MUNICIPAL SOLID WASTE POLICY FORUM

RECYCLING MSW

Results and Conclusions
of a
Forum

Sponsored by
Stony Brook's
Waste Management Institute

J. R. Schubel and H. A. Neal
Conveners

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D.W. Pritchard

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and Director

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This report was prepared with the assistance of Joseph Zipper, George Proios, and Marc Weissburg.

AGENDA FOR ACTION

ACTION	RESPONSIBLE PARTY
Immediately	
○ Set Up Permanent Recycling Advisory Board	NYS Department of Environmental Conservation
○ Increase Staffing for DEC's Source Reduction/ Recycling Office	NYS Legislature
○ Set Up Recycling Act to Generate Funds For: ○ County and Local Recycling Programs ○ Educational Programs ○ Low Interest Loans ○ Municipal Tonnage Grants	NYS Legislature
○ Develop Federal Bill to Reduce Excesses in Packaging	Federal/State Legislature
○ Develop Bill to Eliminate the Federal Depletion Allowance	Federal/State Legislature
○ Set Up Bi-County Agency to Act as Market Broker and Developer	Nassau/Suffolk Counties/Long Island Regional Planning Board
○ Institute Deposit on Batteries	NYS Legislature
○ Develop Waste Management Curriculum with Recycling Component for K-12 and for Adult Learners	NYS DEC, NYS Dept. of Education and SB's Center for Excellence and Innovation
○ Launch "I Love to Recycle" Campaign	NYS Department of Commerce
○ Appropriate Funds and Create a Plastics Recycling Research Program	NYS Legislature and NYSERDA
○ Get Private Industry Involved with Recycling	Counties

ACTION	RESPONSIBLE PARTY
Six Months	
o Insist that Newspaper Publishers Accept and Recycle their Own Products	NYS Legislature
o Establish a Recycling Center in Each Town	Local Government
o Establish a Regional Model Study to Assess and Demonstrate the Impact of a Well-Designed and Well-Run Recycling Plant	NYS DEC, LI Regional Planning Board and SB's Waste Management Institute
o Feasibility Study for a Rubber Tire Processing Center	LI Regional Planning Board
Longer Term	
o Assess the Advantages and Disadvantages of Developing a Waste Paper Conversion Plant on LI: Take Appropriate Action	Private Sector and NYS
o Create New Markets for Recycled Materials	Private Sector and NYS
o Prohibit Landfills from Accepting Recyclables	NYS DEC and Local Governments
o Establish Appropriate Marketing Techniques to Maximize Public Participation	Private Sector/NYS DEC/Local Governments

BRAINSTORMING SESSION RESULTS

The principal objectives of the Forum were to review the recycling plans that are proposed and on-line for Long Island, to share the information about these programs and to share ideas for enhancing recycling on Long Island. We ended the Forum with a brainstorming session in which participants shared their ideas freely. The brainstorming session was patterned after the technique developed by Alex Osborne in the 1940s. The participants were given the following instructions. They were told to accept the proposition that recycling is an important and legitimate component of any comprehensive municipal solid waste program and that during this brainstorming session our objective was to provide as many responses as we could to the following statement:

"In how many ways can we enhance the effectiveness of recycling on Long Island."

What follows is a complete and unedited listing of all of the ideas presented. The order in which they were offered has been preserved.

1. Start to recycle now.

2. Lobby for the elimination of the federal depletion allowance.

3. Concentrate attention on the cost avoidance aspects of recycling and on insurance liability considerations.

4. Develop a federal bill to reduce excesses in packaging.

5. Encourage Nassau and Suffolk Counties to act as brokers for recycling activities on Long Island.

6. Think the entire system through from collection to markets before putting a recycling program in place.

7. Develop a deposit policy which applies to all pesticides containers.

8. Compost -- do not burn.

9. Issue summonses to those who do not comply with approved recycling programs.

10. Create a bi-county agency to develop and sustain markets for recycled materials.

11. Educate industry to reduce the amounts of wastes they produce.

12. Establish a floor under the value of recycled materials by subsidization.

13. Sensitize the waste generators to the problems which they are creating.

14. Design attractive and functional containers for the home for products which are to be recycled and provide them at no cost to homeowners.

15. Institute a state program for tax rebatement for purchase of residential compactors.

16. Develop a state program to aid funding of recycling projects.

17. Tap into and maintain connections with the private sector for recycling activities.

18. Don't issue summonses for those who don't comply with established recycling programs.

19. Educate the residents about the opportunities that exist now for recycling.

20. Insist that newspaper publishers accept and recycle their own products.

21. Design functional and relatively inexpensive vans for the pickup of assorted materials for recycling.

22. Develop uniform methods of reporting the achievements of recycling programs.

23. Have the State provide guidelines for the planning and implementation of local recycling programs.

24. Make funding available for local recycling programs, at least on a pilot scale, to demonstrate their efficiency.

25. Provide property tax incentives to encourage recycling.

26. Examine the recycling practices now in place in West Germany and also in other countries which have been successful.

27. Extend the bottle bill to include liquor bottles.

28. Assess the cost to residents for garbage pickup on the basis of the amount of garbage they produce.

29. Let New York DEC run the <u>entire</u> recycling program.

30. Prohibit landfills from accepting recycleable materials.

31. Establish at least one intermediate processing facility per town.

32. Provide the power to raise the deposit on containers to increase the percentage of recovery.

33. Show towns how to meet New York State's 50% recycling goal.

34. Establish a lottery system to maximize participation in recycling programs.

35. Provide storage areas in commercial and governmental buildings and in industrial parks for storage of materials to be recycled.

36. Establish a zero tipping fee for recycleables.

37. Make it convenient for householders to recycle.

38. Hire New Jersey's magician R.E. Cycle to come to New York to educate and excite New York about the benifits of recycling.

39. Establish a regional model study to assess and demonstrate the impact of a well-designed and well-run recycling program.

40. Make affordable housing on Long Island available using construction blocks fabricated from resource recovery ash.

41. Set up a neighborhood model project to demonstrate the impact that can be achieved through a well designed and maintained recycling program on a small scale.

42. Establish a monetary reward for the carters who carry the most recycleables.

43. Encourage local governmental political support for recycling programs.

44. Develop an integrated agricultural refinery for biomass products.

45. Establish awards for excellence in recycling and give publicity to these programs. Have programs for individuals, towns, neighborhoods, etc.

46. Build a wastepaper conversion plant on Long Island

similar to the one now in New Jersey which is owned and operated by the Chinese.

47. Establish a program for the remanufacturing of cars.

48. Get Grumman to design a new garbage truck which would facilitate the pickup and delivery of recycled materials.

49. Have the counties provide transportation of recycled materials to markets.

50. Establish radio and television promotionals for recycling.

51. Launch an "I Love to Recycle" campaign in New York.

52. Provide consumers with free computers with TVs and encourage their use instead of newspapers.

53. Develop a program for the exchange of recycling experts among countries.

54. Use the Stony Brook's technological incubator to develop novel technologies for recycling and waste processing.

55. Develop a curriculum on recycling for use in local schools from K through 12. Take advantage of curricular materials that already exist in other states.

56. Insist that all governmental agencies at all levels recycle as much as possible.

57. Establish local councils for job training to ensure that those who are displaced from jobs because of new innovations could find jobs in the recycling industry.

58. Establish labeling requirements which indicate proper disposal methods for toxic and hazardous materials. This should include the kinds of materials which are used in the home such as hairsprays and drain cleaners which are toxic and hazardous.

59. Publicize widely the remaining capacities and lifetimes of available landfill space. Use a reverse thermometer technique to demonstrate this in a dramatic fashion.

60. Link Long Island to national markets for recycled materials via the Narrows rail freight tunnel.

61. Provide State assistance for the acquisition of paper recycling equipment.

62. Require manufacturers to take back their own products, including batteries.

63. Have each town set a goal for the volume of materials to be recycled.

64. Establish on Long Island a "Tennessee Valley Authority Model" for dealing with all kinds of wastes and energy products.

65. Develop and implement programs for the recycling of hazardous and toxic materials. This is where the attention should be; not on municipal solid wastes.

66. Put large deposits on containers of harmful substances.

67. Guarantee a profit to recycling operations and turn the operations over to local businesses, i.e. subsidize them to ensure that they make a certain profit.

68. Learn how to make paper using salt water -- an appropriate activity for a marine sciences research center.

69. Develop innocuous substitutes for products which are toxic and hazardous.

70. Have landfills refuse to take plastic bags.

71. Develop an active State program of support for research to develop ways to reduce the volumes of toxic and hazardous waste.

72. End the Long Island Landfill Law and promote recycling instead.

73. Make customers bring their own bags to stores; stop providing bags.

74. Develop ways to encourage, and even insist, that all municipal agencies work together in recycling.

75. Prove that recycling is the least expensive option when all factors are considered.

As the final activity of the brainstorming session, each member was given five votes which he/she could cast for any of these ideas. Each participant was told that they could put all five votes on a single idea or they could spread them among up to five ideas.

Below is a list of the ideas which received four or more votes.

4. Develop a federal bill to reduce excessses in packaging.

16 Votes

5. Encourage Nassau and Suffolk Counties to act as brokers for recycling activities of Long Island.

14 Votes

10. Create a bi-county agency to develop and sustain markets for recycled materials.

8 Votes

31. Establish at least one intermediate processing facility per town.

8 Votes

8. Compost -- don't burn.

7 Votes

62. Require manufacturers to take back their own products including batteries.

7 Votes

2. Lobby for the elimination of the federal depletion allowance.

6 Votes

46. Build a wastepaper conversion plant on Long Island similar to that in New Jersey which is owned and operated by the Chinese.

6 Votes

55. Develop curriculum on recycling for use in local schools for grades K through 12.

5 Votes

20. Insist that newspaper publishers accept and recycle their own products.

4 Votes

16. Develop a State program to aid funding of recycling projects.

4 Votes

51. Launch an "I Love to Recycle" campaign in New York.

4 Votes

43. Encourage local governmental political support for recycling programs.

4 Votes

RECYCLING MSW

MUNICIPAL SOLID WASTE POLICY FORUM

28 January 1987

Agenda

08:30-08:40 Welcome and Introductions: L. E. Koppelman - Long Island Regional Planning; J. R. Schubel - The University at Stony Brook

- Objectives of Forum

08:40-09:00 Recycling as a Component of a Comprehensive Solid Waste Management Program: H. A. Neal - The University at Stony Brook

09:00-09:15 Overview of L. I. MSW Problem: H. Berger - NYS Department of Environmental Conservation

09:15-09:35 Recycling Concept: W. Ferretti - NYS Recycling Forum

- Relevance to L. I. MSW Problem
- Determinants of Success Based on Past Experience
- 28 Recommendations for implementing recycling in NYS

09:35-09:55 Town of Islip WRAP Program: M. LoGrande, Acting County Executive, Suffolk County

09:55-10:15 Current and Proposed L. I. Recycling Projects: G. Proios - NYS Legislative Commission on Water Resource Needs on L. I.

