generators suggests that we should have pilot programs in the near-term for each of the following materials: high-grade office paper, newsprint, organics that can be used for compost, metals, and glass. Plastics and rubber are materials for which adequate markets are currently unavailable, largely due to technological difficulties in collection and processing for re-use. Therefore, we must also focus on the development of such techniques. A significant proportion of the corrugated paper and construction waste generated within the City is currently recycled by the private sector, thus leaving relatively little opportunity for further expansion in the near-term with additional Sanitation Department initiatives. However, through such means as changing the regulations governing transfer stations for construction waste

to allow more flexible operations, we are making efforts to sustain maximal levels of recycling for these materials through fluctuating market cycles.

Program Evaluation

Evaluating the effectiveness of pilot projects will be a critical step in designing an overall waste reduction program for the City. In order to be able to make informed decisions about future program expansions, modifications, or contractions, quantitative measurements for each of the following major criteria will be made to provide a basis for comparative analyses of the varying costs and benefits of alternative waste reduction approaches:

- participation rates;
- percentage by weight/volume of materials diverted from landfill disposal or resource recovery facilities;
- operating costs;
- Department of Sanitation personnel shifts necessary to operate recycling programs, and not required for waste disposal operations;
- impact on regular disposal equipment capital and operating expenses;
- revenues from secondary materials sales;
- demonstrated potential program expansion rates; potential for modular incremental expansion in conjunction with overall program goals;
- number of private sector jobs created in related collection, processing, and marketing with associated increase in disposable income and increase in taxes due to new jobs and businesses.

Steps Towards a 15 Percent Recycling Goal

The bulk of government initiatives elsewhere in the past ten years have focused on household recycling, and thus provide the Department with the greatest number of models. Therefore, the initial thrust of the Department's pilot recycling projects has been directed primarily at the City's residential waste stream. Furthermore, the residential waste stream offers the greatest potential for substantial waste recycling due to its

size and composition. Most of the materials found in the residential waste stream are not currently being recycled in quantity by the private sector.

Almost all of the residential collection strategies outlined in Part II of this report offer the potential for expansion to other materials as these strategies are perfected and processing technologies and end-user markets improve. Ultimately, the Department's own collection patterns and costs could benefit from the removal of significant quantities of materials from the residential waste stream in any given waste shed. At a minimum, it is likely that some combination of all five residential collection strategies the Department is testing, perhaps with modifications or refinements, will be required to gain access to the recyclable materials in the residential waste stream.

The Department has estimated that up to five percent of its 15 percent recycling goal could be achieved through such integrated residential waste-reduction strategies in the near term. This projection assumes that the primary recyclables in the residential waste stream are newspaper and non-returnable bottles and cans, and that, on a citywide average, 33 percent of these materials would be recycled. That would mean, for example, that one in every three New Yorkers would participate in separating all of their recyclables, or conversely, that every city resident would separate at least one-third of the available recyclables in their waste. Some communities may participate more readily than others, and these figures could be increased over time either through an increase in average participation or if additional materials could be targeted, collected, processed, and marketed through the same programs.

Another five percent reduction may be achieved when the Returnable Container Law reaches its full potential for both redemption and recycling -- that is, 90 percent redemption of all containers, and maximum recycling of all materials redeemed. According to a report prepared by the Rockefeller Institute of Government for the New York State Temporary Commission on Returnable Beverage Containers, there has already been a three- to five-percent reduction in solid waste statewide as a result of the law, although redemption rates have been lower in the City and throughout the downstate area than upstate. Potential tonnage reductions in the residential waste stream from the Returnable Container Law are contained in Appendix I-E. Figures for the combined residential/commercial waste streams would be higher, but commercial tonnages available for recycling have not been documented.

The final five percent reduction leading to the City's overall 15 percent target, could be derived from a combination of measures aimed at the institutional and commercial waste streams. Office paper recycling initiatives are described in Part II of this report, and the Department's future plans for diverting additional materials from these two waste streams in

the coming year are outlined in Part III.

The extent to which composting of organic waste may have the potential for further reducing disposal demand has not been projected yet due to the technical uncertainties of a large-scale composting operation in New York City. However, the Department recognizes the potential importance of composting to the City's overall waste reduction effort -- particularly if waste-derived compost could be used for landfill cover -- and will be studying its feasibility in the coming year.

The following report on the progress of recycling activities to date and on future plans for recycling in New York City reflects the philosophical framework outlined here, as well as the realities of the existing private sector collection system and marketplace. Part II of this report contains detailed information on all the activities conducted in the past year. Part III contains a discussion of activities planned for the next twelve months, as well as some longer-term programs that are being considered.

PART II: FIRST-YEAR ACTIVITIES AND ACCOMPLISHMENTS

Substantial progress has been made during the past year in establishing a strong foundation on which to build a long-term citywide recycling program. The Department has moved forward quickly to begin developing the necessary staff and funding resources for a wide range of research, outreach, and direct program initiatives.

This section describes five different residential waste recycling strategies currently in the design or implementation stage, as well as other program strategies and support activities aimed at container legislation materials, high-grade office paper, construction waste, and compostable waste. It also provides information on initial efforts in the areas of market development, general public education and community outreach, and legislative initiatives to assist waste reduction objectives.

These early efforts reflect the planning objectives cited in Part I of this report for the initial selection of pilot projects: to initiate a multiplicity of program approaches that respond to the City's diverse needs and can be reshaped as necessary on the basis of changing external conditions and pilot program results; to allow for gradual market adjustments through incremental implementation of projects; to achieve compatability with private and non-profit efforts as well as with existing Sanitation operations; and to meet the need for rapid implementation of pilot programs and feasibility studies that will provide useful information for future program expansions or modifications.

One of our first-year priorities was to address the need for a diversity of recycling strategies aimed at the residential waste stream, since there has been limited private sector activity in this area to date and the potential pool of recyclables is very large. The Department's existing role in the collection of residential waste also made this a reasonable starting point for Department-initiated programs. With these residential pilots getting underway, attention will begin to shift more towards the non-residential waste stream in the coming year, as discussed further in Part III.

A. Office of Recycling Programs and Planning

A new Office of Recycling Programs and Planning was formally established within the Department in April to perform the technical planning, analysis and administrative functions for a citywide waste reduction effort. The Office is

responsible for designing and implementing programs to achieve the City's goal of recycling an additional 15 percent of the waste stream by 1991. In addition to coordinating activities within the Department by working closely with the operational and resource recovery planning staffs, the Office will assume a leading role in helping to direct the resources of other City agencies. The Office is headed by a Director, and includes three staff members reassigned from within the Office of Resource Recovery and Waste Disposal Planning. The Department received additional funding in the FY '86 budget to expand the Office with eight additional staff positions. Four candidates have been selected, two of whom recently joined the Office with the remaining two scheduled to begin in January, 1986. The other four staff positions will be filled within the current fiscal year.

In addition to creating the Office of Recycling, the Department has focused other internal resources to help meet its recycling goal, particularly in planning the curbside source separation and containerized apartment house recycling programs. For example, the Department's Office of Planning, Evaluation, and Control (OPEC) has been integrally involved in the operational design and implementation process for these residential collection programs. The Office of Public Relations and Education, with the Office of Recycling, is developing a recycling information program for City schools to complement and support the broader public education campaign that will accompany the start of the curbside collection project. The Bureau of Management Analysis has assisted the Office of Recycling in preparing an initial review of Department paper procurement practices in order to assess the opportunities for purchasing recycled paper.

The Office has also drawn on outside consultants to supplement its limited staff resources and expedite projects while permanent staff recruitment continues. To date, consultants have been hired to conduct a recycled products procurement study, and a review of State activities under the Environmental Conservation Law (Chapter 552 of the Laws of 1980), as well as to assist in the design of selected components of specific recycling programs.

For example, the Department has received technical assistance in the design of a computerized records management system for the City Agencies Office Paper Recycling Program and for field surveys related to the containerized apartment house program and the City Agencies Office Paper Recycling Program. Two large contracts have been given to the Environmental Action Coalition (EAC) and the Council on the Environment of New York City (CENYC) for implementation of pilot recycling programs. A local economic development organization in the Bronx was recently awarded a contract to expand a buy-back center for recyclable materials. Resource Conservation Consultants, a national recycling company, has provided the Office with updated information on municipal recycling efforts elsewhere.

B. Entering the Mainstream

The Department has made a concerted effort during the past year to establish ongoing exchanges of information with recycling professionals and other municipal officials across the country so that their expertise and experience can be applied to New York City's efforts. It is clear that experience in other localities should be used to help shape new pilot programs for New York City. It is equally clear, based on conversations with recycling professionals and elected officials across the country, that what happens in New York City can have an enormous impact on the future of recycling elsewhere. Other urban areas are creating and testing programs at the same time we are embarking on new recycling strategies. Should New York City succeed in collecting large quantities of any one material, the potential exists for major economic disruption of regional markets for recyclable materials. The recent impact of New York State's returnable container law on glass and aluminum markets, despite the fact that redemption and recycling have not yet reached optimal levels, illustrates one example of the potential for market flooding.

Concerned recycling leaders in other major cities, including Philadelphia, San Francisco, and Boulder, as well as recycling organizations and local governments in the states of Michigan, Pennsylvania, New Jersey, and California, have reached out to the Department to express support. These professionals agree that everyone can benefit if New York City sets reasonable, attainable goals, runs successful programs that help achieve our recycling targets, and cooperates in a regional effort to increase markets for the new materials which New York City and other localities in the region will be generating in the next five to ten years.

The Office of Recycling has continued to communicate and collaborate with state, regional and national recycling professionals both formally and informally, through participation in conferences, membership in a wide range of recycling organizations, individual exchanges of data, and participation in such information exchange as the newly created National Recyclers Multilogue, a more formal communication system, often described as a "teleconference by mail," that allows professionals to share ideas and receive advice on a wide range of subjects.

The Office of Recycling's Director, Joan Edwards, was recently named to the Board of Directors of the National Recycling Coalition (NRC). This organization unites a broad spectrum of government, industry and environmental/community groups to help promote recycling in the United States. The NRC has published reports on recycling, including the National Buyer's Guide for the Purchase of Recycled Paper, has been a leading advocate for implementation of USEPA's Recycled Paper Procurement Guidelines, and has actively participated in

organizing and supporting state recycling associations throughout the United States. In addition to serving as a national coordinating and advocacy group, the NRC also organizes and co-sponsors the National Recycling Congress, an annual conference for the exchange of information on recycling programs from around the country.

Ms. Edwards has also been appointed by the New York State Department of Environmental Conservation (DEC) to the newly created New York State Recycling Forum, an organization that consists of some 40 representatives from State and local government agencies, public interest groups, private sector recyclers, and secondary materials industries. The Forum was created to provide DEC with advice and recommendations on State recycling policies and programs. A series of formal meetings of the Forum began in November 1985, and the group has been asked to prepare a report for the DEC by October 1986, which will be used by the agency to develop new statewide recycling policies and programs.

Other recycling staff members from the Department have also attended recycling conferences throughout the United States, and City representatives have been invited both to chair and speak at urban recycling workshop panels. They continue to bring back valuable information and contacts which will be useful in planning both current and future Department initiatives.

C. Residential Recycling Programs

As noted in Part I of this report, in the past year the Department has placed major emphasis on developing strategies to segregate available recyclables from the City's residential waste stream. To date, the Department has designed five pilot collection programs that offer the potential of diverting a substantial proportion of the City's residential waste for recycling. They also offer an opportunity to learn how effectively alternative strategies might be applied to New York City's diverse residential neighborhoods. Collectively, these programs could lead to a five percent reduction in the total waste stream assuming a 33 percent average public participation rate could be achieved for the source separation of newspaper and residential glass and metal containers citywide. These five programs are:

1) EAC Apartment House Recycling Program
2) Buy-Back Center Pilot Program
3) Curbside Source-Separation Program
4) Voluntary Drop-off Centers
5) Containerized Apartment House Recycling Program

- EAC Apartment House Recycling Program

The Environmental Action Coalition is one of the City's oldest and most widely respected recycling organizations. Since its inception in 1970 as one of the leading organizers of Earth Day activities, EAC has been a consistently forceful advocate for recycling and other environmentally sound waste management practices in New York City. EAC provides technical support and assistance to voluntary drop-off centers, and provides informational services to schools and community organizations on solid waste and recycling issues.

