

Final Report

Susquehanna County RECYCLING CENTER ANALYSIS

Pennsylvania Department of
Environmental Protection



May 2006



Susquehanna County RECYCLING CENTER ANALYSIS

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EXECUTIVE SUMMARY

Introduction

Since the adoption of Act 101 in 1988, the Pennsylvania Department of Environmental Protection (DEP) has provided grant-funding opportunities for recycling programs and processing facilities throughout the Commonwealth. Numerous municipalities and counties have benefited from the materials recovery facilities (MRFs) that have been established in various urban, suburban, and rural areas in Pennsylvania with financial support provided by DEP.

The Susquehanna County Recycling Center was constructed in 1998 using DEP grant funds. This Center accepts dual-stream recyclables from private haulers, businesses, and residents. The Center was expanded in 2001, primarily to enclose the tipping area, add a residential drop-off area, increase baled products storage, and add an outdoor glass bunker storage area. Susquehanna County is a rural community of approximately 42,000 residents and 19,000 households. Residents in Susquehanna County must hire their own haulers for collection of refuse, if they desire this service, as the municipalities do not provide this service either directly (through municipal crews) or indirectly (through contracts with private haulers). Many residents choose to burn their refuse, as there are no disposal sites located nearby. County ordinance stipulates that licensed haulers offer residents the same type of recycling service as refuse collection service (e.g., curbside collection of recyclables must be offered if curbside collection of refuse is offered), and at a lower price than refuse collection.

The Susquehanna County Recycling Center is on a site of 2.5 acres and covers approximately 13,000 square feet. The average daily throughput of the facility is 4.43 tons; thus, the facility is operating at about 75 percent capacity. The facility operates one shift with floor space allocated as follows:

- 1,000 square feet for incoming materials storage;
- 3,000 square feet for processed materials and contaminants awaiting shipment;
- 6,000 square feet for processing equipment; and
- 3,000 square feet for office space and conference room on the upper level and break room and parts storage on the lower level.

In addition, a covered recycling drop-off area is located at the facility entrance.

Assessment Results

During the site visit at the Susquehanna County Recycling Center it appeared that general housekeeping practices are outstanding. Also, the amount of residue contamination reported by the facility is extremely low (less than 3 percent by

weight). The facility reduces operating costs by relying on some prison laborers. Assuming an average of four prison laborers per 44-hour workweek (5.5 days) paid \$2 per hour, and assuming alternative sorters would earn \$7.00 per hour, the County saves approximately \$45,760 per year in sort labor costs. The major issue being faced by the Center is that it is somewhat underutilized. The facility is designed to process six tons per day, and processes an average of 4.4 tons per day, for a utilization rate of 73 percent. The County needs to focus on increasing the amount of material delivered to the Center in order to increase revenues and spread operating costs over a larger quantity of recyclables. This is challenging, as the facility is operating in a rural area where recycling is not mandatory, and where municipalities are having to pay to have recyclables collected from their drop-off sites and hauled to the facility – an expense some are unwilling or unable to pay.

Recommendations

Recommendations for enhancing Center operations, based on the site visit and subsequent analysis, are presented below for consideration.

General Operations

- ***Improve signage to the Recycling Center.*** Provide more directional signs along the approach route as well as a new entrance sign in order to improve visibility of the Recycling Center in the community.
- ***Improve signage on bins in the drop-off area.*** The 2-cubic-yard drop-bottom bins are labeled with small lettering only. Research shows that clear, easy to read signs and pictures of what is allowed in the container are helpful in minimizing mis-sorting.
- ***Revise educational material to encourage residents to remove caps and lids from glass and plastic bottles and jars.*** Removal of lids from glass bottles will reduce the residue and improve product quality. Removal of caps will improve the bale density of plastic bottles, although if a perforator is purchased, this benefit would be reduced.
- ***Continue to use the “All Bottles” education message.*** As mentioned above, this message has been proven to increase plastics recycling by simplifying the message to residents, while decreasing contamination with non-recyclable plastics.
- ***Increase the amount of recyclables processed at the facility by targeting additional communities for drop-off recycling.*** One way to accomplish this is for the County to purchase a roll-off truck to service additional containers, thereby providing residents of additional communities with recycling opportunities. In a rural area with mostly voluntary communities, the Recycling Coordinator feels that providing more drop-off opportunities is crucial to expanding recycling in the County. The County anticipates painting the truck such that it would serve to promote the County’s recycling program, and would

