

The Third Annual Report of the Recycling Public Advisory Council

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Executive Summary

Introduction

During 2003 the Recycling Public Advisory Council (RPAC) has worked hard to gain a better understanding of the constraints inherent in the state's current recycling system and the types of changes that need to be implemented (and associated costs) if the state is to achieve its goal of 30% diversion of residential solid waste (RSW). In addition, the RPAC significantly increased its public outreach efforts, participating in many meetings with civic and neighborhood associations, businesses, and members of the general public.

In its Second Annual Report, the RPAC made a commitment to complete two primary tasks in 2003. These were:

1. completion and evaluation of a study of costs of recyclables collection and of construction and operation of a materials recovery facility (MRF) for New Castle County; and
2. development of a comprehensive strategy for increasing the RSW diversion rate.

Due to circumstances beyond the RPAC's control, the cost study was completed several months later than initially anticipated. As a result, the RPAC is still evaluating the study's findings. In order to adequately interpret the data, the RPAC is delaying the submission of its strategy and timeline until April 1, 2004. We feel that this is necessary to allow us to produce a strategy that is well thought out and capable of implementation.

Completion and Evaluation of Recycling Cost Study

In March 2003 DNREC issued a Request for Proposals to conduct a cost study of enhanced recycling in New Castle County. Three consulting firms submitted proposals. The contract was awarded to DSM Environmental Services, Inc., for a cost of \$74,740. DSWA contributed \$15,000 toward the cost, and DNREC paid the remaining \$59,744.

DSM submitted its final report on October 15, 2003. The findings were presented to the Governor on October 15 and to the public in meetings held on October 15 and 16. The Executive Summary of the cost study is attached to this report as Appendix D, and the full report is available on DNREC's website at www.dnrec.state.de.us.

DSM's study will play an important role in the development of the RPAC's recommended strategy for increased recycling. The following are some of the findings that the RPAC will be taking into consideration (*note: there is a 20% margin of error in the cost figures presented in the report*):

- The current drop-off program alone will never achieve the desired 30% diversion. A subscription curbside recycling program could be expected to achieve about 15% participation and a RSW recycling rate of 8%. An organized system providing curbside recycling to all New Castle County households would potentially capture three to four times the quantity of recyclables captured by RECYCLE DELAWARE and achieve a RSW recycling rate of 13% to 19%.
- A MRF is essential to an effective curbside recycling program. Here's why: To achieve high participation, a recycling program must be convenient. For a curbside program, this means that residents must be allowed to place all of their recyclables into one or two containers for pickup. This practice is referred to as commingling. The commingled recyclables must then be delivered to a MRF for separation into their various marketable components.
- It would be cost effective to convert the DSWA's intermediate processing facility at Pigeon Point into a MRF to accept all recyclables collected in New Castle County. A system designed to process either single-stream (all recyclables collected in one container) or dual-stream (recyclables collected in two containers) collections could be installed in existing buildings and operated for tip fees ranging from \$1 to \$7 per ton net of material sales revenue.¹ This analysis is based on ten-year historic prices for all materials; these are considerably lower than current prices. The costs of operating and maintaining the MRF could potentially be offset by a restructuring of the existing recycling system. Further discussion of this possibility will be included as a part of RPAC's strategy.
- The recycling method that would capture the most recyclables at the lowest per-ton cost is organized weekly single-stream collection with MRF processing. This method would achieve 19% RSW diversion at a cost of about \$136 per ton. This compares favorably to both the cost of RECYCLE DELAWARE (\$190 per ton) and the current cost of refuse collection and disposal in unincorporated New Castle County (\$180 per ton).
- A system of integrated refuse and recyclables collection could potentially provide curbside recycling to residents in unincorporated areas at no additional cost above what these residents currently pay for trash collection alone. If the free-market refuse collection system is retained, county-wide curbside recycling could be implemented at a cost of \$1.80 to \$2.60 per household per month.² By comparison, the cost of RECYCLE DELAWARE (spread over all households) is about \$1.00 per household per month. Some users of the program must travel out of their way to recycle and thus incur an additional transportation expense; based on a limited survey of individuals dropping off their recyclables, DSM estimates this cost to average about \$1.60 per month per RECYCLE DELAWARE user.

¹ These costs are feasibility level costs, having a margin of error of 20%, according to DSM, and should not be taken as absolutes – the actual costs could be somewhat higher or lower. It is also important to note that tip fees required to cover MRF operating costs would vary with the market value of the recyclables. While DSM has made every effort to be realistic in its assumptions about the recyclables markets, there is no guarantee that these markets will not become weaker, resulting in the necessity for a higher tip fee.

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- To reach the goal of 30% diversion, we must address yard waste as well as curbside recycling. The study suggests that collection and composting of leaves, combined with increased on-site management of grass, would be the most cost-effective way of increasing yard waste diversion.

Development of Strategy for Increasing the Diversion Rate

The RPAC will submit its recommended strategy by April 1, 2004. The strategy will address both curbside recycling and yard waste management. It will include a target date for reaching the 30% diversion rate and a timeline for accomplishing the individual steps required to achieve the final goal.

It is important to report the following items, which relate to the development of the strategy:

1. Recognizing that increased yard waste diversion is essential to reaching our goal, the RPAC voted in 2003 to advise the State to implement a ban on the disposal of yard waste in the state's landfills. Accordingly, Chairman Paul Wilkinson sent a letter to DNREC Secretary John Hughes advising the development of regulations to effect such a ban by April of 2005. Secretary Hughes responded, in a letter dated November 18, 2003, that DNREC would initiate the process for development of a regulation to ban yard waste, with a goal for adoption of the final regulation in December of 2004. The RPAC is aware that the issue of composting facilities to manage the yard waste, as well as fair and effective enforcement of the ban, will need to be addressed before the ban takes effect.
2. Senator David McBride attended the RPAC's November 2003 meeting and asked for the RPAC's help in developing legislation that would "take recycling to the next level." The RPAC welcomes this legislative interest and looks forward to working with the General Assembly in implementing its strategy.
3. Believing that the primary obstacle to the implementation of curbside recycling programs is the lack of a Materials Recovery Facility (MRF) capable of processing commingled recyclables, the RPAC voted in December 2003 to send a letter to the DSWA advising the DSWA to develop a MRF in New Castle County capable of processing 30,000 tons per year of commingled recyclables. The letter was sent by Chairman Paul Wilkinson to N. C. Vasuki on January 8, 2004. It specifies that the MRF should be ready to begin operating by the end of 2005.

Memorandum of Agreement

On December 17, 2003, all RPAC members received a copy of a Memorandum of Agreement (MOA) under which DNREC, DSWA, and RPAC would collectively pursue additional information and analyses that would lead to recommendations concerning mandatory curbside recycling on a statewide basis. The MOA had already been signed by the Secretary of DNREC and the Chief Executive Officer of DSWA. Paul Wilkinson

asked the RPAC members to review the document and scheduled a special meeting for discussion and a vote on whether to sign the agreement.

On January 5, 2004, the RPAC discussed the MOA and voted to sign the agreement. The work to be done under the MOA includes assessments of quantities of recyclables that would be amenable to curbside collection; market trends for sale and utilization of collected materials; reviews of mandatory curbside recycling programs throughout the United States; and estimated costs and revenues of the preferred recycling models considered feasible and effective for use in Delaware.

The MOA is attached to this report as Appendix F.

Upon signing the agreement, Chairman Wilkinson included an addendum laying out certain conditions that were not included in the MOA but that were agreed to during the discussion on January 5, 2004. The addendum is included in Appendix F.

Recycling Assistance Grant Program

For FY03, as in previous years, the amount of grant funding requested by eligible groups exceeded the amount available. DNREC, in conjunction with RPAC, selected ten projects for funding, at a total funding amount of \$68,333.80. The RPAC recommends that the grant program continue and that the amount of state funding available be increased to \$100,000 per year.

Notable Recycling Activities

In 2003 the DSWA made two notable enhancements to its recycling program:

1. It implemented a pilot subscription curbside recycling program in selected sections of New Castle County. The cost is \$6 per household per month for recyclables and an additional \$3 per month for yard waste.
2. It expanded its "Junk Mail" collection, previously provided on a trial basis at four sites in New Castle County, to 60 RECYCLE DELAWARE centers statewide.

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1.0 INTRODUCTION

This is the Third Annual Report of the Recycling Public Advisory Council (RPAC). The purpose of the report is to fulfill a requirement of Executive Order No. 82, which directs the RPAC to prepare an annual report addressing the following:

1. the status of attainment of the goal of diverting 30% of Delaware's residential solid waste;
2. an accounting of the Recycling Assistance Grant Program and recommendations for future funding of the program;
3. an assessment of the activities of both the DNREC and the DSWA in achieving the 30% recycling goal; and
4. such other recommendations as the RPAC shall deem appropriate.

Executive Order No. 82, issued by Governor Thomas Carper in September 2000, is attached to this report as Appendix A. A list of RPAC members can be found in Appendix B.

During 2003 the Recycling Public Advisory Council (RPAC) has worked hard to gain a better understanding of the constraints inherent in the state's current recycling system and the types of changes that need to be implemented (and associated costs) if the state is to achieve its goal of 30% diversion of residential solid waste (RSW). In addition, the RPAC significantly increased its public outreach efforts, participating in many meetings with civic and neighborhood associations, businesses, and members of the general public.

In its Second Annual Report, the RPAC made a commitment to complete two primary tasks in 2003. These were:

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2.0 Recycling Public Advisory Council Activities

2.1 Completion and Evaluation of Cost Study of Recyclables Collection and Processing for New Castle County

In March 2003 DNREC issued a Request for Proposals to conduct a cost study of enhanced recycling in New Castle County (see Appendix G of Second Annual Report). Three consulting firms submitted proposals. The contract was awarded to DSM Environmental Services, Inc., at a cost of \$74,740. DSWA contributed \$15,000 toward the cost, and DNREC paid the remaining \$59,740.

DSM conducted its evaluation between June 17 and September 12, 2003, and submitted its final report to the RPAC on October 15, 2003. DSM presented its findings to the Governor on October 15 and also made two public presentations, one on October 15 and the other on October 16. The Executive Summary of the cost study is attached to this report as Appendix D, and the entire report is available on DNREC's website (www.dnrec.state.de.us).

DSM's study will play an important role in the development of the RPAC's recommended strategy for increased recycling. The following are some of the findings that the RPAC will be taking into consideration (*note: there is a 20% margin of error in the cost figures presented in the report*):

- The current drop-off program alone will never achieve the desired 30% diversion. A subscription curbside recycling program could be expected to achieve about 15% participation and a RSW recycling rate of 8%. An organized system providing curbside recycling to all New Castle County households would potentially capture three to four times the quantity of recyclables captured by RECYCLE DELAWARE and achieve a RSW recycling rate of 13% to 19%.
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- To reach the goal of 30% diversion, we must address yard waste as well as curbside recycling. The study suggests that collection and composting of leaves, combined with increased on-site management of grass, would be the most cost-effective way of increasing yard waste diversion.

2.2 Strategy for Increasing the Diversion Rate

The DSM study presents several options for increasing the diversion rate, and it provides estimates of the amount of increase that each option would achieve as well as the costs associated with each. The RPAC is still in the process of evaluating the information. We expect to complete this evaluation and develop our recommendations by April 2004. When our recommendations are complete, we will submit them as an addendum to this Annual Report.

The strategy recommendations will address both curbside recycling and yard waste management. It will include a target date for reaching the 30% diversion goal and a timeline for accomplishing the individual steps required to achieve the final goal.