On November 15, 1984, EAC and the Department signed a two-year, $233,000 contract approved by the Board of Estimate under which EAC was to design and implement a pilot newspaper recycling program in apartment houses of varying sizes throughout New York City. This project was selected because it builds on existing private sector interest in purchasing high-quality, source-separated paper in bulk. By providing organizational and marketing assistance to building management staff, the program is intended to test an alternative recycling approach for high-rise buildings, which are generally not suited to the traditional curbside collection system.

EAC was to organize programs in, and provide outreach to 35 buildings each year. Their goal was to recycle 225 tons of newspaper in the first year, and to increase the total to 725 tons after two years. EAC's contract services include outreach efforts to building superintendents, managers, tenant associations, and coop boards; assistance in designing programs tailored to individual building types; installation of storage equipment where necessary; providing educational advice and materials for participating tenants; and assistance in marketing the collected newspaper. EAC is also compiling and evaluating data on generation rates, collection and storage systems, local markets, and paper prices that will be used in planning future program expansion.

The EAC Apartment House Newspaper Recycling Program has already far exceeded its original contract goals. The program has received enthusiastic support from tenants, building managers, and maintenance staffs. In its first year of operation, 73 buildings containing 11,815 apartment units are participating in the program, and over 300 tons of paper have already been recycled. Another 47 buildings, representing 11,272 units, have expressed serious interest in joining the program. EAC has also served as an intermediary for buildings that require only occasional collection service. Total monthly tonnage has climbed steadily, from a little over three tons in November, 1984, to almost 50 tons in November, 1985 (see Appendix II-A to this report). If these participating buildings continue to recycle at the same rate, they can be expected to generate 700 tons of newspaper for recycling in the coming year.

EAC facilitates recycling in apartment buildings by

devising suitable collection and storage procedures, and by coordinating pick-ups by private haulers who pay the buildings directly for the papers. A wide variety of building types are taking advantage of the program. The buildings range in size from a single building with 34 units to multi-building complexes containing over 1700 units. Since adequate storage facilities are especially limited in smaller buildings, EAC's outreach program has concentrated on buildings with at least 50 apartment units. To ease storage problems at some locations, EAC provides outdoor storage sheds purchased with City funds. Buildings smaller than 50 units are not precluded from participating in the newspaper recycling program; EAC's experience has demonstrated that its program can be successfully adapted to various building types.

Over the past year, EAC's activities have included hiring staff for the program, conducting initial outreach to buildings, and beginning the long process of bringing maintenance staff and newspaper dealers together for each individual building. EAC has two staff members who work full-time on outreach and organization of buildings, and market development, and the agency's Waste Management Director assists the newspaper recycling program part-time.

The EAC Program capitalizes on the fact that many buildings in New York City handle newspaper separately in order to minimize compactor damage, cut operating costs for on-site incinerators, or for other cost-avoidance reasons. However, most of these buildings have not been recycling the paper they collect, but merely put it out for collection and disposal by the Department of Sanitation. Initial contacts with buildings are frequently made through individual tenants who are concerned about recycling for environmental reasons; the Program is also supported by management and maintenance staffs because of the operational advantages it offers them.

EAC has maintained records of the rate at which individual buildings are collecting paper in an effort to calculate per-unit generation rates. Generation rates have tended to vary widely (see Appendix II-B). For example, one group of 20 buildings showed a generation rate of 1.59 pounds per week per unit while another group of buildings produced 8.84 pounds per week per unit. These figures are based on the average generation rate for the entire building, since, to date, EAC has not been able to determine exactly how many tenants are participating in each building.

In some buildings, it has been found that the maintenance staff insist on source separation of materials for operational reasons, while in others, separation and, consequently, participation in recycling, is simply voluntary. As the Program progresses, EAC will conduct tenant surveys to determine how the generation rate is affected by such factors as building location, tenant income and educational level, extent of home newspaper delivery, amount of effort required by tenants to

participate, management enforcement of separation, tenants' previous experiences with recycling, and support for recycling by City government and the media.

Like all recycling programs, this one has found itself affected by market fluctuations. Local paper prices had been fairly stable until January 1985, with the haulers paying buildings $10 per ton for newspaper. By May of this year, the national trend of falling prices caught up with the local market, forcing haulers to cut their payments to buildings by 50 percent. In addition, recent cutbacks by some end-users created more uncertainty, causing some dealers to postpone taking on new accounts.

EAC is continually seeking new markets, particularly in the export sector. The organization is also studying methods to reduce collection overhead costs for haulers so that the current collection/payment system can be maintained. So far, personnel at all participating buildings understand the current market situation and continue to recycle because of the operational and environmental advantages. With the current low economic incentives, new organizing efforts have proven somewhat more difficult and haulers are less interested in servicing buildings. EAC's role as intermediary, helping buildings to overcome collection problems and finding the best outlet for their paper, is especially crucial during such soft market periods. It seems reasonable to assume that if programs can be successfully initiated at this time when paper prices are low, newspaper recycling will continue to grow as prices rise.

Two factors make evaluating the cost-effectiveness of the program premature at this time. First, the start-up and design aspects of the program have taken precedence in the first year. It will take at least another year to determine an optimal rate at which buildings can be brought into the program and to assess staff needs. Second, it is unclear how long each individual building's program will continue and what degree of ongoing support will be needed from EAC. EAC's primary role after a program has been set up is to act as trouble-shooter when problems arise in the management of any individual program and to continue to link up buildings with paper buyers when marketing problems are encountered. To the extent that the price of paper falls below the point at which any given generator or buyer feels it is no longer economically viable to collect or purchase paper, EAC's role as a market coordinator becomes more vital and time-consuming because they must find alternative buyers for generated paper. Ultimately, any long-term cost-per-ton analysis will have to consider both the average lifespan of each program, the cost of setting up each program, and the amount of EAC support (in time and money) required over the life of each program.

- Buy-Back Center Pilot Program

A two-year contract was approved by the Board of Estimate in October, 1985, to help a South Bronx recycling facility to substantially expand its ability to purchase a wide variety of materials from the public. The contract, for an amount between $600,000 and $900,000 depending upon the volume of materials recycled, will subsidize the operation of a "buy-back" facility which will purchase recyclable materials and process them for sale to manufacturers who use secondary materials.

Buy-back centers may be particularly suited to lower income neighborhoods where there is the potential to combine recycling with local economic development objectives. While this pilot project aims to remove the same recyclable materials as other residential recycling programs, it is intended to test an alternative collection concept for possible application in other low-income neighborhoods of the City.

The recycling facility, which is located at 1809 Carter Avenue in the East Tremont section of the Bronx, is operated by Recoverable Resources/Boro Bronx 2000 (R2B2), a subsidiary of the South Bronx 2000 Local Development Corporation. Under the terms of this contract with the Department, R2B2 will be able to purchase materials from the public, which, because of the type of material or the limited quantity being sold, are not now generally purchased by the existing scrap industry, and consequently are discarded for disposal at City waste facilities.

With City support, R2B2 will purchase equipment to densify cans, crush glass, bale fibers, and weigh, store, and handle the materials it buys from the public. The recyclable materials the center will purchase include: glass, aluminum, bi-metal cans, tin cans, newspaper, magazines, corrugated paper, plastics, and wood. Following the example set by buy-back centers now operating elsewhere, the facility will rearrange its public admittance area so that the persons who bring materials to the facility for sale can also perform the bulk of the work involved in separating the materials, thus saving considerably on labor costs. One or more staff members will be on hand to pay for the materials and to direct the public to the appropriate weighing and sorting areas. Once these tasks are completed by the public, facility staff will further process the materials for sale. A portion of the funds provided to R2B2 will be used for a major outreach campaign to advertise their services to the public.

Monthly reports from R2B2 will provide the Department with information about the types of materials and tonnages brought in by the public, operating costs for the facility, revenues generated by the sale of purchased materials, and the effect of outreach efforts on the types and quantities of materials received.

With this pilot project, the Department will be studying

how the public responds to the availability of economic incentives for selling rather than disdcarding recyclable materials. The Department also hopes to learn more about the economics of operating a community-based buy-back center designed to accept small quantities of materials from individuals. Since the returnable container law has essentially eliminated access to higher-priced aluminum, which previously might have subsidized the operation of a buy-back center such as R2B2, the Department is prepared to subsidize this pilot project so that it can evaluate possible future applications of the buy-back concept in other neighborhoods of the City. Initial projections, based on various tonnage and material composition scenarios, show an operating deficit for the R2B2 facility. Therefore, the R2B2 contract includes provisions for a City subsidy.

- Curbside Source-Separation Program

One of the Department's most ambitious residential recycling initiatives this year has been to design a curbside collection system for source-separated recyclables. Curbside programs have been the most common government-initiated source-separation strategy used in the United States, but primarily for low-density suburban communities. For this reason, our pilot curbside program is intended to test the suitability of this particular approach for City neighborhoods with similar low-density characteristics.

As a first step, recycling staff collaborated with other Department analysts on a six-month feasibility study of the potential for curbside collection in New York City. A variety of collection and processing alternatives, as well as their potential impact on different areas of the City, were evaluated in this study. Preliminary results suggested utilizing a separate recycling collection vehicle in low- and medium-density communities. Department representatives met with borough and community board leaders and received support for testing the curbside concept in one community board district in each borough. In July, the Department published its Curbside Source Separation Program Feasibility Study, and Mayor Koch, with the support of the five borough presidents, announced the City's intention to launch this major new residential curbside waste recycling program on a voluntary basis.

As presently designed, the curbside pilot program calls for a weekly collection of recyclable materials, beginning with newspaper and then expanding to include bottles and cans, from residential buildings in five community board districts. The recyclables will be collected by Sanitation Department crews operating specially designed dual-compartment trucks. Selected low-rise buildings in these districts will also be provided with marked containers in which to put their recyclables for collection at the curb. Experience elsewhere indicates that participation rates rise when such containers are provided. An

intensive public education campaign will be conducted prior to starting the program and will continue throughout the two-year pilot period to inform householders about the program, describe how materials should be prepared for collection, and encourage their voluntary participation.

The program will be tested initially in five community board districts: the Pelham Bay, Schuylerville, Throgs Neck, and City Island sections of the Bronx (Bronx Community Board 10); Bay Ridge, Brooklyn (Brooklyn Community Board 10); Greenwich Village in Manhattan (Manhattan Community Board 2); the Rego Park and Forest Hills section of Queens (Queens Community Board 6); and the southern portion of Staten Island (Staten Island Community Board 3).

Since July, Department staff have continued work on the many operational and outreach preparations required to implement the program. These include: development of an intermediate processing center (IPC) where the collected recyclable materials would be prepared for marketing; ordering the specially designed collection vehicles that will be tested in the program; designing new collection routes and schedules; purchasing the containers that will be distributed to participating households; surveying public attitudes to help in the design of an effective public information campaign, and preparations for launching such a campaign early in the new year; and establishing evaluation criteria by which to measure the effectiveness of the pilot program. The status of each of these activities follows.

Intermediate Processing Center (IPC): A Request for Proposals was developed, a pre-bid conference held with potential vendors, and a final RFP was issued by the Department in August to seek proposals from qualified vendors to construct, operate, and maintain an Intermediate Processing Center that will service the Curbside Source Separation Program and possibly several smaller programs. The IPC will be located at an existing facility on 127th Street in East Harlem, which was previously contructed with City and Federal funds for the processing of bottles and cans only. The RFP indicated that the reconstructed IPC must have the capacity to sort, clean, and densify metals, glass and newspaper removed from the residential waste stream. Sanitation collection crews will bring mixed glass and metal, and separated newspaper to the facility for processing.

Criteria for vendor selection, in addition to the bid price, included: a) previous experience operating facilities that process mixed recyclables; b) financial ability of the proposer; c) technical soundness of the proposal; and d) the performance guarantees offered. Proposers were required to provide information on the cost of rebuilding the plant, a bid price for operating the facility based on different tonnages, a plan of operations, evidence of marketing outlets, financial disclosure, and documentation of experience in the processing of

mixed recyclables. Four proposals have been submitted for review; these are presently being evaluated for award.

Collection Vehicles: Specifications were written for the dual-compartment collection vehicles that will be used to collect newspaper and mixed glass and metals in the pilot areas, a pre-bid conference was held, adjustments were made to the specifications after input from potential bidders and from the labor force, and the trucks were bid publically. Three bids were received and a winning bidder has been selected.

Operational Planning: Existing collection routes in each district have been reviewed, tentative recycling routes and schedules have been planned, and Department staff are now riding each planned route to make further route evaluations and count the number of households that will be involved for future program evaluation purposes. Plans for training the labor force to use the new equipment, and a general orientation and training program for all staff who will be involved in the program, are being developed at this time.