make it available for display at special events to further promote recycling in the County. Increasing tons processed at the facility will make the Center operate more cost effectively, as the laborers are not fully utilized, nor is the facility itself, and additional revenues will result in spreading capital and operating costs among more tons.

- ***Continue to monitor residue being generated.*** The Center recently started weighing the residue containers being emptied into the trash dumpster to estimate the quantity of waste being generated at the Center. Similarly, Center staff has developed an estimate of the waste being hauled by a private hauler at no charge, as a favor to the County. Ongoing monitoring of residue weight will result in more consistent waste estimates.
- ***Improve operating/sorting efficiency by:***
 - *Increasing the speed of the sort line conveyor to increase sorting efficiency.* The belt should be operating at a speed of 40 to 50 feet per minute.
 - *Removing the unused paper infeed belt conveyor located adjacent to the sort line.* This would allow sorters to easily throw materials forward, which is the most efficient way to “toss” materials. Currently this conveyor blocks some materials as they are tossed into the bin.
 - *Adding a perforator to the bottom of the HDPE plastics chute.* Ideally, this perforator would be mounted relatively high up so as not to impede significantly on the HDPE storage bin capacity. The plastics perforator will provide increased storage in the bin below (by around 50 percent or more) and denser bales (by about 20 percent). It is estimated that the total cost of such a perforator would be around \$15,000 to \$20,000, installed.
 - *Replacing the incline conveyor of the vertical baler with the incline conveyor of the unused paper infeed conveyor.*
- ***Meet with businesses and haulers to help increase recycling, and identify the best role for the County to take.*** The County should develop a two-year action plan detailing how they will increase recycling tonnages coming into the Center. Soliciting input from local businesses, municipalities, and haulers, will better enable the County to develop strategies that attract additional material suppliers and will help the County move forward with the support of local stakeholders. Issues/questions to be explored include:
 - What factors are keeping businesses and municipalities from recycling?
 - What do haulers see as the County’s role in collecting recyclables?
 - What role do haulers wish to take in collecting recyclables?
 - What can the County do to encourage local businesses to self-haul recyclables to the Center?
 - What can the County do to encourage private haulers to deliver recyclables to the Center?

- What are most municipalities willing to spend to provide their residents with the opportunity to recycle via drop-offs or other means?

Ideally, the County's services should complement versus compete with those provided by private haulers. It is important for the County to develop a positive rapport with commercial haulers, in order to encourage them to supply the Center with recyclables. Also, it may be possible for the County and private haulers to develop a public-private partnership to increase recycling among commercial and institutional entities. Potential solutions/outcomes of the stakeholder involvement and planning process might include one or more of the following scenarios:

