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TRIP REPORT TO KRAKOW MUNICIPAL SANITATION COMPANY
POLAND
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EXECUTIVE SUMMARY

In November 1991, a team of four officials from New York City's Department of Sanitation visited Krakow, Poland to review its municipal waste disposal system. Miejskie Przedsiębiorstwo Oczyszczania (MPO) is a state enterprise responsible for handling the 400,000 tons per year of waste that is produced by Krakow's 1.2 million inhabitants. It does this with a workforce of 700 employees and a fleet of over 100 vehicles. It operates one landfill, which accepts all of its waste.

Krakow will face a set of challenges over the next several years. The landfill it operates requires significant investment to insure that adequate environmental controls are in place. Improvements in worker productivity must be established in order to keep the cost to households from rising too rapidly. A municipal recycling program must be established. New disposal technologies must be evaluated and a long-term plan for handling the City's waste stream must be outlined.

The mission from New York City has made a set of proposals, based on its experience, that MPO might consider as it moves forward to meet these challenges. They include suggestions to evaluate equipment needs, to refine the method of charging households for waste disposal services, and to develop adequate environmental controls. In general, however, the New York City officials found the Krakow operations to be an efficient operation well positioned to address the challenges of the future, provided that adequate resources were available.

INTRODUCTION

In November 1991, a team of four officials from New York City's Department of Sanitation visited Krakow, Poland to review its municipal solid waste management system. The mission was headed by John Doherty, Deputy Commissioner for Operations and included Richard Delaney, Director of Management Analysis, Jane Levine, Deputy Commissioner for Legal Affairs, and Peter Montalbano, Director of Waste Disposal. They met with officials of Miejskie Przedsiębiorstwo Oczyszczania (MPO), the agency charged with refuse collection and disposal in Krakow, Wydziału Ochrony Środowiska, the environmental regulatory agency for the region, as well as the Deputy Mayor of Krakow charged with overseeing environmental operations.

Section I of this report outlines the findings of the mission while Section II lists proposals the Krakow municipal government might consider to improve its methods for handling solid waste. Section III provides biographies of the New York City officials; Section IV lists the officials they met; Section V gives the daily itinerary of their mission.

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I. FINDINGS

A. WASTE GENERATION AND COMPOSITION

The size and characteristics of the local waste stream help to determine the most appropriate system of waste management for a city. When comparing the waste management system of Krakow and New York City, it is important to understand the dramatic differences in the amount of waste generated in each locale.

In Krakow, approximately 250,000 tons of household waste is generated annually. For a city of 0.8 million inhabitants, that works out to be less than one-third of a ton annually for each individual. By comparison, New York City's 7 million inhabitants generate approximately 3.5 million tons of waste annually, or one half of a ton a year for each individual. [See Figure I.] Obviously, with waste generation rates so much lower in Krakow than in New York City, the scope of the waste disposal system can be much smaller and much less complex. [In this report, discussion of waste management systems will focus on the residential waste stream. As in New York City, Krakow has a separate mechanism for dealing with commercial waste.]

Miejskie Przedsiębiorstwo Oczyszczania (MPO), the state enterprise that provides waste management services for Krakow, estimated the composition of the material in the municipal waste stream. Surprisingly, it is very similar to the composition of the waste stream in New York City. Paper and plastics are a slightly greater proportion of the New York City waste stream while metal and glass comprise a slightly larger segment of Krakow's residential waste stream. [See Figure II.]

B. CURRENT WASTE COLLECTION SYSTEM

Households in Krakow place unsorted waste in cans distributed by MPO. The vast majority of these cans (94 percent) hold a volume of 110 liters; some cans in high density housing complexes are 1100 liters in volume. MPO also distributes 600 7-cubic yard containers to institutions such as hospitals and markets. The frequency at which these cans are collected ranges from two times per week to five times per week and is determined by the type of service to which households subscribe. Increased collection frequency can be purchased if a household or housing complex pays a higher waste disposal fee.