Containers for Recyclables: Based on a survey of household waste container specifications and uses, the Department has decided to purchase at least 10,000 containers made from recycled plastic in order to test their durability. This represents one of the Department's efforts to use its procurement practices to help spur the development of markets for materials which are not currently being recycled due to technological difficulties or lack of market incentives. Bids for the balance of the containers that will be distributed free of charge to residents in the five pilot districts will be open to products made of either post-consumer or virgin material.

Public Education: Experiences with virtually all curbside recycling programs around the country have shown that the key to a successful program is a high and consistent level of public participation. Consistent public participation can be brought about only through an intensive public education campaign launched in advance of the programs's start date, and continuing until source separation recycling has become a well-ingrained habit on the part of the public. To date, five basic steps have been taken to organize effective public education programs in each of the communites that will be participating in the pilot curbside program.

a) Public Participation Staff: A Project Manager has been appointed to direct the public education component of the project. Two Community Liaison staff persons have been hired to work with the Community Coordinator to organize public participation programs in each of the five pilot communities. Public participation staff have reviewed the educational strategies and materials of successful municipal curbside programs in the United States and Canada for application to the public participation program in New York City.

b) Public Education Consultant Contract: An RFP was issued to solicit proposals from public relations and advertising firms for designing public education materials and advising the Department on overall public education strategy. The firm of Dudley-Anderson-Yutzy, the public relations arm of the Ogilvy & Mather advertising agency, was selected and a contract was approved by the Board of Estimate on December 5. Under their contract with the Department, this firm will create and produce a theme, slogan and logo for the program, and design a wide variety of educational materials, such as flyers, posters, decals, ads, audio-visuals, and exhibits, to be used by Department staff in their ongoing outreach to the participating communities. Other services to support the Department's own outreach activities will also be provided.

c) Public Attitude Survey: In order to aid both the Department and the public relations consultant in designing an effective public education program, a public opinion survey of attitudes toward residential recycling in the pilot communities was undertaken this fall. The survey disclosed the following information: (i) 12 percent of the respondents said they currently recycle materials in addition to returnable beverage containers, the most frequently recycled materials being newspaper (87%), glass (18%), and metal (14%); (ii) 66 percent of the respondents said they would definitely be willing to participate in a program requiring newspaper separation while 22 percent said they would probably be willing; 53 percent said they would definitely be willing to participate in a program to separate glass and metal from the rest of their trash, while 24 percent said they would probably be willing; (iii) 90 percent of the respondents agreed that participation in such a program would be worthwhile because it would help reduce the City's waste stream and it would conserve natural resources. Based on the experiences of other communities where curbside programs have been implemented, a greater number of people are likely to declare their intention to participate in the program than will actually do so. In addition, there are different interpretations of "participation," which, for example, can be measured in terms of frequency of participation or percentage of available materials correctly sorted by the householder and put out at the curbside each week. Nevertheless, the survey clearly indicates a very favorable attitude on the part of the public toward a residential recycling program directed by the Department.

d) Community Outreach: The Office of Recycling has begun its initial outreach to the five pilot communities. Meetings have already been held with leaders of key local organizations to enlist support for the pilot program in some pilot areas, although the bulk of community education efforts will take place after educational materials

(brochures, posters, audio-visuals) are produced.

e) School Programs: The Department's Office of Public Relations and Education, in collaboration with the Office of Recycling, is developing educational materials for a school program and a teacher-education program on the Department's overall recycling efforts and the curbside program in particular. Initially these programs will be focused in the five community board districts where the curbside pilot program is to be conducted. The Office of Public Relations and Education will also stress the recycling theme in its other school programs as a first step in educating children about the City's long-term recycling goals.

Evaluation Criteria: A crucial element of the pilot curbside program will be the process by which its performance is monitored and evaluated. A detailed monitoring plan is now being developed, which, at a minimum, will include: (i) the tonnages of recyclable materials collected and tonnages of regular waste not collected (compared to previous-year figures); (ii) personnel and equipment costs; (iii) route travel time, number of stops, items per stop, and utilization of truck capacity; and (iv) public participation rates.

- Voluntary Drop-Off Centers

In its Curbside Source Separation Program Feasibility Study (July 1985), the Department identified voluntary drop-off centers as an additional means for diverting residential recyclables that should be further investigated and tested in New York City. In suburban areas, drop-off centers are often the focal point for source-separation activities, and in New York City, there has been some experience with small, but cost-effective, and long-running voluntary center operations in certain neighborhoods. To be successful, this approach depends on a high degree of neighborhood commitment to recycling and residents' willingness not only to separate recyclables but also to deliver them to a designated area at certain specified times.

On July 1, the Department signed a $9850, five-month planning contract with the Environmental Action Coalition to investigate opportunities for expanding and strengthening the network of voluntary recycling centers in Manhattan, and to make recommendations to the Department in the following areas: 1) What steps could be taken in cooperation with existing voluntary centers to strengthen their operations and expand the tonnage collected? 2) What other opportunities exist for the establishment of voluntary centers open to the public in community board districts that are not currently served by voluntary drop-off centers, and what steps might be taken to establish these centers? 3) How might multi-material source-separation programs be installed in those apartment buildings which recycle newspaper through EAC's existing

contract with the Department of Sanitation? EAC has surveyed existing voluntary drop-off centers and has contacted individuals and organizations in various community board districts as part of its fact-finding study. "Mini-proposals" have been prepared by the centers for inclusion in EAC's final report. At EAC's suggestion, the Department of Sanitation determined that another center should be added to this core group of existing drop-off centers: New Yorkers for a Better Environment, which has successfully run one of New York City's largest voluntary centers for 15 years in Brooklyn's Community Board 2. EAC's final report will be submitted shortly and the Department expects to develop a drop-off center pilot program based on its recommendations.

- Containerized Apartment House Recycling Program

In addition to the EAC newspaper recycling program, the Department will be testing a second approach to residential source-separation recycling in large apartment buildings, which generally are not suited to the traditional curbside collection concept. A pilot program is being developed for residential apartment complexes in Manhattan that currently receive Sanitation collection service through some form of containerized system. In contrast to the EAC program, which has no direct Sanitation Department involvement, this containerized program will involve Sanitation employees and equipment in the collection of recyclables. These two programs will offer opportunities for comparing alternative collection approaches for high-rise recycling.

All of the residential complexes in Manhattan that use a containerized system have been surveyed by a team of Department employees to determine whether source-separation programs currently exist at the sites, to gather information about management attitudes toward such a program, and to determine the feasibility of instituting this program at each individual site. Based on this initial survey, some buildings were eliminated from consideration for the pilot project due to lack of space for additional recycling bins, incompatibility of waste management systems, or for other operational reasons. Some building staffs expressed interest in a program that would allow them to earn funds from their recycling efforts; these buildings were referred to the program sponsored by EAC. Other buildings were found to be currently operating newspaper recycling programs on their own.

To date, 76 buildings in 37 complexes have been selected as prime candidates for a pilot program in the coming year, based on the following criteria: compatibility of existing waste management systems with program equipment and operations, available space for additional recycling bins and access for program equipment, and generally positive attitudes among management and maintenance staff toward the concept of the program.

The program equipment evaluation has continued in the past six months and the appropriateness of using E-Z Pak trucks has been reconsidered. While E-Z Pak trucks will still be used for the newspaper collection portion of this apartment house program, an alternative vehicle is considered to be more suitable for the collection of glass and metal. This alternative, known as the Midway, is a three-bin truck which has the ability to pick up fully loaded containers and replace them with empty ones. Glass breakage will be kept to the absolute minimum level because the Midway containers are not dumped from a height into the truck body, as is the case with the E-Z Pak truck. The Midway vehicle is currently used in several California programs, including the Santa Monica multi-family collection program. This truck should maneuver well on City streets and have easy access to containers in the buildings targeted for the high-rise apartment house recycling program.

- Other Residential Recycling Activities

Over the past year, the Office of Recycling has surveyed other localities for innovative residential recycling strategies that might be tested in New York City. Of particularly interest is the concept of explicit government requirements for the incorporation of recycling facilities into newly constructed or rehabilitated residential buildings. Recycling staff have had preliminary contacts with private developers who have indicated an interest in possibly incorporating special design features into new residential construction that will make it easier for source separation and storage of recyclables.

One example of legislated requirements along these lines has been found in New Jersey where the Coastal Area Facilities Review Act requires that developers of multi-unit complexes (24 or more units) include provisions for recycling such as: (i) making space available in the unit for stacked containers which could hold separated materials; (ii) providing bins for recyclables in the central waste-collection area; or (iii) undertaking general recycling education activities. Building code amendments to require space for recycling have been proposed in Los Angeles and Chicago, but they have not yet been enacted.

The Office of Recycling Programs and Planning has been consulting with the Zoning Study Group of the Department of City Planning on the inclusion of source-separation amenities into a proposed new Quality Housing Program zoning amendment. The proposed amendment would expand and simplify the current regulations allowing exceptions to current floor area ratios for new multi-family housing when certain amenities are provided by developers. Two of the new amenities covered by the proposed amendment would provide for: 1) better storage of mixed household waste; and 2) provisions for safe, efficient source-separation programs in multi-family dwellings. An environmental impact study of the proposed Quality Housing

Program zoning amendment by the Department of City Planning will include an analysis of the cost of including the following amenities in new buildings: 1) a chute room on each floor with shelves or bins to store recyclables; and 2) an enlarged compactor room to store recyclables. This represents an example of how public-sector incentives may be used to encourage private sector involvement in the City's residential recycling efforts.

D. New York State Returnable Container Law

The Department has continued to support efforts to improve the effectiveness of the two-year-old New York State Returnable Container Law because of its potential for reducing solid waste and litter in New York City. As a recycling strategy, the deposit system offers the largest potential waste reduction of any single recycling program and could result in an overall reduction of 5.5 percent by weight, or 825 tons per day, if ultimately a 90 percent container return rate by consumers is achieved. Other states with deposit systems have achieved this level of redemption. At the current rate of return in New York City, estimated to be about 66 percent, the Container Law has the potential for removing approximately 550 tons a day from the City's waste stream.

The Department's efforts to increase the container return rate in the past year have included: 1) lobbying the State Department of Environmental Conservation -- the law's regulatory and enforcement agency -- for regulatory amendments to overcome implementation difficulties that have been encountered; 2) supporting recommendations by the Temporary State Commission on Returnable Beverage Containers for legislative and regulatory changes in the Law that could result in a higher New York City return rate; and 3) working with the City Council to win adoption of a "Bottle Bill of Rights" law (which became effective July 1985) to encourage improved retailer compliance with the law.

- Temporary State Commission on Returnable Beverage Containers

From September 1983 through March 1985, the nine-member Temporary State Commission on Returnable Beverage Containers met to study the structure and effects of the law and to make recommendations for its improved implementation. Sanitation Commissioner Steisel served on the Commission as an appointee of the Governor.

The Commission retained the Nelson A. Rockefeller Institute of Government to perform a comprehensive study of the structure of the law and its effects on litter and solid waste reduction, on the wholesale and retail beverage industries, and on the consumer. In March 1985, the Commission issued its report,

which included an evaluation of the Law's effectiveness and impacts after one year, as well as recommendations for changes in the law's structure and implementation.

The Commission concluded that "the law is accomplishing the purposes intended. It has reduced beverage container litter, reduced the amount of solid waste in municipal landfills, has encouraged and assisted the growth of the recycling industry for some materials, and has created new jobs, resulting in an increase in the total number of hours of employment in New York State."

The Commission also found that the law has imposed additional costs on beverage consumers and segments of the beverage industry, and recommended changes in the structure of the deposit system which might effect a reducton in these costs.

- The "Bottle Bill of Rights" Law

In July 1985, Local Law 25 (known as the "Bottle Bill of Rights") went into effect. The law, passed by the Council, requires that all City retailers who sell beverages covered under the State Returnable Container Law for off-premise consumption must post a conspicuous sign in their stores describing consumers' rights under the law.

The "Bottle Bill of Rights" local law was a joint initiative of the Mayor, the Department of Sanitation, and the Department of Consumer Affairs. Although City and state-wide surveys have shown that the Container Law is supported by the majority of the public, the substantial number of consumer complaints to City and State agencies indicates that many New York City consumers are still discouraged from participating in the deposit system due to local storeowners' refusal to comply with the law. The "Bottle Bill of Rights" law is intended to encourage storeowners to comply fully with Container Law regulations by informing consumers of their rights under the law.