- *The County will collect recyclables from County offices, municipal drop-offs, and school drop-offs, but not from private entities.* The County would have to purchase a roll-off truck with a hoist system in order to provide this service. Under this scenario, the County could charge customers a fee for providing this service. At a minimum, the fees should cover labor and fuel costs.
- *The County will also collect recyclables from private entities, for a fee, but only within a certain mile radius.* Under this scenario, the County could charge a service fee based on the number of collections per month, rather than a flat \$45-per-quarter fee. To establish fees, the County should carefully review labor and operational costs, as well as capital costs, to see what a reasonable charge would be for providing this service. The County should further compare this cost to what private haulers charge.
- *The County will issue an RFP and contract for collection services for municipal drop-offs and school drop-offs.* Contracting for service would most likely result in more cost-effective pricing for all municipalities and schools. This option might require the purchase of additional drop-off containers. However, the County should also check with surrounding counties to see if there are extra drop-off containers not being used that could be transferred to the County.
- ***Consider forming a Commercial/Institutional Recycling Committee.*** Such a committee would be comprised of representatives of various institutions and commercial establishments, and members would have an ongoing role in promoting recycling and the benefits of recycling in the community. These members could be trained by the Recycling Coordinator to perform waste audits, and could help convey the benefits of recycling. Often members of such a group have insights into potential barriers to recycling, as well as examples of how such barriers have been overcome.
- ***Consider developing a revenue-share program, such that entities (haulers, municipalities, and/or schools) are rebated a portion of revenues from the sale of commodities at the end of the year, based on the quantity of recyclables delivered, and revenues earned from these recyclables.*** Other possible incentives include raffles, recognition programs, and contests among schools and municipalities. The Center could seek corporate sponsors to furnish prizes.

- ***Consider modifying the County’s recycling ordinance.*** The County’s recycling ordinance could be modified to stipulate that haulers providing trash collection service in the County to residents must include recycling collection services at no additional cost to the resident. Although haulers’ rates would likely increase slightly, they would find their recycling routes to be more cost-effective, as they would be collecting more material while their disposal fees would decrease.

Safety/Loss Prevention

- ***Improve traffic flow signage at the Center.*** Consider placing a sign with arrows clearly indicating where vehicles should go to enter the scale area, as well as where residents should enter the drop-off area. This sign could be located on the grass median at the entrance to the Center
- ***Improve security at the Center.*** Consider adding chain link fencing and additional video monitoring with warning signs to increase security at the Recycling Center. In addition, provide a large sign located near the front of the facility indicating that the site is monitored by security cameras. The metal bales are at a high risk for theft, as some are stored outside the building.
- ***Improve the amber and clear glass chutes to enhance safety.*** Currently there are “gaps” in the amber glass drop chute, which provide an opportunity for glass shards to drop out of the chute onto workers or the floor below. One way to remedy the situation is to install a flexible connection at the bottom of the drop chute to prevent damage from impacts by rolling stock. Clear glass slides down an open chute, posing a safety risk to the prison laborers. By installing an enclosed drop chute for the clear glass leading to the portable storage container, the Center could enhance safety. This chute should be placed such that it does not impede walking traffic on the sort floor walkway. The current chute impedes the walkway, as it is placed at such an angle that sorters have to make a concerted effort to step over it. This could be problematic in the event of an emergency.
- ***Develop an orientation and training program.*** Due to the high turnover rate of prison laborers, the County should develop an orientation and training program. As part of the program, laborers should be instructed to wear proper personal protection equipment (safety glasses, safety vests, longer gloves, and ear protection).
- ***Paint brightly-colored OSHA safety markings on the floor to indicate unsafe areas for workers near balers.***
- ***Improve spacing of the infeed conveyor to the vertical baler.*** Relocate the infeed conveyor and vertical baler about 10 feet further away from damaged roll-up door entrance to provide more loading space.

Materials Marketing

- ***Work with other counties to collect additional rigid plastics.*** The County is the first in the area to attempt to bale and sell rigid plastics. Other nearby counties

EXECUTIVE SUMMARY

with recycling centers (such as Wyoming) might be willing to deliver rigid plastics in order to develop a full load of material more quickly. Rigid plastics are often cited as a major contaminant, and most recycling Centers are unwilling or unable to attempt to develop markets for these materials.