10:15-10:30 Coffee

10:30-10:50 The L. I. Landfill Law: E. Liblit - NYS Department of Environmental Conservation

- Statewide Solid Waste Plan
- State Priorities for Meeting the NYS Solid Waste Mandate
- Role of Recycling

10:50-11:10	"State Organization for Recycling": M. Sheil - NJ Department of Environmental Protection
11:10-11:30	Organizing a Recycling Program: J. Purves- Camden County Office of Solid Waste Management
11:30-11:50	Case Study: Montclair, NJ: J. Clark - Montclair Recycling
12:00-01:00	Lunch
01:00-01:20	Integrating Recycling with Total Waste Management: G. Smith - Essex County, NJ Planning Department
01:20-03:30	Brainstorming Session: J. R. Schubel o A Sharing of Ideas
03:30-04:00	Recap: L. E. Koppelman and J. R. Schubel
4:00	Adjourn

RECYCLING AS A COMPONENT

OF SOLID WASTE MANAGEMENT

Homer A. Neal

During the course of the research conducted by Dr. Schubel and myself in connection with our recently published book entitled "Solid Waste Management and the Environment", we became increasingly impressed by the complexity of our country's garbage and trash dilemma. Not only is the amount of garbage and trash we produce increasing, but an increasing fraction of what we produce is non-biodegradable, meaning that more and more of what we throw away will remain more or less intact for decades, posing an environmental burden for future generations. In addition, space for landfilling is becoming scarce in our populated urban regions, and in many cases there is a legitimate growing concern about the pollution of water sources in these regions, making the very areas where our populace prefers to live environmentally dangerous.

What can we do with the 150 million tons of garbage and trash we generate each year? In crude terms we can pile it on the ground, burn it, or (at least in principle) toss it into the ocean. In none of these options do we fully get rid of the waste. In the case of landfilling we reap the returns of water pollution and air pollution, as well as other undesirable effects. Ocean dumping, if it were again practiced, could create return pathways to humans through the marine food chains, and could create objectionable beach fouling. Incineration raises other issues regarding the extent to which emissions might pose health hazards, and the questions as to what should be done with the considerable amount of ash residue that results -- residue which may contain undesirable chemicals.

Given the above concerns, and the pressures emanating from the explosive world population growth, as well as the increasing degree of urbanization, it is clear that solid waste disposal ranks as a very critical public policy matter that requires attack from all sides. And one of the most obvious flanks to explore is whether the overall problem can be reduced by reducing the amount of garbage and trash to be disposed of in the first place. That is, what can be done to extract maximum use out of a product before its ultimate disposal and -- for those products that are undergoing ultimate destruction-- removing and using as much heat energy, nutrients or ash as possible. Clearly, this concept of recycling should be an active component of any solid waste management plan. At present, of the 150 million tons of garbage and trash we generate, less than 10% of this amount is recycled. The

fraction could be much higher, at least in the range of 20-50%.

Before turning to some of the obstacles that must be overcome by any recycling program, it would be useful to review some of the major factors that are exacerbating the situation. Fig. X illustrates the remarkable growth of the world population in just the past 100 years. The growth in the past decade is comparable to the entire world population total just 200 years ago. And the growth is continuing; at the current rate of growth the population of the world will double in the next half century. What will be done with the waste these persons generate?

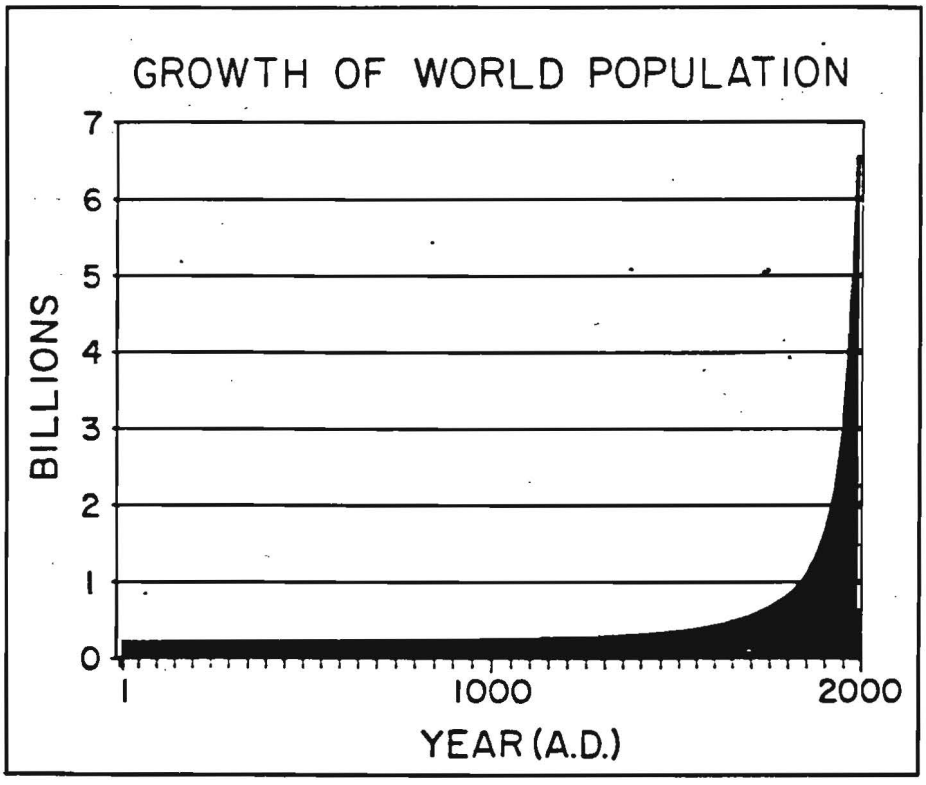
There is more to the problem than just the overall population total. To emphasize the point, just look at the population density distribution for the United States (Fig. X). One may have to stare at this plot for a few seconds to grasp the story it is trying to tell. It is a three dimensional representation of the number of persons living in each square mile of the country. You can easily see the population centers represented by Miami, Tampa, Chicago, Los Angeles, San Francisco and, for heavens sake, the Northeast. Indeed, the fact that we are here on Long Island, with its sensitive water supply system, in the midst of a very high population density, is one of the reasons for our symposium today. In many respects the problems we have alluded to will be more severe for our region than any other in the United States. And, on top of it all, our per capita garbage generation rate and our population are growing even faster than the averaged nationwide rates illustrated in (Fig. X). The problem has many of the features of a ticking time bomb.

It makes common sense to take every reasonable step to insure that each product is used and reused as many times as practical before final disposal. Since such a large fraction (approximately 30 - 40%) of the waste stream is made up of packaging, there is reason to be optimistic about a significant recovery rate. Some pertinent facts include:

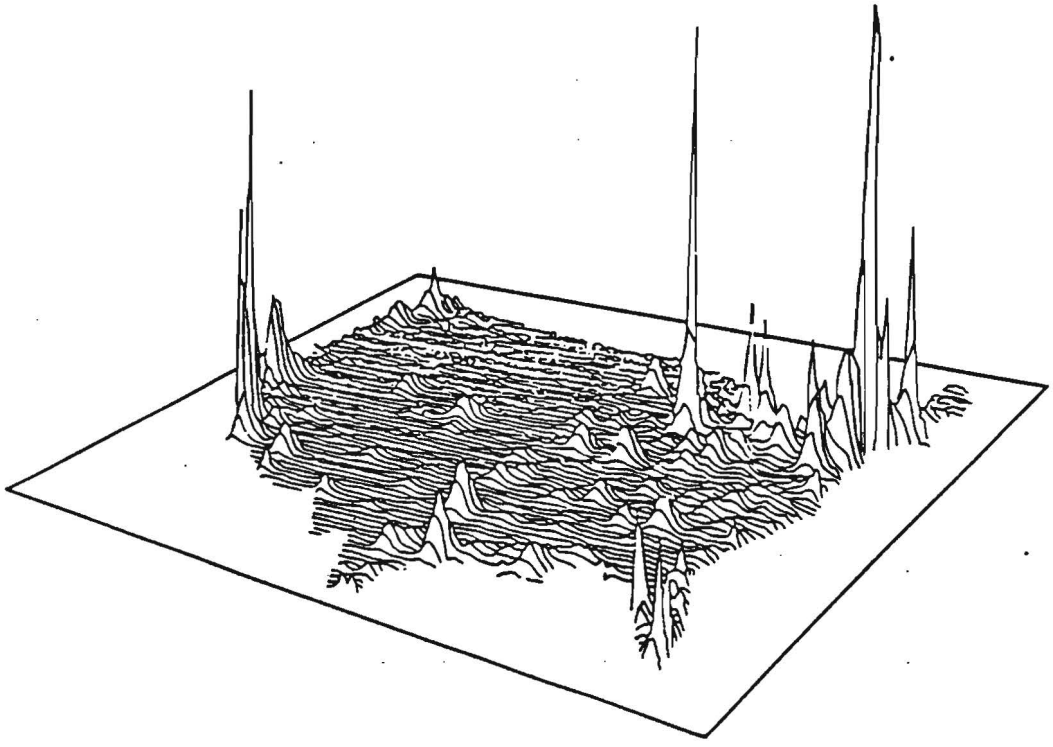
- containers and packaging increased from 24 million tons in 1960 to 43.5 million tons in 1984. This amount is projected to increase to 50 million tons in 2000.

- the quantity of plastic containers and packaging has grown dramatically, from only 100,000 tons in 1960 to 5 million tons in 1984; this amount is projected to grow to 8.2 million tons by year 2000.

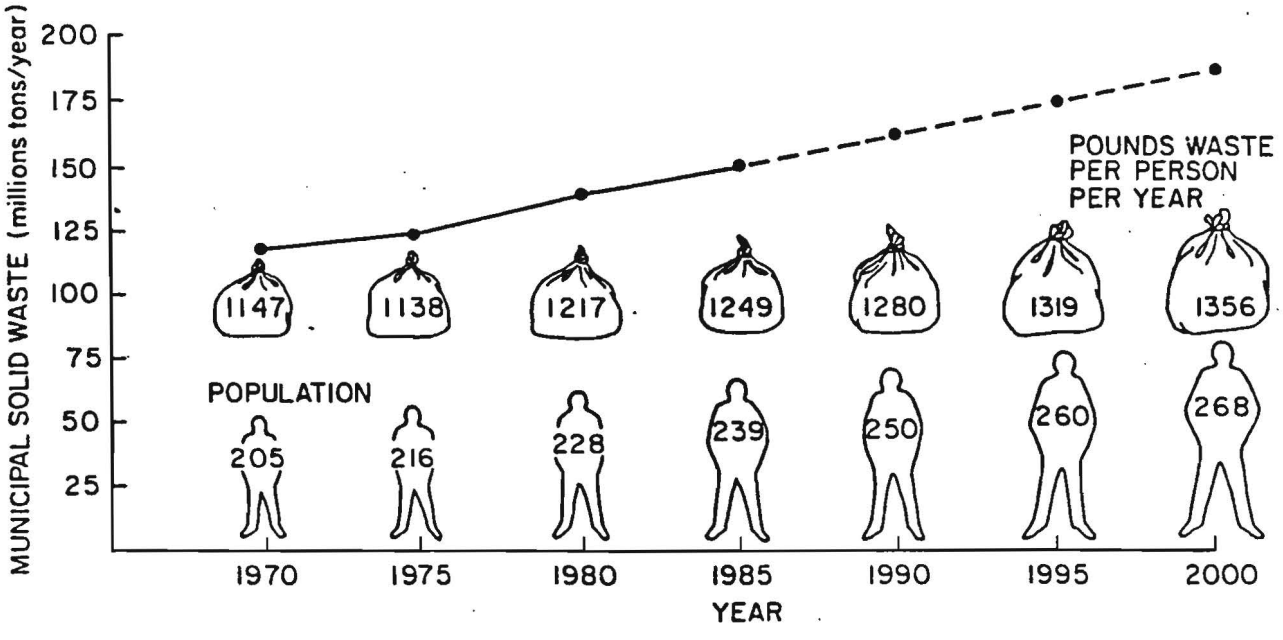
- paper and paperboard disposal increased from 11 million tons in 1960 to 20.8 million tons in 1984. The projection for year 2000 is 25 million tons.