FIGURE I.
RESIDENTIAL WASTE GENERATION PER CAPITA
New York City and Krakow

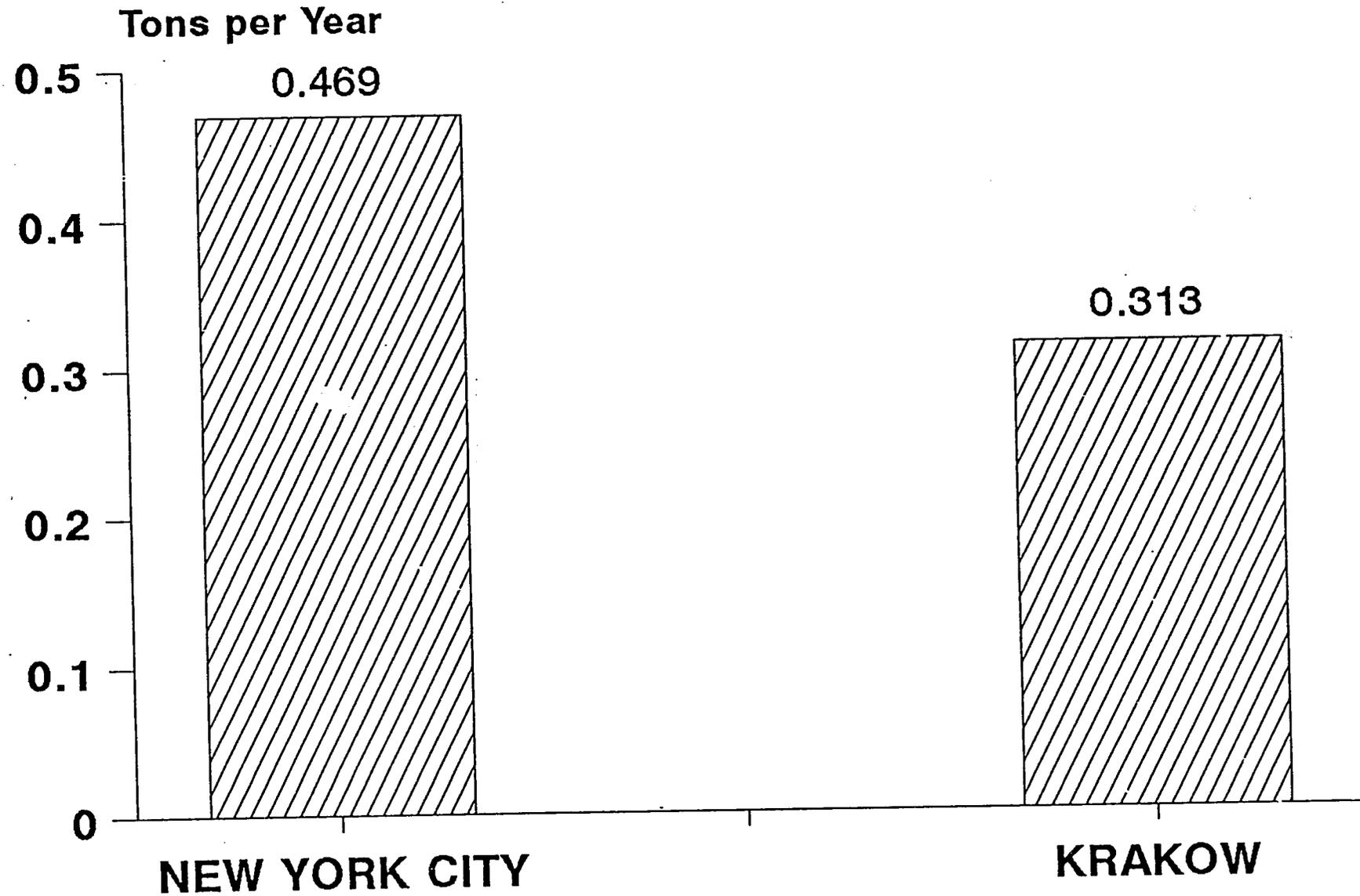