- ***Continue to monitor market pricing.*** One way to monitor market pricing is by reading trade journals and publications such as *Recycling Today* and *Waste News*, or by subscribing to services such as *Waste News Pricing*. Although the Recycling Center is in a more remote area and may be further from some markets, it is beneficial to know the direction the market is taking, and the magnitude with which pricing is moving.
- ***Investigate the extent to which it would be advantageous to sort incoming metal by selected grades to include copper, brass, and aluminum scrap and to market selected items such as lawn mowers and bicycles for refurbishing and resale.*** Performing metals upgrading will require dedicated labor but could pay off in increased revenue.
- ***Routinely contact at least three or four end markets to check pricing, when ready to sell a commodity.*** Although it is wise to be cautious with new vendors due to the risk of non-payment, calling several vendors will provide for a check on prices being obtained from existing markets, and may help the Center obtain better materials pricing.
- ***Periodically market each material to more than one market.*** Although this takes additional effort, and despite the fact that markets are currently strong, it is important to have an established relationship with more than one broker or market for each commodity, should something happen to the predominant market.

Section 1

INTRODUCTION

Since the adoption of Act 101 in 1988, the Pennsylvania Department of Environmental Protection (DEP) has provided grant-funding opportunities for recycling programs and processing facilities throughout the Commonwealth. Numerous municipalities have benefited from the materials recovery facilities that have been established in urban, suburban, and rural communities in Pennsylvania.

To further the financial sustainability of Pennsylvania's materials recovery facilities, the DEP sponsored operational efficiency and cost structure evaluations in selected materials recovery facilities for the purpose of identifying processing improvements, increasing throughput and recovery rates, and maximizing the return on investment of recycling grant funds. DEP retained R. W. Beck, Inc. to assess the operational efficiency of the Susquehanna County Recycling Center ("Recycling Center").

Objectives

The primary objectives of this project are to:

- Identify opportunities to improve operations and increase the efficiency of the Susquehanna County Recycling Center;
- Identify opportunities to increase revenues and/or decrease risk from recyclables marketing;
- Identify best practices and potential solutions and improvements that may benefit other MRF managers in Pennsylvania, such that they, too, can enhance their centers' operations.

The DEP sponsored two such studies in 2005, and three in 2006, including the Susquehanna County Assessment, the results of which are presented in this report.

Approach

The study approach included three project tasks:

- Task 1 – MRF Data Request;
- Task 2 – Conduct MRF Field Observation; and
- Task 3 – Prepare Report and Recommendations.

Prior to conducting the kickoff meeting and field observation, R. W. Beck submitted a formal data request to the Susquehanna County Recycling Coordinator/Solid Waste Manager. The data request encompassed the following operational and financial items:

- General facility information;
- Material quantity reports and material markets;

Section 1

- Financial information;
- Operational data;
- Equipment data;
- Employee data;
- Residue and material contamination rates;
- Contracts/Ordinances; and
- Future plans.

On March 23-24, 2006, R. W. Beck's project team conducted the site visit and interviewed key employees at the Recycling Center, including:

- The County Recycling Coordinator/Solid Waste Manager;
- The Center Secretary;
- The Processing Manager; and
- The Assistant Processing Manager.

While on site, the project team observed all aspects of materials processing.

Section 2 RECYCLING CENTER

2.1 Background Information

The Susquehanna County Recycling Center was constructed in 1998 using DEP grant funds. The Center accepts dual-stream recyclable materials from municipal and private haulers and has a drop-off site for receiving recyclables brought in by private residents. The Center was expanded in 2001, primarily to enclose the tip area, add the residential drop-off area, increase baled products storage space, and add an outdoor glass bunker storage area. Susquehanna County is a rural community of approximately 42,000 residents and 19,000 households. Residents in Susquehanna County either hire their own haulers for refuse removal or burn their refuse, as there are no disposal facilities in close proximity. County ordinance stipulates that licensed haulers offer residents with the same type of recycling service as refuse collection service, and at a lower price than refuse collection.