Growth of world population.



Distribution of population in the United States by region



Municipal solid waste generation in the United States.

- The quantity of aluminum containers increased from 200,000 tons in 1960 to 900,000 tons in 1984; the projection for year 2000 is 1.5 million tons.

From these figures it is clear that exercising some degree of control over the recycling rate for plastics, paper, and aluminum containers and packaging stands to offer significant benefits.

If the recycling idea is so great, why doesn't everybody do it? This is a complex subject that touches on technology and sociology. Why do some people throw trash out of their car window?

Could we realistically expect those same people to dutifully return used soft drink cans to their store if there were no deposit to be collected?

In somewhat general terms, some of the pressing questions that must be addressed in designing effective national recycling efforts include the following:

- how to make recycling convenient to the customers
- how to provide reasonable incentives for participation
- how to make the public aware of the existence of recycling programs
- how to insure that in the design and manufacturing of products some thought is given to the recyclability of the product, so that continual marginal design change does not render a "just produced" product unfit for recycling
- what research is needed on improving the quality and cost of recycled products (e.g., can recycled paper be made more desireable and less costly.)
- how to deal with long term logistical issues, such as the tendency for papermills to be located near the forests and the primary paper users being far away in metropolitan areas. Such situations make recycling less attractive
- what public policy decisions make recycling more profitable and politically desirable (e.g., governmental directives that a certain fraction of purchases must be of recycled products)
- what steps must be taken to effect behavioral changes in society, so that recycling becomes as ingrained a habit as making up the bed in the morning?

- what educational programs can be instituted to insure that future generations are aware of the need to recycle?

As the above list demonstrates, the task is awesome. But the benefits are so great that every effort must clearly be made to make sure that in the generations ahead, those items that end up en route to the dump or resource recovery facility have indeed rendered an appropriately long and distinguished service to their owners.

OVERVIEW OF LONG ISLAND MUNICIPAL SOLID WASTE PROBLEM

Harold Berger

While some might think that I am wearing rose colored glasses, my perception of the refuse disposal problem on Long Island is quite positive and optimistic and obviously contrasts markedly with the view of the media and of many others.

I have told the story very often of the meeting of early 1984, where Commissioner Henry Williams met with several of the Long Island supervisors to discuss the closing of landfills on Long Island.

The meeting was very hostile. One supervisor said that he didn't expect to be in office in 1990 so he wasn't going to do anything now. Another asked if the State would put him in jail if he didn't close his landfill by 1990.

What has happened in the 3 years that have gone by since that meeting?

Just about that time, the City of Glen Cove began full operation of their waste to energy facility. In 1986, the Towns of Islip and Babylon each began construction of waste to energy plants. In that same year, the Town of Hempstead received its permits to construct and will shortly break ground for its new facility.

In addition, the Towns of North Hempstead, Huntington and Oyster Bay are almost ready to select vendors to build their plants.

The Supervisors of the Towns of Smithtown and Babylon have agreed in principle, to consider the use of an additional line at Babylon for the incineration of Smithtowns garbage.

To address the east end towns problems, the Brookhaven National Laboratory, the Town of Brookhaven and the Environmental Facilities Corporation are discussing a plan to build a plant on the BNL's grounds. This plant could burn the waste from the six east end towns.

Two towns, the Towns of Easthampton and Southold are planning on implementing composting operations to handle their waste problems.

In addition to all of these positive developments, almost every town has developed or is in the process of developing aggressive recycling and source separation programs in their individual towns.

The Town of Islip has announced that it has put an increased emphasis on its well known WRAP program. The Town of Babylon, as part of its permit to construct its resource recovery facility, will source separate or recycle at least 15% of its waste stream. The Town of Hempstead's new permits require a mandatory recycling program with public oversight. The Town of Oyster Bay has announced a mandatory program in a pilot area. The Towns of North Hempstead, Smithtown, Huntington and Brookhaven have all announced that they will be developing recycling programs. I am confident that the towns of Southampton, Riverhead, Easthampton, Southold and Shelter Island will be following suit in the near future.

While, admittedly, it has been a long time coming, the State of New York has finally come up with a draft Solid Waste Management Plan which includes as an integral part of local solid waste plans, strong recycling and source separation programs. The State is proposing to participate in this effort by helping in the development of markets for these recycled materials and the creation of incentives for recyclers and users of these products.

In addition, our inspectors have been finding that the private construction and demolition sites have developed strict monitoring programs where they insure that anything they receive that is recycleable, not be dumped into their landfills. Glass is separated and wood is sent to chippers, etc.

Another major development in the past three years has been the successful growth of the DEC sponsored STOP (Stop Throwing Out Pollutants) programs in the towns of L.I. Almost every town has had at least one STOP program and several have already repeated these programs where they designate one or two sites within the town and have homeowners bring their household hazardous wastes to these sites. When a sufficient amount is accumulated the material is taken by a professional waste hauler to a secure landfill off Long Island. The Town of North Hempstead is planning monthly STOP days in the spring and summer and the Town of Southold is working with Region 1 DEC to develop a permanent STOP program where homeowners will be able to drop off their household hazardous wastes at local sites any <u>weekday</u> they please.

So you see, a lot of positive things have occurred since 1983 and I firmly believe these developments have been directly or indirectly a result of the Long Island Landfill Law.

Of course, it is also obvious that a lot of problems have also cropped up as a direct result of this law.

The law, preventing the building of new or expanded landfills in the deep recharge areas of Long Island, has forced municipalities to put strict requirements on who can use its

landfills. Towns have begun to strictly monitor what goes into its landfills and have raised the costs of landfilling to more realistic numbers and finally towns are being forced to ship waste out of town until their resource recovery facilities go on line. These shipping costs are extremely high. Up until now these costs have ranged between $67 and $86 per town and these costs are expected to go much higher.

While it is understood that these costs may be only temporary, i.e., 2-3 years until resource recovery facilities are on line, these costs, even on a temporary basis, are difficult for localities to bear. They must be passed on to the individual citizens or in the case of Islip, to its business people, resulting in obvious concerns.

Increased emphasis on source separation, recycling, waste minimization and yes, cooperation among neighboring municipalities are the forseeable solutions to soften the impact of these problems on the communities. The use of balers, the Long Island Railroad and possibly barges should be evaluated to help reduce these costs.

Accordingly, it was with great pleasure, that I noted that both new county executives have publicly expressed their intent to use their good offices to help resolve some of the refuse problems of Long Island. The Department has and continues to offer its resources to the counties to work with them in this regard.

We all know that building resource recovery facilities is not the only answer to garbage disposal. Not only are we limited in what we can burn but also incineration does produce ash in quantities of 25% by weight and 10% by volume. How will we dispose of this ash?

On this subject also, I have been accused of wearing rose colored glasses. As a former businessman, I am always intrigued at the discovery of a new source of large quantities of cheap materials. I have always believed that the entrepenurial characteristics of Americans would result in a use of these materials to fill a need.

I have been told by New York State DOT that while they found ash residue from resource recovery facilities suitable for road underlayment, the material was not consistent in quality to be used other than on an experimental basis. While this objection is understandable, it is simple to foresee a central facility that would receive ash from many plants, blends the ash and develop a consistent product to meet particular specifications.

Most of us know of the work done by the University of Stony Brook on building blocks from resource recovery ash. Some of you may not be aware of the impending grant that the Long Island Regional Board hopes to get from NYSERDA for research

on ash development for uses for this ash.

We know there are problems in the use of ash. Is the ash a hazardous material as classified by USEPA? Will it be necessary to separate the fly ash from the bottom ash and if so how will we handle the fly ash?

It is hoped that answers to these questions will be forthcoming shortly.

In my lifetime, I have found that rarely is there a single solution to a problem. Solutions usually are a combination of answers and so it is with garbage disposal. As recommended in the draft New York State Solid Waste Management plan, municipalities must develop a multifaceted and integrated program for garbage disposal. These plans should employ minimization of waste, recycling and source separation, waste to energy plants, composting and land burial.

Any overview of the garbage disposal situation on Long Island would not be complete without some discussion of the problems and costs associate with off island shipment of garbage.

First, let me say that while off island shipment may be necessary in some cases, I do believe that it is not necessary in all cases. There are sites on Long Island that are outside the sensitive deep recharge areas that could be used for garbage disposal until 1990. For one reason or another, some officials have opted to ship off island rather than consider these options.

Shipping off island is extremely costly and everyone is rightly concerned about the burden that this puts on the taxpayer. Some have estimated that these costs may be as much as $150 or more per family. We do believe that some businessmen are taking advantage of the situation by charging exorbitant sums for garbage disposal.

Perhaps we ought to attempt to put garbage disposal costs in perspective. I bought my home 35 years ago at a price of $18,750. Today the market price of my home is approximately $250,000. An increase of more than 13 times. At that time, a hot dog cost $0.05. That same hot dog now costs $1.50. An increase of 30 times.

Thirty five years ago I created a lot less garbage than I do today yet I venture to say that I pay very little more for garbage disposal than I did then. I pay much more for cablevision today than I do for garbage disposal.

I am not suggesting that we should not attempt to keep our garbage disposal costs to a minimum. I am suggesting, however, that these additional costs might have to be borne a

while if we are serious about protecting our environment.

When one also takes into consideration the fact that we have never paid the true costs of garbage disposal, the increased costs become less onerous. Up until now, garbage disposal costs were simply the costs of pickup. Today, we know the true costs should include elevated land costs, designing and building a sanitary landfill, permitting that landfill, costs of closure and possible costs of remediation. If one considered all of these costs, the projected costs being discussed are not as frightening to consider.

Many of us living on Long Island seem to feel that the landfill and water problems we live with are unique to us. Visiting Cape Cod two weeks ago and reading the local papers, I though I wast back home. The papers had several articles on the costs of shipping garbage off the Cape. One article even talked of setting "caps" on the amount of water that could be pumped in certain areas. I can assure you that there are many states and areas that find it necessary to eliminate landfilling of garbage and have found it necessary to ship garbage long distances for the interim periods until they find alternate methods of garbage disposal.