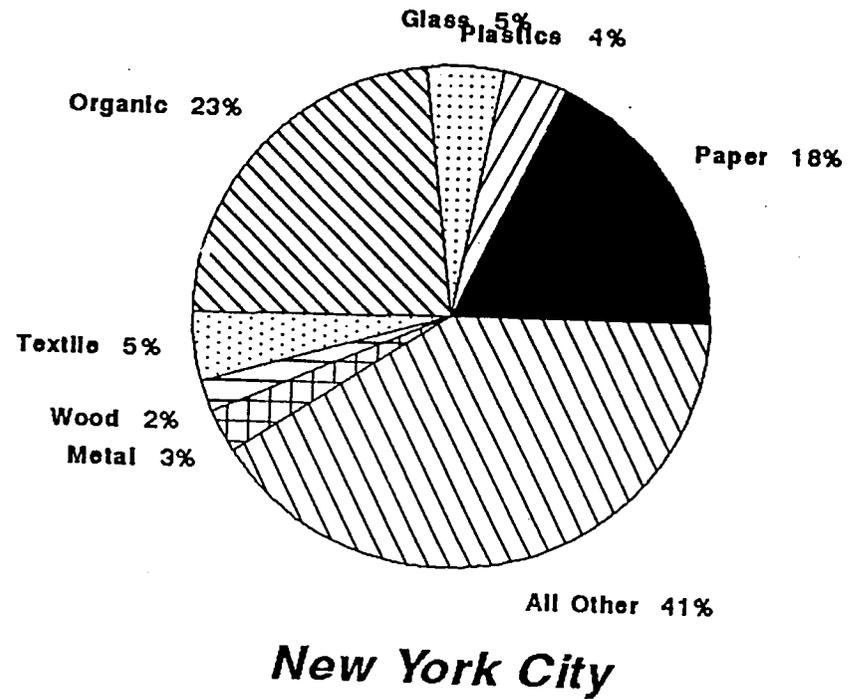
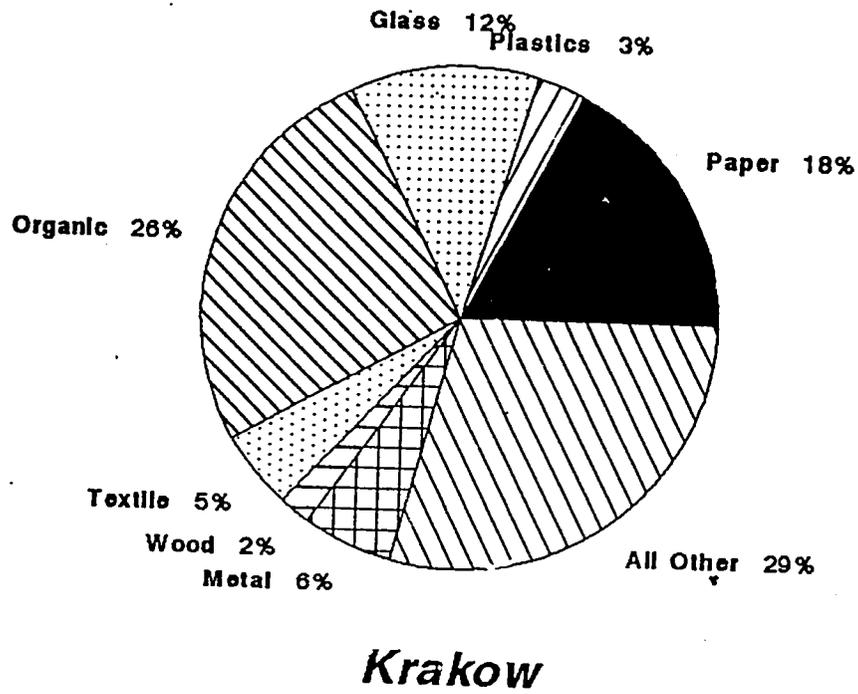