The Susquehanna County Recycling Coordinator estimates that approximately 75 percent of residents hire a hauler for trash collection. The number of residents that have curbside collection of recyclables is unknown; however, the County Recycling Coordinator estimates that the recycling rate in the County is 8 percent. No communities in Susquehanna County are mandated to recycle under Act 101. Silver Lake Township is the only municipality that voluntarily mandates recycling by ordinance. Although the Township does not contract for curbside recycling collection, it does recommend a particular hauler that has agreed to provide the service to Silver Lake Township residents at a relatively low rate. Table 2-1 provides a summary of basic background information of the facility.

**Table 2-1
Susquehanna County Recycling Center Background Information**

| | |
|---------------------------|--|
| Facility Address | 5 Ellsworth Drive South Montrose, PA 18801 |
| Facility Owner | Susquehanna County |
| Facility Operator | Susquehanna County |
| Hours of Operation | Processing: Monday - Friday 8:00 a.m. - 4:30 p.m. Saturday 8:00 a.m. - 12:00 p.m. Receiving: Monday - Friday 8:00 a.m. - 4:30 p.m. Saturday 8:00 a.m.-12:00 p.m. Drop-off: On-site, available 24 hours per day, 7 days per week. |
| Number of Bays | 4 Receiving – Upper Level 1 Receiving – Lower Level 2 Loading – Lower Level |

Section 2

| | |
|-----------------------------|--|
| Number of Scales | 1 Truck scale |
| Facility Operating Capacity | 6 tons per day |
| Major Equipment | Elevated sorting conveyor with belt magnet Balers: - Horizontal Baler - Vertical Baler Small and large skid steer loaders Clamp truck Forklift |
| Types of Materials Received | PET and HDPE plastic bottles, glass bottles, aluminum cans, steel cans, corrugated containers, mixed paper, scrap steel, and rigid plastics. |

2.2 Description of the Recycling Center

The Susquehanna County Recycling Center is on 2.5 acres and covers approximately 13,000 square feet. The average daily throughput of the facility is 4.43 tons, thus, the facility is operating at about 75 percent capacity. The facility operates one shift, with floor space allocated as follows:

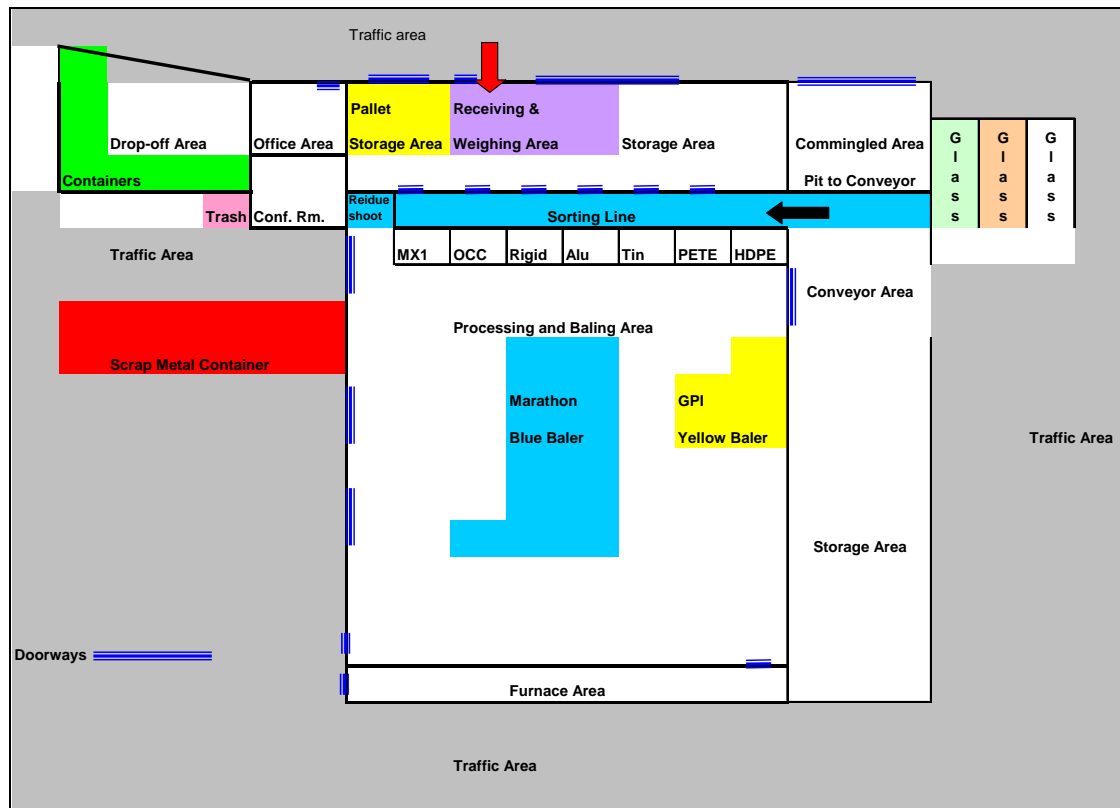
- 1,000 square feet for incoming materials storage;
- 3,000 square feet for processed materials and contaminants awaiting shipment;
- 6,000 square feet for processing equipment;
- 3,000 square feet for office space and education/conference room on the upper level and break room and parts storage on the lower level;