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3.0 Recycling Assistance Grant Program

3.1 Grant Program History and Status

The Recycling Assistance Grant Program was developed in 2001. The grant criteria and selection procedures were developed by the DNREC, with advice from the RPAC. For the FY01 grants, recipients were required to provide matching funds equal to at least 25% of the funds provided by the state. The match requirement was revised for FY02 and future years, on the recommendation of the DNREC's accounting office, to specify that grantees must provide a match of 25% of the total project cost.

Grant selections were made by the RPAC in conjunction with the DNREC.

The chart below summarizes the grant statistics for FY01, FY02, and FY03.

	State Funds Available	State Funds Requested	# Applications Received	# Projects Funded
FY 2001	\$46,000	\$122,000	9	6
FY 2002	\$75,000	\$130,175	12	10
FY 2003	\$69,855	\$99,852	11	10

The period of time covered by this Annual Report encompasses the close-out of the FY02 grants, the awarding and implementation of the FY03 grants, and the announcement of the FY04 grants. The grant activities for all three fiscal years are described in the next three sections.

3.2 Close-Out of FY02 Grants

All FY02 grants ended on May 1, 2003. Each grant contract specified that a final report must be submitted to DNREC by that date and that no expenses incurred after that date would be reimbursed with grant funds.

Ten projects were approved for funding in FY02. The amount of state funding approved was \$73,260.05 (funding exceeded \$50,000 because some of the money awarded in FY01 had not been spent and had been added to the amount allocated by the state's Budget Office for FY02). During the course of the grant period, DNREC learned that four of the projects would not be implemented. These were proposals for implementation of curbside recycling in four residential subdivisions in New Castle County. The applicants were maintenance corporations in partnership with a consultant and a waste hauler. The waste hauling company found that it could not provide the

service of picking up the recyclables because of other business exigencies that arose after the proposal had been approved.

The amount of funding awarded to each grant recipient, and the amount actually spent, are listed in Table 3-1 below:

Table 3-1. FY02 Grant Wrap-Up

<i>Grant Recipient</i>	<i>State Funding Approved</i>	<i>Amount Reimbursed</i>	<i>Reason Money Not Spent</i>
Warrington Foundation – Mid-Atlantic Composting Assn.	\$19,000.00	\$19,000.00	All money spent
Delaware City	\$18,099.00	\$17,099.00	\$1000 of approved money not spent
Town of Camden	\$10,032.00	\$9,282.00	Full reimbursement not requested
City of Rehoboth Beach	\$9,788.00	\$8,304.72	Expenses were less than projected
B.C. Consulting – Limestone Hills Maintenance Corp.	\$9,180.00	0	Program not implemented
Praise Assembly Church	\$2,993.05	\$2993.05	All money spent
B.C. Consulting – Middle Run Crossing Maintenance Corp.	\$1,350.00	0	Program not implemented
Fenwick Island Lions Club	\$1,000.00	\$160.85	Illness interfered with project
B.C. Consulting – Westridge Maintenance Corporation	\$936.00	0	Program not implemented
B.C. Consulting – Hockessin Chase Maintenance Corp.	\$882.00	0	Program not implemented

The amount of money awarded but not spent during FY02 amounted to \$16,420.43. The sum was added to the \$50,000 that the Budget Office allocated for the grant program for FY03.

3.3 FY03 Grant Summary

In FY03, as in previous years, the amount of grant funding requested by eligible groups exceeded the amount available. Ten projects were selected for funding, at a total funding amount of \$68,333.80 (this included roll-over money from previous grant years). Table 3-2 summarizes the projects approved for funding in FY03. A more complete description of each project, detailing its progress and current status, can be found in Appendix B. Descriptions of projects funded in previous years can be found in Appendix E of the Second Annual Report.

Table 3-2. FY03 Grant Summary

<i>Grant Recipient</i>	<i>Grant Amount</i>	<i>Brief Description</i>
Christ the Teacher Catholic Sch.	\$3077.50	In-house recycling; community outreach
City of Dover	\$4449.00	Flyer promoting recycling
Del. Acad. of Science/Iron Hill	\$3,648.00	Outreach program and essay contest
Henderson Heights Civic Assn.	\$6,110.00	Recycling education and containers
Loyal Order of the Moose	\$1,200.00	Recycling education and containers
City of New Castle	\$2,250.00	Mobile recycling stations
Newark Parks and Recreation	\$4,133.30	Containers for recycling at public events
Newark Public Works	\$20,250.00	Site work to increase composting capacity
City of Rehoboth Beach	\$9,150.00	Implement on-the-Boardwalk recycling
University of Delaware	\$14,066.00	Composting education and bin sales

3.4 FY04 Grant Opening

DNREC announced the FY04 grants in October 2003 and held four informational workshops between November 12 and November 20, 2003. Completed applications must be submitted to DNREC by January 30, 2004. The amount of funding available for the grants is \$50,000. The Budget Office has informed DNREC that unspent money from one grant year may no longer be rolled over into the next grant year.

3.5 Recommendations for Future Funding

The grant program has been severely limited by the small amount of funding that the state has provided. The Citizens' Work Group on Recycling recommended grant funding of \$500,000 per year to approach a diversion rate of 25%, stating that more grant money would be needed to achieve a higher rate. The amounts provided thus far are well below the recommended amount.

Two small grants helped Delaware City provide its residents with a more convenient way of recycling, and RPAC is proud of Delaware City's program. However, even if all of the small towns in Delaware implemented such a program, we would not reach the target diversion rate. To divert 30% of RSW, we must substantially increase recycling in the large municipalities and the unincorporated areas of the state. If our major tool for increasing the recycling rate is to be a grant program, that program must be funded at a much higher level than the current \$50,000 per year.

The amount of grant funding that the RPAC recommends is \$100,000 per year. This still is far less than the amount recommended by the Citizens' Work Group on Recycling, and not enough to provide a municipality the size of Wilmington with the money needed to implement a program that would substantially increase its RSW diversion. It would, however, be sufficient to help a city such as Dover or Newark to establish an effective program.

4.0 DSWA Activities

4.1 RECYCLE DELAWARE Drop-off Program

The DSWA continues to operate the RECYCLE DELAWARE program, one of the most successful and cost-effective voluntary drop-off programs in the nation. In FY03, approximately 18,977 tons of recyclables were received at RECYCLE DELAWARE centers. The materials collected at the centers are taken to the Delaware Recycling Center (DRC), an intermediate processing facility in Wilmington, where they are prepared for market.

List of all drop-off materials by Type and Quantity for FY03:

Material	Pounds	Tons
ONP (Newspaper)	25,981,660	12,991
Plastic	2,008,359	1,004
Clear Glass	2,357,980	1,179
Brown Glass	717,500	359
Green Glass	1,573,700	787
OCC (Corrugated Containers)	3,729,540	1,865
Cans	1,496,520	748
Junk Mail	674,000	337
Batteries	87,080	44
Oil	339,430 gallons	

4.2 Other DSWA Recycling Programs

Pilot Curbside Recycling Program:

In May 2003 DSWA started a Curbside Recycling Pilot Program to serve a test area in four Brandywine Hundred zip codes. This voluntary subscription service program collects newspaper, junk mail, plastic bottles, cans, glass, corrugated cardboard and even yard waste. Customers pay a basic fee of \$6/month for the weekly curbside service. Yard waste collection has an additional \$3/month fee. As of the end of October, DSWA was serving 600 customers, with an average recycling rate of 33% per customer.

Electronic Goods Recycling Program:

The DSWA's electronic goods collection program, begun in July 2001, continues to be extremely successful. As of June 30, 2003, almost 4 million pounds of electronic goods had been recycled through this program. According to figures reported at a recent U.S. EPA (Region III) conference on electronic goods recycling, this quantity was greater than the combined total for Virginia, West Virginia, Pennsylvania, and Maryland. In fact, DSWA's e-scrap program represented 60% of U.S.EPA (Region III) totals. The materials (computer and computer peripherals, televisions, telephones and telephone peripherals, and electronic games) are taken to the DRC where they are sorted and packaged in preparation for recycling by a contractor working with OIC Industries in Wilmington, Delaware.

Junk Mail and Undeliverable Bulk Business Mail (UBBM) Recycling Programs:

In the summer of 2003, the DSWA expanded its collection of mixed paper to 60 RECYCLE DELAWARE locations throughout the State. The collection of mixed paper has expanded into a partnership with over 12 U.S. Post Offices throughout Delaware. Each Post Office has committed to diverting its UBBM from its trash containers to DSWA's roll-offs. Currently DSWA is collecting an average of 30,000 pounds of material a week from all participating Post Offices. DSWA is diverting 40 tons of mixed paper per week through both the Junk Mail and UBBM collection programs. The paper is sent to the Marcal Plant in Elmwood, New Jersey, where it is used as feedstock to make various recycled paper products.

Glass Beverage Container Recycling Program:

In the spring of 2003, DSWA signed a 3-year contract with NKS Distributors to take all glass beer containers collected through their statewide redemption programs. DSWA is currently processing 4,500 cases of beer bottles a week at the DRC and is working with other distributors to establish similar partnerships.

Oil Filter and Waste Oil Recycling Programs:

The DSWA's continuing commitment to providing cost-effective programs to divert recyclable materials from Delaware's waste stream is evident through its award-winning oil filter recycling program. In FY03 DSWA collected 621,760 pounds of oil filters and 339,430 gallons of motor oil from over 485 service stations and businesses throughout the state and from over 60 RECYCLE DELAWARE centers. On average there are 1.4 million oil filters sold in Delaware annually; DSWA collects over 1.2 million of those oil filters.

Other DSWA Waste Diversion Programs:

In addition to recycling the materials collected at the drop-off centers, the DSWA diverts scrap tires, white goods, construction and demolition (C&D) waste, and yard waste from the working face of its landfills. Tires are sent to a waste-to-energy facility; white goods are picked up by a recycler; C&D waste is recycled through processors located in Philadelphia and Baltimore to produce an alternate daily cover material which

is used at the landfills; and yard waste is used at the landfills as ground cover or wet weather pads, or in the production of topsoil. (These activities are not considered residential recycling for purposes of RPAC but do constitute beneficial use of materials that would otherwise be landfilled. For further clarification as to what activities the RPAC considers to constitute recycling of RSW, see Appendix E, "Glossary of Waste Management Terms".)

4.3 Assistance to Communities

The DSWA continues to help recipients of Recycling Assistance Grants by providing containers and processing and marketing services. Assistance provided to Delaware City's curbside recycling program is a case in point. Initially, the DSWA provided a full RECYCLE DELAWARE center specifically for storage of the materials collected in the program and provided for transportation of the materials to the DRC for processing and marketing, all at no cost to Delaware City. The city now transports the recyclables to the DRC in its own trailer (purchased with grant funds), but the DSWA continues to bale and market the materials.

Similar assistance was provided to the Town of Camden. The DSWA supplied storage containers for the collected recyclables. Camden continues to use those containers, and the DSWA provides the transportation (through their contractor), processing, and marketing of the materials.

The DSWA also serves as the market outlet for the plastic containers collected in Rehoboth Beach's program.

4.4 Public Education and Outreach

Considering Public Education and Outreach to be a priority, DSWA has developed many educational materials, curriculum packages, and lesson plans to help educate children about solid waste management, recycling, and other environmental topics. During FY03 the DSWA continued to enroll more children into its popular educational program, Trash Can Dan and the Clean Up Kids. This initiative, a hit with children and parents throughout Delaware, has enrolled more than 7,400 children in its first two years. Members can earn prizes by searching for recycling points and participating in environmental activities. They also receive a membership kit that includes an original storybook, trading cards, stickers, and a magazine with games and fun recycling projects.