Finally, we must periodically review our goals. The Long Island landfill law was only one spoke in a program to prevent the contamination of Long Island's groundwater. The Long Island Groundwater Management Plan recommended 129 programs to help protect and conserve this valuable asset. Limiting disposal of garbage to non-sensitive areas was only one of these programs. We have implemented many of these programs and are continuing to do so. Many noted planners have stated that if we do not insure an adequate supply of water for our Island, Long Island will surely lose its many attractions for people and for industry. The elimination of landfills in the sensitive parts of Long Island will go a long way toward insuring protection.

I mentioned earlier that I have been accused of wearing rose colored glasses. Perhaps... I am optimistic because I know we have in New York State and particularly here on Long Island, a vast body of expertise held by concerned officials and citizens. Putting this to work, developing a sense of cooperation among the towns, counties, state and our citizens will help us overcome our problems. Perhaps it is my rose colored glasses, but I see Long Islanders meeting their responsibilities head on in the coming years. Groundwater contaminating landfills will be closed and our precious groundwater will be protected for posterity. Thank you.

RECYCLING CONCEPT

William Ferretti

EXECUTIVE SUMMARY

- Local government traditionally has accepted responsibility for directly (or indirectly) removing solid waste from the point of generation (residential and sometimes commercial).

- Today, the most common destination for that waste is disposal via landfilling (in the very near term - incineration for conversion to energy).

- We have learned, however, that there are serious costs associated with the practice of disposal.

- These are the social costs that accrue in addition to the accounting costs.

- In addition, the real basic accounting costs are escalating as existing disposal capacity is exhausted and new more expensive replacement capacity is sought out.

- Given this climate of escalating accounting costs and increased sensitivity to social costs, a number of state and local governments are giving serious attention and political and fiscal support to other waste management practices that may relieve some of these growing social and accounting costs.

- These other practices are: Reduction
  Reuse
  Recycling

- The intent of these three practices is to reduce the pressure for disposal and bring the waste management cost spiral under control.

KEY DETERMINANTS OF PROGRAM SUCCESS

- These principles evolved from the New York State Recycling Forum's deliberations.

1. Recognition that recycling involves more than the separation and collection of certain materials from the waste stream.

   - Recycling also involves the conversion of those materials into usable intermediate or final goods.

- This implies a recognition of markets and marketing as a key component of recycling.

- A realistic assessment of markets must acknowledge the short run limitation and uncertainties but must also recognize the long run opportunities.

- Furthermore, those limitations and uncertainties must not be evaluated in isolation but in relation to the limitations and uncertainties associated with other waste management strategies.

2. Following from this is the need to recognize that there are some very important social benefits to be derived from recycling. Too often this assessment is not made or given short shrift.

   - There are, for example, some significant costs that can be avoided by implementing recycling.

   - There is evidence to suggest that recycling, when implemented in concert with other strategies (including waste-to-energy plants), can yield greater net benefits than a system without recycling.

3. Important economies of scale can be realized by aggregating materials processing and marketing activities.

   - Evidence from the New York State Bottle Bill, and experiences in other states, indicate that the efficiency of local recycling activities can be increased through centralized processing.

   - Aggregating large quantities of materials in central locations can also improve material marketability by enabling the processor to demonstrate its ability to provide materials of consistent quality and volume to buyers.

4. With the State taking the lead, the State and local governments must act as the catalyst for demonstrating that recycling is a very real solid waste management strategy.

   - It was on this point that the Recycling Forum focused its recommendatons: making proposals on how the State can act as catalyst.

Highlights of the New York State Recycling Forum's Recommendations.

POLICY

A. The State solid waste managment plan should recognize a hierarchy of waste management strategies.

   - o Waste Reduction.
   - o Reuse.
   - o Recycling.
   - o Energy Recovery.
   - o Landfills.
   - o Implementation of such strategies should proceed in a manner that maximizes the overall benefits of the full compliment.

ADMINISTRATIVE COMMITMENT

A. The State needs to fulfill its recycling mandate under Ch. 552. There are a number of provisions that have not been, or are only now, being addressed.

   - o planning,
   - o interagency cooperation,
   - o market development activities,
   - o aid to localities including the setting of guidelines for grant applications,
   - o technical assistance, and
   - o government procurement and source separation programs.

MARKET DEVELOPMENT

A. The Forum made a number of proposals regarding market development. They include:

   - o Expansion and further refinement of the State's recycled procurement program to open opportunities for the procurement of other recycled products.
   - o Directing more of the State's research and development resources toward developing cost effective process for converting materials into competitive intermediate and

finished products.

- Grants-in-aid to encourage existing firms to expand their recycling efforts and to encourage the entry of new intermediate processors or end-use manufacturers.

- State creation of an extensive market data base for use by localities in their planning efforts.

- Addressing the issues of product recyclability and excess packaging including defining the terms "recyclable" and "recycled" and establishing guidelines for their use.

SUMMARY

The circumstances in which we find ourselves mandate creative solutions to New York's growing solid waste crisis.

The Recycling Forum majority was not naive in approaching its charge. It recognized that the optimal solid waste management strategy for New York consists of a multi-faceted approach that includes recycling and energy recovery but also requires the implementation of efforts to reduce the amount of waste we generate.

It is the strong opinion of the Forum, however, that efforts in waste reduction and diversion preceed or are incorporated into the design and construction of new disposal facilities or the upgrading of existing facilities.

It is this approach, in the view of the Froum by which we can maximize overall benefits and minimize the overall costs of waste management.

TOWN OF ISLIP WRAP PROGRAM

Michael A. LoGrande

EXECUTIVE SUMMARY

- In 1981, as a result of Islips landfill crisis, the Town implemented the WRAP recycling program.
- The program involved households in the recycling process - devote one day a week to recycling garbage items in their homes.
- The most important aspect of a recycling program is markets for the items. Without first establishing markets, any program is doomed.
- Recycling saved volume at the landfill and the recycling program kept items out that could be recycled.
- The Town recycled nearly 300 tons per week of metal cans, paper, and glass.
- How to enforce "voluntary" recycling 1. Do not enforce by laws or policy; 2. Provide economic incentives; 3. Educational programs starting early in school and using the media.
- State should establish guidelines as to how recycling should be carried out.
- The State must give positive asistance to the overall solid waste problem including recycling as opposed to its negative policies of simply regulating without assuming responsibility.

CURRENT AND PROPOSED RECYCLING PROJECTS

ON LONG ISLAND

George Proios

NORTH HEMPSTEAD

Currently generates 750 tons/day (195,000 tons/year)

Has had a voluntary program for the last 10 years.

A local law was passed last year requiring homeowners to separate recyclable materials. The program is being implemented in phases. Beginning December 1, 1986, residents will be required to sort newspapers for separate collection. Phase 2 will begin in August of 1987 when glass and metals must also be separated. This is the first Town in Nassau County to institute a mandatory recycling program.

The New York State Legislature passed enabling legislation last year allowing N. Hempstead to establish Flow-Control over their waste stream.

A draft RFP was issued on December 19, 1986 for the system design, installation, and operation of a recycling facility to automatically re-sort the materials residents have already separated but will be collected simultaneously in a single vehicle.

HEMPSTEAD

Currently generates 2500 tons/day (624,000 tons/year)

The Town does not see the need for a mandatory recycling program at this time, but expects one will be in place in 1989 when their resource recovery plant comes on line.

A draft recycling plan was completed in September 1986 but no details have been adopted. The town has refused to set recycling goals as part of their 360 permit as has been requested by DEC. Existing voluntary drop-off centers currently collect an estimated 3/4 to 1 1/2% of the Town's waste stream of 2,400 tons/day.

Major obstacle to recycling is the added cost for the town to purchase additional trucks and hire personnel to collect the recyclable materials. Subcontractors could keep these costs down, but municipal employees union would object.

OYSTER BAY

Currently generates 850 tons/day (221,000 tons/year)

On January 13, 1987, the Town enacted amendments to their waste ordinance which becomes effective February 1, 1987. These amendments allow the public works commissioner to impose mandatory recycling townwide or in a limited area. They have decided to begin a one year pilot program for 6,000 homes in Plainview and Old Bethpage area, the exact boundaries yet to be worked out. The Town will provide a 15 gallon container to each household. Monday will be set aside for bottles and cans (which must be cleaned and have labels removed), and Thursday for newspapers. The glass will go to central collection facility where it will be manually separated. Vendors have not been selected (or found). Paper will go to P & P Paper. A grace period will be allowed residents to "learn the rules" after which garbage will not be picked up from homes not cooperating.

Townwide program is scheduled to begin in 1988.

HUNTINGTON

Generates 900 tons/day (234,000 tons/year)

Currently has only a voluntary program whereby residents can drop off glass, paper, metals and motor oil. Town is planning a mandatory recycling program and has had a plan developed by a local engineering firm which was presented to the Town on January 6, 1987. As of this point, they have not formed any details or established a starting date.

BABYLON

Generates 700 tons/day (182,000 tons/year)

The Town enacted a law that requires the separation of paper, metals, glass, concrete, and compost materials beginning October 1, 1987. This is the only Township on Long Island that has agreed formally with DEC and committed in writing to recycle a specific volume of waste, 15%, expecting to collect 50,000 tons/year.

SMITHTOWN

Generates 350 tons/day (78,000 tons/year)

Enacted legislation this month that will initiate a mandatory program on March 1, 1987. Residents will be required to separate cans, bottles, newspapers, and cardboard. Town expects a 20% compliance.

ISLIP

The first town on Long Island to actually institute a mandatory recycling program. For the last 4 years, residents have been required to separate cans, bottles, newspapers and cardboard for separate pickup. Town officials estimate that compliance is only 20%. No enforcement action has been taken against those who do not comply.

BROOKHAVEN

Generates 1200 tons/day (312,000 tons/year)

Town has been conducting a voluntary program at several sites within the Township for the collection of metals, paper, glass, and motor oil.

They had been planning a pilot recycling program in Shirley and Mastic. A newspaper recycling project initiated in that location years ago failed. A recycling coordinator was hired the beginning of this year and is working on establishing a townwide program. A draft local law is not expected for at least 6 months.

RIVERHEAD

Generates 100 tons/day (26,000 tons/year)

Town has had a voluntary drop-off program for the past 20 years at the municipal landfill. Presently has 80 tons of metal accumulated with no market available. Has not been able to find markets for glass or paper, although the paper is picked up on occasion. 40% of the town's residents transport their garbage to the landfill themselves.

Town is investigating mandatory recycling to begin in 1-2 years, but does not feel it can occur without creating new markets for the recycled materials.

SOUTHAMPTON

Generates 210 tons/day (54,600 tons/year)

Legislation establishing a voluntary recycling program was passed earlier this year, and should be underway by April. Initially paper, cardboard, and tires will be collected at 3 transfer stations. Cost startup is expected to be $150,000 and includes the cost of a rolloff truck at $110,000. Town expects an additional 8-12 rolloffs may be needed. The program will later be expanded to include glass and metals. They expect the program to become mandatory in 1988.

EAST HAMPTON

Generates 72 tons/day (18,720 tons/year)

Had a voluntary program in effect for newspapers and metals, but their contract expired at the end of 1985. Contractor stated that he was losing money and that alternative markets were not available. Thus, no materials were collected in 1986.