The Recycling Center's education/conference room has a viewing area of the sort area. The Center hosts groups and Center staff speaks to students and the public about recycling on a regular basis

A covered recycling drop-off area is located at the facility entrance. Figure 2-1 depicts a general floor plan of the Recycling Center. The concrete floor in the processing equipment area of the building contains electric heating coils for use during the winter. The facility temperature and lighting are excellent – new task lighting was recently installed over the sort line.

Municipal drop-off recycling sites, referred to as “remote drop-off sites” are serviced by private haulers, although the County owns the containers. Municipalities pay \$150 to \$200 per pull. The remote drop-off sites provide a recycling opportunity to residents and businesses that do not elect to have curbside recycling services. Four schools in the area also have drop-off recycling containers, generally for mixed paper, with one school also recycling commingled containers. Like the municipal remote drop-off sites, the County owns the containers at the schools and the school district pays private haulers to deliver the materials to the Recycling Center.

Figure 2-1
Recycling Center Floor Plan



Note: Not to scale

- Aluminum cans;
- Tin cans;
- Glass jars and bottles (clear, green, and amber);
- PET and HDPE plastic bottles;
- Mixed paper (including newspapers, magazines, catalogues, white & colored paper, chipboard (non-corrugated cardboard), and books); and
- Corrugated cardboard.

The Recycling Center also receives electronics and scrap steel (including white goods) from commercial entities and households, as well as used motor oil, oil filters, and antifreeze from residents. The County charges the following for white goods:

- \$25 – large refrigerators and freezers,
- \$15 – air conditioners,
- \$15 – dehumidifiers, and
- \$15 – mini-refrigerators.

Section 2

In addition, the Center recently started accepting and baling rigid plastics, including:

- All clean 1- to 5-gallon buckets;
- Plastic toys & play houses;
- CDs and DVDs and their cases;
- Laundry baskets;
- Lawn furniture;
- Plastic shelving;
- All plastic totes, pet carriers;
- Cleaned empty garbage cans (any size);
- Rinsed plastic drums (any size);
- Plastic pallets;
- Plastic landscape trays and flower pots;
- Plastic 5-gallon water bottles;
- Plastic toy packaging; and
- Automotive plastics: hubcaps, grills, bed liners, headlight, and rear light lenses.

The following types of materials are specifically not accepted in the rigid plastics program:

- Food containers;
- Vinyl, PVC, or rubber products (i.e. vinyl siding, PVC water pipes or conduit); and
- Oil containers.

The rigid plastics program was implemented in October 2005, primarily to increase tonnage and revenues. An additional benefit to the program is a reduction in residue. The Recycling Center has baled some rigid plastics, and has a broker in New York City willing to purchase them, but has not yet sold the material.

