

November 13, 2000

Ms. Mary Ellen Tibbott
Council Member
Northern Cambria
1901 Lorell Avenue
Northern Cambria, PA 15714

Subject: Implementing Curbside Recycling in Barnesboro and Spangler Boroughs

Dear Mary Ellen:

This letter is to provide the Council members of the merged Boroughs with the results of R.W. Beck's review of the feasibility of implementing a cost-effective curbside recycling program in these two newly joined municipalities.

Given the layout of these municipalities—they are both compact, with easily navigable streets lined with single family dwellings—there is no reason that the cost to add curbside recycling should be prohibitive. Implementing some of the recommendations that come from this study should enable these municipalities to add efficient, cost effective curbside recycling programs.

PLANNING AND IMPLEMENTATING CURBSIDE RECYCLING IN THE MERGED BOROUGHES

This study considers the following: 1) the current waste collection programs in each former single municipality; 2) the plan to merge the residential refuse collection into a single municipal collection program in both formerly separate Boroughs; 3) what other similar southwestern PA municipalities are paying for services; 4) potential costs associated with contracting out recycling collection; and 5) approaches to be considered for soliciting bids and implementing a curbside collection program at a reasonable cost. Each of these issues is addressed below.

CURRENT WASTE COLLECTION SYSTEMS

Currently each former Borough has its own individual residential waste collection system. The former Barnesboro Borough has a municipal collection system that uses a municipal crew of three to provide weekly curbside collection to its residents, while the former Spangler Borough uses a contracted hauler to provide weekly collection services. Collection services in both Boroughs can be preformed in two collection days per week. Barnesboro residents pay \$9.00 per month with a three bag per week limit, and an additional charge of \$1.00 per bag beyond the three in a given week. Spangler Borough residents pay \$11.00 per month, with a four bag per week limit, for their refuse collection services provided by the private contractor. Collection services to commercial establishments in both Boroughs is, provided by anyone of three private collectors, with all arrangements being made by each individual commercial entity.

PROPOSED WASTE COLLECTION SYSTEM

Effective as of January 1, 2001, Barnesboro's municipal collection services will be expanded to include the collection of all the residential units in Spangler Borough. With the expansion of municipal refuse collection the joint Boroughs are evaluating including curbside recycling collection as an extension of the current refuse collection program.

The evaluation considers each of the following factors:

- Amount of material potentially recyclable from Boroughs;
- Frequency of collection;
- Location of facility to accept materials for processing and marketing; and
- Options to maximize diversion rate.

AMOUNT OF MATERIAL POTENTIALLY RECYCLABLE FROM BOROUGHES

Table 1 below illustrates the quantity of material potentially recyclable from the residential waste stream generated by the joint Boroughs. To derive the quantities shown in Table 1 the following assumptions were applied.

Materials selected for recycling are those commonly collected in residential curbside programs. They include six of the items identified in Act 101 as recyclable materials. To determine how much each item makes up of the residential waste stream, the total amount of waste generated by the two communities was needed.

The amount of total residential waste generated is based on an average of what Barnesboro reported as disposed on an average weekly basis (20 tons from just Barnesboro), and a quantity calculated by multiplying an average per capita generation factor accepted by the State with the population of the combined Boroughs. The reported figure when applied to both Boroughs generated a figure of approximately 2,100 tons per year, while the calculated figure was approximately 4,600 tons per year. Therefore, the two figures were averaged and the value of 3,300 tons was used to calculate the expected quantities of each recyclable material in the residential waste stream.

A recovery factor was then applied that takes into consideration material recovery factors and residential participation. Material recovery factors are a function of how easily the materials are processed by the residents for recycling. For instance, newsprint is simply bagged or bound with string and set out for collection while glass containers have to be cleaned. Certain glass containers can be a nuisance to clean such as peanut butter jars, and it is not uncommon for residents to throw away these items as a matter of convenience. Participation rate is a factor of the total number of set-outs on a weekly basis. Not all residents will set their recyclable materials out on a regular basis for a variety of reasons including the bin was not full, they were away, etc. Therefore, the potentially recycled column in Table 1 depicts the actual amount of materials the Boroughs can expect to recover on an annual basis.

Table 1
Recycling Scenarios for Northern Cambria

Materials	Percent Of	Tons In	Recovery	Potentially
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	MSW	MSW	Factor	Recycled
Glass (Clear and Colored)	9%	297	60%	178.2
Aluminum Cans	1%	33	80%	26.4
Steel and Bimetallic Cans	2%	66	80%	52.8
Newsprint	10%	330	80%	264
Plastic (HDPE, PET only)	3%	99	70%	69.3
Totals	25%	825		591

FREQUENCY OF COLLECTION

A curbside recycling collection system typically involves weekly, biweekly or monthly curbside collection from each household in a particular community. The curbside sorted recyclable materials are taken to a recycling center where they can be processed and marketed.