Town recently applied for a grant with NYSERDA to start a pilot project. If approved, they could begin to collect newspapers and composting material by the spring of this year.

SOUTHOLD

No plans for recycling. Currently has composting program.

SHELTER ISLAND

No current plans.

THE LONG ISLAND LANDFILL LAW

Evan Liblet

EXECUTIVE SUMMARY

- "Resource Recovery" - goal is to minimize waste disposal.
- Hierarchy of Solid Waste Management
  - Reduction
  - Recycling
  - Waste to energy conversion
  - Landfilling
- N.Y. State generates 17.5 million tons of MSW per year.
- This is approximately 1 ton per persn per year.
- N.Y. State's reduction/recycling goal is 50% by 1997.

CURRENT STATE ACTIONS

- Require recycling before granting part 360 permit.
  - DEIS for 360 permit must contain detailed analysis of recycling.
  - If project is of regional or state wide significance DEC should assume a lead agency role.
  - Only applies now to landfills and resource recovery plants.
- Convene N.Y. State Recycling Forum.
- Source separation/recycling handbook. Will be out soon and will contain the following:
  - Directory of markets.
  - Sample market survey.
  - Sample market contract.
  - Information on recycling of rubber tires, food waste and concrete.

STATE INITIATIVES TO ENCOURAGE REDUCTION/RECYCLING

- DEC's effort is through the new Bureau of Source Reduction and Recycling. The bureau will provide:
  - Technical and financial assistance to local governments.
  - Market development.
  - Public education.

TECHNICAL AND FINANCIAL ASSISTANCE TO LOCAL GOVERNMENTS

- Project planning assistance.
  - Document review.
  - Model recycling ordinaces.
  - Model letters of intent.

- Financial assistance.
  - Expanded EQBA funding.($2.247 million plus $500,000 for L.I.
  - Special appropriations(e.g. $3 million to N.Y. City in 1985).
  - Other grants/loans from:
    - Waste initiators tax.
    - Disposal tax.
    - General funds.
    - $ from unredeemed deposits an containers(tolal approx. $200 million for 1983-1986).

MARKETS DEVELOPMENT

- Expand State's procurement policies.
  - By 1997 75% of all paper procured by the state will be from recycled paper.
  - Increase requirements for State purchace of other recycled materials.
  - Increase price preference for recycled paper from 10% to 20% in competitive bidding.
  - Require contractors and grantees to utilize materials in at least 25% of procurement.

- Financial assistance to businesses.
  - Low interest loans.
  - Pilot programs to demonstrate viability of using recycled materials in manufacturing process.

- Maintenance of markets directory.

- Reduce barriers to use of recycled materials.
  - Investigate disincentives to use recoverd materials. Eliminate and neutralize barriers.
  - Tax incentives and tax equity for investing in processing equipment.
  - Depletion allowance for secondary materials.
  - Adjust intrastate freight rates so as not to favor virgin materials.

- Encourage use of letters of intent between local governments and prospective markets.
  - Help local governments to make financially sound deals.

PUBLIC EDUCATION

- Develop reduction/recycling coursework for incorporation into grades K-12 curricula.
  - Instill conservation ethic in children.

- Special publications on recycling programs.
  - How to do it.
  - Cost benifits to citizens and government.
    - Avoidance costs.
    - Market revenues.
    - Reduce need for resource recovery plants.
  - Environmental considerations.
  - Economic benifits.

SOURCE REDUCTION ACTIVITIES

- Packaging waste is 32-35% of MSW in N.Y. State.

- Returnable container law:
  - Diverting 3-5% of the waste stream now.
  - State will expand coverage of RC law to include wine and wine coolers; mandatory deposit may increase to as much as 25 cents deposit on larger bottles.

- Waste initiators tax.
  - Tried by N.Y.C. in 1971.
  - Tried by Minisota in the 1970's.
  - Would impose graduated assesment on items depending on recyclability of packaging. Best implemented at the federal level on wholesale transactions.

- Packaging design controls to minimize excess packaging.
  - Mandated changes have been strongly opposed by the packaging industry.
  - State and federal government will work with packaging industry in a manner that will account for variables of distribution economics and consumer demand.

- By 1997 the goal is to affect an 8-10% reduction in N.Y. State's waste stream volume.

OTHER COMMENTS

- State should be catalyst for local action.
  - Creative ideas come from local(implementor) level.

- County should be broker for recovered materials(by towns).

STATE ORGANIZATION FOR RECYCLING

Mary T. Sheil

EXECUTIVE SUMMARY

- New Jersey's recycling activities began with an advisory group of business, environmental, and government representitives set up by the New Jersey Dept. of Environmental Protection and Dept. of Energy to address their MSW problems.

- There was a great deal of involvement with industry from the beginning.

- Recycling plan was adopted in 1980.

- They began to draft legislation to implement the plan.

- The State Recycling Act was introduced. 42 cents a ton is collected at N.J. landfills which raises 4.5 million dollars a year to fund the following areas:
  - County and local recycling programs
  - Educational programs
  - Low interest loans
  - Municipal tonnage grants
  - Administrative expenses

- In 1982 240 municipalities participated in the Tonnage Grant Program.

- In 1984 340 municipalities participated and in 1985 404.

- In 1985 almost 900,000 tons were recycled.

- As incentives, municipalities received $2-$8/ton in state funds for recycled materials properly documented.

- Towns expressed great pride in their recyling achievements.

- Low interest loans:
  - One plastic company mixes recycled plastic with sawdust to produce logs and fence posts. New Jersey is planning to build such a plant in the future.

- The educational program used "R.E. Cycle the Magician" for statewide advertisement in schools. The program included a recycling curriculum for K-12 and workshops for teachers.

- Counties are beginning to process and market recycled goods for small towns that do their own collecting.

- Markets
  - 90 dealers that process and ship to others.
  - 19 papermills in state.
  - 6 glass processing plants.
  - 2 mini steel mills.
  - China opened papermill in New Jersey.
- New Bill:
  - New Jersey gave plastics industry one year to look at ways to recycle as much as bottle/can industry, otherwise,the state may put deposit only on plastics.

- New Jersey's position: Recycling is part of the solid waste management program and must be incorporated as such.

- Six years ago landfill disposal costs were $3/ton. New quotes are coming in as high as $90/ton. Some towns already pay $65/ton.

- New Jersey is running out of landfill space. There are now 10 landfills with more than 50% due to close shortly.

- At the present time there are no resource recovery plants in operation but at least 4 are in planning or permit stages.

ORGANIZING A RECYCLING PROGRAM

John Purves

EXECUTIVE SUMMARY

- Cooperation between state, county and municipal government responsible for success of program.
- Each program must address the individual needs of localities.
- Camden started program because of rapidly increasing costs of waste disposal.
- In 1983 the county developed overall solid waste management plan integrating recycling programs and waste management program.
- The county recycles: (What there are markets for)
    - Newspaper
    - Cans
    - Bottles
    - Vegetative Wastes
    - Scrap Metals
    - Waste Oils
- Items the county would like to recycle:
    - Demolition material.
    - Ash. (Convert to asphalt)
    - Tires.
- Scrap metals is a significant portion of solid waste management system? (Not always required to recycle.)
- Status of Camden Program:
    - Recycling approximatly 25% of waste stream.
    - Could do 35% with new plant.
    - Still need other disposal options.

Final Goal: Through recycling reduce waste stream 30-40%

- Tips:

    1. Involve private sector extensively.
    2. When private sector can't be involved, form partnership with County.

3. Must make recycling very easy for the homeowner.

   -Provide waste containers.
   -Put waste out once a week.
   -No sorting of waste or any other handling.

4. Housing structure in county (single family houses) is ideal for collection and recycling of waste.

5. County has taken responsibility for identifying and developing markets for recycleable goods. Town people only worry about collecting the waste in their homes.

6. Present options to private sector as to their participation in the collection of waste and their market of waste.

Philosophy of Program - Recycling will work if it yields economic gains throughout the system.

CASE STUDY: MONTCLAIR, NEW JERSEY

Jean Clark

EXECUTIVE SUMMARY

- 38,000 population, 1/2 single family, 1/2 multi.
- Up to 1985, all buildings, equipment, etc., for recycling was paid for from revenues from recycled products.
- Curbside collection on different day than garbage - bi-weekly.
  - newspaper.
  - glass and aluminum(combined).
  - household appliances.
- Recycling center processing-
  - glass and aluminum sorted manually.
  - glass sorted by color manually.
  - glass crushed mechanicaly.
- Flexibility should be built into any recycling program, due to;
  - fluctuating collection volumes (weather and seasonal variations).
  - requirements of markets.
- Cost analysis: (includes salaries and disposal costs)
  - Collecting recyclables- $150,000-$200,000/year
  - $ received from recyclables- $30/ton
  - Cost of regular disposal- $60/ton
  - Cost of disposal using recyling- $20/ton
  - Cost avoidance- $40/ton
- Appliances and scrap metal are third most important recyclable (See Montclair Recycling Report). Other hidden benifits:
  - volume reduction.
  - lower maintenance costs on sanitation trucks.
  - less physical injury to sanitation personel.
- Corrugated cardboard collection has just been started in the business district and is growing fast.

MONTCLAIR RECYCLING
Montclair, New Jersey

POPULATION:	38,000
HOUSING UNITS:	14,500
AREA:	6 square miles
SPONSOR:	Township of Montclair & Montclair Organizations for Conservation
CONTACT:	Jean Clark Montclair Recycling 219 North Fullerton Avenue Montclair, N. J. 07042 Tel: (201)783-5600

Montclair's program, started in 1971, has evolved slowly and steadily from a depot program manned by volunteers to a multi-material, mandatory curbside program operated by the town's Department of Public Works.

Montclair was the first community in New Jersey to use step-vans as collection vehicles for newspaper. The use of step-vans and small, single-compartment trailers for glass and aluminum gives a great deal of flexibility and versatility to the collection system. When a trailer is full but the van is not, the driver can radio for an empty trailer to be delivered to him on the route. In sections of the town where there are a number of dead-end streets, a step-van is used without the trailer. Barrels for glass are placed inside the van. The vans are also used to collect fiber drums placed in apartment houses enabling tenants to recycle both newspaper and glass.

Residents are permitted to place glass and aluminum in a single container for collection and to use paper bags to bundle newspaper. All necessary sorting is done by Montclair Recycling personnel. This convenience is a major factor in the high participation rates achieved.

PROGRAM:	CURBSIDE	DEPOT
LEGAL STATUS:	Mandatory	Voluntary
DATE STARTED:	1975 newspaper 1980 glass 1983 household appliances	1971
MATERIALS COLLECTED:	newspaper glass aluminum household appliances	newspaper glass aluminum scrap metals and appliances corrugated cardboard high grade paper used motor oil
COLLECTION FREQUENCY:	biweekly	Tuesday - Saturday, 8:00 a.m. - 4:30 p.m.

MONTCLAIR RECYCLING

1985 RECOVERY RATES:	newspaper	118.7	lbs. per cap.
	glass	52.2	lbs. per cap.
	aluminum	.63	lbs. per cap.
	appliances	14.4	lbs. per cap.
	total	190.9	lbs. per cap.