Although the Clean Up Kids program is designed for children, it also reaches parents with its message of responsible trash handling. Parents are encouraged to assist their children in completing recycling projects, and children help their parents look for materials that can be recycled instead of thrown into the trash.

Other outreach programs include classroom presentations, landfill tours, DSWA website, educational materials for Delaware teachers, and brochures. In FY03, DSWA's Public Information Group reached over 168,000 households throughout Delaware and other countries with its presentations and mailings.

Through its comprehensive public information and education efforts, DSWA is truly planning for a growing Delaware. The DSWA has continued its commitment to outreach through participating in public events. In April, DSWA held its 3rd Annual Earth Day Festival at Brecknock Park in Camden, DE. Over 5,000 people enjoyed a day full of fun activities, games, and environmental education. Other public events where DSWA provided information were the Delaware State Fair, Delaware Home and Garden Show, Delaware ENVIROTHON, DuPont RiverFest, Coast Day, America Recycles Day, Safe Summer Day, and several school presentations or events. DSWA also again held a poster/calendar contest for children in grades Kindergarten through 5.

DSWA has strived to develop new ways of educating the residents of Delaware about important environmental messages. The continued development and delivery of DSWA's "Talking Trash" Radio Series has provided DSWA an opportunity to positively impact Delawareans throughout the entire State. Through a constant delivery of brief environmental messages, DSWA is able to reach individuals at work, school, and home. The DSWA continues to work with organizations, municipalities, and homeowners on projects that deal with increased awareness in recycling for Delaware. The partnership with Retired Seniors Volunteer Program (RSVP) has helped to develop a recycling trailer designed to visit community events to encourage Delawareans to act responsibly when managing their waste. The DSWA will also be partnering with the Wilmington Blue Rocks by providing plastic recycling bins throughout the stadium designed to collect plastic bottles sold during its home baseball games. It is estimated that over 40,000 plastic bottles are sold through a 70-game season. The partnership with Post Offices throughout Delaware has proven to be an excellent relationship. This partnership started by a postal employee at the Dover Post Office hearing one of DSWA's Talking Trash Radio Segments discussing DSWA's new Junk Mail Recycling Program. The employee contacted DSWA after hearing the spot and asked how the post office could get involved in recycling its undeliverable mail.

In FY03 the DSWA also provided information and education to more than 11,335 citizens through its toll-free Citizens Response Line, and over 146,362 page demands on their website.

All of DSWA's recycling programs are paid from landfill user fees and recyclable sales revenues, and not local, state, or federal taxes.

Information on all of DSWA's programs is available on its website (www.dswa.com).

5.0 DNREC Activities

DNREC's recycling activities fall into three major areas: providing support to the RPAC, conducting public outreach on the Recycling Assistance Grant Program and recycling in general, and providing technical assistance to grantees and potential grant applicants.

5.1 Support to the RPAC

In fulfillment of its responsibilities under Executive Order No. 82, DNREC has worked very closely with the RPAC in administering the Recycling Assistance Grant Program and in providing support to the RPAC. The tasks that DNREC has carried out in this area include, but are not limited to:

- making meeting arrangements;
- preparing and distributing agendas and minutes for all RPAC meetings;
- drafting (for RPAC review) and finalizing all grant documents, such as application packages, contracts, and reporting forms;
- publicizing the grant program by means of press releases, announcements, direct mailings, and participation in environmentally themed events;
- conducting workshops for potential grant applicants;
- conducting research (as resources allowed) as requested by the RPAC; and
- preparing the Annual Report.

A notable contribution that DNREC made toward assisting the RPAC in 2003 was DNREC's coordination of the study conducted by DSM Environmental Services, Inc. DNREC drafted the RFP, revised it several times to reflect the input from the RPAC, negotiated the contract terms with the selected consultant, paid 80% of the cost of the study, and organized public meetings at which the consulting firm presented its findings.

DNREC also organized and led a meeting of yard waste stakeholders for the purpose of helping the RPAC to better understand current yard waste management practices, barriers to increased yard waste composting, and the level of interest among municipal officials in providing enhanced yard waste management services to their residents.

5.2 Public Education and Outreach

DNREC conducted or participated in many activities in an effort to increase public awareness of recycling opportunities and to promote the grant program. These activities included but were not limited to: meetings with civic associations and other community groups; presentations to nonprofit organizations; exhibits at special events such as Earth Day, State Fair, Newark Community Day, and Coast Day; and workshops in each county to explain the grant program. DNREC staff developed new outreach materials, and updated existing ones, for distribution at these events. As a result of these activities, thousands of Delaware residents received outreach and education on the issue of recycling.

DNREC also provided training on recycling for municipal officials, waste haulers, and several RPAC members. DNREC contracted with the Solid Waste Association of North America (SWANA) to conduct the training, using SWANA's training materials and adapting the organizations three-day course, "Managing MSW Recycling Systems," into a two-day course for Delaware. Representatives from eight municipalities, one county, and four waste hauling companies attended.

DNREC continues to improve and augment the recycling information resources available on its website. All of RPAC's annual reports, the complete New Castle County curbside recycling study, information on the Recycling Assistance Grant Program, and general information on recycling and composting can be found on the website, which is found at www.dnrec.state.de.us.

5.3 Technical Assistance

DNREC staff provided technical assistance to several grant applicants in planning their projects and preparing their applications. Help with carrying out the grant activities is ongoing.

6.0 Recommendations

The RPAC's recommendations for increasing the diversion rate will be submitted by April 1, 2004, as an addendum to this report.

Appendix A. Executive Order Number 82

EXECUTIVE ORDER NUMBER 82

TO: HEADS OF ALL STATE DEPARTMENTS, AGENCIES, AND AUTHORITIES, AND ALL POLITICAL SUBDIVISIONS AND GOVERNMENTAL UNITS OF THE STATE OF DELAWARE

RE: RECYCLING

WHEREAS, the average Delawarean produces 1,200 pounds of solid waste annually and much of that waste can and should be recycled;

WHEREAS, recycling saves energy and natural resources and conserves valuable landfill space;

WHEREAS, the Department of Natural Resources and Environmental Control (DNREC), the Delaware Solid Waste Authority (DSWA), and the Delaware Economic Development Office (DEDO) all promote varying aspects of municipal solid waste recycling in the State of Delaware;

WHEREAS, increasing Delaware's recycling efforts will benefit the environment and is in the public interest;

WHEREAS, increasing our recycling efforts over the long-term will require a strong commitment on the part of Delaware's youth;

WHEREAS, communities, schools, counties, municipalities and cities are the entities most able to increase recycling within their borders and need assistance to provide the tools necessary to start recycling programs; and

WHEREAS, while the majority of Delawareans think that recycling is important and are interested in doing more recycling, many Delawareans are unaware of current recycling opportunities.

NOW, THEREFORE, I, THOMAS R. CARPER, by virtue of the authority vested in me as Governor of the State of Delaware, do hereby declare and Order as follows:

1. It shall be the goal of this State to achieve a thirty (30) percent diversion rate for recyclables from Delaware's residential solid waste stream.
2. The DNREC, the Division of Air and Waste Management, in concert with the DSWA and the Recycling Public Advisory Council created herein, shall:

- a. Monitor the state's recycling initiatives and measure Delaware's achievements toward attainment of the thirty percent recycling goal;
 - b. Implement a grant program for use by communities, municipalities, counties and cities in reaching the statewide thirty (30) percent recycling goal specified herein;
 - c. Design and implement public educational efforts aimed at increasing public awareness of recycling opportunities.
 - d. Implement a public school recycling initiative whereby our school systems are able to participate in and benefit from increased recycling opportunities;
 - e. Provide technical assistance to local entities to assist them in increasing their recycling rates;
 - f. Provide administrative support to the Recycling Public Advisory Council; and
 - g. Promote any other measures identified by the Council to support the achievement of the thirty (30) percent recycling goal.
3. The DNREC shall make matching grants available to communities and local governments to implement programs to reduce the amount of residential solid waste disposed of in Delaware. Grants may be used for the implementation or expansion of recycling programs, encouraging composting of yard waste, implementing "pay-as-you-throw" programs or any other activity that supports the achievement of thirty (30) percent recycling goal. The DNREC, in conjunction with the Recycling Public Advisory Council, will develop criteria for the grants program by March 31, 2001. The criteria shall include, but shall not be limited to, the terms and conditions for obtaining a grant, grant selection criteria, match requirements, reporting requirements, and applicant eligibility. Match requirements for the grant program shall not be less than 25% local match. The availability of grant money shall be subject to annual appropriations by the General Assembly.
4. There is hereby established a Recycling Public Advisory Council. The Council shall be composed of nine members who shall be appointed by the Governor as follows:
- a. One member each from DNREC, DEDO, and DSWA;
 - b. One member representing County governments with such member being recommended by the Delaware Association of Counties;
 - c. One member representing municipal governments with such member being recommended by the Delaware League of Local Governments;
 - d. One member representing the recycling industry;
 - e. One member representing the waste hauling industry; and
 - f. Two members representing environmental or citizens' groups.
5. Members of the Council shall serve 3-year terms and may be reappointed. Members shall be appointed for staggered terms so that no more than 3 appointments shall expire in any one calendar year. For the initial appointments, 3 members shall be appointed for 1 year, 3 members shall be appointed for 2 years and 3 members shall be appointed for 3 years. Thereafter, all terms are three years. Members may not serve more than 2 consecutive, 3-year terms. Members may be reimbursed for travel to and from meetings. The governor shall appoint a Chairman from among the nine members. Actions of the Council shall be approved by a majority vote of the Council.
6. The Recycling Public Advisory Council shall:
- a. Advise the DNREC and the DSWA on all aspects of recycling;

- b. Advise the DNREC in developing grant criteria, including local match requirements, and selection of applications;
- c. Develop, in conjunction with DNREC and the DSWA, a methodology for measuring recycling rates;
- d. Advise the DNREC and the DSWA on possible outreach activities designed to achieve greater recycling rates;
- e. Report to the Governor and the General Assembly annually by December 1st of each year on the status of recycling activities in Delaware. Said report shall include, but not be limited to the following: (1) status of attainment of the thirty (30) percent recycling goal; (2) an accounting of the matching grants program authorized herein and any recommendations for future funding of the grants program; (3) an assessment of the activities of both the DNREC and the DSWA in achieving the thirty (30) percent recycling goal; and (4) such other recommendations as the Council shall deem appropriate.

Approved this ____ day of _____, 2000

Governor

Attest

Secretary of State

Appendix B
Recycling Public Advisory Council Members

Paul Wilkinson, RPAC Chairman
Del EASI

Patricia Todd
League of Women Voters of Delaware

The Honorable Donald H. Mulrine
Mayor, Town of Newport

Richard C. Cecil
Executive Director, Delaware Association of Counties

Pasquale S. Canzano
Delaware Solid Waste Authority

Robert Propes
Delaware Economic Development Office

Paul R. Bickhart
Recycling Express of Delaware, Inc.

Steve Masterson
Waste Management of Delaware

John Blevins
Department of Natural Resources and Environmental Control
Division of Air and Waste Management

Appendix C
Summaries of Recycling Assistance Grants
FY02 and FY03

FY 2002 Recycling Assistance Grants

Grant Recipient: City of Delaware City
407 Clinton Street
PO Box 4159
Delaware City DE 19706
302-834-5473
Contact: Paul Morrill

Grant Amount: \$18,099

Project Description: Implement the second phase of the city's curbside recycling program. Purchase a recycling collection trailer to streamline the collection and handling of recyclables to support program expansion with a goal of enrolling an additional 200 subscribers, bringing the total participation rate to 65% of the town's population.