Estimated cost per household to collect recyclables was calculated by using R. W. Beck's Collection Efficiency Model, a computer program developed to estimate collection costs based on various data points including number of households, annual tonnages of RSW or recyclables collected, number and wages of employees, and proximity to a recycling center. In order to take into account differences in collection frequencies and volumes collected, three different analyses were performed determine overall cost per household. The first analysis involves collection from all households in a four day work week while the second analysis has collection from all households being done in a five day work week. Finally, a third analysis estimates the cost for every other week collection being done on a five day work week basis. These scenarios are shown in Table 2 below.

Table 2
Recycling Scenarios for Northern Cambria

<i>Analysis</i>	<i>Collection Days</i>	<i>Frequency</i>
1	4 days/week	Every week collection
2	5 days/week	Every week collection
3	5 days/week	Every other week collection

The most relevant data points for each analysis can be broken into two groups: 1) data that remains the same for all three scenarios; and 2) data that can vary between scenarios. Data that remains the same for all scenarios is listed below while data that varies is shown in Table 3. For a complete review of all inputs please refer to Appendix A – Recycling Collection Efficiency Model Data Sheets.

INPUTS FOR AUTOMATED WORKSHEET

Data that Does Not Change Between Scenarios

- Multiplier used to calculate overtime pay rates - 1.5
- Time spent at the yard prior to starting the route - 10 minutes
- Time spent at the yard for post-trip inspection, maintenance, etc. – 10 minutes
- Percent of hourly rate that is required to pay for benefits - 30%
- Number of households served – 1,925
- Rate of interest used to finance vehicle purchases - 1% (assumes full payment up front)
- Expected years of useful life of vehicle - 7
- Spare truck percentage - 0%
- Average set out rate - 70%

Data that Can Change Between Scenarios

Data that can be modified is shown in Table 3 below.

RESULTS OF ANALYSIS

The impact of collection frequency can be seen in the costs associated with each of the three scenarios. Table 4 below shows the estimated total annual cost for each of the scenarios. For a complete review of all outputs please refer to Appendix A – Recycling Collection Efficiency Model Data Sheets.

The highest annual cost is for weekly collection done in a four day work week. Curbside separation of materials by the collection crew is a timely process taking no less than 60 seconds per stop. Due to the number of stops required each day to accommodate the four day collection period, some overtime is required, increasing labor cost at a rate excessive of what it costs on a five day per week collection basis.

The least-cost collection scenario involves collecting materials from each residential unit every other week. However, other programs have seen a decline in the recovery factor of materials due to some residents finding it difficult to store all of their recyclable materials for two week period. Also, some confusion results when residents forget which week to set out recyclable materials and end up with four weeks worth of material between collections.

Table 3
Data that Varies Between Scenarios

<i>Data</i>	<i>Input for Each Analysis...</i>		
	<i>Analysis 1 (1X/wk 4 days)</i>	<i>Analysis 2 (1X/wk5days)</i>	<i>Analysis 3 (biweekly)</i>
Number of times Household is Served per Year	52	52	26
Total Tons of Recyclables Potentially Collected per Year	450	450	360
Actual Length of Work Day (hours)	8	8	8
Average number of days per week on which collection crews work	4	5	2.5
Time spent traveling from the yard to the start of the route (minutes)	5	5	5
Time spent traveling from/(to) the route to/(from) the processing facility (minutes)	60	60	60
Time spent unloading at the processing facility (minutes)	30	30	30
Time spent traveling from the route back to the yard (minutes)	5	5	5
Average capacity of the collection vehicle (tons)	2.5	2.5	2.5
Average Seconds per Stop	60	60	90
Number of individuals in collection crew	2	2	2
Average Hourly Pay Rate for Driver	9.7	9.7	9.7
Average Hourly Pay Rate for Laborer	5.15	5.15	5.15
Capital Cost of One Collection Vehicle	88,000	88,000	88,000
Estimated Scrap Value of Vehicle at End of Its Useful Life	8,800	8,800	8,800
Estimated Annual Vehicle Operation and Maintenance (O & M) Cost	6,000	7,000	3,500

Table 4
Results of Recycling Collection Cost Analysis

<i>Data</i>	<i>Analysis 1 (1X/wk 4 days)</i>	<i>Analysis 2 (1X/wk5days)</i>	<i>Analysis 3 (biweekly)</i>
Total Annual Recycling Collection System Cost	\$60,667	\$52,825	\$35,150
Number of Households Served	1,925	1925	1925
Average Cost per Household	\$31.52	\$27.44	\$18.26

RECYCLING COLLECTION SYSTEM COSTS

The costs associated with the joint Boroughs implementing a curbside recycling collection program are discussed below.