To generate greater public awareness of the "Bottle Bill of Rights," the Mayor's office, and the Departments of Sanitation and Consumer Affairs jointly developed a publicity campaign, including media coverage and citywide distribution of "Bottle Bill of Rights" leaflets. "Bottle Bill of Rights" posters, printed in English and Spanish, have been distributed to over 30,000 local beverage retailers. The New York State Food Merchants Association has also assisted in publicizing the new law.

E. Office Paper Recycling Programs

In November 1984, the Department executed a two-year,

$268,000 contract with the Council on the Environment of New York City (CENYC) for a major expansion of its highly successful Office Paper Recycling Service (OPRS). This represents an example of the type of program that can help enhance existing private-sector recycling without direct City involvement. Over the past five years, OPRS has helped to initiate paper recovery programs in over 30 corporate offices. Under its present contract, CENYC is providing technical assistance to additional corporations that are interested in developing paper recycling programs, as well as to the City Agencies Office Paper Recycling Program, and other not-for-profit and non-City governmental agencies.

Appendix II-C contains an updated summary of OPRS programs. Based on OPRS experience, the average lifespan of OPRS-initiated recycling programs has already been demonstrated to be at least 6 years. The per-ton costs of programs initiated during the past year, based on the first-year budget and six-year life span, ranges from $8.43 to $27.29 per ton, depending on whether the program is municipal, not-for-profit, or corporate.

- City Agencies Office Paper Recycling Program

The City Agencies Office Paper Recycling Program was started in 1979 by the Department of Records and Information Services (DORIS), which employed CETA workers to collect and process largely obsolete records from City agencies. A grant from the Department of Sanitation the following year allowed the program to expand by also collecting large volumes of high quality paper from print shops and computer centers.

The program was transferred to the Department of General Services (DGS) in 1981. Initial plans called for adding a desk-top paper collection program where individual employees separate out high-grade paper and place it in desk-top folders for transfer to a centrally located collection bin. Funds for desk-top folders and collection bins were obtained through an allocation from the State Environmental Quality Bond Act (EQBA) and a small pilot program was started.

In 1982, a decision was made to eliminate the costly CETA collection and sorting process and to award a contract to a private paper dealer for the collection of the paper, with a portion of the gross revenues to be returned to the City. Plans for further expansion of the program were subsequently cancelled in favor of other projects with higher revenue-generating potential, and program management was incorporated into other DGS staff duties. Program tonnages began to decline and the Department of Sanitation approached DGS last year to suggest that the program be transferred to the Department and incorporated into the City's overall waste reduction strategies. This was viewed by the Department as a useful opportunity to develop a cost-effective recycling program

quickly that could serve as a model for other private-sector generators of office paper. It also offered an added advantage: the opportunity to develop an increased recycling awareness among thousands of City employees.

The Department of Sanitation assumed responsibiltiy for the City Agencies Office Paper Recycling Paper Program in July 1985, and a major effort is now underway to substantially expand its potential. A full-time Citywide Coordinator in the Department's Office of Recycling is now responsible for implementing the expansion plans. Field audits of all participating offices have been conducted and a computerized records management system has been designed so that the Department can efficiently monitor contractor performance in servicing what is now a total of 300 waste-paper collection bins located in 28 agencies at 95 different addresses around the City. The new records management system will allow the Department to maintain cumulative records on individual bins, agencies and building addresses, and will provide easy access to records on tonnages, paper types and revenues as of July 1985. Also, Department staff have worked closely with the new contractor, V. Monteleone and Co., to improve dispatch and reporting procedures for the program, and to assist in the recycling of obsolete files which are periodically discarded at City agencies.

Primarily as a result of improved dispatch and monitoring systems, total tonnages and revenues have increased dramatically from 1984, as indicated below:

	July - Nov. 1984	July - Nov. 1985
Tonnage	221.19 tons	386.65 tons
Revenue	$11,871.39	$21,029.33

In addition to the overall improvement indicated by these figures, it should be noted that monthly tonnages are also increasing, in contrast to fiscal year 1984, when average monthly tonnage declined steadily throughout the year. By December 1986, the average monthly tonnage for the program is expected to reach 190 tons.

The steady growth in tonnage and revenue achieved to date is particularly encouraging in light of two major factors: 1) the presently depressed wastepaper market has resulted in severely reduced prices for even the highest grades of paper; and 2) the fact that the desk-top component of the paper recovery program, which is expected to be the cornerstone of the Department's goal of recycling 7,000 tons per year with this program by 1991, has not yet been implemented.

Desk-top programs rely on individuals to put high-grade office paper in a desk folder and to periodically empty the folders into strategically located recycling boxes and bins. To prepare for a

major expansion of the desk-top concept in City agencies starting in January 1986, the Department, with assistance from CENYC's Office Paper Recycling Service (OPRS), has developed educational materials and preliminary business plans for 35 City agency locations involving almost 7,000 employees.

OPRS arranged for the design and printing of the educational materials to be used in the program, including four-page brochures (copy attached as Appendix II-D to this Report), posters, signs and desk-top folder labels, and oversaw the design and production of an eight-minute slide show to be used in employee training sessions. The program's theme is "Turn Over A New Leaf -- Turn to Recycling" and all materials stress the garbage disposal crisis and the urgent need to reduce disposable trash. A program operations manual was also prepared by OPRS for use by agency program coordinators.

OPRS and Department staff have developed a modified business plan for the City Agency Program based on the one currently used by OPRS for paper recycling programs at private corporations. This modified business plan has been designed for the types of multi-tenanted buildings City agencies generally occupy. An initial round of building feasibility studies has been completed by OPRS. After review and approval by participating City agencies, the Department will arrange for OPRS to begin employee educational sessions for the 7,000 City employees covered by these initial plans. Based on an average generation rate of 0.5 pounds of paper per employee per day, these new programs will add some 450 tons per year to the City paper recycling program.

- Not-for-Profit and Other Governmental Paper Recycling Programs

The current contract allows OPRS to continue to waive consulting fees and equipment and education material costs for not-for-profit and non-City governmental agencies. OPRS performs ongoing outreach and designs and installs high-grade office paper programs free of charge to these agencies.

Their first year contract goal was to initiate five programs with a combined tonnage averaging 330 tons. During the first several months of the contract, OPRS succeeded in installing five programs in multi-tenanted buildings. These are particularly difficult programs to organize given the logistics of a number of small offices occupying the same building, each of which generates limited quanitities of paper. OPRS provides marketing assistance for these small generators and coordinates in-house support services for these programs.

OPRS has initiated a program for the National Audubon Society and has been invited to provide services to Columbia University. The design and installation of this campus-wide program, which involves 13 buildings generating 819 tons of paper per year, will be an important model for other large institutions in New York City.

- Corporate Office Paper Recycling Programs

OPRS has approached several leaders of the scrap-paper industry with a proposal that they help promote desk-top recycling by their clients and provide, for no fee, all necessary equipment for an OPRS-designed program. Dealers in New York, New Jersey and Westchester have agreed to participate, and OPRS is now able, for the first time, to market desk-top recycling programs to the private sector free of outside start-up costs.

The City's contract subsidizes OPRS outreach costs to private corporations and allows OPRS to waive up-front consulting fees to these corporations for program design and installation if 25 percent of the annual program revenues are shared with OPRS.

The OPRS contract goal for the corporate sector was to initiate five programs each averaging 160 tons per year, for a total of 800 tons. Although OPRS exceeded its goal by initiating seven programs, its tonnage projections fell far short, only averaged about 50 tons. This now appears to be a more realistic goal for an average corporate program, although the introduction of any single large program next year could change these figures. In addition, OPRS has begun a new marketing campaign for its services directed at property managers, emphasizing that its recycling programs can handle their waste disposal needs more efficiently and at less cost.

F. Construction Waste Recycling

Since 1980, there has been a marked increase in the number of operating construction waste transfer stations in New York City, where some materials are consolidated into large vehicles to reduce transportation costs to disposal sites and others are segregated by type for recycling. As Appendix II-E indicates, by 1982 this increase in the number of transfer stations began to result in substantial decreases in quantities of construction waste received at City disposal sites. Average construction waste disposal figures never fell below 1111 tons per day in any year from 1975 through 1981. But in 1983, construction waste disposal figures were averaging only 308 tons per day, a figure which had not increased as of August 1985.

This trend appears to be linked to both the sharp increases in tipping fees (disposal charges) and unrelated increased markets for recyclable components of the construction waste stream. Increased tipping fees do not in themselves create a demand for recyclable materials. However, they can have three possible beneficial side effects, depending on individual circumstances, by: (i) reducing the relative cost to carters of processing recyclable materials for market; (ii) making out-of-city disposal more economical; or (iii) making private transfer station tipping fees more economical. Nevertheless, a good part of the overall reduction in construction waste is certainly due to increased construction waste recycling

activity in New York City.

An intra-departmental task force was formed this past spring to review construction waste transfer station regulations, and to suggest possible changes which might encourage continued recycling efforts. Coordinated by the Bureau of Waste Disposal, the task force was composed of representatives from several Department offices, including the Office of Recycling. Over the course of several months, the task force members met regularly to review the existing regulations, solicit recommendations from members of the carting industry and transfer station operators, and visit transfer stations in New York City and surrounding areas. As a result, new regulations have been promulgated to make it easier for transfer station operators to store recyclable materials for markets and to increase the types of materials which may be brought to transfer stations for sorting and recycling. This is consistent with the Department's stated objective to enhance private-sector recycling wherever possible through limited direct government involvement.

G. Composting

Following an initial review of composting activities that might be suitable for New York City, Department staff prepared a scope of work for a composting feasibility study which appears to offer the greatest potential for reduction in organic waste in New York City. The study will examine the opportunities for using garbage-derived compost as cover material at the Fresh Kills landfill, replacing some of the cover material the Department is required to purchase.

This has been selected as the Department's first composting project because: (i) it could have a significant waste reduction impact, in light of the fact that cover material consumes about 7 percent of available landfill volume; and (ii) there would be no concern with finding or flooding markets since the City would consume its own product. This represents one approach to overcoming market problems for a selected recyclable material. However, first it must be determined that any cover material produced would meet government specifications before embarking on a costly pilot program.

The study will: 1) examine New York State and City specifications for landfill cover; 2) identify locations where garbage-derived compost is used as landfill cover, including specifications, if any; 3) evaluate the effectiveness of compost as cover material at these locations, how long it has been used, the kind of garbage it covers, and the regulatory basis for the use of compost as cover material; 4) provide both the New York State Department of Environmental Conservation and the Department of Sanitation with samples of the type of garbage-derived compost that New York City might produce, for preliminary evaluation; 5) provide descriptions of the processes by which compost is produced and provide the general cost data for one or more appropriate systems. The interim and final results of the study will be made available to

city and state officials for comment and review, and several joint meetings will be held to review the data. Based on the results of this process, a determination will be made on the potential for using any given process to provide cover material in New York City and whether the City should move forward to a pilot program for this purpose.

In addition, the Department is providing technical advice regarding City and State regulatory procedures to an association of Brooklyn landscapers who have identified a site for a cooperative composting project for their members. This project is being launched, in part, because of concerns about increased travel time for disposal when the Fountain Avenue Landfill closes at the end of this year.

H. Public Information and Education

Making New Yorkers aware of the waste disposal crisis in New York City and how our recycling activities and goals fit into the Department's overall waste disposal planning efforts will require a major coordinated public information/education campaign in the coming year, some aspects of which are discussed in Part III of this report.

To date, the major public education initiatives have been centered around the Curbside Source-Separation Program. The theme and logo that are being designed for the specialized informational materials for the curbside program, however, will also be adaptable to other City recycling programs. For general public information about recycling, the Department's consultant, Dudley-Anderson-Yutzy, will be designing a transit poster with a general theme encouraging the public to recycle and telling them how to get more information. In addition, the Department's Recycling Office will begin to publish a regular 4-page newsletter early next year, for which a distinctive masthead and back page are being designed.

I. Legislative Initiatives

As a first step towards developing a possible legislative agenda to help stimulate more recycling and waste reduction, the Department commissioned a study of the effectiveness of the five-year-old State Environmental Conservation Law (known as Chapter 552 of the Laws of 1980), which was intended to promote a broad array of resource conservation programs. The Department retained Public Interest Projects, Inc., a non-profit research organization created and staffed by two former senior staff attorneys with the New York Public Interest Research Group (NYPIRG) to conduct the study. The report was recently completed and is now being reviewed for future actions.