Project Accomplishments: A new trailer especially designed for collecting recyclables was purchased with grant money and entered into service in August. The trailer is achieving its intended objectives of reducing the time required to collect and transport the recyclables and eliminating double handling. The city is now transporting all collected materials except cardboard to the DSWA processing plant at Pigeon Point. The recyclables collection has been outsourced to a private contractor, reducing costs and improving operating efficiencies.

For the grant year, the following information was reported:

- 270 households subscribing to curbside recycling at the end of the grant year (31 added during the year), representing 44% of all households.
- 478 households participating in yard waste collection at the end of the grant year (53 added during the year), representing 78% of all households.
- 73,125 lbs (36.6 tons) of targeted recyclables collected.
- 11.7 tons of yard waste diverted from landfilling.

The DSWA reports that they have not observed any decrease in the volume of recyclables being deposited at the 'RECYCLE DELAWARE' center in closest proximity to the town. This suggests that the recyclables being captured by the city's curbside program represent an increase in waste diversion and not merely a shift in the point of collection.

Grant Recipient: Fenwick Island Lions Foundation, Inc. **Grant Amount:** \$1,000
P.O. Box 732
Bethany Beach DE 19930
302-436-2560
Contact: Martin I. Cook

Project Description: Construct aluminum can collection cages to be provided to other Lions Clubs to replicate the Fenwick Island club's successful aluminum can recycling and college scholarship program.

Project Accomplishments: The Lions Club Environmental Committee purchased materials to construct additional cages, but a series of medical problems prevented members from actually doing the construction. The committee also contacted the Selbyville Lions Club but was not successful in persuading them to implement a similar program. The group remains committed to building the cages and is considering expanding into the Selbyville area.

Grant Recipient: Praise Assembly, Inc. **Grant Amount:** \$ 2993.05
P.O. Box 9025
Newark DE 19714
302-731-9176 x23
Contact: Dwight Walters

Project Description: Expand and improve the church's existing aluminum can recycling initiative and offer a convenient recycling drop-off location for church attendees and residents of surrounding communities; develop flyers promoting the recycling program and distribute to church attendees and the surrounding communities; educate members of the Royal Rangers Boys Club about the environment and the benefits of recycling.

Project Accomplishments: Prior to the grant, the Praise Assembly Royal Rangers Boys' Club collected only aluminum cans from church members for sale to a local recycling business, using the revenue to support Royal Rangers program activities. The bin being used to store the cans was deteriorating and also was too small to allow for expansion of the program. Grant money was used to purchase a larger, enclosed trailer, enabling the group to collect more cans and to expand its collection to include old newspapers. In addition to providing revenue to the Royal Rangers, the program is used as a tool to teach the children the environmental benefits of recycling and to reinforce resource conservation and environmental preservation principles.

For the grant year, the following activities were reported:

- Collection of approximately 800 lbs of newspapers, taken to a local 'RECYCLE DELAWARE' center.
- Recycling of 1076 lbs of aluminum (vs. 550 lbs. during the same period last year).
- Outreach to church attendees through church bulletins and group presentations.
- Educational presentations and distribution of flyers to the Royal Rangers.

Grant Recipient: City of Rehoboth Beach **Grant Amount:** \$9,788
229 Rehoboth Avenue
Rehoboth Beach DE 19971
302-227-6181
Contact: Gregory Ferrese

Project Description: Implement a recycling program on the beach targeting aluminum cans and plastic bottles. Establish 125 collection centers, each consisting of one refuse container, one barrel for aluminum, and one barrel for plastic bottles. Label all containers to clearly communicate their purpose; purchase a trailer and two large hoppers for collection and handling of recyclable materials; and promote beach user participation with advertising boats.

Project Accomplishments: A Delaware-based industrial drum reconditioner provided 250 32-gallon containers with lids for the recyclables (125 for aluminum cans; 125 for plastic bottles) and 125 55-gallon containers for trash (purchased with city funds). City workers affixed decals to the recycling containers and placed them at 125 locations along the City's one and one-half mile length of beach. The City purchased a utility trailer and two large hoppers capable of being lifted and dumped into the DSWA storage containers. Receiving wide press coverage, the 'Beach Recycling Program' kicked off on Memorial Day weekend, 2002. Initially, the City's beach maintenance staff emptied the recycling containers every other day; the frequency increased to every day during the peak season to keep up with demand and maintain high beach cleanliness standards. A local recycling processor purchases the aluminum cans, and DSWA collects and processes the plastic bottles.

The final report reveals the following achievements:

- 8,840 lbs of aluminum cans collected and sold to a recycler. The City received \$2,102 in revenue from the sale of the aluminum cans.
- Approximately 5,000 lbs of plastic bottles collected.
- A noticeably cleaner beach, according to City officials.
- Total reported operating expenses of \$1,454.95.

Because of the early success of the program, renting advertising time on advertising boats was deemed unnecessary. Consequently, the state's share of total project expenses was reduced to \$8,305 (15% below budget). Building on the success of the program, City officials plan to apply for a grant in FY03 to expand recycling to the boardwalk.

Grant Recipient: Limestone Hills, Middle Run Crossing,
Hockessin Chase, and Westridge Maintenance Corporations
in partnership with:

Grant Amount: \$12,348

Boylan, Cayhill Consulting, Inc. (BCC)
2035 Sunset Lake Road
Building A, Suite 2
Newark DE 19702
302-731-7710
Contact: Jim Weldin

Project Description: Establish a subscription curbside recyclable collection program in four communities with approximately 2,200 total residences. Grant funds will be used to purchase recycling collection bins with a goal of enrolling 30% of the communities' households in a single-subscription, voluntary curbside recycling service to be offered by Independent Disposal Services (IDS) under the direction of BCC.

Project Accomplishments: The opportunity to subscribe to a curbside recycling service was announced to residents in the targeted communities through community newsletters and outreach meetings. The private partner, IDS, proposed to collect newspaper, clear glass, and aluminum and steel cans. Feedback at a community outreach meeting revealed that more homeowners would subscribe if plastic containers and green and brown glass were added to the collection mix. IDS originally planned to offer the service by January 2003; however, due to exigent business demands they were unable to provide the service. The project was not implemented.

Grant Recipient: Town of Camden
2 South Main Street
Camden DE 19934
302-697-2299
Contact: Laura Voshell

Grant Amount: \$10,032

Project Description: Expand the town's curbside recycling service through the purchase of a compartmentalized recycling collection trailer to allow efficient collection and handling of newspaper, aluminum cans, bi-metal cans, and plastic bottles with a goal of increasing the number of participating households to 500 from the current level of 300. Develop and implement a public education and outreach program to inform residents about the benefits of recycling and to encourage participation.

Project Accomplishments: The town announced the program expansion in the town newsletter. Residents enrolled in the service at the Town Hall, where they received two recycling collection bins and instructions on materials accepted, preparation requirements, and set out dates.

The recycling collection trailer was placed into service in early July. Two glitches became apparent. First, the tractor could not clear the top of the container used to store the plastic bottles. This problem was solved by construction of a ramp. Second, the tractor was not able to lift the trailer's newspaper bin after completing the collection round. Pending a permanent solution, the newspaper is being collected in the town's pick up truck. At current collection volume, this does not pose an immediate problem; however, it may in the future.

During the first four months of the grant (June - September 2002) town officials estimate that 78 new subscribers arranged for service, bringing total estimated participation to 378 households. According to estimates provided by the DSWA, about 8,000 lbs of targeted materials were collected for the period July - September 2002. Loss of personnel has hampered the town's ability to track progress, and the total number of participants at the end of the grant period has not yet been determined.

Recognizing the need to enhance its public education efforts, the town had planned to engage a marketing firm to develop a community recycling outreach program and to form a recycling committee comprised of citizen volunteers; however, neither of these plans materialized.

Grant Recipient: The Warrington Foundation
4701 Cliff's City Road
Chestertown MD 21620
410-778-7676
Contact: Herb Brodie

Grant Amount: \$19,000

In partnership with: The Mid-Atlantic Composting Assoc. (MACA)

Project Description: Expand an ongoing educational program that teaches consumers that composting is an environmentally preferred method of treating urban organic waste. Funding will support the following activities: 1) Provide backyard compost bins and instructions to Delaware residents; 2) purchase and distribute educational materials instructing on back yard composting techniques and compost uses; 3) outreach to landscapers with compost information and compost spreading demonstrations; 4) refurbish MACA's compost educational display; and 5) conduct a survey of Delaware municipalities to determine current yard waste management practices, develop recommendations for increasing composting, and provide a report to municipalities and the DNREC.

Project Accomplishments: For the grant year, the grant recipients conducted the following activities:

- Public Outreach Activities
 - Participated in Old Dover Days, the University of Delaware's Ag Day event, and Earth Day; conducted 8 presentations and a seminar. Only 7 of the 10 planned spreader demonstrations

were held during the grant year, but the grantees are committed to conducting the remaining demonstrations.

- Compost Informational Materials
 - Produced a MACA informational brochure for distribution at public events.
 - Purchased and distributed a guide to backyard composting methods. The manual is included in the sale of compost bins and made available to other individuals who express interest in learning more about composting methods.
- Backyard Compost Bin Distribution
 - During the year, the group sold 200 compost bins and purchased 800 additional bins, with the intention of continuing to sell them. MACA has found a vendor that is selling a comparable product at lower cost than the original vendor. This enables the group to sell the bins at cost. Under these conditions, compost bin sales are self-funded and therefore sustainable after the term of the grant is expired.
 - The names and addresses of compost bin purchasers are being recorded to allow a follow-up evaluation on the use and effectiveness of the bins. Effectiveness of instructional methods (personal instruction at point of sale and printed material) will also be evaluated.
- Compost Educational Display Refurbishment
 - The grant recipient initially performed a quick refurbishment of the MACA traveling exhibit in order to get the project “on the road.” Later, improved graphics and photos were added.
- Survey of Delaware Municipalities
 - The grant recipient conducted a mail and telephone survey targeting 52 municipalities, with 84% response. Results indicated 9 municipalities claiming to have a yard-waste diversion program, but only 2 attempting to measure the quantity of material handled. An additional 8 municipalities had no program but were interested. The grantee recommended that municipalities be educated about the importance of diverting yard waste and the methods for turning that material into a product of value.

FY 2003 Recycling Assistance Grants

Grant Recipient: Christ the Teacher Catholic School **Grant Amount:** \$3,077.50
2451 Frazer Road
Newark, DE 19702
302-838-8850 ext. 129
Contact: Gina Scarmozzi

Project Description: The project consists of seven activities aimed at students, their families, and the neighboring communities. Activities include the following:

1. Develop a flyer promoting the on-site 'RECYCLE DELAWARE' center; distribute the flyer to neighboring communities and students' families.
2. Use the school newsletter, parish bulletins, signage, and school open houses to promote recycling.
3. Purchase shredded tires as playground surface, purchase playground equipment made from recycled materials, and incorporate the use of these materials into lessons on the importance of "completing the cycle".
4. Incorporate recycling lessons into the school's math, science, art, social studies, language arts, and music curricula.
5. Purchase recycling bins to be used in the school for collection of recyclables, which will be taken to the on-site 'RECYCLE DELAWARE' center.
6. Measure and record the quantities of materials recycled.
7. Award prizes to students for outstanding achievement in promoting recycling and in creating artwork with recycled materials.