PARTICIPATION RATES:	newspaper	±80%
	glass	±55%

WASTE REDUCTION 1985:

Total Residential Refuse:	27,049 tons (including commercial refuse collected by DPW)
Total Recycled:	3,627 tons
% Recyled:	13.4%

EQUIPMENT:

Collection :	3, 12' step vans (hold 3.5-4 tons of newspaper) 2, single compartment trailers, 5'x8'x3.5' (hold 1.3 tons glass) 1, flat-bed truck with hydraulic lift-gate for appliances
Processing:	1, glass crusher 3, conveyor belts for sorting and processing glass 100, 55 gal. steel drums for processing glass 1, skid-steer loader
Delivery:	1, 25 cy compactor truck for newspaper 1, 25 cy compactor truck for corrugated cardboard 5, roll-off containers (20, 25 & 30 cy) for glass and appliances (Town owns roll-off truck)
Storage:	4 covered concrete bins (9'x16'x6') metal storage shed (16'x24')

CAPITAL COSTS: 1971-1985	$117,500 (building construction, equipment purchase)
PERSONNEL:	9 full-time employees to collect, process and deliver recyclables

MARKETS:	Quality	Buyer
newspaper:	de-ink grade	Garden State Paper Co., Garfield
glass:	color-sorted	Pace Glass, Jersey City; R.E.I., Hillside
aluminum cans:		Alcoa Recycling, Newark
ferrous scrap:	sorted by grade	Parkway Iron & Steel, Clifton
non-ferrous scrap:	sorted by material	Curcio Scrap Metal, Saddle Brook
corrugated cardboard:		Zozzaro Bros., Clifton
high grade paper:	color-sorted	Hackensack Paper Co., Jersey City
used motor oil:		Petrocon, Pa.

TOWNSHIP OF MONTCLAIR REFUSE GENERATION - 1986

	Loads	Cu. Yds.	Tons (est.)	% of total
Regular Refuse	2,815	70,375	23,590	70%
Leaves	360	9,835	3,587	11%
Uncompacted: Streets, Parks, Bulky, etc.	323	9,460	2,419	7%
Total Landfilled	3,498	89,670	29,596	88%
Recycled			3,960	12%
Total Generated			33,556	

TIPPING FEES

	Cu. Yds.	Rate/yd Avg.	Amount
Regular Refuse	70,375	$6.35	$447,225
Leaves	9,835	$7.54	$74,192
Uncompacted: Streets, Parks, Bulky, etc.	9,460	$6.38	$60,343
Total Landfilled	89,670	$6.49	$581,760
Recycled - (Avoided Fee)			($83,794)

COLLECTION COSTS - Recycling vs. Refuse

Regular Refuse			
Refuse Dept. Salaries		$959,439	Note: Fringe benefits &
Tipping Fee		$447,225	other expenses not included
Total		$1,406,664	
Tons	23,590		
Cost per ton		$60	
Recycling			
Recycling Dept. Salaries		$191,230	Note: Fringe benefits &
Income from Sale of Materials		$118,806	other expenses not included
Net Cost		$72,424	
Tons	3,880		
Cost per ton		$19	
Avoided Cost per ton		($41)	
Total Avoided Cost		($158,939)	

1/21/87

MONTCLAIR RECYCLING
REPORT FOR 1986

MATERIALS COLLECTED	Tons	% Increase over 1984	Avg Tons Weekly
Newspaper	2,512.7	+ 11%	48.3
Corrugated	71.0	+10%	1.4
Office Paper	33.7	- 7%	.7
Glass	899.9	- 8%	17.3
Appliances, Scrap Metal	334.6	+ 23%	6.4
Aluminum	15.2	+ 28%	.3
Used Motor Oil (3,305 gals)	13.0	+ 12%	.2
Total	3,880.1	+ 7%	74.6
Wood Chips mulched	80.0		

CONSOLIDATED FINANCIAL SUMMARY

INCOME		EXPENSES	
Sale of Materials:		Operating Expenses:	
Newspaper	$ 79,225.06	Salaries & Wages	$191,230.41
Corrugated	1,114.00	Operating Expenses	4,456.56
Office Paper	1,514.60		$195,686.97
Glass	24,526.42		
Aluminum	6,985.47	Publicity	2,134.18
Appliances & Scrap Metal	5,442.06	Organization & Misc.	635.00
Used Motor Oil	(57.50)		
Miscellaneous	56.00		
	$118,806.11		
Interest & Misc.	7,136.72		
1984 Tonnage Grant	2,261.29		
1985 Tonnage Grant	9,625.98		
Total Program Income	$137,830.10	Total Program Expense	$198,456.15
Net Loss	$(60,626.05)		
		Capital Expenditures:	
Budget Appropriation	48,000.00	1, 12' Step Van (Town)	$ 20,635.00
MOC Contribution	7,000.00	1, 12' Step Van (MOC)	$ 20,135.00
Balance	$(5,626.05)	Contribution: TREES	2,500.00

EFFECT ON GENERAL FUND

COSTS AVOIDED		EXPENSES IN BUDGET	
Refuse Tip'g Fees @ $21.16/ton avg.	$83,794	Fringe Benefits @25%	$47,808
472 Trips to Landfill @ $65/trip	30,680	Equipment O & M	11,000
6 Men for Regular Refuse Collection	140,887	Budget Appropriation	48,000
Total Costs Avoided	$255,361	Total Expenses	$106,808
Less Expenses	-106,808		
NET BENEFIT	$148,553		

INTERGRATING RECYCLING WITH TOTAL WASTE MANAGEMENT

Garrett Smith

EXECUTIVE SUMMARY

- The state of New Jersey needs to be cleaned up in order to improve its image and hence increase tourism and other business interests.
- Since 1978 New Jersey has had an integrated program - burning coupled with sorting of wastes.
- For a successful recycling endeavor it must be planned out as a profitable enterprise.
- In new Jersey there is a need for intermediate processing centers. They could be financed through recovery investment funds.

APPENDICES

Appendix A

LIST OF PARTICIPANTS

1. Harold Berger, Director, Region 1, N.Y. State Department of Environmental Conservation.

2. Jerry Bresner, Regional Solid and Hazardous Waste Engineer, N.Y. State Depatrment of Environmental Conservation.

3. Jennifer Epp, Senator Owen Johnson's Office.

4. William Ferretti, Coordinaator, N.Y. State Recycling Forum, Rockefeller Institute of Government.

5. Elsa Ford, Environmental Chairman, Brentwood PTA.

6. Elizabeth Gallagher, N.Y. State Department of Environmental Conservation, Town of Islip.

7. Rim Giedraitis, President, Islip Resource Recovery Agency.

8. Ted Goldfarb, Associate Professor of Chemistry and Associate Vice Provost for Curriculum, SUNY at Stony Brook.

9. Louise Halga, N.Y. State Department of Law.

10. Jeff Hartman, Town of Huntington.

11. James Heil, Commissioner of Sanitation, Town of Hempstead.

12. Bob Henderson, Bureau of Source Reduction and Recycling, N.Y. State Department of Environmental Conservation.

13. Judith Hope, Supervisor, Town of East Hampton.

14. R. Italiano, Recycling Coordinator, Newark, New Jersey.

15. Doris Kerby, Public Information Officer, Town of Babylon.

16. Evan Liblet, Bureau of Source Reduction and Recycling, N.Y. State Department of Environmental Conservation.

17. Michael A. LoGrande, County Executive, Suffolk County.

18. Dennis Lynch, Commissioner of Environmental Control, Town of Babylon.

19. James McAllister, Town of Oyster Bay.

20. James McCulley, Deputy Supervisor, Town of Southold.

21. Sophie Morris, N.Y. State Department of Environmental Conservation.

22. Gerhardt Muller, Port Authority of New York and New Jersey.

23. Greg Munson, Supervisor, Town of Islip.

24. Frank Murphy, Supervisor, Town of Southold.

25. Homer A. Neal, Professor of Physics, SUNY at Stony Brook.

26. George Proios, Senate Executive Director, N.Y. State Legislative Commission on Water Resource Needs on Long Island.

27. John Purves, Camden Couonty Office of Solid Waste Management.

28. Sheldon Reavon, Waste Management Institute, SUNY at Stony Brook.

29. Frank Roethal, Associate Professor, Nassau Community College, and Research Professor, Marine Sciences Research Center.

30. Richard Rozney, Recycling Coordinator, Town of Brookhaven.

31. J.R. Schubel, Provost, SUNY at Stony Brook.

32. Mary Sheil, Administrator of New Jersey Department of Environmental Protection.

33. Jeff Simes, Supervisor, Town of Shelter Island.

34. Bob Simmons, Town of Hempstead.

35. Edward Skidmore, Town of Hempstead Solid Waste.

36. Garrett Smith, Essex County Division of Solid Waste Management.

37. Pat Vecchio, Supervisor, Town of Smithtown.

38. William Wise, Associate Director, Marine Sciences Research Center, SUNY at Stony Brook.

39. Joseph Zipper, SUNY at Stony Brook.

Appendix B

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14. D. Knapp, "Costs, Revenues, and Benefits of Urban Plant Waste Composting", New York State Legislative Commission on Solid Waste Management Conference on Materials Recycling and Composting, Albany, NY, October 8, 1985.

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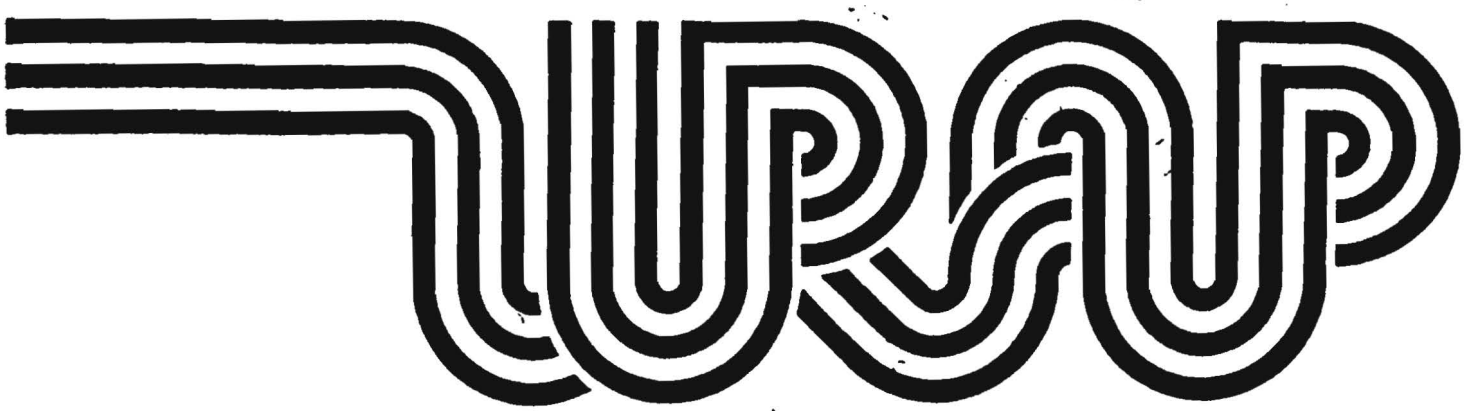
ISLIP'S Solution to a Wasteful Problem!