A. PROJECT DEVELOPMENT

The joint Boroughs will utilize the services of a solid waste consulting firm to assist in developing bid specifications for the collection vehicle and household containers. The firm will also assist in establishing collection routes to maximize the collection of materials and minimize the number of trips on a daily basis to deliver materials to the Indiana County Recycling Center. Finally, the consultant will assist the Boroughs develop and negotiate an Agreement with the Indiana County Solid Waste Authority to secure recycling processing and marketed services at the Indiana County Recycling Center. The expected fees for these professional services have been estimated by R. W. Beck to be approximately \$10,000.

B. PUBLIC EDUCATION

The joint Boroughs will develop a brochure for distribution to each residential unit that will describe the program and the responsibilities of each resident. The brochure will include information on collection days, materials collected and how to prepare the materials for collection. A brief overview of the benefits of recycling will be included in the brochure text. The brochure will be an 8 1/2 x 11 inch tri-fold that can be attached to refrigerators as a reminder to the homeowners. The estimated cost to prepare and produce 3000 copies of a colored brochure is \$10,000. This assumes the Borough furnishes a copy center with a camera-ready mock-up of the brochure for their production.

In addition to the brochure, the Boroughs will conduct a public meeting to present the program to interested residents and allow them an opportunity to ask questions. A representative from the solid waste consulting firm selected to assist with Project Development will be present at the meeting. The representative will assist Borough staff in preparing and presenting information at the meeting directed at educating the public on the benefits of recycling and their role in the program. The consultant brings to the meeting a knowledge of programs throughout the Commonwealth and will be able to use examples from existing programs to address questions and concerns. The cost for this portion of Public Education is based on the estimated cost of the consultant's participation. The estimate for this report was furnished by R. W. Beck and is expected to be \$2,000.

C. COLLECTION EQUIPMENT

Collection Vehicle

The Borough will require one compartmentalized vehicle to collect and transport materials collected from residential units in the joint Boroughs. The Boroughs will purchase a collection truck that allows for a larger volume of each material to be transported in a single trip to reduce the need for multiple trips in a single collection day.

New collection vehicles have a capacity range of 20 to 50 cubic yards, with prices ranging from \$50,000 to \$100,000 including truck chassis. The broad price range is a factor of options included with the collection bodies. For instance, there are models that are hand loaded, single or multi-compartment, tarp or permanent roofs, models that are semi automated "top-loading" style and others that offer hydraulically controlled compression panels mounted in the body and provide for densification of materials.

To accommodate the needs of the Borough's curbside collection program, the specifications for the trucks should factor one vehicle being utilized for containers and paper items. The number of compartments depends on whether it is in the Borough's best interest to separate plastics into two groups and bimetal and aluminum cans. At a minimum the proposed separations would include, clear, green and brown glass, aluminum and tin cans, number one and two plastic bottles and newsprint (optional). The paper truck would be divided into five to seven compartments depending on the extent of material separation at the collection point and whether or not newspaper is including in the curbside collection program.

Manufacturers of collection equipment have furnished materials on equipment specifications and estimated prices. Copies of the brochures provided have been attached to this grant. This information has been used to develop recommended specifications for equipment to serve the Borough's needs and determine estimated cost.

Collection Equipment Specifications:

- Body capacity of up to 28 cubic yards (with cage for plastics total capacity equals 42 cubic yards)
- Aluminum construction
- Vertically adjustable compartment doors with spring loaded stainless steel handles
- Single lever latching and unlatching of compartment divider doors
- Nylon bushings at divider door hinge area
- Top hinged rear door with cam type latching device
- 17 ton scissors type hoist with body prop

These are general specifications for low-tech type vehicle. The propose price for vehicle meeting the specifications above, with top cages for plastic materials that increase available capacity of the vehicle to 42 cubic yards is approximately \$88,000 including delivery charges. Attached are price quotes furnished by an equipment vendor.

- Collection Equipment Total Estimated Cost.....\$88,000.

Household Containers

To promote the program and provide homeowners with a container in which to store recyclable materials for curbside collection, the Boroughs will purchase at least 2,100 containers. These will be distributed to the residents just prior to the implementation of the collection service to provide a storage unit and to notify the public that the service is forthcoming. Included with each container will be a brochure with instructions on what materials are collected and how to prepare them for collection.

The Boroughs are considering two sizes, 14 and 24 gallon with lids. The lids will provide homeowners with the opportunity to store containers outside if it is more convenient. They may even elect to purchase some of each to allow residents the opportunity to select the size most suitable for their needs. The cost of the containers based on each being purchased in a quantity of 2,100 or greater are \$5.13 and \$7.48 respectively. The quantity of 2,100 ensures the availability of a container for each residential unit with approximately 100 spares for replacements. There will also be a shipping fee factored into the total cost of the containers.