Project Accomplishments: Their reported baseline average of recyclables collected was 1556 pounds per month for October and November of 2002. Their current reported monthly average of recyclables collected is 2740 pounds for October 2002 through August 2003. This constitutes a 76% increase in use of the 'RECYCLE DELAWARE' center. School officials report that the project is currently 35% above goal, and they plan to take it further! Specific accomplishments for each of the activities listed above are as follows:

1. The development of the flyer to be distributed to communities will probably be completed in Spring 2004.
2. A flyer was sent to all families at the School in the May 2003 newsletter. It was printed on paper made of recycled materials and printed double sided.
3. The shredded tire material was purchased for the playground this summer. Cost was underestimated based on size, quantity, and surface installation. In addition they purchased playground equipment (not part of the grant) that is made from recycled plastic bottles.
4. Lessons are in the planning process but have not yet been implemented. The art teacher has ordered materials and is reviewing them, and the library has ordered and received several books relating to recycling for the teachers' use. The technology teacher receives copies of the monthly reports on quantities collected at the "RECYCLE DELAWARE" center, and several of her classes will be creating spreadsheets to show the activity of collection.
5. The School has met with a contractor about plastic and aluminum recycling bins to be used in the School. The order was recently submitted and should be received soon.
6. DSWA provides a monthly report on the quantity collected at the recycling center. The number of pounds collected quarterly will be posted on a sign near the center. The sign will include the starting point as well as the goal. The initial goal has already been exceeded.
7. The prizes for outstanding achievement and artwork will be awarded near to the end of the school year (May 2004).

Grant Recipient: City of Dover
P. O. Box 475
Dover, DE 19903-0475
302-736-7026
Contact: Scott Koenig

Grant Amount: \$1,257.46

Project Description: Develop a two-sided flyer to promote recycling of electronic goods and use of 'RECYCLE DELAWARE' centers. One side will describe Dover's program for collecting old e-goods; the reverse side will contain information about 'RECYCLE DELAWARE' and maps showing all of the drop-off locations within Dover's sanitation service territory. The flyer will be distributed by inserting it into residents' utility bills.

Project Accomplishments: The first draft of the two-sided flyer has been completed and is ready for review by the appropriate representatives of the City of Dover. Distribution within utility bills is proposed to occur in March or April of 2004.

Grant Recipient: Henderson Heights Civic Association
2 Henderson Hill Road
Newark, DE 19711
302-266-0211
Contact: Lonnie D. Webb

Grant Amount: \$6,110.00

Project Description: The Civic Association will survey residents to determine types and quantities of materials they are currently recycling and composting; investigate their interest in receiving bins for collection of recyclables and bins for composting; purchase bins for recyclables and composting; prepare promotional and guidance materials; involve youth and youth groups to distribute and promote materials and to create posters, signs, and flyers; study the appropriate method for collection of materials; measure and record quantities of materials recycled; conduct follow-up surveys; and award prizes to youth and scouting troops for outstanding contributions.

Project Accomplishments: The first survey was completed in September. Twenty-one responses were received from the 55 houses within the subdivision. The surveys were tabulated and evaluated. An oral survey will be performed on October 31, 2003, to investigate who would be interested in receiving bins for recycle collection and composting. The promotional contests are being organized.

Grant Recipient: Delaware Academy of Science, Inc.
Iron Hill Museum
1355 Old Baltimore Pike
Newark, DE 19702
302-368-5703
Contact: Laura M. Lee

Grant Amount: \$3,648.00

Project Description: Develop and present an educational program, targeting children in grades 3 through 6, designed to teach the impacts of human activities on non-renewable natural resources. Conduct pre- and post-presentation surveys of students and parents to measure the effectiveness of program. Conduct an essay contest with prizes awarded to winning participant.

Project Accomplishments: The outreach curriculum has been researched and formalized. The target press release date is November 14, 2003, to take advantage of teacher interest in presentations in the winter months. Presentations will begin December 1, 2003. A pre-outreach booklet has been developed and will be sent to interested teachers. Pre- and post-presentation surveys are being developed. The essay contest will be conducted from December 1, 2003, to April 10, 2004.

Grant Recipient: Loyal Order of the Moose
Newark Lodge #630
1932 Seneca Road
Wilmington, DE 19808
302-995-6840
Contact: April Garr, Nicole Curran

Grant Amount: \$ 1,200.00

Project Description: Conduct a survey to determine current waste handling practices. Use pledge cards to encourage families to agree to recycle. Purchase recycling bins and distribute them to residents of The Woods subdivision and to members of the Newark Moose Lodge. Develop and distribute flyers explaining why, where, and what to recycle. Involve the 4-H Club in creating a tool for tracking the recycling activity among the target population. Measure and record the quantities of materials recycle.

Project Accomplishments: Report not yet received.

Grant Recipient: City of Newark
Parks and Recreation Department
220 Elkton Road
Newark, DE 19711
302-366-7060
Contact: Joseph Spadafino

Grant Amount: \$4,133.30

Project Description: Purchase containers and liners to be used in the collection of recyclables at public events. Purchase decals and attach to containers. Use containers to collect recyclables at no fewer than three public events in Newark. Deliver recyclables to appropriate recycling facilities. Measure and record the quantity of recyclables collected at each event. The containers will be available to the University of Delaware for University events.

Project Accomplishments: The city purchased twenty-five containers, affixed signage, and has used the containers at several public events. City workers deliver the recyclables to appropriate facilities and record the quantities collected.

Grant Recipient: Mayor and Council of New Castle
220 Delaware Street
New Castle, DE 19720
302-322-9812
Contact: Robert W. Martin

Grant Amount: \$2,250.00

Project Description: Purchase two trailers for existing “Waste Warrior” recycling receptacles, and affix appropriate signage to attract the deposition of empty cans and bottles for recycling. Use the mobile recycling systems at no fewer than seven public events in the city of New Castle. Deliver the recyclables to appropriate facilities for recycling. Measure and record the quantities of recyclables collected. Develop and implement a recycling outreach initiative.

Project Accomplishments: The City has purchased one of the two trailers and installed the “Waste Warrior” receptacles. The trailer has been used at seven events. To date 63 pounds of cans, 57 pounds of glass, and 65 pounds of plastic have been collected and recycled. A brochure on recycling programs in New Castle is being planned.

Grant Recipient: City of Newark
Public Works Department
P. O. Box 390
Newark, DE 19715-0390
302-366-7040
Contact: Richard M. Lapointe

Grant Amount: \$20,250.00

Project Description: The city will engage the services of a contractor to construct an access road to the new composting site and purchase equipment necessary for site preparation and access road construction.

Project Accomplishments: The site improvement contract for Iron Glen Park was awarded to R. Julian Enterprises, Inc. The contract included the installation of an access haul road, clearing and grubbing of the compost area, and seeding. All equipment and materials required for the preparation of the site and access road were included in the contract. The work under this contract was completed on October 24, 2003.

Grant Recipient: City of Rehoboth Beach
P. O. Box C
Rehoboth Beach DE 19971
302-227-4641
Contact: Gregory Ferrese

Grant Amount: \$9,150.00

Project Description: Purchase 200 barrels for collection of aluminum and plastic containers, affix labels, and place the barrels in pairs at 100 locations along the boardwalk. Purchase a trailer and two dumping hoppers for managing the collected recyclables. Deliver the collected recyclables to appropriate facilities for recycling. Conduct a multi-media advertising campaign to promote the recycling program. Measure and record the quantities of materials recycled.

Project Accomplishments: Containers and trailer were purchased and used during the past tourist season. Due to high contamination levels occurring in the containers on the boardwalk, city officials hired a consultant to evaluate the reasons for the contamination and recommend ways to reduce it. The consultant’s report is pending.

Grant Recipient: University of Delaware
Office of Vice Provost
210 Hullahen Hall
Newark, DE 19716
302-831-2136
Contact: Mark Manno

Grant Amount: \$14,066.00

Project Description: Expand existing composting education programs by conducting hands-on workshops in elementary schools, camps, and after-school programs. Offer in-service instruction on composting to teachers. Establish two compost demonstration sites, one in Kent County and one in Sussex County, similar to the existing site in Bellevue State Park. Purchase backyard compost bins and sell them to the public at various events throughout the state. Use the money from the sale of the bins to purchase more bins and additional educational materials. Follow up the compost bin sales with questionnaires designed to gain information about the use of the bins and the amount of material being composted.

Project Accomplishments: This program has, so far, reached 4,628 students. Two in-service training days for teachers have resulted in a spring schedule that is filled to capacity. A compost demonstration sites have been opened at Killens Pond State Park in Kent County. A second site at Trap Pond State Park in Sussex County is in the initial stages of planning. Compost bins were purchased and have been sold to the public for \$10 a piece at three public events as well as to home schoolers, teachers, visitors to Bellevue State Park, and others. The follow-up questionnaires are being compiled by University staff and students.

Appendix D

Evaluation of Enhanced Residential Waste and Recyclables Collection and Processing for New Castle County

Executive Summary

OCTOBER 15, 2003



Presented to

Delaware Recycling Public Advisory Council

Prepared by:

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Introduction

DSM Environmental Services, Inc. (DSM) was contracted by the Delaware Department of Natural Resources and Environmental Control (DNREC), on behalf of the Recycling Public Advisory Council (RPAC), to evaluate quantities of material diverted and costs for an enhanced residential recyclables collection and processing system in New Castle County (NCC).

RPAC was directed by former Governor Carper's Executive Order 82 to assess how Delaware can meet a residential recycling goal of 30 percent. Currently the residential recycling rate from the Recycle Delaware program and leaf and yard waste recovery in NCC is about 6 percent.^{1,2} RPAC recognized that curbside collection of recyclables in NCC would be necessary to meet the 30 percent goal, but that any curbside collection program must be cost effective to gain public support. In addition, expanded recycling in NCC will contribute to "Livable Delaware's" initiatives regarding conserving natural resources and open space, improving traffic congestion, and improving air and water quality.

Therefore RPAC contracted for a feasibility study to evaluate different residential recyclables collection and processing alternatives for NCC to determine the most efficient method of recycling collection. DSM was also asked to evaluate the reasonableness of current leaf and yard trimmings generation estimates, and the feasibility and costs associated with separate leaf and yard trimmings collection.

DSM conducted this evaluation between June and September 2003, beginning by estimating the quantities diverted and associated costs of the current recycling collection system in NCC. DSM conducted a similar analysis of current quantities of leaf and yard trimmings recovered and disposed.

This study is limited to residential solid waste, and therefore only includes recyclables and leaf and yard trimmings generated by households. Estimates of quantities of recyclable material that

¹ The 6 percent recycling rate is for New Castle County alone and includes: Recycle Delaware drop-off materials (approximately 4 percent), excluding oil; leaf and yard waste recovery programs (1.4 percent); Recycle Delaware *special material* collections including electronics, appliances and tires that were specifically shipped for recycling; and, existing curbside recycling programs (Wilmington, Recycle Delaware and Delaware City).

are potentially available for recycling are based on a September 2002 report prepared for the Delaware Solid Waste Authority (DSWA) by Franklin Associates entitled "*Assessment of Delaware Solid Waste Discards in 2000 and the Potential for Recycling of Materials*". DSM independently developed estimates of the quantities of leaf and yard trimmings potentially available for collection and processing.

Projections of household participation and associated recovery rates of recyclables and yard trimmings under the different collection scenarios presented in this report are based on DSM's measurement and knowledge of recovery rates under similar collection programs in other states.

This feasibility study also relies on estimates of market prices for recyclable materials recovered. DSM recognizes that market demand, and market prices, change based on local, domestic and global factors. While recycling markets behave as commodity markets, millions of pounds of recyclables are marketed each year and there is every indication that these markets are maturing, not getting weaker. NCC's strategic location in the Mid-Atlantic Region further increases its access to markets. Therefore DSM does not consider markets for properly prepared recyclable materials to be a barrier to the success of these programs. The greatest barrier is the lack of a cost effective curbside collection and processing system for residential recyclables. This report addresses this barrier.