Appendix C



MICHAEL A. LO GRANDE
Supervisor

NORMAN DEMOTT
Councilman

VINCENT A. GIANNI
Councilman

FRANK D. BONCORE
Councilman

ANNE PFIFFERLING
Councilwoman

WILLIAM TYLER
Town Clerk

EDWIN BOOGERTMAN
Receiver of Taxes

DEPARTMENT OF ENVIRONMENTAL CONTROL

THOMAS J. HRONCICH
Commissioner

SOURCE SEPARATION

"Source separation" is a method of recycling which requires residents to separate their waste at the first point of disposal -- the garbage can. The purpose of source separation is to segregate recyclable materials before they are mixed or contaminated with non-recyclable materials. That way good quality recyclables are easily diverted from landfilling or incineration to the raw material market for reprocessing.

Source separation has several advantages:

1. Capital cost is low;
2. Materials for recycling are of good quality, this commands high prices and insures market stability;
3. Citizens are directly involved in saving natural resources and energy;
4. Public awareness is increased about the composition and disposal of solid waste.

Source separation also has the advantage common to all recycling systems which include the removal of noncombustibles from MSW. This allows any complementary combustion system to be more efficient and to last longer.

The major problems of source separation are:

1. Maintaining public interest and participation;
2. Collecting the separated materials;
3. Removing contaminants from recyclables;
4. Keeping revenues higher than processing cost.

Solutions to these problems are often incompatible. For instance, if all recyclables were placed in separate containers, processing costs and contamination would be minimized, but participation would drop off and collection would be difficult. Participation could be stimulated with special containers and advertising, but the cost of such inducements could greatly exceed the revenues of the program. Thus the design of a source separation program must be carefully balanced to minimize these problems.

WRAP Source Separation (Islip Style)

The EPA has stated that Islip's WRAP Program is the largest source separation program in the United States. The program collects newspapers, glass bottles and jars, food and beverage cans, and corrugated each week.

The program is somewhat unique in that:

1. Homeowners mix all recyclables into one container.
2. Collection is accomplished using ordinary garbage packer trucks.
3. It works.

Developing the Program

Source separation did not start in Islip on a voluntary basis. It started because of a mandate by the New York State Department of Environmental Conservation when they ordered Islip to initiate a source separation program as a condition of Islip obtaining the State's approval to continue operating our landfill. This consent order, signed by the Town of Islip and New York State DEC on August 5, 1980, required that a source separation program be in place and operational by October 6, 1980, a mere two months.

Two months gave us little time for conducting studies and to accomplish the necessary planning. The first action we took was to review other source separation programs, particularly those that had failed. Our short investigation into the programs that had failed indicated that the failures could be generally attributed to irregular collection schedules and placing too much burden on the homeowners.

Existing resources were studied to establish the perimeters within which we had to work:

1. Financial - There was virtually no money available to start the program. The existing 1980 budget contained no money for new programs and the 1981 proposed budget was an "election year" budget where expenditures were kept to a minimum.

2. Collection Equipment - The Town had five packer trucks, however, they were assigned to collect garbage from Town facilities. 35% of the Town's population were under Town Garbage Collection Districts that were bid out to private carters. The balance of the Town's population either brought their garbage to the Town's landfill or had private collection.

3. Facilities - The Town had a 300 TPD incinerator that was constructed in 1970, but closed in 1978 due to air emission problems.

4. Personnel - When the incinerator was shut down in 1978, 30 employees were transferred to other Town departments. Those who remained were transferred to the landfill. While the transfers resulted in reducing the department's staffing, those who remained were considered the "cream of the crop".

5. Existing Recycling Program - Since 1978, the Town had a volunteer recycling program operating at our landfill. Approximately 100 tons per month of recyclables such as newspaper, glass and metal were brought to the landfill by residents and deposited in a contractor's rolloff container. The Town was paid by the contractor for those items collected.

After analyzing our existing resources, we then established some general program objectives:

1. Homeowner convenience was to be top priority.

2. Collection method had to be the most economical method.
3. Equipment purchases were to be kept to the minimum.
4. Market development would be low priority.

After reviewing all the data we had gathered, we made decisions as how to proceed. Our inexperience was probably our greatest asset. Just about everyone thought we were candidates for the looney farm, however, our success so far indicates our ideas were either 1) good or 2) lucky or 3) a combination of both.

The program was established as follows:

1. COLLECTION

It was decided that the carters who were under contract to the Town would do all the collecting of the recyclables. Hence, only those in the Town Garbage Districts would participate. This decision was actually made for us since no other feasible alternative existed. Town equipment was not available, the two month period did not permit enough time to purchase specialized collection equipment and probably the most important factor, we had no money.

The existing contracts between the Town and the carters required three collections per week - two for household and yard waste and one for refuse. The household and yard waste were picked up on Monday and Thursday or Tuesday and Friday and all refuse was collected on Wednesday. The refuse collection was a throwback to the days when our incinerator was operating, however, since it was being disposed of in our landfill, the refuse collection (generally non-burnables) was switched to the same days household and yard waste were collected. This left Wednesday available for recyclable collection.

The carters were not overly enthused with the revised collection schedule, since the refuse collection day was an extremely light pick up day and they felt that the substitution of recyclables would cause them to increase their equipment and manpower.

To make the recyclable collection more palatable, we decided to eliminate our disposal fee on recycling day. That decision proved to be counterproductive as will be explained later.

2. HOMEOWNER CONVENIENCE

In order to make source separation as easy as possible for the homeowner, it was decided to mix all the recyclables together. The homeowner would only have to separate their recyclables from their household garbage. No other separation was required, thus eliminating the need to separate newspapers, clear, green and brown glass, steel cans, aluminum cans, green and clear plastic bottles.

While we wanted to make it convenient for the homeowner, we also knew that counting on voluntary participation would bring a quick end to the program. A mandatory Recycling Ordinance was written establishing it to be a violation not to recycle and establishing fines for those not willing to participate.

3.FACILITY

While there was a potential that our incinerator might be re-opened to burn garbage, it was decided to use the facility for the processing of recyclables. Since recyclables were collected and disposed of on one day (Wednesday) an area sufficient to receive and hold enough material to permit five days of processing was required. The closed incinerator with it's 1000 ton holding pit was ideal. It also was the only building available that had the capacity to do the job.

Prior to the start of our first collection, residents were sent a letter from the Town Supervisor and a brochure explaining the proper way to prepare their recyclables for collection. Radio announcements were made and the weekly and daily newspapers printed everything we sent them.

We set up our processing system using material from the scrap pile. Conveyers were made from several checkout counters a supermarket had thrown out. A separator (we called it "the Grisley") was constructed to separate bundled newspaper from cans and bottles. The "Grisley", was a bunch of rollers spaced six inches apart and placed on an inclined frame that, after testing with a mixture of tied newspapers, glass bottles and metal cans, separated the tied newspapers from everything else with a 90% efficiency factor. We were going to conquer the world!

Unfortunately, we forgot one thing. We were dealing with the public. On the first collection day, October 6, 1980, with newspaper reporters, Town officials and crews from CBS and ABC television, the first truck came in and dumped it's load on the "Grisley". The load stopped half way down. Most of the newspapers were not tied. Those that were tied were tied poorly and everything jammed up in the rollers. The hope that we had to revolutionize the recycling world turned out to be a disaster - totally. We experienced the same feeling Ralph Branca must have had watching Bobby Thompson's home run. Today, the "Grisley" stands next to our recycling center as a monument to optimism.

Our first method of separating the recyclables was quite primitive. Material was dropped onto grates that were salvaged from highway sand spreaders. Newspapers were handpicked and the remaining material fell through into the incinerator's furnace where crews hand separated the various material.

As tonnage increased each week, we were unable to process what we were receiving and material began to pile up in the holding pit. We were only processing one ton per hour or about 40 tons per week. Plans were made to increase hourly production to 3 tons per hour. Conveyers, a trommel and a magnetic separator were purchased and installed by May 1981.

With the installation of the newly acquired equipment, productivity increased to approximately 3½ tons per hour. With this capability, our backlog was reduced and the decision was made to expand the WRAP Program to include those residents who were serviced by private carters. This expansion became effective on July 1, 1981 and resulted in an increase from 120 tons to 175 tons of recyclables collected.

Additional modifications were made to the recycling line to increase hourly capacity to 8 tons per hour, however, the entire process was too labor intensive and costly.

Plans were made to completely revise our processing line to increase production to 15 tons per hour. In order to accomplish this production increase a sizeable capital investment was needed. In the Fall of 1981, Islip applied for a $169,000 grant from New York State. Approval of this grant was received in May 1983 and preparations are now being made to revise the production line. Figures 1 and 2 show the existing layout and the revised layout.

On January 1, 1983, the Town expanded it's Garbage Districts to include all Town residents. The effect of this expansion on the amount of recyclables collected was dramatic from 175 tons to over 300 tons per week. The increase in participation can be attributed to a better informed public and increased control over the carters.

1983 has been the first time the WRAP Program has shown a profit. Our operating cost was $304,000 for the year and total revenues were $490,831.

In 1984, there was a decrease in tonnage collected. This reduction can be generally attributed to the State's Bottle Bill since the tonnage reductions were generally in glass cans and aluminum. The Bottle Bill also resulted in lower prices, particularly for glass which went from $45 per ton to $20. In addition, markets for amber and mixed glass became nonexistent.

We have also seen a reduction in the participation rate during 1984. The 1983 rate was estimated to be 40% and a study conducted in November of 1984 estimated that the participation rate had dropped to 31%.

In order to increase the public's awareness of the importance of recycling, the Town has embarked on a major education program. This program consists of:

1. Production of a documentary film and video cassette explaining the need to recycle. This film will be made available to local schools and libraries and will be shown to various civic and local organizations.

2. Instituting recycling lesson plans, with emphasis on the WRAP program, is a part of the curriculum in our local schools.

3. Insertions of a WRAP brochure in each piece of mail sent out by every Town Department.

4. Creation of a brochure to be mailed to all Town residents explaining our solid waste plans and the WRAP program.

We are quite proud of our WRAP program. It's success can be

attributed to the support of our elected officials, the dedication of our employees and the cooperation of our residents. We consider the WRAP Recycling Facility to be one of the rare resource recovery plants that works, that makes a profit and creates a positive environmental impact.

We realize that recycling is not the total answer to our solid waste problem but it certainly is one of the rare positive steps that can be taken as part of the solution.....and that's tough to beat!