If the Boroughs elect to collect recyclable materials every other week, then the larger containers would be preferable to accommodate holding more material for the longer period. Therefore the cost assumption used for this report was based on purchasing 2,100 units of the 24 gallon containers. The price including shipping is \$15,750.

■ Collection Container Total Estimated Cost.....\$15,750

TOTAL EXPECTED PROJECT COST

A summary of the total estimated project costs are shown below:

- Project Development.....\$10,000
- Public Education.....\$12,000
- Collection Equipment.....\$103,750
- **Total.....\$125,750**

SUMMARY OF PROJECT TOTAL DEVELOPMENT COSTS

Table 5 below is a summary of the total project costs presented in a format consistent with the financial information required for Act 101, Section 902 grant applications.

**Table 5
Summary of Total Project Development Costs**

BUDGET ITEM	BUDGET ITEM COST	DEP SHARE	APPLICANT MATCH <small>(Budget item cost less DEP share)</small>
A. PROJECT DEVELOPMENT	\$10,000	\$5,500	\$4,500
B. PUBLIC EDUCATION	\$12,000	\$10,800	\$1,200
C. COLLECTION EQUIPMENT	\$103,750	\$96,875	\$6,875
D. PROCESSING EQUIPMENT			
E. CONSTRUCTION, ACQUISITION AND MODIFICATIONS OF BUILDINGS			
F. LAND ASSOCIATED COSTS			
G. OTHERS			
TOTAL COSTS	\$125,750	\$113,175	\$12,575

ESTIMATED TOTAL COST OF MUNICIPAL COLLECTION SYSTEM

The combined costs of municipal refuse and recycling collection are presented in Table 6. The refuse collection cost portion is based on the average of the two costs charged per residential unit for each Borough or \$10.00 per household per month. If a bag limit is placed on each residential unit and an additional fee charged for additional bags, consistent with the current system in-place in Barnesboro Borough, then additional revenues will be realized above the

amounts reflected in the total collection system costs in Table 6. However, the basic service of providing weekly curbside collection of refuse and each alternative collection scenario for recycling, the rates required range from \$139 to \$152 per household per year. This range is consistent with the average rate for comparable service in other parts of Pennsylvania. Not factored into this cost are billing fees and other administrative costs. The values in Table 6 represent the costs associated with collection services.

**Table 6
Results of Recycling Collection Cost Analysis**

<i>Data</i>	<i>Analysis 1 (1X/wk 4 days)</i>	<i>Analysis 2 (1X/wk5days)</i>	<i>Analysis 3 (biweekly)</i>
Total Collection System Cost	\$291,667	\$283,667	\$266,150
Number of Households Served	1,925	1925	1925
Average Cost per Household	\$152.00	\$148.00	\$139.00

CONCLUSIONS

- If the joint Boroughs elect to implement a curbside collection program for recyclable materials the cost will range from , \$18.30 to \$31.50 per household per year, with the actual cost dependent on the number of collections per year.
- It is less costly to collect materials five days per week, once a week, than it is to collect on a four day per week basis as is projected for refuse collection. The higher cost of the four day collection week it a function of paying overtime to collection crews, due to the time per stop required to curb sort materials.
- The least-cost collection scenario for curbside recycling collection is every other week collection of each residential unit in the two Boroughs. However, there is a potential to collect less materials overall annually, given that some residents will not want to store all of their recyclable materials for a two week period.
- The total estimated annual cost of a municipally operated curbside refuse and recycling collection system is expected to range from \$139 to \$152 per household. This range is inline with the average rates paid by residents across the Commonwealth.

RECOMMENDATIONS

- The Boroughs should apply for an Act 101, Section 902 grant money from the Department of Environmental Protection to help fund the costs associated with implementing a curbside recycling collection program. If awarded grant funds, the project implementation costs will be approximately \$12,575.
- Since the Boroughs are considering a bag limit on refuse setouts for each residential unit on a weekly basis (similar to the present program in Barnesboro Borough), the recycling collection should be offered on a weekly basis. This will offer the maximum opportunity for material diversion and residential participation, which will be important to the volume-

based refuse collection system. Residents will need to be offered the maximum opportunity to recycle if they are expected to pay for additional refuse setouts.

Please feel free to call me at (717) 730-0404 with any questions relating to this report.

Sincerely,

Richard M. Schlauder, Jr.
Director Environmental Services, Pennsylvania Office

cc: Kathleen Kilbane, SWANA
Carl Hursh, DEP