FIGURE II. WASTE COMPOSITION



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The waste disposal section of MPO employs over 700 workers, the majority of which are deployed each day to residential refuse collection. The City is divided into four districts from which crews are dispatched on one of the 83 collection trucks in the Department's fleet. On an average day, 50 crews of four workers are dispatched throughout the city to collect the residential waste from small generators. The 1000 liter containers are serviced by a small handful of two-worker crews while the 7-cubic yard containers are collected by a one-person truck at night.

A combination of factors limit the efficiency of collection in Krakow. First, much of Krakow's housing is located relatively far from the curbside. The distance that the cans must be transported from their storage space to the curb and back slows down the crews. The size and compaction ratio of the trucks limit the load size to approximately 4-5 tons. Finally, since there is only one disposal location for Krakow waste (and it is located outside the City), compared to over 10 locations in New York City, travel time after filling the truck limits the amount collected on each shift.

The waste collection system has responded to offset some of these factors. Despite time restrictions to transport waste to disposal sites, some trucks complete more than two loads per day. This is due, in part, to the incentives built into the pay structure for the crews. If a crew finishes three loads in a day, it qualifies for a bonus.

C. CURRENT WASTE DISPOSAL SYSTEM

MPO operates only one disposal site: a large landfill located in the town of Wieliczka, which accepts all of Krakow's waste as well as the town of Wieliczka waste. The landfill, which is situated in the site of an old salt mine and covers an area of 36 hectares, has been in operation since 1974. Right now, 20 hectares of the landfill remain. At the current rate of filling, this space will last more than 10 years if the waste is not compacted and 20-to-25 years with compaction. Over much of its lifetime, the landfill has been unregulated. Therefore, it is difficult to know the level of contamination at the site. The landfill has no gas or methane control system, although there is a crude leachate control system expected by April 1993. Leachate is a particular concern at the landfill. Equipment at the site is up to 20 years old and serviceable vehicles have been difficult to maintain. Compaction of waste and daily covering of material has been curtailed because the necessary vehicles have not been available and the cover material has been expensive and difficult to obtain.

D. CURRENT RECYCLING OPERATIONS

Recycling in Krakow currently is done on a very limited basis. Scrap metal is brought to local steel mills for reuse. Glass and plastics are landfilled because adequate markets for their reuse do not exist. Composting of organics is limited because of concerns for heavy metal content.

E. CURRENT SUPPORT OPERATIONS

MPO operates one facility to repair all of its vehicles. The total fleet repaired at this facility includes 83 regular collection trucks and 23 containerized collection trucks. In total, 80 people are employed to repair motor equipment. Vehicles are scheduled to be replaced on a eight year replacement cycle. However, for the past three years, no vehicles have been replaced. Therefore, it is becoming increasingly difficult to meet vehicle needs. Many of the vehicles required by MPO were supplied by enterprises that are no longer in existence or that can no longer provide discounts to buyers. In addition, parts availability has been reduced as many of the original manufacturers of the vehicles have gone out of business.

F. PLANS FOR THE FUTURE

Krakow is exploring the possibility of a number of joint ventures with foreign companies in order to deal with its waste in the future. It is reviewing technologies for converting waste into energy pellets, burning waste to directly create energy, and landfilling its waste at a new, controlled landfill. In addition, it hopes to establish enterprises for the recycling of individual materials, such as glass, metal, paper, and organics.

II. **RECOMMENDATIONS**

A. WASTE GENERATION

- (1) With per capita waste generation at a level one-third the rate in New York City, Krakow is well placed to maintain a less complex waste management system. However, as new products are introduced into the Polish market, waste generation rates may increase. The City of Krakow can take an active role in national discussions about legislation to limit packaging, to require, where feasible, manufacturers to accept their materials for re-use, and to establish deposit mechanisms for difficult to dispose of items, such as car batteries and tires.

B. WASTE COLLECTION

- (2) As salaries demand begin to increase, pressure to reduce the size of the work crews in order to control costs are certain to develop. MPO is well situated to meet these demands. Its pay system is already based on worker productivity. Discussions with the workforce should focus on sharing gains in productivity with the workforce.
- (3) Although the width of Krakow's streets may limit the use of larger vehicles Citywide, some districts in the City might be able to use larger capacity trucks. All trucks should be specified for higher compaction.

C. WASTE DISPOSAL

- (4) It is essential to evaluate the leachate and methane control system needs for Krakow's landfill and develop a rapid timetable for their implementation. Delays in implementing the system could greatly increase remediation costs in the future. The city of Krakow should put a high priority on identifying such funds, either from general tax revenues or from loans from international organizations, required to introduce these systems.

- (5) Maintaining the availability of landfill compactors and cover material should be ensured. Until more sophisticated environmental control systems are in place, operating procedures at the landfill are the best way of reducing adverse environmental impacts.

D. RECYCLING

- (6) With a landfill that can handle all of the city's waste, it is not essential that it expand its recycling efforts quicker than market for materials develop.

E. SUPPORT OPERATIONS

- (7) To the extent possible, given limited finances, MPO should maintain its replacement cycle of vehicles. Allowing the fleet to become obsolete will limit the ability to introduce productivity initiatives in the collection workforce. If current financing is not possible, MPO should attempt to negotiate a long term contract with a truck manufacturer that would guarantee regular replacement in the short term in return for a commitment by Krakow to use the manufacturer for a lengthy period as its sole provider of trucks.
- (8) MPO should explore computerized inventory management systems that might increase inventory turnover and reduce costs.