J. Market Development

As noted in Part I of this Report, market prices, market capacity, and market stimulation are issues that must be addressed as increasing numbers of states and municipalities turn to recycling as a part of their long-term waste management strategy. The Department has begun to study the characteristics of markets for secondary materials from several perspectives. Further market analysis and development activities will be a continuing and increasingly significant part of the City's recycling efforts in the coming year.

- In November, 1984, the Department contracted with the South Bronx 2000 Local Development Corporation to prepare a summary report on existing markets for selected recyclable materials which may be collected through "source separation" by individuals, community groups, schools, and other institutions. Bronx 2000 was also to study alternative collection, processing, and shipping approaches for recyclable materials, and to identify possible end-products which could be manufactured locally from selected recyclable materials. Finally, the report was to include recommendations regarding possible economically viable recycling enterprises and industries; likely capitalization, space, and location requirements for such industries; and the potential for developing an "incubator" facility or industrial park for recycling enterprises and industries.

The Bronx 2000 report was completed in June and the R2B2 buy-back center pilot project described earlier in this report is a product of one its recommendations. Department staff are now reviewing opportunities for implementing other recommendations made by Bronx 2000.

- In May 1985, the Department engaged VandenBerg-Ferrand Associates to conduct a study of City procurement policies and to identify potential restrictions on the purchase of recycled products. The report has been received and reviewed by Department staff. Specific Department recommendations are now being developed based on the findings in this report.

- The Department has also been reviewing its own internal procurement practices to determine what opportunities exist and what steps might be taken to purchase more recycled products. As a result, two initiatives have already been undertaken.

First, the Office of Recycling Programs and Planning compared the costs incurred by the Department for bond office paper in fiscal year 1985 with the prices for recycled bond. This study showed that, in some instances, recycled paper could be less expensive than virgin (non-recycled) paper. Consequently, the Department has adopted a policy that favors purchasing recycled bond paper when prices are competitive with virgin products.

Second, the Department's Offices of Resource Recovery and Fiscal Services have begun to test recycled xerographic paper in both standard and high-speed photocopying machines. Preliminary results have shown that recycled xerographic paper, containing a minimum of 15 percent post-consumer waste material, performs excellently. If the final results are equally favorable, the Department will recommend purchasing recycled xerographic paper internally whenever prices are competitive with virgin paper.

- To promote the use of recycled products outside government, the Office of Recycling has assumed a role as a clearinghouse for information on recycled products. For example, in response to a request from a manufacturer of cellulose insulation (which is made from waste paper), staff provided information on the New York City market for insulation materials. The company that requested the Department's assistance is also interested in buying New York City waste paper as part of a back-haul operation if the company ships its recycled product to the City.

- Department staff are also currently reviewing a proposal for a feasibility study that would include the development of business plans for enterprises that might locate in New York City and use the City waste materials in the manufacture of new products.

- The Department has investigated the possibility of purchasing waste containers made of recycled post-consumer plastic to be provided to households that will be participating in the pilot curbside source separation program. Since no existing sample containers or manufacturers could be located, the Department decided to issue two separate bids for household containers. One bid will cover the bulk of containers required in the pilot and proposals will be accepted from manufacturers of either virgin or recycled plastic containers. The second bid will be for 10,000 containers and will specify a post-consumer recycled plastic content. In this way, the Department expects to use the curbside program to encourage the manufacture of recycled plastic containers and to test their performance in the pilot stage. If the test proves successful, containers that might be purchased in a future expansion of the program could be required to be made of recycled materials.

PART III: NEXT STEPS

The pilot programs outlined in the previous section of this report focus on efforts that rely primarily on direct Sanitation Department involvement in materials collection, processing and marketing. In the coming year, as the City moves towards a sustainable waste-reduction goal, the range of our programs will be expanded to include a proportionately greater number of efforts to encourage more private and non-profit sector collection and marketing of source-separated materials.

There are several reasons for devoting increased attention to private-sector recycling incentives in the future. First, because of the inherent volitility of the markets for secondary materials, it is desirable from a public policy perspective to minimize the exposure of the public sector -- through fixed capital and operating costs -- to the fluctuations of the market cycle.

Second, because of the natural economic incentives that exist for specific materials during high-market conditions, the private sector is already diverting significant proportions of saleable recyclable materials during these periods. Attempts at public-sector collection, therefore, would tend to compete with private-sector activity for these specific materials, and might do less to divert <u>additional</u> tonnages from the waste stream than simply to decrease the prices of recyclable materials and/or drive already established recycling enterprises out of business. During market-low periods, private recycling efforts would be relatively more cost-efficient than the public sector's due to the fixed nature of public-sector costs (i.e. personnel cannot be hired and fired to conform to market cycles, nor can redundant capital equipment be easily turned to other uses).

Third, public-sector programs tend to represent larger, more centralized, more narrowly focused efforts, while a multiplicity of private programs might be able to respond more flexibly to market opportunities, with more incentives for research and development, reducing the public sector's exposure to the risks of failure.

Fourth, there are a variety of intermediary actors involved in the handling of recyclable waste materials between generator and collector, and to the extent that economic incentives could be expanded and made more directly available to a greater number of these actors (such as building superintendents who must expend extra efforts in order to divert residential waste from Sanitation curbside pick-ups to secondary markets), such incentives could have the effect of stimulating expansion of the overall quantities of secondary materials diverted from the waste stream.

This section provides an outline of some additional planning and program development activities that will be undertaken by the Department of Sanitation in the year ahead to continue moving the City towards its goal of recycling an additional 15 percent of its waste stream by 1991. It also contains a brief outline of possible longer-term programs that might be considered.

In 1986, the Department will develop strategies and implement major new pilot programs to foster recycling in the institutional and commercial waste streams. The Department will also continue to evaluate current projects, implement its planned residential waste stream pilot programs, and complete staff recruitment for the Office of Recycling Programs and Planning. In addition, the Department will expand its local market development, composting, and community outreach initiatives, and continue to monitor developments in construction waste recycling. Finally, through participation in the State Recycling Forum, staff review of opportunities for new legislative initiatives, and ongoing discussions with our counterparts in other municipalities, the Department will continue to be a part of the planning process to create a viable support system for municipal recycling efforts on a state-wide and regional basis.

A. Residential Recycling Projects

The Department will continue to monitor the performance of the EAC apartment house recycling program with a view towards future expansion, and at a minimum, expects to submit a contract modification to the Board of Estimate to extend the current contract by up to 16 months allowing EAC to: a) organize an additional 35,000 apartment units for newspaper collection by the end of the contract period; b) design and initiate a pilot program in which selected buildings will collect at least one other material for recycling; c) reinforce programs in all currently participating units to maximize participation; and d) develop a model source-separation program for household hazardous wastes.

The Department will also be providing assistance for expansion of existing voluntary drop-off center services based on recommendations contained in EAC's planning study. The R2B2 buy-back center operation will also be monitored closely.

Implementation of the curbside and containerized apartment house pilot programs will be the Department's most ambitious residential recycling effort. Educational materials will be designed and produced, outreach to communities and individual apartment complexes will begin, and the East Harlem IPC will be equipped.

A new recycling newsletter, to be published quarterly by the Office of Recycling Programs and Planning, will become an important vehicle for public information and education, as well as for general progress reports on the status of recycling initiatives sponsored by the Department.

B. Office Paper Recycling Programs

The high-grade office paper recovery programs described in Part II of this Report represent the Department's first efforts at diverting materials from the City's institutional and commercial waste streams. Based on the positive results achieved so far with these pilots, the Department intends to expand them in the coming year as described below. Additional commercial and institutional waste stream recycling initiatives are described in the next sections of this Report.

Major changes will take place in the operation of the City Agencies Office Paper Recycling Program in the coming year. With new management and auditing procedures in place, and educational materials completed, the Department will emphasize the implementation of desk-top, high-grade office paper recovery programs. In those agencies where draft business plans have already been developed, plans will be finalized with agency coordinators and arrangements made for the education of agency employees in small groups beginning in late January 1986. Gradual extension of the program to additional City offices will proceed throughout the year. The year's goal will be to at least double current monthly tonnage in the program. Appendix III-A contains tonnage projections for the program through 1991. New bins will be purchased to accommodate this increased tonnage, and bi-monthly communications will alert all agency coordinators of the program's progress.

The Department also intends to extend CENYC's Office Paper Recycling Service (OPRS) contract by up to 16 months to: a) increase program design and employee education services to the City Agencies Office Paper Program through the addition of another full-time staff member; b) increase participation in the non-profit sector by another 2,000 tons per year by the end of the contract period; and c) improve and expand outreach and marketing efforts to the not-for-profit and corporate sectors. In addition, OPRS will prepare monthly reports for the Department on wastepaper prices for a variety of grades; quarterly reports on office paper program activities nationwide, and on regional and national paper prices; semi-annual reports on changes and trends in the wastepaper market; annual surveys to document the overall effectiveness of OPRS-designed programs, including revenues, operating cost, recovery figures, waste reduction and cost-avoidance; and periodic reports on other office paper recovery issues.

C. Institutional Waste Stream Pilot Programs

In the coming year, the Department will study the feasibility of implementing waste-reduction programs in large institutions, such as schools, hospitals, libraries, and prisons. A preliminary assessment by the Department indicates that the institutional waste-generating sector of the City may offer the potential to divert significant quantities from the waste stream in a cost-effective manner and possibly reduce regular waste collection costs to the Department.

Department collection and disposal records show that City agencies, tax-exempt institutions, and other government agencies that receive Department services collectively generate at least 5 percent of the waste disposed of in New York City. These figures do not include any private institutions which are serviced by private carters.

Specialized recycling strategies directed at the City's institutional waste stream appear to offer significant potential for the following reasons:

- There are currently private sector firms which provide waste management services to private and non-profit institutions free of charge or at a reduced fee in return for access to selected portions of their waste streams, e.g. corrugated paper.

- There is some private sector interest in obtaining and using certain recyclable portions of the institutional waste stream which currently have no value because they are not segregated and accumulated in bulk, e.g. plastic utensils.

- The Department of Sanitation provides collection and disposal services free of charge to tax-exempt properties. To the extent that these properties embarked on recycling programs that substantially reduced their waste-generation rates, a noticeable offset in the cost of Sanitation collection services might be realized.

- Since some institutions currently receiving City collection services have requested more frequent collections because of problems with internal waste management systems, separate collection of recyclables might be a means by which the City could provide improved service and at the same time help to achieve its recycling goals. Other institutions that currently pay for private collection services might realize disposal savings, and possibly additional revenue, through a recycling program aimed at selected portions of their waste streams.

With a view towards designing suitable pilot recycling programs for the institutional waste stream, the Recycling

Office expects to begin to collect and analyse relevant data about: (i) waste quantities collected by the Department from institutions; (ii) the frequency of institutional collections; (iii) collection methods in use; (iv) the composition of wastes generated by different types of institutions; and (v) the potential impact institutional recycling programs might have on regular collection/disposal costs.

D. Additional Commercial Waste Stream Reductions

A number of private-sector recyclers, including commercial carters, metal and paper scrap dealers, transfer station operators, and processors of glass, plastic, wood and tires, have approached the City over the past few years to seek assistance in upgrading existing recycling facilities or creating new ones to improve their economic return. To date, the Department's involvement has been primarily limited to helping other City economic development agencies evaluate recycling proposals that are submitted.

However, the Department expects to expand its role in private sector recycling through direct incentives to intermediate processors and/or end-users of recyclable materials to help augment their existing recycling activities. There are clear advantages to the City to helping the private sector to increase recycling of materials diverted from the commercial waste stream. The most appropriate mechanisms for this assistance have yet to be determined.

Some of the options include direct financial assistance for innovative projects, service contracts that provide waste reduction benefits to the City, diversion credits for documented waste reduction efforts, marketing assistance, and eliminating obstacles that may inhibit private sector activity. Activities to stimulate end-use markets for recyclable materials from the commercial waste stream would also benefit all private sector intermediate processors. However, the Department recognizes that incentive policies must be developed carefully so that their effect is not to pay for or displace existing recycling efforts.

E. Market Development

Market development activities in the coming year will include recommendations by the Recycling Office regarding procurement of recycled products by the City, pilot programs to test the performance of specific products with recycled content, and efforts to coordinate activities with and among City and regional economic development agencies (such as the Port

Authority of New York and New Jersey) related to market development for secondary materials. Successful market development activities should also have the ancillary effect of spurring the private sector to additional recycling efforts in response to increased demand for secondary materials.