Recycle Delaware Drop-Off Program

The drop-off recycling collection system operated by the DSWA is one of the most comprehensive drop-off programs in the United States, and includes a model used oil and oil filter collection and recovery programs. However, even with 75 convenient drop-off locations open 24 hours per day seven days per week, only 20 to 30 percent of NCC households are estimated to participate in recycling. As a result, the Recycle Delaware drop-off program is only recovering approximately 14 percent of *potentially available recyclables*³ from NCC households, resulting in a recycling rate of about six percent of residential waste.

The reason for the low participation rate for residential recyclables is that 95 percent of NCC households have curbside collection of refuse. The lack of a parallel system for refuse and recycling collection is a limiting factor in recycling program participation. Drop-off recycling

² Recycling rates associated with diverting additional residential waste for recycling in New Castle County are additive to the 6 percent base rate used throughout this report.

³ This 14% recovery rate refers to materials commonly collected in curbside and drop-off recycling programs including cardboard, newspaper, mixed paper, boxboard/chipboard, plastic bottles, aluminum and steel cans and glass bottles. This does not include scrap metal, white goods, tires and organic material.

programs only achieve high participation rates when households drop-off their refuse at the same location.

The cost to divert material through the Recycle Delaware program is also high on both a per-ton and per-household basis. Statewide costs for 2002 reported by DSWA were approximately \$3.6 million, excluding special wastes. Assuming that 64 percent of statewide costs can be attributed to NCC, where 64 percent of the population resides, then it cost roughly \$2.4 million to collect and process 12,700 tons of recyclable material dropped off at the 75 sites in NCC. This is equivalent to \$190 per ton, excluding the transportation costs incurred by households that deliver material to drop-offs. When these transportation costs are added, total costs for the NCC drop-offs were estimated at \$250 per ton.

One of the reasons for the high cost of the Recycle Delaware program is that each material must be kept separate at the drop-off, and transported separately to the DSWA processing facility. In addition, the DSWA facility does not separate mixed paper and mixed plastics which would add value to the collected material. This added value is lost to other processors through the sale of mixed materials.

Spreading the drop-off costs across all NCC households yields an average cost per household of \$12 per year, or \$1.00 per household per month. If the drop-off costs are assigned only to those households who use the drop-offs, and their transport costs are included, then it costs each participating household somewhere between \$4.90 and \$6.60 per month to recycle material through the NCC drop-offs.

Current drop-off system costs are important because although estimated organized curbside recycling costs are higher on a per household basis than drop-off costs (ranging from an estimated \$1.80 to \$3.30 per household per month, see Table E-1), many of the curbside collection systems analyzed result in lower per ton costs. Curbside collection systems also have the potential to divert as much as five times the material currently diverted by the drop-off program.

Expansion of Materials Accepted at the Drop-Offs

One way to increase the quantity of material recycled in NCC would be to expand the types of material accepted at the Recycle Delaware sites.⁴ Assuming that the junk mail program introduced at four NCC drop-offs in 2003 is expanded to all drop-offs, and boxboard is added in 2004, quantities of recyclable material collected could be increased by an estimated 3000 tons per year. This would raise the percent of recyclable materials recovered from the current level of 14 percent to 18 percent of potentially available recyclable materials, and increase the residential

⁴ DSM did not evaluate increasing the number of drop-off sites because DSM believes this change would increase collection costs and per ton costs without significantly increasing recovery rates.

recycling rate to seven percent. However, without significant changes to the DSWA processing facility, adding materials to the drop-offs will not appreciably lower per ton drop-off costs.

Curbside Recycling Collection and Processing

DSM analyzed potential diversion rates and costs of four categories of curbside recycling collection systems. Systems analyzed, arranged in ascending order of quantities diverted include:

- ◆ Requiring all private and municipal refuse collection services to offer recycling collection for which households can choose to sign up and pay an additional monthly fee for the recycling collection service (subscription service).
- ◆ Implementation of weekly curbside collection of recyclables in Incorporated Areas only by reducing refuse collection to once per week and collecting recyclables on the second day of the week.
- ◆ Organized weekly collection of recyclables from all households in NCC overlaid on the existing refuse collection system, but with the cost included in the refuse collection fee.
- ◆ Organized collection of refuse and recyclables throughout NCC.

DSM also developed feasibility level designs for dual stream and single stream Materials Recovery Facilities located at the DSWA facility at Pigeon Point capable of processing all of the recyclable materials collected under the four systems analyzed.

The results for each of the four systems are summarized below.

Subscription Service

Based on data from other areas of the United States with subscription service for recyclables collection, roughly 15 percent of NCC households might choose to participate in, and pay for, curbside collection of recyclables. At this level of participation, and assuming that the DSWA continued to operate the Recycle Delaware drop-off program, an estimated 15,100 tons of recyclable material would be recovered. This represents 19 percent of potentially available recyclables in NCC for an overall recycling rate of eight percent.

Based on DSM's analysis, refuse haulers would be required to charge between \$5.40 and \$5.80 per month to cover their costs associated with provision of every other week curbside recycling service. Two reasons for the high cost are the overlapping service territories of the various haulers, and the high number of households that are not participating, resulting in long drive times

to collect relatively low quantities of recyclable material.

The estimated price that would have to be charged to offer subscription service is significantly above what households surveyed by RPAC say they would be willing to pay for curbside collection of recyclables. As such, a requirement for private haulers to offer subscription service for recyclables is not a feasible way to significantly increase recycling in NCC.

Integration of Recycling and Refuse Collection in Incorporated Areas Only

Incorporated Areas of NCC already have organized collection of refuse. Because there is a single hauler, the potential for efficiently organizing collection of recyclables becomes greater. This is especially the case in NCC because 87 percent of households in Incorporated Areas receive twice-weekly collection of refuse. Switching to once per week refuse collection and once per week recyclables collection allows for use of existing refuse compactors and crews to collect the recyclables, assuming that the collected recyclables can be delivered to a single stream materials recovery facility. However, because there are less recyclables than refuse, there would be a need for an increase in trucks and crews to collect the larger quantity of refuse on the one refuse collection day each week.

Assuming high participation rates associated with weekly, single stream recycling collection in the Incorporated Areas, with the remainder of NCC continuing to rely on Recycle Delaware drop-offs, an estimated 19,300 tons of residential recyclables could be diverted. This results in diversion of 25 percent of potentially available recyclables in NCC, or a residential recycling rate of ten percent.

If savings in reduced refuse disposal costs are not considered, costs for replacing twice per week refuse collection with once per week refuse and once per week recyclables collection are estimated to increase per household costs in the Incorporated Areas by approximately \$2.55 per month. However, marginal costs for collection and processing of recyclable material are only estimated to be \$71 per ton, and each ton recycled avoids \$48/ton in landfill disposal costs. For this reason, Incorporated Areas should carefully consider the potential benefits of this change.

Organized Curbside Collection of Recyclables

The curbside recycling systems with the potential to divert the greatest quantities of material at the lowest possible costs are collection systems that provide organized recyclables collection to all households in NCC as part of their refuse collection service. Because of the large number of different refuse collection systems operating in NCC, it has been assumed that a single entity

(e.g., the DSWA, or the County) would contract for this organized recyclables collection, which would be provided over and above the existing refuse collection service.

Five separate organized collection systems were analyzed, organized in ascending order with respect to the quantity of recyclable material expected to be recovered. The results of this analysis are shown in Table E-1 for the following systems:

- ◆ Dual stream, bi-weekly collection;
- ◆ Dual stream, weekly collection;
- ◆ Single stream, bi-weekly collection;
- ◆ Single stream, weekly collection; and,
- ◆ Single stream, weekly collection with households paying a per unit fee refuse collected (This system is referred to as a pay-as-you-throw or PAYT system).

The system with the **lowest overall cost and lowest per household cost** – *dual stream bi-weekly collection* service – could be implemented for an annual cost of approximately \$4.2 million – or approximately \$1.8 million more than the current drop-off program (See Table 16). This system is estimated to divert approximately 29,500 tons of material annually, which is 38 percent of potentially available recyclables. It would result in a recycling rate of 13 percent, and would cost \$1.80 per household per month, or \$147 per ton, including all processing costs. If such a system were to replace the drop-off program, it would cost an additional 80 cents per household per month compared to the existing drop-off program.

By comparison, using the evaluation criteria of **lowest cost per ton and highest recovery of material**, DSM's analysis concludes that an *organized, weekly, single stream recycling collection* program is preferred. This system could divert approximately 45,100 tons from landfilling per year at an annual cost of \$5.9 million (Table 16), or \$2.55 per household per month. This would result in diversion of 58 percent of potentially available residential recyclables for a recycling rate of 19 percent. Per ton costs for recycling collection and processing are estimated to be \$136. This cost is less than the average cost of \$180 per ton for refuse collection and disposal in the unincorporated areas of NCC.

Summary of Diversion and Cost Estimates,

All Recycling Systems Analyzed

Table E.1 summarizes pertinent data for all of the recycling collection systems analyzed. To facilitate calculations by the reader, there has been minimal rounding of the costs. However, all costs should be viewed as a feasibility level cost with a margin of error of 20 percent.

As illustrated by Table E.1, integrated collection of recyclables in Incorporated Areas and either bi-weekly collection of dual stream recyclables or weekly collection of single stream recyclables **would be less costly on a per ton basis than collection of these recyclables as refuse for disposal in the landfill.**

System	Tons diverted (tons)	Percent of available recyclables (%)	Residential recycling rate (1) (%)	Cost per ton (\$)	Monthly cost per household (4) (\$)
Current Recycle Delaware Drop-Off Program	10,800	14	6%	\$190	\$1.00
Expansion of Materials Collected at Drop-Offs	13,800	18	7%	\$183	\$1.15
Subscription Service	15,100	19	8%	\$206	\$5.55
Integrated Collection, Incorporated Areas Only	19,500	25	10%	\$71	\$2.55
Organized Curbside Collection of Recyclables					
Dual Stream, Bi-weekly	29,500	38	13%	\$147	\$1.80
Dual Stream, Weekly	33,400	43	15%	\$237	\$3.30
Single Stream, Bi-weekly	37,300	48	16%	\$195	\$3.05
Single Stream, Weekly	45,100	58	19%	\$136	\$2.55
Single Stream, Weekly, PAYT	50,100	64	21%	\$141	\$2.95
Comparison With Current Refuse Only Collection					
Incorporated Areas (2)				\$115	\$15.00
Unincorporated Areas (3)				\$180	\$19.00
<p>1) Contributions to this rate include drop-off recycling (> 4%), curbside recycling (<1%), yard trimmings (>1%) and special materials (>1%).</p> <p>2) Average of reported costs.</p> <p>3) Average of reported prices divided by 1.27 tons per household per year.</p> <p>4) Rounded to nearest five cents to illustrate that these are estimates.</p>					

Integrated Collection of Recyclables and Refuse

Costs for a recycling collection system imposed over the existing refuse collection systems will be greater than the cost of organizing and integrating refuse and recyclables collection in the unincorporated areas of NCC. Because of the large number of independent haulers operating in NCC, the only way to predict what costs might be if refuse collection were organized in NCC is to compare NCC prices with prices in other areas of the United States where refuse and recycling collection are organized.