Electronics are accepted during facility receiving hours. Accepted materials and residential fees are:

- TVs – \$8.00,
- Computer Monitors – \$7.00,
- All other items up to 60 pounds – 25 cents per pound, and
- All other items over 60 pounds – 20 cents per pound.

Commercial entities can deliver electronics to the facility at special commercial rates developed for each generator. The County periodically delivers the collected

electronics waste to Amandi Services (previously known as Envirocycle) in nearby Halstead.

In addition, Susquehanna County will hold its annual waste tire collection program over four Saturdays during May – June 2006. The disposal fees for waste tires are:

- Small tires (16 inches in diameter) off the rim - \$1.50 per tire, and
- Large tires – 10 cents per pound.

2.3 Equipment

Table 2-2 summarizes the major equipment in use at the Susquehanna County Recycling Center.

Table 2-2
Equipment Utilized at the Recycling Center

| Equipment Type | Manufacturer/Make/Model | Materials Handled | Condition |
|---------------------------------------|----------------------------------|---|--|
| Sorting Conveyor | Remcon Equipment | Commingled containers | Good |
| Horizontal Baler with infeed conveyor | Marathon TR-8-40 | PET, HDPE, OCC, mixed paper, Rigid plastics | Good |
| Vertical Baler with infeed conveyor | Vertech GPI Division T60XDRC | Tin cans, aluminum cans | Baler – Good Infeed Conveyor - Poor |
| Small Skid Steer Loader | Bobcat 742B (Propane Fuel) | Push loose material into infeed conveyors of baler | Good |
| Large Skid Steer Loader | New Holland LS 190 (Diesel Fuel) | Load glass into bins; push/plow loose materials into incoming storage bins as needed, particularly commingled containers. | Good |
| Clamp Truck | Komatsu (Propane Fuel) | Moves bales, used refrigerators, air conditioners, etc. | Good |

Section 2

| Equipment Type | Manufacturer/Make/Model | Materials Handled | Condition |
|----------------|--------------------------|---|-----------|
| Forklift | Toyota (Propane Fuel) | Empty drop-off containers, moves pallets (electronics, glass bottles) | Good |

The Center staff performs preventative and routine maintenance on the processing and mobile equipment, including changing the motor oil and oil filters. Outside contractors provide major maintenance on the processing and mobile equipment three times per year.

Routine maintenance of the processing equipment includes greasing conveyor bearings. The slider belt on the sorting line conveyor has not been replaced for five years.

2.4 Labor

The Recycling Center has a staff of four full-time employees, and uses three to five prison laborers. The full-time employees include:

- Recycling Coordinator/Solid Waste Manager;
- Center Secretary;
- Processing Manager; and
- Assistant Processing Manager.

The secretary and the processing manager are both union employees, and the recycling coordinator and the assistant processing manager are non-union. Many of the tasks of the processing manager and assistant processing manager are shared, with the division of tasks determined by the Recycling Coordinator. The major responsibilities of these employees are as follows:

Recycling Coordinator/Solid Waste Manager –

- Direct the operation of the Recycling Center;
- With an assistant supervisor, supervise, train and evaluate the work of a crew of drivers and materials processors;
- Coordinate the delivery of materials to the Center by municipal and private haulers;
- Advise municipal government units on waste management;
- Speak at meetings and prepare written materials on the subject of waste and recycling management;
- Serve on various groups and committees to work on solving problems related to waste management and environmental issues;

- Prepare and distribute reports to the public on recycling activities;
- Arrange for volunteer workers at the Center;
- Prepare curricula for public schools to promote environmental awareness;
- Contact buyers and potential buyers to promote the sale of processed recycled materials; and
- Resolve public complaints about solid waste, septage, and recycling issues.