F. Recycling Surcharges

The Department will study possibilities for instituting a "recycling surcharge" on tipping fees at City disposal facilities both as a means of generating revenue to fund (or subsidize) ongoing recycling efforts, and as an incentive for more recycling by private industry.

The concept of making waste generators share responsibility for all aspects of solid waste management is only recently being adopted around the country. Increasingly, local governments are using disposal or collection fees not only to cover operating costs, but also to finance planning and construction projects and to fund recycling programs. Typically, three approaches have been used:

(1) A separate surcharge on all waste disposed may be levied and used exclusively for recycling-related expenditures. This surcharge typically has been levied by a local or regional government for its own use, although the states of Minnesota and New Jersey have enacted surcharge programs that apply a portion of the collected funds to local governments.

(2) Some local and regional governments add a waste management surcharge to diposal fees and a portion of these funds are used for internal programs to promote or facilitate recycling. The Metropolitan Service District in Portland, Oregon and the Los Angeles Sanitation District both do this.

(3) Some local governments assess a surcharge on a differential basis to encourage recycling. For example, in Lane County, Oregon, those waste haulers who offer a certified recycling program pay a lower disposal fee than those firms that do not offer such a program.

The funds raised by surcharges are dispersed in the same way governments make other funds available for recycling activities:

- to budgeted program elements of the fee-collecting agency and to other public agencies for projects such as recycling collection programs, telephone hotlines, recycling centers at transfer and disposal sites, program promotion activities, and research tasks;

- to private contractors who provide recycling collection and

processing services, promotion campaigns and school education, and who conduct studies; and

- to private operators for recycling equipment purchases and low-interest loans.

The Department will assess current surcharge programs elsewhere for their revenue-generating potential and will determine the types of programs that appropriately could be subsidized through such a surcharge program (private and public) in New York City. The Department will also study the probable impacts of such programs: the opportunities for increased recycling through the initiation of new programs and/or funding of new facilities, the possibility of waste reduction at current facilities due to increased disposal costs, and the potential for extending the useful life of disposal facilities through increased recycling.

G. General Community Outreach and Education

The Department will begin to publish a quarterly Recycling Newsletter to provide ongoing information about City programs and plans in early 1986.

A transit poster with a general recycling theme is being developed and will appear on buses and subways within the next few months. It will invite New Yorkers to write for information about City recycling programs and ways in which individuals can help. A Householder's Recycling Guide, offering suggestions on how individuals can participate in the City's waste reduction efforts, will also be published by the Department in the spring.

H. Composting Studies

The Department will be conducting a feasibility study of the potential for using garbage-derived compost as landfill cover, which may lead to the development of a pilot project utilizing portions of the City waste stream in the coming year.

In addition, the Department will examine the potential for producing and marketing compost using source-segregated compostable waste and low-technology approaches. In some suburban localities, municipal leaf-collection and programs requiring segregated deliveries of compostable yard wastes by private haulers and park maintenance workers at disposal sites account for large diversion rates. Given the somewhat different composition of an urban waste stream, the more complex collection logistics, and the limited land space that would be available for such composting activities in New York City, the

potential for composting on a large scale here remains to be determined. The economics of composting may improve as the travel distance to landfill sites and disposal costs increase.

I. Legislative and Policy Initiatives

Department staff will continue to examine opportunities for legislative and policy initiatives that would support recycling and waste reduction. The Department's involvement with the State Department of Environmental Conservation's Recycling Forum will help to shape state policies that could benefit the City's recycling objectives. In reviewing routine city, state and federal legislative activities, special attention will be given to measures that might promote or inhibit waste reduction and recycling efforts.

J. Resource Recovery Planning

The Department's resource recovery planning efforts will continue in 1986 with detailed environmental analyses of four proposed waste-to-energy projects. The Recycling Office will be integrally involved in these analyses and in the development of the required environmental impact statements. Public meetings in each borough will be held within the next several months to receive comments on a draft scope of work for the project studies. They will include analyses of the effects of the City's projected long-term recycling program on overall waste quantities, on waste composition, and on the waste sheds that the four proposed waste-to-energy facilities would serve.

K. Mid- and Long-Term Planning

In conjunction with the efforts outlined above, the Department will continue to explore potential opportunities to stimulate further private sector involvement in recycling over the long term to complement -- and possibly supplant -- direct Department-sponsored activities. This might involve several incentive-type programs, in which per-unit subsidies would be provided for the successful marketing of secondary materials. Sanitation Department involvement, in these cases, would consist primarily of program design, public information efforts, management of subsidy programs, monitoring, and evaluation. Specific programs could be tailored to specific types of waste generators (and collectors) for a range of selected materials.

An example of one such program that is in the early stages

of consideration might be directed at high-rise residential buildings where maintenance personnel are involved in waste-handling. The program would offer economic incentives to sellers of secondary materials collected from such buildings to manufacturers of new materials on an as-of-right, per-unit basis. Payments per ton of solid materials (collected within New York City) would be set at a levels that would have the effect of encouraging larger volumes of material to be collected during periods when it could be economically marketed, or to make marketing the material economically feasible in marginal market situations. These "bonus payments" would not be high enough to economically justify collection in itself, so that markets would not be overloaded with materials they could not absorb, nor would there be an incentive to collect more materials than could be marketed at a given time.

Private or non-profit collection agencies could join this type of program, and periodically be paid per-ton subsidies upon submission of validated sales receipts from materials markets. In order to expand their collections, these collectors would have an incentive and an increased profit margin with which to make payments to building supers, who are a direct source of secondary materials from most apartment buildings. In cooperatives and apartment complexes, resident organizations could join the program for direct payment, or a reduction in City taxes.

Other types of programs designed to increase market volumes gradually without producing more materials than can be converted to new end-uses -- and which recognize that there will be periods when markets will not accept particular materials at economically feasible prices -- might be developed for private carters.

One such possibility is a program that would allow any private carter to dispose of specified source-separated materials (e.g. high-grade paper, corrugated, newsprint, glass, construction waste) at designated Sanitation facilities without payment of a disposal fee. This would increase private carters' economic incentive to source-separate materials they collect during low-market periods when materials could not be economically sold, thus helping to stabilize source-separated collection systems through cycles of market disruption.

Having received these separated materials at no cost, the Department could afford to market them for relatively low returns. Other potential options for such materials include: provision to paying (franchised) or non-paying scavengers, burning them for resource recovery, composting, use as landfill cover or road-building material, or landfilling.

These and other innovative conceptual approaches to the complex separation-collection-marketing mechanisms that produce recycling will continue to evolve along with the immediate, concrete pilot programs and feasibility studies that have been

identified as Departmental priorities in the initial stages of developing a comprehensive recycling program for the City. As more is learned through trial, practice, and inevitably, failures, this experience will be applied to the design of a long-term, sustained waste-reduction program.

APPENDIX I-A

Solid Waste Generation and Disposal Demand 1981 and 1985

City-Wide Totals (Tons/Day)

	1981	1985
BCC Collections	13,381	13,224
Commercial (Private[1] Carters)	8,356	9,193
Other Government Agencies	592	572
Construction Waste	1,780	1,885
Other Waste	348	365
Non-Municipal[2] Waste	1,650	1,650
	26,107	26,889
WASTE FLOW CONTINGENCIES		
Non-Municipal[3] Incinerators	-1,650	-1,485
DOS Incinerators[4]	-1,000	-1,925
B.C.D.L.[5]	-	691
Exported Waste[6]	-2,000	-
DOS DISPOSAL DEMAND	21,457	22,788

NOTES:

1. Commercial (private carters) figure represents an average of a calculated range.

2. The New York State Department of Environmental Conservation estimates an approximate 2,750 TPD of solid waste is burned in non-municipal incinerators. It is estimated by the NYCDOS that approximately 40 percent, or 1,100 TPD is collected by the DOS as ash residue, and is included in the figures presented for BCC Collection.

From: The Waste Disposal Problem in New York City: A Proposal For Action (Volume 7: Recycling Strategies)

NOTES: (Continued)

The figure presented here (1650 TPD) represents that amount of solid waste committed to non-municipal incinerators, and not collected as ash residue by the City. ("Refuse Incineration 1980-81 VOC Emission Inventory for New York City-June 15, 1981 NYSDEC Region 2").

3. The figures presented here show the full amount of waste committed to non-municipal incinerators (less that portion collected as ash), as being removed from the total waste stream in 1981. The New York City Department of Environmental Conservation estimates that of the 2,750 TPD committed to non-municipal incinerators, approximately 10 percent or 275 TPD can be attributed to housing authority establishments. The table shows the elimination of these housing authority incinerators by 1985 (10 percent of the 1,650 TPD removed), and the possible shutdown of all other non-municipal incinerators by 1990 with all of the associated tonnages entering the waste stream.

4. The NYCDOS operates the three municipal incinerators. Southwest Brooklyn, Betts Avenue, and Greenpoint. These units burned a reported 1,675 TPD in 1981. Assuming a 60 percent burn rate, these units would have removed approximately 1,000 TPD from the waste stream. The NYCDOS plan to upgrade these facilities to a combined capacity of 2,750 TPD. Assuming an improved burn rate to 70 percent, these units would then be anticipated to remove 1,925 TPD from the waste stream.

5. Beverage Container Deposit Legislation - The New York City Department of Sanitation estimates that the legislation will result in the removal of approximately 5.5 percent of the Bureau of Cleaning and Collection (BCC) waste stream.

6. Exported Waste - The New Jersey Department of Environmental Protection has reported that in 1981, approximately 2,000 TPD of NYC generated waste was deposited at disposal facilities within Middlesex County and Hackensack Meadowlands. This waste flow is assumed to be generated by commercial sources within NYC. An out-of-state waste ban has since been placed in effect for the Hackensack Meadowlands area. According to the NJDEP records, Middlesex County has approval to accept approximately 1,300 TPD of out-of-state waste. However, the continuation of these agreements is contingent upon the construction, and/or expansion, of disposal facilities within Middlesex County and other areas of the State. Since the continued acceptance of out-of-state waste cannot be guaranteed, the entire commercial waste stream generated within NYC would have to be disposed of at NYCDOS facilities, and is represented as such in this table.

7. The totals presented here are the anticipated tonnages requiring disposal capacity in each of the forecast years. The numbers should be considered in light of possible increases or decreases in the tonnages shown as waste flow contingencies. The NYCDOS has indicated that a possible additional 1,000 TPD may be removed from the waste stream, as a result of recycling efforts. However, no specific sources for these can be found. Intensified recycling efforts in both the public and private sector may result in additional amounts of material being removed from the waste stream.

APPENDIX I-B

SELECTED RECYCLABLE MATERIALS AS PORTION OF DISPOSED MUNICIPAL WASTE
BASED ON NEW YORK CITY, MID-ATLANTIC REGION, AND NATIONAL STUDIES
(CONSTRUCTION WASTE EXCLUDED)

	NYC Studies			DS Estimates Based on NYC Studies			Regional Study	National Study	Pre-RCL*	RCL Impact	Post-RCL
	1	2	3	4	5	6	7	8	9	10	11
Paper**	52.5%	34.8%	40.7%	51.25%	42.05%	--	44.9%	30.0%	42.3%	--	38.1%-46.5%
Glass and Ceramics	8.1	8.7	8.6%	6.69	18.03[a]	8.8	9.5	12.4	9.0	(3.7)%	4.8-5.8
All Metals (Including Ferrous and Aluminum)	7.5	12.7	--	15.22[a]	9.3	--	9.3	6.6	9.0	--	-- --
Ferrous Only	--	9.0	7.39	--	--	4.1	--	5.3	6.4	(1.0)	4.9-5.9
Aluminum Only	--	3.6[a]	3.5[a]	--	--	1.4[c]	--	1.0[d]	1.2	(0.2)	0.9-1.2
Plastic & Rubber	3.2	9.6[a]	8.9[a]	5.0[b]	6.0[b]	--	--	4.7	4.7	(0.6)	3.7-4.5

FOOTNOTES

a Figure discounted when averaging for pre-and post-RCL because far exceeds generally accepted range.
b Includes rubber and leather.
c May contain trace quantities of other non-ferrous metals.
d 50 percent aluminum cans.

* RCL = New York State Returnable Container Law
Pre-RCL = Pre September 12, 1983
Post-RCL = Post September 12, 1983

**See Exhibit II-6 for breakdown of paper by category

SOURCES (Numbers refer to column numbers)

1. EPA Resource Recovery Task Force and Leonard S. Wegman Co., Inc., Consultant under Contract with the New York State Department of Environmental Conservation. Summary Report: New York City EPA Comprehensive Solid Waste Management Plan for Refuse Disposal and Recovery of Material and Energy Resources, June 1977, Page 5.