Monthly household refuse only collection and disposal prices reported by NCC haulers and residents range from \$18 to \$20. These prices can be compared to average costs for organized refuse collection in Incorporated Areas ranging from \$11 to \$17, for an average of \$14 per month. Data from other projects that DSM has recently worked in other areas of the United States support a difference of \$4 to \$5 per month in costs between organized and unorganized refuse collection systems. ***Therefore, the general conclusion is that organizing collection of refuse and recycling in the unincorporated areas of NCC could allow for the addition of recycling collection at no additional cost per household compared to the existing system of free market refuse only collection.***

Recycling Processing

Five processing systems were evaluated – two dual stream systems and three single stream systems. In general, all processing systems could be constructed in existing DSWA buildings and operated for tip fees ranging from \$1 to \$7 per ton net of material sales revenue. Although fluctuations in material sales are often cited as a drawback to materials recycling, millions of pounds of material are successfully marketed throughout the United States each year from hundreds of MRFs. This analysis is based on ten-year historic prices for all materials, which are considerably below current prices. At current prices, any of the MRFs analyzed could operate at close to a zero tip fee, or even return revenues to the DSWA. **Given the flexibility that a single stream MRF offers to the collection infrastructure (especially in Incorporated Areas), DSM recommends that single stream technology be used to provide the greatest potential for lowering collection costs and increasing diversion.**

Drop-off Recycling

The number of drop-off recycling sites could be reduced significantly if organized curbside recycling were offered. Certainly the waste oil and oil filter collection program should continue as

a drop-off program in combination with an extensive curbside program for other materials. Thus, drop-off of the majority of materials that are projected to be collected in the curbside program would no longer be necessary.

Based on DSM's review of materials quantities, six of the most heavily used sites in NCC would need to remain open after full implementation of curbside recycling to assure continued participation in the waste oil and other special waste recycling programs.

Yard Trimmings Collection Program

Based on DSM's analysis of yard trimmings generation and disposal, we believe that the 2002 Franklin report overestimates yard waste disposal in NCC by approximately 45 percent. This has a significant impact on how one views the potential for implementing either a curbside recycling program or a yard waste collection program.

As illustrated by Table E.2, based on the 2002 Franklin Associates report, it would appear that if the goal is landfill diversion, yard trimmings, at 38 percent of total residential waste, offer the greatest potential. However, when yard trimmings are adjusted to be consistent with national data, and more importantly with a detailed waste characterization study carried out in Delaware in 1997, it is clear that residential recyclables are a larger component of the waste stream (29 percent) than yard trimmings (23 percent).

Residential Waste, NCC	Tons	Percent
NCC Residential Waste Generation (Franklin Associates) (1)	327,000	
Residential Recyclables Generation (2)	78,000	24%
Yard Waste Generation (3)	123,900	38%
Total Residential Waste (DSM Adjusted)	264,600	
Residential Recyclables	78,000	29%
Yard Waste Generation (4)	61,500	23%
Impact On Current Recycle Delaware Recycle Rate, NCC		
Franklin Associates Waste Generation	327,000	
Current Recycle Delaware Drop-Off Recycling, NCC (5)	10,800	3%
DSM Adjusted Waste Generation	264,600	
Current Recycle Delaware Drop-Off Recycling, NCC (5)	10,800	4%
<p>1) 2002 Franklin Associates Report, Table 9, 64% of Statewide Total MSW Recovered.</p> <p>2) NCC Recyclables Generation based on Table 9.</p> <p>3) 2002 Franklin Associates Report, 64% of Statewide Yard Trimmings.</p> <p>4) DSM Estimated NCC Yard Trimmings Generation using 246 lbs/capita.</p> <p>5) Exclusive of special materials and durable goods which contribute another 1% to the rate.</p>		

In DSM's opinion, a well-managed leaf and grass trimmings collection program in NCC could divert approximately 39,300 tons of material per year. This would contribute 15% (including existing yard trimmings recovery programs) to the recycling rate. Costs per household would be similar to, but on the high end of the range compared to organized curbside collection of recyclables. However, the average per ton cost of a collection program for both grass and leaves would be higher. Total annual costs are estimated to be approximately \$8.4 million, or \$214 per ton, with per household costs of \$3.50 per month.

Breaking out grass collection and leaf collection costs, the analysis indicates that leaf collection is less costly on a per household basis, at \$11 per year, but more costly on a per ton basis than grass collection. Because of the low density of leaves, per ton costs are estimated to be \$312 per ton. This compares to an estimated per ton cost for grass collection of \$194 per ton. However,

the total cost of a grass collection program is relatively high (\$6.3 million) with estimated per household costs of \$31 per year. Table E-3 compares the estimated cost of grass collection to that of leaves.

	Leaves	Grass	Total
Collection and Processing Costs:	\$2,118,500	\$6,276,200	\$8,394,700
<i>Tons Collected</i>	<i>6,800</i>	<i>32,400</i>	<i>39,200</i>
Annual Cost per Ton:	\$312	\$194	\$214
<i>Total Households, NCC</i>	<i>199,521</i>	<i>199,521</i>	<i>199,521</i>
Annual Cost per Household	\$11	\$31	\$42
Monthly Cost/Household	\$0.90	\$2.60	\$3.50

There are compelling reasons for collecting leaves in urban and suburban areas, even at high per ton costs, including the impact of leaves on storm drains. **Conversely, it is significantly less costly to encourage households to simply mulch their grass clippings compared to development of a separate collection program.** This not only improves soil fertility, but also eliminates the environmental impacts associated with driving trucks to collect grass clippings.

For leaf collection in Incorporated Areas, a vacuum collection program is recommended. Conversely, paper bags are recommended for leaf collection in the CDPs and in the remaining 75 percent of NCC where curbside collection is considered cost effective.

Drop-off collection of yard wastes in rural areas has a significantly lower cost per ton, exclusive of individual transport costs. However, there is a trade-off between participation in a program and the convenience that the program offers the user. In the event drop-off sites are considered, it is critical that access to sites be limited to times when an attendant can be on-site. This will minimize contamination of the yard trimmings, allowing for the proper processing and sale of the resultant material.

Collection of grass clippings throughout NCC would be more feasible using rolling carts because of the weight of grass clippings. However cart costs significantly increase per-household costs.

Any collection program that seeks to maximize both participation and diversion of yard trimmings from disposal will require an extensive public education program prior to commencement, and a mechanism in place to respond to citizen concern and questions. For an organized program, this would require at least one full time person interfacing with the public and responding to citizen communication.

Conclusions

Achieving a residential recycling rate of 30 percent in NCC cannot be accomplished with either a curbside recycling collection program or a curbside yard trimming collection program alone. Instead, it will take a combination of curbside recycling, expanded leaf collection programs, and an aggressive campaign to convince residents to mulch their grass clippings.

Data from this analysis demonstrates however, that whether or not curbside collection of recyclables achieves a 30 percent recycling goal, at least two curbside recycling systems have lower system costs than continuing to collect this material as refuse for disposal in the landfill. These systems are:

- Organized dual stream, bi-weekly collection of recyclables countywide; and,
- Organized single stream collection of recyclables countywide.

The primary question is who pays for implementation of one or more of these collection systems. DSM believes that if refuse collection were to be organized throughout NCC, and if twice weekly collection of refuse were reduced to once per week collection, weekly curbside collection of recyclables could be added at no additional cost to households in the unincorporated areas of NCC. This would require that the DSWA invest in a new processing facility capable of managing the collected material. This processing system could cover all capital and operating costs with a tipping fee of approximately \$6 per ton given long-term average revenues for recyclable materials.

If the State of Delaware is unwilling to change the current free market refuse collection system in NCC, then it would be necessary for a single entity, such as DSWA to contract for curbside collection of recyclables throughout the county. Costs for this added service would either have to be covered through increased tipping fees at the landfill⁵, or through a per-household charge ranging from \$1.80 to \$2.60 per month. However, if refuse collection companies reduce refuse costs to reflect the lower tonnages collected and tipped at the landfill, the *net* impact on the households should be lower.

⁵ Raising the tipping fee could have other economic impacts including loss of tonnage due to diversion to lower cost disposal options.

Appendix E

Glossary of Waste Management Terms

Combustion means the burning of waste material.

Composting means the process by which organic material is decomposed to a stable point so that it can be safely used as a soil amendment, conditioner, or additive.

Discards include the solid waste remaining after recycling and composting. These discards are mainly disposed of in landfills or combusted, although some waste is littered, stored, or disposed on site, particularly in rural areas.

Diversion of materials from disposal may be accomplished through source reduction and recycling (including composting). (*Note: this term is synonymous with **waste reduction**.*)

Generation refers to the amount of materials and products that enter the waste stream before recycling (including composting), landfilling, or combustion takes place. (*Note: MSW is considered to have been generated if it is placed at curbside or in a receptacle such as a dumpster for pickup, or if it is taken by the generator to another site for recycling or disposal.*)

Landfill Avoidance refers to those activities (i.e., resource recovery and combustion) that reduce the amount of waste generated that ultimately gets landfilled.

Materials Recovery Facility (MRF) means a facility in which recyclable and reusable materials are recovered, by either hand sorting, mechanical processing, or a combination thereof.

Municipal solid waste (MSW) includes durable goods (excluding vehicles and other moving equipment), nondurable goods, containers and packaging, food scraps, yard trimmings and miscellaneous inorganic waste from residential (single- and multi-family households) and non-residential (commercial, institutional and industrial) sources. MSW does not include construction and demolition debris, vehicle bodies, municipal sludges, combustion ash, industrial process wastes, and trees and brush from parks, streets or power line trimmings that might also be disposed in municipal solid waste landfills

Recovery of materials means removing certain materials/products from the waste stream for the purpose of recycling (including composting).

Recyclable materials refers to the portion of the waste stream that can be separated from the waste stream and managed through the process of recycling.

Recycling refers to materials that would otherwise be discarded and includes any of the activities necessary for a recovered material to be used in a new product. Recycling involves any and all of the following steps: separating, collection, processing, market or free distribution,

remanufacturing (if done), and purchase/use by a consumer. Excludes the use of these materials as a fuel substitute or for energy production.

Residential solid waste (RSW) consists of wastes that fall within the following categories and that are generated by the residential sector (single- and multi-family dwellings).

- Durable goods
 - Major appliances
 - Furniture and furnishings
 - Small appliances and carpets and rugs
 - Rubber tires
 - Lead-acid batteries
 - Miscellaneous durables (e.g., consumer electronics, luggage, sporting equipment)

- Nondurable goods
 - Old newspapers
 - Old magazines
 - Office papers
 - Disposable diapers
 - Clothing and footwear
 - Other nondurable goods (e.g., books, junk mail, tissue paper and paper towels, paper and plastic plates and cups, other nonpackaging paper, trash bags, sheets, and towels)

- Containers and Packaging
 - Glass packaging
 - Metal packaging
 - Paper and paperboard packaging
 - Plastics packaging
 - Wood packaging
 - Other miscellaneous packaging (e.g., cloth, leather)

- Other Wastes
 - Food waste
 - Yard trimmings
 - Miscellaneous inorganic wastes

Resource Recovery means removing certain materials/products from the waste stream for the purpose of recycling (including composting), reuse, or energy production.

Reuse refers to the use of a product or component of MSW in its original form more than once. Examples include refilling glass or plastic bottles, using corrugated or plastic containers for storage, and returning milk crates.

Source reduction refers to those activities that reduce the amount or toxicity of wastes that enter the municipal solid waste management system. Reuse of products such as refillable glass bottles, reusable plastic food storage containers, or refurbished wood pallets are examples of source reduction. Management of yard trimmings at home is another example of source reduction.

Waste-to-Energy means the combustion of solid waste to produce energy in the form of electricity and/or steam.

Equations

Example Inputs: Ourtown generates 60,000 tons of RSW per year.
5,000 tons is source reduced through homeowner composting.
10,000 tons is recovered for reuse, recycling, and/or municipal
composting.
40,000 is combusted, leaving 10,000 tons of ash that must be landfilled.
10,000 tons of RSW is sent directly to the landfill.
Total tonnage landfilled is 20,000. Total tonnage avoided is 40,000.