F. FINANCING SYSTEM

- (9) A dedicated revenue stream for waste collection and disposal would allow Krakow a stable environment for planning changes in its waste management practices. The fee currently charged to households would allow for such a revenue stream. Krakow should consider raising this fee to cover all costs.
- (10) A waste collection charge that mirrors actual costs will have an added benefit: it can be adapted to promote better waste management by households. Households have an economic incentive to produce less waste. Differential fees could be charged for recycling collections in order to increase participation.

G. FUTURE PLANNING

- (11) MPO should undertake an integrated long term planning process to determine its system's needs for the next five and ten years.
- (12) MPO should establish ties with other solid waste management professionals in Poland and abroad. It should expand on its discussions with the delegation from New York City by visiting the New York's waste management operation.

III. BIOGRAPHICAL SKETCHES OF AUTHORS

This report was prepared by the four member mission from the New York City Department of Sanitation, by whom they are all still employed.

John Doherty, Deputy Commissioner for Operations, Mission Leader

Has directed all daily operations of the Department of Sanitation since 1988. Responsible for managing the daily collection of 17,000 tons per day of residential refuse, the cleaning of streets, daily disposal of as much as 30,000 tons of day of residential and commercial refuse, development of the Department's expanding recycling programs, clearing snow and ice from the City's 6,000 miles of streets and highways, and management of the enforcement division. Deputy Commissioner Doherty has over thirty years experience in the Department, starting as sanitation worker in 1960. He is a graduate of the City's Top 40 Program and completed the Senior Executive Program at Harvard University's John F. Kennedy School of Government.

Richard Delaney, Director of Management Analysis

Has directed development of the Department of Sanitation's \$500 million expense budget for the last four years and is responsible for gathering and analyzing data on the Department's operations and productivity. Prior to working on the Sanitation budget, analyzed New York City's economy and tax base for the City's Office of Management and Budget. Has a Bachelor Degree in Social Sciences with Honors from Swarthmore College and a Master Degree in Public Policy from Harvard University.

Jane Levine, Deputy Commissioner for Legal Affairs

Has directed the Bureau of Legal Affairs of the Department of Sanitation for the past two years. During the prior three years, was Special Counsel in the Bureau, which provides advice on environmental, regulatory, disciplinary, contractual and other legal matters and drafts legislation concerning sanitation-related issues. Before coming to the Department, Ms. Levine was an attorney in the New York State Attorney General's office and the Legal Aid Society, where she specialized in civil rights litigation. She graduated Magna Cum Laude from the State University of New York at Stony Brook and from Columbia Law School.

Peter Montalbano, Director of Waste Disposal

Has directed the Bureau of Waste Disposal since 1989. The Bureau, which employs over 1,000 workers and has a total annual budget of approximately \$72 million, operates one landfill and two incinerators. Since becoming director, improvements in operations have been instituted that have saved the Department over \$5 million in overtime costs and increased productivity and operational efficiency. Received a Bachelor's Degree in Economics from the City University of New York.

IV.
ORGANIZATIONS AND PERSONS CONSULTED

This report was prepared after consultation with the following people and organizations in Krakow.

Miejskie Przedsiębiorstwo Oczyszczania

Jerzy Stec, General Director

Wydział Ochrony Środowiska

Ryszard Stawski, Director
Andrzej Kusiak, Deputy Director

Wydział Usług Komunalnych

Andrzej Biegun, Director
Janusz Kala, Deputy Director
Alicja Maciejewska
Grazyna Stanuch
Cecylia Jurczak

Office of the Mayor, Krakow

Jan Friedberg, Deputy Mayor

V.
PROJECT SCHEDULE

Listed below are the sites visited by the mission during their stay in Krakow from November 17, 1991 to November 20, 1991.

- | | |
|----------------|--|
| November 17th: | Arrival in Krakow |
| November 18th: | Meeting in the offices of Ryszard Stawski, giving overview of municipal solid waste system in Krakow |
| November 19th: | Meeting in offices of Jerzy Stec, giving description of daily operations
Review of equipment
Tour of operating landfill at Wieliczki |
| November 20th: | Meeting with Deputy Mayor of Krakow |