From: The Waste Disposal Problem in New York City:
A Proposal for Action (Volume 7: Recycling Strategies)

2. Pope, Evans, Robbins Incorporated, Consulting Engineers, Study of Municipal Waste Quantity, Composition and Heating Value: Spring Creek Area, Brooklyn, New York, Janaury 1979. Prepared for the Port Authority of New York and New Jersey. Table 1-1, Page 1-5 (Sample Assay Period October 1978).

3. E.R. Kaiser, D. Kasner, and C. Zimmer, Incinerator Grate Deterioration... Causes, Cures and Costs, Final Report to the City of New York Environmental Protection Administration, Department of Sanitation, August 1972, Table 19, Page 54 (Betts Avenue Incinerator, Assay Period, June 1971).

4. Department of Sanitation estimates based on report by Pope, Evans, Robbins, Incorporated, Consulting Engineers, entitled Winter Seasonal Effect on Quantity, Composition, and Heating Value of MSW in the Spring Creek Area of Brooklyn, prepared for the Port Authority of New York and New Jersey, May 1979 (Sample Assay Period March 1979). Department arrived at estimates by combining the residential and commerical categories on Page 9 of the report in a 74.2/25.8 ratio. This was the City-wide ratio of household and commercial waste in Fiscal Year 1979.

5. Department of Sanitation estimates based on report cited in #4 above. The household refuse figures in Table 14 (Page 49) and the commerical refuse figures in Table 16 (Page 51) of the cited report were combined in a 70/30 ratio based on the report's recommendations on Page 54.

6. Department of Sanitation estimtes based on Final Report, Solid Waste Sampling Program, New York City, Resource Recovery Project by SCS Engineers (November 1982). Department estimtates are the result of averaging the report's seasonal figures for each material (Page 8 of the SCS report).

7. Westchester County, Department of Public Works, A Report on the Feasibility of Regional Management of Local Source Separation Programs in Westchester County, January 1982, Page 43.

8. Franklin Associates, Ltd., unpublished national data done under contract for USEPA. Table entitled "Net Discard - 1980." Note: This material is based on flow estimates rather than actual solid waste composition site studies. Figures used are prior to 1980 energy recovery.

9. Department of Sanitation estimates based on a strict numerical average of Columns 1 through 9, excluding figures which were considered too far out of generally-accepted ranges (Footnote A). These are pre-container legislation estimates.

10. Department of Sanitation estimates of the reduction in solid waste to be disposed of in New York City as a result of the New York State Returnable Container Law. Glass, aluminum, and ferrous reductions were based on figures obtained from the U.S. Department of Commerce, Energy and Economics of Mandatory Deposits, September 1976, Appendix 1, Page 5. Department calculation of plastic reduction was based on general research and conversations with Peter Karter, Resource Recovery Systesm, Incorporated. Since this study was completed, the switch from steel to aluminum has continued, leading us to conclude that the steel figure in Column 10 is too high and the aluminum figure is too low.

11. Column 9 less Column 10. Post-container legislation estimates by the Department of Sanitation expressed as a range of percentage figures +/-10%.

APPENDIX I-C

SELECTED RECYCLABLES REMAINING IN THE MUNICIPAL SOLID WASTE
(POST-RETURNABLE CONTAINER LAW)(1)
WHICH MAY BE TARGETED FOR NEAR-TERM SOURCE SEPARATION PROGRAMS*

Residential	Percentage of Residential Waste[2]	Tons Per Day	Tons Per Week	Tons Per Year
Newspaper	6.3 - 7.7(3)	945 - 1,115	5,670 - 6,930	294,840 - 360,360
Glass Containers	4.8 - 5.8	720 - 870	4,320 - 5,220	224,640 - 271,440
	1.8 - 2.2(4)	270 - 330	1,620 - 1,980	84,240 - 102,960
Aluminum Cans/ Plates/Foil	0.9 - 1.2	135 - 180	810 - 1,080	42,120 - 56,160
	13.8 - 16.9%	2,070 - 2,535	12,420 - 15,210	645,840 - 790,920

Commercial/ Governmental	Percentage of of Municipal Waste(5)	Tons Per Day	Tons Per Week	Tons Per Year
High Grade Office Paper	2.9 - 3.5	675 - 819	4,070 - 4,914	211,725 - 255,528

* Figures represent the estimated "universe" of selected recyclables in the waste stream, not the actual quantities that are assumed to be accessible through source separation programs.

NOTES

(1) Assumes 90 percent of the deposit beverage containers have already been removed.

(2) The residential waste stream for purposes of this calculation is 15,000 tons/day; Department of Sanitation Bureau of Cleaning and Collection (BCC) collections, 1981.

(3) Newspaper as a percentage of residential waste is felt to be higher than as a percentage of total municipal waste (residential plus commercial) cited in Table 3.

(4) Source: Franklin Associates, Ltd., unpublished national data prepared under contract to US EPA, 1981.

(5) The municipal waste stream, 1981, is approximately 23,400 tons/day. Source: Bureau of Cleaning and Collection residential waste tonnage plus privately-carted commercial waste. The percentage of high grade office paper is based on generation figures for NYC office workers in commercial and governmental sector offices, less estimated current recycling. Source: Gershman, Brickner and Bratton, 2/84.

FROM: The Waste Disposal Problem in New York City: A Proposal for Action

APPENDIX I-D

ESTIMATE OF MAXIMUM
PRIVATE SECTOR RECYCLING EFFORTS*

MATERIAL	TONS PER DAY
Paper[1]	
Newspapers	330
Corrugated	700
High Grade	85
Metal[2]	1600
auto	(700)
demolition	(700)
other	(200)
Construction[3]	1450
TOTAL	4165

1. Paper estimates prepared by Gershman, Brickner and Bratton based on regional and national recycling rates.

2. Metal estimates provided by L. Formato, President, Central Iron & Metal, March 28, 1984.

3. Construction waste figure represents the average daily decrease in construction waste at City disposal sites documented by Department figures since 1982, a proportion of which is accounted for by out-of-city disposal.

* Estimate does not include industrial waste recycling or recycling of returnable container law material.

APPENDIX I-E

BEVERAGE CONTAINER MATERIALS REMOVED FROM THE RESIDENTIAL WASTE STREAM IN NEW YORK CITY AS A RESULT OF THE NEW YORK STATE RETURNABLE CONTAINER LAW[1,2]

	Percentage of Residential Waste[3]	Tons/Day	Tons/Week	Tons/Year
Glass Bottles	3.7	555	3,330	173,160
Steel Cans	1.0	150	1,000	52,000
Aluminum Cans	0.2	30	180	9,360
PET Bottles[4]	0.6	90	540	28,080
	5.5	825	5,050	262,600

1 The residential waste stream is considered to be 15,000 tons/day, derived from Sanitation Department Bureau of Cleaning and Collection data, 1981 .

2 The New York State Returnable Container Law was implemented September 12, 1983.

3 See Column 10, Table 3.

4 PET = polyethylene terephthalate, the plastic used for soft drink beverage bottles.

FROM: The Waste Disposal Problem in New York City: A Proposal for Action (Volume 7: Recycling Strategies)

APPENDIX II-A

EAC Apartment House Recycling Program

MONTHLY COLLECTION STATISTICS

	Nov. '84	Dec. '84	Jan. '85	Feb. '85	March '85	April '85	May '85	June '85
Program Total* (in lbs.)	2500	3300	-	4000	10,900	48,250	45,530	28,720
Miscellaneous** Total (in lbs.)	4000	14,420	2000	-	12,150	8440	12,155	16,865
Monthly Total (in lbs.)	6500	17,720	2000	4000	23,050	56,690	57,685	45,585

	July '85	Aug. '85	Sept. '85	Oct. '85	Nov. '85	Dec. '85	Jan. '86	Feb. '86
Program Total (in lbs.)	76,805	41,560	41,915	85,680	74,030			
Miscellaneous Total (in lbs.)	9760	10,550	14,840	13,615	25,295			
Monthly Total (in lbs.)	86,565	52,110	56,755	99,295	99,325			

* Program Total is the total weight collected for the month from buildings participating in the Program.

** Miscellaneous Total is the total weight collected from locations other than Program buildings, including collections from recycling centers, offices and individuals who have been unable to get their buildings to participate in the Program.

APPENDIX II-B

Environmental Action Coalition

625 Broadway (Bleecker/Houston)
New York, N.Y. 10012
(212) 677-1601

PROGRAM GENERATION RATES
(Through November 26, 1985)

Building Address	# of Units	Time Period (in days)	Weight Collected (in lbs.)	Overall Generation Rate
67 Riverside Drive	36	205	2100	1.99 lbs. / unit week
205 W. 13th St.	55	329	12,335	4.77 lbs. / unit-week
263 West End Ave.	120	167	10,000	3.49 lbs. / unit-week
60 Sutton Place	360	252	34,765	2.68 lbs. / unit-week
Riverton Apartments 2237 Fifth Avenue	1236	189	60,170	1.80 lbs. / unit-week
139 E. 35th St.	154	241	16,685	3.15 lbs. / unit-week
Big Six Towers 59-55 47th Ave.	982	91	32,000	2.51 lbs. / unit-week
201 W. 21st St.	120	39	2500	3.74 lbs. / unit-week
175 E. 79th St.	62	188	6000	3.60 lbs. / unit-week
258 Broadway	46	182	5100	4.26 lbs. / unit-week
140 E. 72nd St.	100	128	9310	5.09 lbs. / unit-week
140 E. 28th St.	107	193	9970	3.38 lbs. / unit-week
310 W. 106th St.	78	87	5150	5.31 lbs. / unit-week
30 E. 62nd St.	101	152	6400	2.92 lbs. / unit-week
552 Riverside Drive	60	56	1200	2.50 lbs.

APPENDIX II-B (contd)

Building Address	# of Units	Time Period (in days)	Weight Collected (in lbs.)	Overall Generation Rate
315 W. 106th St.	52	120	7880	8.84 lbs. / unit-week
Concord Village 215 Adams Street	1023	89	20,655	1.59 lbs. / unit-week
316 W. 84th St.	41	64	1200	3.20 lbs. / unit-week
322. W. 57th St.	850	21	8160	3.20 lbs. / unit-week
6801 Shore Road	100	27	1665	4.32 lbs. / unit-week

PROGRAM GENERATION RATE (Weighted Average) = $\frac{3.58 \text{ lbs.}}{\text{unit-week}}$

N.B.: This weighted average applies only to the buildings listed above.