WRAP COMPOSITION

PER CENT	ITEM	LBS. PER TON
5.9	Clear Glass	118
2.9	Brown Glass	58
2.6	Green Glass	52
.4	P.E.T.	8
7.9	Steel Cans	158
1.04	Bi Metals	20.8
.26	Aluminum	5.2
1.6	Other Metal	32
2.0	Corrugated	40
30.5	Newspaper	610
24.0	Mixed Glass	480
20.9	Waste	418
100.0		2000

TOWN OF ISLIP **DEPARTMENT OF ENVIRONMENTAL CONTROL**

401 MAIN STREET • ISLIP, NEW YORK 11751 • (516) 224-5640
Michael A. LoGrande, Supervisor
Thomas J. Hroncich, Commissioner

TOWN OF ISLIP RECYCLING ORDINANCE

The following portion of Chapter 21, "Garbage and Rubbish" of the Code of the Town of Islip pertains to separation of recyclables for residents within Town Garbage Districts.

21-1. Definitions.

As used in the ordinance, the following words are intended to include and be defined as follows:

BULK ITEM - an item of solid waste larger than 2' x 2' x 4' or heavier than 50 pounds.

RECYCLABLES - Solid waste consisting of newspaper, cardboard, glass and/or metal food and beverage containers and aluminum and metal food and beverage containers.

SOLID WASTE - means materials or substances discharged or rejected as being spent, useless, worthless or in excess to the owner at the time of such discard or rejection, except sewage and other highly diluted water-carried materials or substances and those in gaseous form. Such wastes shall include but are not limited to garbage, sludge, rubbish, ashes, incinerator residue, street cleanings, dead animals, offal, abandoned vehicles, agricultural waste, industrial waste, commercial waste, and construction and demolition debris.

21-2.1 RECYCLABLES

A. Recyclables shall be separated from all other solid waste.

B. Paper recyclables shall be tied in bundles prior to the collection, removal or disposal of same. Newspaper shall be bundled separately from cardboard.

C. Glass and metal recyclables shall be clean and all contents shall be removed therefrom prior to the collection, removal or disposal of same. Labels shall be removed from metal recyclables prior to the collection, removal or disposal of same.

removal and disposal. Recyclables shall not be placed in plastic bags for collection, removal or disposal.

E. Recyclables shall not be placed in the same garbage can as or otherwise mixed with other forms of solid waste for collection, removal or disposal.

F. It shall be unlawful for a person to collect, remove or dispose of solid waste which consists of recyclables combined with other forms of solid waste.

G. Ownership of recyclables set out for collection shall thereupon vest in the Town of Islip. It shall be unlawful for a person to collect, remove or dispose of recyclables which are the property of the Town of Islip without first having obtained the license required by this Chapter. A person who collects or removes recyclables which belong to the Town of Islip shall deliver and dispose of same at such locations as the Commissioner shall designate for that purpose.

H. The Commissioner is empowered to designate the day of the week on which recyclables shall be collected, removed and disposed of from a particular area. Recyclables shall not be collected, removed or disposed of from that area on any day of the week other than that designated by the Commissioner.

I. The Commissioner is empowered to designate the day of the week on which solid waste which does not contain recyclables shall be collected, removed and disposed of from a particular area. Solid waste which does not contain recyclables shall not be collected, removed or disposed of from that area on any day of the week other than that designated by the Commissioner.

21-10 PENALTIES FOR OFFENSES

B. A person convicted of violating 21-2.1 A, B, C.D or E shall be guilty of a violation and punishable as follows:

(1) For a first conviction, by a fine of not less than $10.00 nor more than $25.00.

(2) For a second conviction within one year by a fine of not less than $25.00, nor more than $50.00.

(3) For a third conviction within one year by a fine of not less than $50.00, nor more than $100.00.

(4) For a fourth conviction within one year, by a fine of not less than $100.00, nor more than $250.00.

DEPARTMENT OF ENVIRONMENTAL CONTROL

1983

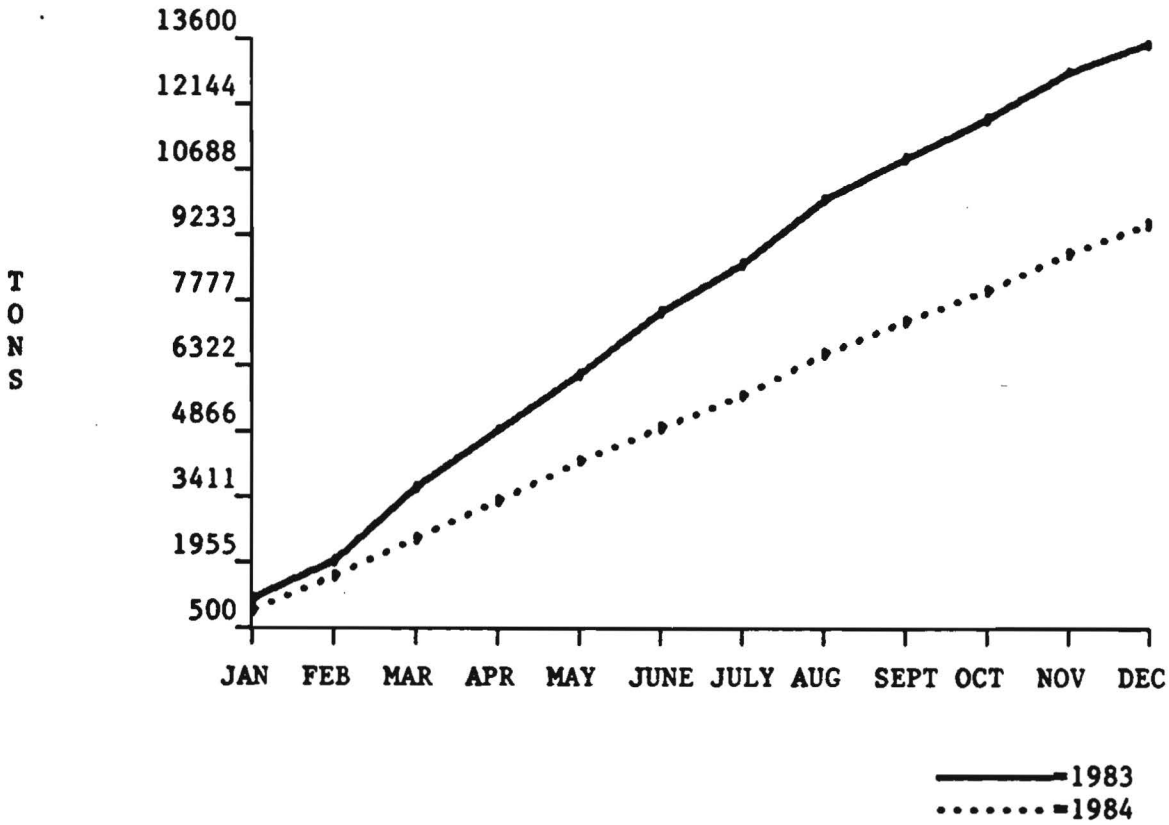
MONTHLY WRAP REPORT

MONTH	TOTAL TONS RECEIVED	MATERIALS SOLD	WASTE	TOTAL MATERIAL DISPOSED	PAPER	GLASS	ALUMINUM	METAL	P.E.T.	MATERIAL REVENUES	TIPPING FEES	TOTAL REVENUES
Jan.	1136.47	734.67	127.30	861.97	400.54	207.87	5.67	101.92	18.67	25,067.97	11,364.70	36,432.67
Feb.	805.82	633.26	115.00	748.26	378.52	139.29	6.68	94.89	13.88	21,375.65	8,058.20	29,433.85
Mar.	1638.86	880.38	174.00	1054.38	563.48	178.42	10.12	123.78	4.58	28,822.86	16,388.60	45,211.46
April	1281.25	873.15	463.00	1336.15	600.08	241.94	6.25	101.04	——	37,032.00	12,812.50	45,164.48
May	1277.44	756.70	223.00	979.70	521.55	130.77	8.09	109.69	——	32,390.08	12,744.40	49,844.50
June	1394.90	833.34	384.00	1217.34	543.63	175.17	4.71	54.76	——	33,508.79	13,949.00	47,457.79
July	1040.67	640.12	280.00	920.12	442.16	91.10	5.53	65.62	——	27,347.04	10,406.70	37,753.74
Aug.	1437.57	863.19	210.00	1073.19	617.24	182.63	7.87	98.80	——	39,357.98	14,375.70	53,733.68
Sept.	936.41	658.94	125.00	783.94	428.48	121.64	4.70	104.12	——	28,752.04	9,364.10	38,116.14
Oct.	881.24	707.81	275.00	982.81	476.09	108.01	2.19	121.52	——	27,337.10	8,812.40	36,149.50
Nov.	1052.15	610.09	115.00	725.09	444.42	82.88	1.82	80.97	——	26,882.80	10,521.50	37,344.30
Dec.	659.39	618.53	160.00	778.53	478.32	68.61	1.79	69.81	——	27,595.25	6,593.90	34,189.15
TOTAL	13,542.17	8,810.18	2,651.30	11,461.48	5,894.51	1,728.33	65.42	1,126.92	37.13	355,469.56	135,391.70	490,831.26

DEPARTMENT OF ENVIRONMENTAL CONTROL
1984 MONTHLY WRAP REPORT

MONTH	TONS REC'D.	MATERIAL SOLD	WASTE	TOTAL MATERIAL DISPOSED	BEER	GLASS	ALUMINUM	FERROUS CANS	WHITE MEDAL	CORRUGATED	MATERIAL REVENUE	TIPPING FEES	TOTAL REVENUES
January	639.43	544.00	159.00	703.00	404.98	61.79	1.72	45.99	29.52	———	26,065.65	6,394.30	32459.95
February	782.08	509.17	153.60	662.77	264.43	49.36	2.10	30.37	137.04	25.87	22,662.23	7,820.80	30483.03
March	821.73	786.91	258.35	1045.26	602.76	51.14	4.04	34.47	72.14	22.36	39,429.14	8,217.30	47646.44
April	843.21	731.67	235.80	967.47	561.89	59.74	1.33	37.77	61.38	9.56	35,636.88	8,432.10	44068.98
May	894.62	782.09	288.74	1070.83	566.55	46.21	2.94	42.63	112.74	11.02	38,403.41	8,946.20	47349.61
June	942.74	695.37	144.94	840.31	488.90	62.88	1.77	27.37	87.08	27.37	31,704.46	9,427.40	41131.86
July	696.46	601.56	124.28	725.84	451.42	31.43	——	23.68	60.91	34.12	27,485.15	6,964.60	34449.75
August	961.18	922.75	177.86	1,100.61	667.42	53.52	4.51	41.82	103.07	52.41	43,765.77	9,611.80	53377.57
September	726.34	581.76	136.25	718.01	416.18	31.38	3.04	25.77	78.64	26.75	27,489.26	7,263.40	34752.66
October	695.50	612.22	153.30	765.52	442.10	20.19	3.16	35.47	72.03	39.27	29,447.49	6,955.00	36402.49
November	838.01	504.45	135.75	640.20	356.82	22.66	1.68	16.76	75.61	30.92	22,885.67	8,380.10	31265.77
December	656.78	628.15	174.39	802.54	461.14	34.80	3.23	25.79	59.36	43.83	29,872.68	6,567.80	36440.48
TOTAL	9498.08	7900.10	2142.26	10,042.36	5684.59	525.10	29.52	387.89	949.52	323.48	374,857.79	9,4980.80	469838.59

WRAP TOTAL TONS COLLECTED



WRAP REVENUES