1. Equation for calculating residential recycling rate:

$$\text{RSW Recycling Rate (\%)} = \frac{(\text{Total RSW Recycled})}{(\text{Total RSW Generated*})} \times 100$$

Using Ourtown example: $\frac{10,000}{60,000} \times 100 = 16$ percent

*Total RSW Generated = Total RSW Recycled + Total RSW Discards

2. Equation for calculating residential waste diversion rate:

$$\text{RSW Diversion Rate (\%)} = \frac{(\text{Total RSW Diverted})}{(\text{Total RSW Discards} + \text{Total RSW Diverted})} \times 100$$

Using Ourtown example: $\frac{10,000 + 5,000}{50,000 + 15,000} \times 100 = 23.1$ percent

3. Equation for calculating landfill avoidance percentage:

$$\text{LAP} = \frac{(\text{Tons Removed Through Resource Recovery})}{\text{Tons Generated}} \times 100$$

LAP is $\frac{30,000 \text{ combusted} + 10,000 \text{ recycled}}{60,000} \times 100 =$ or 67%

Note: If any residue from Resource Recovery (e.g., ash from waste-to-energy) must be landfilled, the tonnage of that residue must be subtracted from the numerator.

Appendix F
Memorandum of Agreement

MEMORANDUM OF AGREEMENT

BETWEEN

**DELAWARE SOLID WASTE AUTHORITY,
DELAWARE DEPARTMENT OF NATRUAL RESOURCES
& ENVIRONMENTAL CONTROL, and the
RECYCLING PUBLIC ADVISORY COUNCIL**

WHEREAS, the General Assembly determined that the reduction of solid waste disposal and recovery of usable materials from solid waste are matters of extreme importance in minimizing the environmental impact of solid waste disposal through landfilling, 7 Del. C. §6450; and

WHEREAS, the General Assembly further determined that it is in the public interest to develop a comprehensive statewide system of recycling and resource recovery which maximizes the quantity of solid waste materials which can be recovered, reused, or converted to beneficial use, 7 Del. C. §6450; and

WHEREAS, in order to accomplish the goals and objectives of statewide recycling and waste reduction, the General Assembly further determined that the Delaware Solid Waste Authority (“DSWA”) develop a comprehensive program incorporating long range planning, project development, public education and promotion, information gathering, and marketing, 7 Del. C. §6450; and

WHEREAS, DSWA is charged, in part, with the function of the planning, design, construction, financing, management, ownership, operation and maintenance of solid waste disposal, volume reduction and resources recovery facilities and all related solid waste reception, transfer, storage, transportation and waste handling and general support facilities considered by the Authority to be necessary, desirable, convenient or appropriate in carrying out the statewide solid waste management plan and in establishing, managing, and operating solid waste disposal and resource recovery systems and their component waste-processing facilities and equipment, 7 Del. C. §6404(1); and

WHEREAS, DSWA is charged, in part, with the function of providing assistance with the coordination of efforts directed toward source separation for recycling purposes, and assistance in the development of industries and commercial enterprises within the State based upon resources recovery, recycling and reuse, such objectives being considered operating responsibilities of the Authority, 7 Del. C. §6404(4) and (5); and

WHEREAS, DSWA has the further power to determine the location and character of any project to be developed under the enabling legislation, subject to the requirements of the statewide solid waste management plan, including the location of recycling centers; 7 Del. C. §6406(15); and

WHEREAS, DSWA has implemented and operated a statewide voluntary recycling program for residential solid waste for 13 years with 145 current drop off locations, and as a result DSWA has gained valuable experience in handling and marketing recycled materials; and

WHEREAS, DSWA has established and operates a statewide program to recycle used motor oil and oil filters, tires, white goods, plastics, and electronic equipment at its various facilities; and

WHEREAS, DSWA, as part of its statewide solid waste management plan, is authorized to develop a program of coordination and cooperation with public interest groups and municipalities to further statewide recycling and waste reduction, 7 Del. C. §6452; and

WHEREAS, it is a policy and purpose of 7 Del. C. §6001 that the Delaware Department of Natural Resources and Environmental Control (“DNREC”), protect, conserve and control the resources of the State and provide improved solid waste storage, collection, transportation, processing and disposal; and

WHEREAS, DNREC has issued a regulatory start action notice (SAN) to develop a regulation for implementation of a landfill yard waste ban; and

WHEREAS, state policy with respect to DSWA and DNREC are to be read *in pari materia*, 7 Del. C. §6025(a); and

WHEREAS, the Recycling Public Advisory Council (“RPAC”) was established in September 2000, by Executive Order of former Governor Thomas R. Carper, and continues by consent of current Governor Ruth Ann Minner, Exec. Order No. 82(2000); and

WHEREAS, the RPAC is charged with advising and assisting DNREC and DSWA in achieving the goal of diversion of 30% of residential solid waste through Executive Order No. 82 (September 2000); and

WHEREAS, the RPAC is required to prepare an annual report that addresses, in part, an assessment of both DNREC and DSWA in achieving the 30% goal, and recommendations as the RPAC deems appropriate;

WHEREAS, the RPAC has recommended completion and evaluation of a cost study for curbside collection of recyclables and construction and operation of a materials recycling facility for New Castle County, and development of a comprehensive strategy for increasing the residential solid waste diversion rate, SECOND ANNUAL REPORT OF THE RPAC (January 2003) and has completed a report; and

WHEREAS, RPAC has committed to the development of a comprehensive strategy for monitoring the residential solid waste diversion rate; and

WHEREAS, a significant component of residential solid waste involves yard waste, and it is desirable to evaluate the feasibility of separating and composting yard waste at various locations as an alternative to land filling; and

WHEREAS, the Delaware House of Representatives in the 142nd General Assembly passed House Resolution No. 49 urging DNREC to delay issuing a permit for any expansion of DSWA's Cherry Island landfill until waste reduction and curbside recycling alternatives are pursued; and

WHEREAS, the Delaware Senate and House of Representatives in the 142nd General Assembly passed Senate Concurrent Resolution No. 26 requesting DSWA to undertake a public outreach campaign to create public awareness of DSWA's proposed expansion plans at the Cherry Island

landfill, including evaluation of feasibility and costs associated with enhanced recycling programs designed to extend the useful life of the Cherry Island landfill; and

WHEREAS, the Delaware Senate in the 142nd General Assembly passed Senate Concurrent Resolution No. 27 which proposed the creation of a Task Force to explore the establishment of a pilot mandatory curbside recycling programs, which Task Force was to include representatives of DSWA and DNREC; and

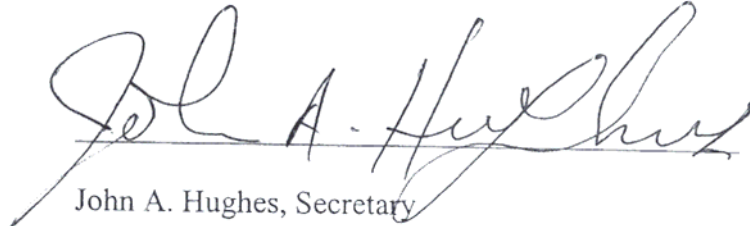
WHEREAS, it is desirable that DSWA, DNREC and RPAC collectively pursue on a coordinated basis a thorough evaluation of the feasibility and costs associated with various statewide mandatory curbside recycling alternatives which would serve the purpose of diverting significant quantities of residential solid wastes from land filling, such evaluation to include proposed legislation to effectively fund and implement any recommended mandatory curbside recycling alternative.

NOW, THEREFOR, the parties agree as follows:

1. The parties shall collectively make an assessment of the statewide composition of residential solid waste based on available information and prepare a characterization and quantification of the residential solid waste composition which would be amenable to source separation and curbside collection.
2. The parties shall collectively prepare a market study utilizing available commercial information pertinent to Delaware to determine the historical, short term and long term trends for the sale and utilization of curbside source separated materials.
3. The parties collectively shall conduct a comprehensive review of mandatory curbside recycling programs adopted and operating throughout the United States for purposes of determining the most feasible and effective program models capable of being utilized on a statewide basis in the State of Delaware.
4. With respect to the preferred mandatory curbside recycling models considered feasible and effective for use in the State of Delaware, the parties shall provide an estimate of the revenues that would be generated, the cost of conducting the program, and the means by which the cost of each program would be funded. A projection of the true cost to individual residential users under each program shall also be provided.

5. The parties shall collectively provide an estimate of the quantities of recycled materials that would be removed from the residential solid waste stream as a result of implementation of the preferred mandatory curbside recycling models, with a comparison of the relative costs related thereto.
6. With respect to each preferred mandatory curbside recycling model selected for consideration by the parties, the parties shall develop a draft implementing legislation to address all program requirements.
7. Each mandatory curbside recycling model shall include provisions for the sources separation of yard waste and the handling and processing of yard wastes to avoid to the maximum extent feasible the land filling of yard wastes. The parties shall identify the type, number and general locations of facilities necessary to effectively handle and process yard wastes throughout the State of Delaware.
8. With the input and concurrence of DNREC and RPAC, DSWA shall take the lead in completing the work as set forth in paragraphs 1-7 above with 120 days from the date of this Memorandum of Agreement, and submit a draft report encompassing the work for review, comments and recommendations of the parties. The report, when finalized, shall be released to the public and provided to the Governor and members of the General Assembly.
9. The parties shall jointly conduct public meetings to review the alternative programs and receive public comment. At least one (1) public meeting shall be held in each county.
10. After conducting public meetings and the receipt of public comment, the parties shall submit to the Governor and the General Assembly their recommendations regarding potential reduction in land filling associated with the adoption of a proposed statewide mandatory curbside recycling program included proposed legislation.

IN WITNESS WHEREOF, the parties enter into this Memorandum of Agreement this 6th day of
January 2004.



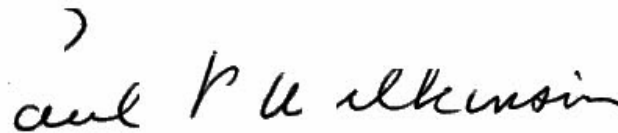
John A. Hughes, Secretary

DELAWARE SOLID WASTE AUTHORITY



N.C. Vasuki, P.E., D.E.E., Chief Executive Officer

RECYCLING PUBLIC ADVISORY COUNCIL



Paul Wilkinson, Chairperson

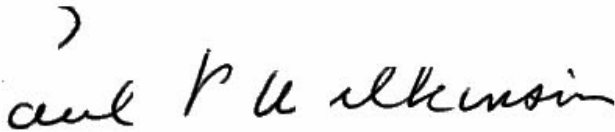
January 6, 2004

To: Pat Canzano
John Blevins

Supplemental Agreement to the MOA between DSWA, DNREC and RPAC signed by Paul Wilkinson on January 6, 2004

The following items were discussed in the RPAC meeting of January 5, 2004 and in general agreed to by RPAC and representatives of DSWA and DNREC. I am signing the MOA with the understanding that these items will be a part of the agreement.

1. DSWA will discuss the program scope at the January 21st meeting of RPAC and provide a detail update at each meeting thereafter until the report is completed. DNREC and RPAC shall be participants in the development of the scope of the study.
2. Recycling terms and recycling materials used in the report and legislation will follow the definitions agreed to by RPAC and published in the first annual report.
3. Consideration of the establishment of a Material Recovery Facility and cost calculations will be separated from the consideration of mandating curbside recycling.
4. DNREC shall provide funds for a review of the final draft report by DSM Environmental Services for RPAC prior to releasing the document to the legislators or public.



Paul R. Wilkinson
Chair, RPAC

Cc: RPAC
John Hughes, DNREC
N.C. Vasuki, DSWA
Andrea Kreiner