APPENDIX II-C

OPRS-DESIGNED PAPER RECYCLING PROGRAMS IN OPERATION Through December 1985

Company	Date Implemented	Months In Operation	Participating Employees	Paper Grade	Average Tons/Month	Accumulated Tonnage
Consolidated Edison	March 1980	70	**	Computer	23	1610
New York Times	May 1980	68	**	Computer	6	408
AT&T Communications						
-32 Avenue of the Americas	July 1980	60	3000	White Ledger/Computer	16(+)	997.25
-33 Thomas Street	October 1985	3	**	White Ledger/Computer	2	72
Chemical Bank						
-55 Water Street	January 1981	60	**	Computer	24	1,426.5
-Secaucus, NJ	October 1981	51	*	Mixed Ledger	7	357
-52 Broadway	June 1983	31	1000	White Ledger/Computer	5	155
-30 Rockefeller Plaza	August 1983	29	500	White Ledger/Computer	2.5	72.5
-380 Madison Avenue	April 1984	20	600	White Ledger/Computer	5	100
Royal Insurance	February 1981	57	**	Computer	25	1425
Dancer Fitzgerald Sample	June 1982	43	900	White Ledger/Computer	4.5	193.5
St. Regis Paper,	July 1982	42	**	Computer	1.5	63
American International Group	October 1982	39	2000	White Ledger/Computer	15	585
Cleary Gottlieb Steen & Hamilton	November 1982	38	***	White Ledger/Computer-Shredded	2.4	91
Merrill Lynch	November 1983	26	**	Computer	60	1,560
The Dime Savings Bank						
-9 DeKalb Avenue	November 1983	26	*	White Ledger	1	27
-Valley Stream, L. I.	November 1983	26	**	Computer	6.5	169
Marine Midland Bank	December 1983	25	**	Computer	4	100
Metropolitan Transportation Authority	April 1984	21	**	Computer	4	84
National League for Nursing	May 1984	20	100	White Ledger/Computer	.5	10
Federation of Protestant Welfare Agencies	July 1984	19	65	White Ledger/Computer	.3	6
New York Power Authority						
-10 Columbus Circle	September 1984	16	500	White Ledger/Computer	2.5	40
-White Plains	September 1984	16	400	White Ledger/Computer	2	32
Interchurch Center						
-United Church Board for World Ministries	November 1984	14	65	Colored Ledger/Computer	.3	5
-Reformed Church In Amer.	December 1985	1	75	Colored Ledger/Computer	.4	.4
-Church Women United	December 1985	1	45	Colored Ledger/Computer	.2	.2
Young & Rubicam	April 1985	8	1100	White Ledger/Computer	5.5	44
County of Essex, New Jersey						
-Hall of Records	April 1985	8	500	White Ledger/Computer	2.5	20
-New Courthouse	April 1985	8	700	White Ledger/Computer	3.5	27
Wang Labs, Inc.	June 1985	7	35	White Ledger/ Computer	.2	1.4

APPENDIX II-C (contd)

Columbia University						
-Butler Library	November 1985	2	250	White Ledger/Computer	1.3	3
-Low Library	November 1985	2	200	White Ledger/Computer	1	2
-Facilities Operation	November 1985	2	50	White Ledger/Computer	.3	1
Dresdner Bank	December 1985	1	250	White Ledger/Computer	2	2
National Audubon Society	December 1985	1	150	White Ledger/Computer	1	1

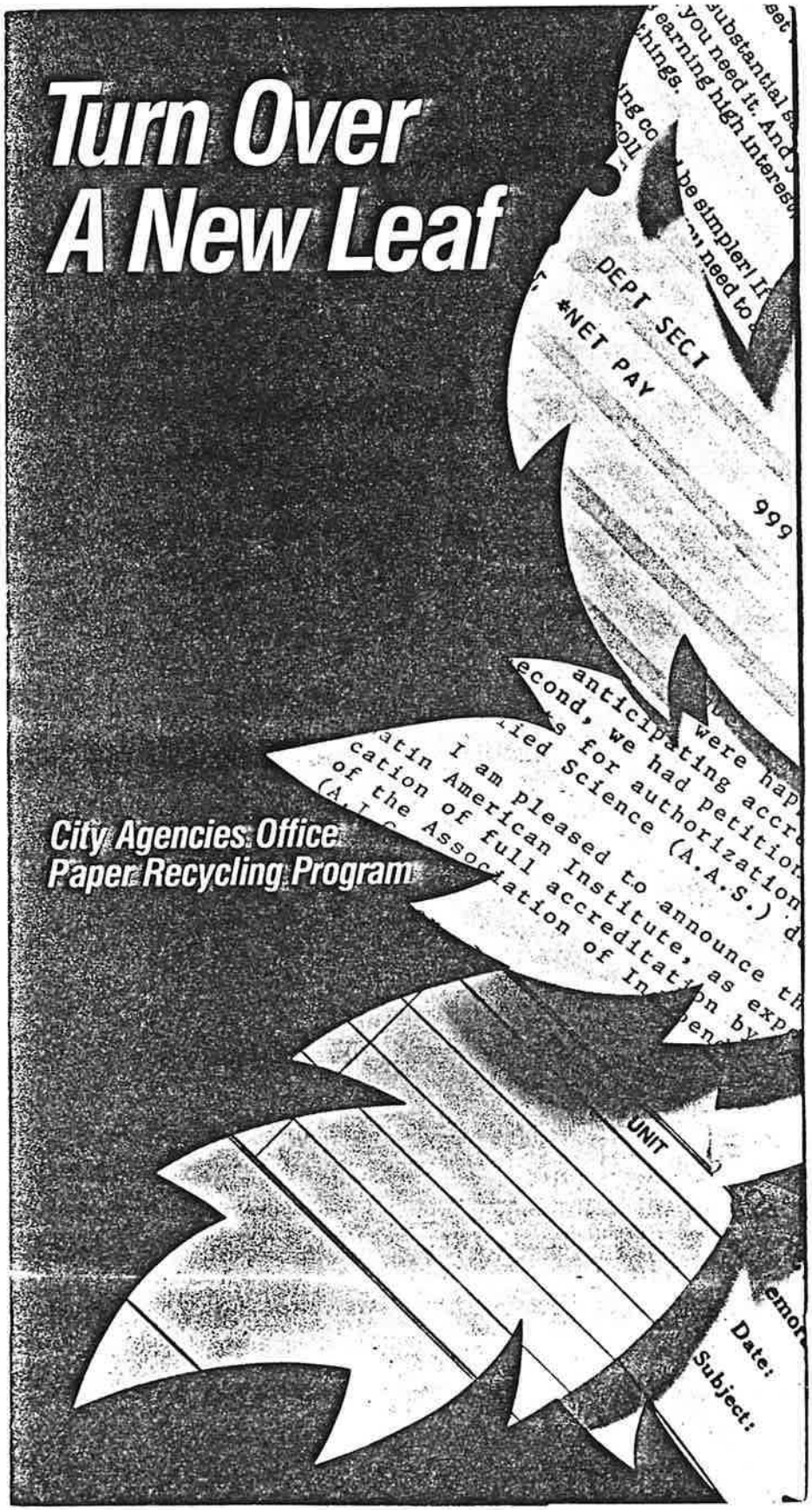
Current Annual Recovery: 2,849 Tons
Aggregate Recovery: 9,825 Tons ++

OPRS-DESIGNED PROGRAMS TO BE INSTALLED
December 1985 Update

Company	Participating Employees	Paper Grade	Estimated Tons/Year
Pfizer			
235 East 42nd Street	2200	White Ledger/Computer	132
219 East 42nd Street	400	Computer	24
Columbia University			
Uris, Law, SIA, Printshop, Data Center, Hamilton			
(Balance of Campus)	---	White Ledger/Computer	720
Interchurch Center			
National Council of Churches, Presbeterian Churches			
(Balance of Building)	1580	White Ledger/Computer	70
Estee Lauder	670	White Ledger/Computer	40.2
CrossLand Savings	17*	White Ledger/Computer	34
Doyle Dane Bernbach	850	White Ledger/Computer	51
Newark, New Jersey			
City Hall	530	White Ledger/Computer	32
Weschester County			
Michelean Building	950	White Ledger/Computer	57
New York City Municipal			
Agencies	6800	White Ledger/Computer	450

*** Records Retention Center
** Program limited to the collection of computer paper.
* Print Shop

(+) Paper recovery has increased since program implementation.
++ Includes accumulated tonnage of programs disbanded because of company relocation.


Turn Over
A New Leaf
City Agencies Office
Paper Recycling Program
DEPT SECT
*NET PAY
999
UNIT
Date:
Subject:

Turn to Recycling

Here's your chance to join with all other city agencies to reduce waste, conserve energy, alleviate air and water pollution, and protect trees right here at the office! That's what you'll be doing when you take part in the City Agencies Office Paper Recycling Program, sponsored by the New York City Department of Sanitation. It's easy! In the same time it takes to throw waste paper away, you'll be saving it—and contributing to a better environment for you, your family and New York.

How Recycling Helps

Recycling Reduces Waste. The amount of waste which must be disposed of everyday in New York City is staggering—more than 22,000 tons. Our landfills are closing. Resource recovery plants are being planned for but are years away. Everyone is being asked to take an active role in solving the garbage problem now. Nearly 50% of all municipal solid waste is paper, much of which is generated in offices just like ours. The more paper recycled the less that has to be disposed of.

Recycling Conserves Energy. When paper is made from paper, up to 70% less energy is used than if paper is made from virgin wood fiber. In fact, recycling one ton of paper saves the equivalent of 380 gallons of oil. For every four tons recycled, enough energy is saved to heat an average-size house in New York State for a year.

Recycling Reduces Pollution. Making paper from paper produces significantly less air and water pollutants than making paper from virgin fibers.

Recycling Extends the Life of Our Forests. There is an ever-growing demand for paper. Luckily there's a way to produce paper and extend the life of our nation's valuable forests—RECYCLING! One ton of waste paper can substitute for about three tons of virgin wood fiber in the making of new paper.

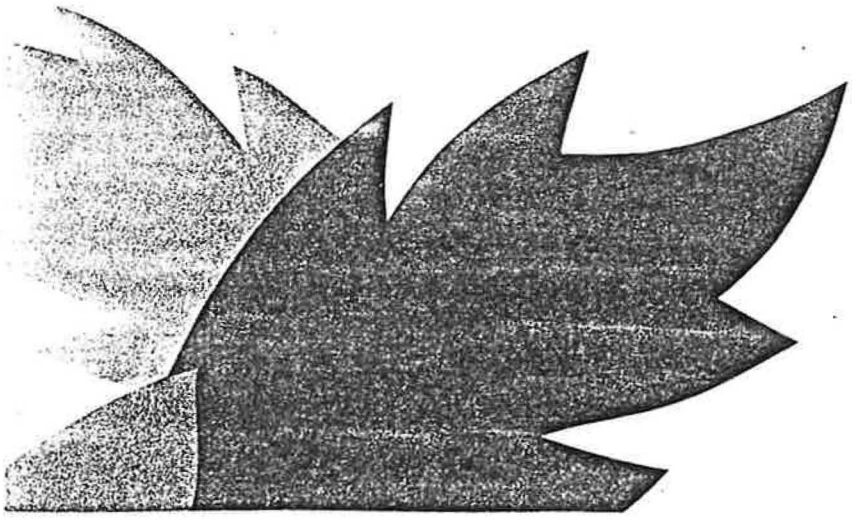
How We Can Help

Most of our office waste paper is not waste! It is estimated that each of us currently throws away 1/2 lb. to 3/4 lb. of high-grade recyclable paper every day. With your participation in the City Agencies Office Paper Recycling Program over 7000 tons of office paper now thrown away as trash each year will be saved for recycling.

The City Agencies Office Paper Recycling Program is designed to catch this valuable waste paper before it reaches the waste basket—in an easy, efficient way that fits in with the way we work.

You will receive a plastic desk-top folder printed with a list of papers that can and cannot be recycled. As you go through the day, set aside paper that *can* be recycled in the folder.

When your folder is full, simply deposit the papers in the nearest recycling container. When the program is underway, not only will you have the satisfaction of a job well done, but also you will have helped preserve forests... clean the air and water ... conserve energy... and solve the garbage crisis. A good day's work!



Do Recycle

White Bond Paper such as:
- Typing Paper
- Letterhead
- Copier Paper used in dry process copy machines
- Memos, worksheets
- Unbound Reports

White Bond Computer Printout including:
- Green-and-white bar
- Multi-stripe
- All-white

Computer Tab Cards
(Staples need not be removed)

Don't Recycle

Colored Paper
Carbon Paper
NCR (Paper with carbonless copies)
Envelopes
Photographic, Blueprint, Mimeograph
Adding Machine Paper
Glossy, coated paper
Newspapers, Magazines
Cardboard
Rubberbands, Paper Clips
Binders: metal, spiral, glued
Self-stick labels, adhesives
Wrappers, tissues, napkins, cups, etc.
Solid Green Computer Printout
Federal Registers

Our program is designed in cooperation with the New York City Department of Sanitation, Office of Resource Recovery and the Council on the Environment of New York City.

Printed on 100% Recycled Paper.

When in doubt— throw it out

APPENDIX II-E

CONSTRUCTION WASTE DISPOSAL HISTORY
1975-1984

Calendar Year	Construction Waste Fee	Construction Waste Disposal Tonnages	# of Operating Transfer Stations
1975	1.50	964,982	3
1976	2.50	350,229	3
1977	2.50	335,784	4
1978	2.50	343,911	4
1979	2.50	430,911	6
1980	2.50	443,883	13
1981	2.50	500,385	23
1982	6.00	367,000	47
1983[1]	6.00/7.00	93,000	62
1984	7.00	65,000	56
1985[2]	9.25	62,000	60

1. Price increase effective September 6, 1983
2. Eight-month total from January through August 1985

Source: Monthly Management Reports, Department of Sanitation

APPENDIX III-A

Tonnage Estimates
City Agencies Office Paper Recycling Program
1984 - 1991

	Tons Per Month
December 1984 (Actual)	45
December 1985 (Actual)	80
December 1986	190
December 1987	275
December 1988	375
December 1989	475
December 1990	521
December 1991	583

Projections are based on gradually expanding the program to reach 83,000 City employees by 1991.