Secretary –

- Weigh trucks in and out and keep records on paper and computer;
- Assist public and maintain handout information;
- Audit recyclable material before sending to processing;
- Keep drop-off area clean/safer, organized.
- Prepare/complete Bills of Lading;
- Keep accurate records of shipments/sales on paper and computer;
- Generate accounts receivable records;
- Compile best prices data and complete purchase order requisition forms;
- Record income and make deposits;
- Keep time-worked records for County payroll, inmate check requests, community service report forms;
- Keep volunteer data records for insurance;
- Maintain records as required for DEP annual reporting and grants;
- Attend and take minutes of SWAC meetings;
- Handle filing, copying, telephone-related duties (including public information and maintaining current contact information at all three work stations);
- Prepare mailings and maintain mailing lists;
- Maintain office supplies;
- Keep upstairs office space clean and request necessary supplies; and
- Sort material as necessary.

Processing Manager –

- Maintain, operate and oversee operations of equipment and machinery;
- Be responsible for safe and proper operation, preventive maintenance and PM record-keeping for all equipment;
- Process recyclables for shipping by sorting and baling according to market specifications;

Section 2

- Weigh bales as they are produced, maintain inventory, and enter inventory data into computer;
- Load trucks for market;
- Supervise agency workers and work-release prisoners assisting in processing.
- Keep time-worked records for processing workers.
- Operate collection programs by driving tuck, loading and unloading truck, and record keeping.
- Make arrangements for janitorial duties and snow-debris removal;
- Thoroughly train according to Recycling Center safety manual, the work-release prisoners as they begin work, with regard to safety and equipment operation;
- Oversee implementation of safety program and compliance by the workers; and
- Review and update safety program as needed.

Assistant Processing Manager –

- Maintain, operate and oversee operations of equipment and machinery;
- Process recyclables for shipping by sorting and baling according to market specifications;
- Communicate with market brokers;
- Weigh bales as they are produced; maintain inventory; enter inventory data into computer;
- Prepare bill of lading for shipments and forward to weigh station;
- Load trucks for market;
- Perform the necessary intake records operations as necessary;
- Operate collection programs by driving truck, loading and unloading truck, and record keeping;
- Thoroughly train work release prisoners;
- Implement safety program and compliance by the workers;
- Work alternate Tuesday nights until 7:00 pm; and
- Perform grounds keeping and cleanup.

Together, these salaried positions account for \$105,919 per year in salary, and an additional \$63,723 in benefits. Benefits include the following:

- FICA;
- FICAMED;
- Worker's compensation;

- Unemployment compensation;
- Hospitalization; and
- Retirement fund.

The prison laborers are low-security inmates from the Susquehanna County Department of Corrections, which is located adjacent to the Recycling Center. These laborers earn \$2 per hour. Prison laborers primarily:

- De-bag bagged recyclables in the commingled container tip area;
- Sort materials on the commingled container sort line;
- Monitor the drop-off bins for contaminants; and
- Floor sort incoming mixed fiber loads.

The benefit of these laborers is that they are low cost. The drawbacks are as follows:

- Prison laborers are generally relatively short-term employees (three months to a year or two);
- The prison has control over their availability, not the County (at times the Department can provide only two laborers, at times they can provide five or six); and
- Prison laborers are typically not highly motivated workers.

The Susquehanna County Recycling Coordinator occasionally rewards the sorters with a pizza lunch for work well done, which seems to enhance their motivation to some degree. The County has not had any serious issues with the laborers. In 2007, the County spent \$22,534 for work-release labor.

2.5 Material Streams

The incoming material streams accepted at the Recycling Center include:

- Residential curbside recyclables delivered by private haulers;
- Residential recyclables delivered to the Recycling Center;
- Residential recyclables from remote drop-off sites (delivered by contracted private haulers);
- School recyclables from drop-off sites (delivered by contracted private haulers);
- Commercial recyclables delivered to the Recycling Center;
- Commercial recyclables (generally corrugated cardboard and mixed paper) collected by County.

2.5.1 Residential Curbside Collection

Susquehanna County licenses 19 haulers to collect solid waste/recyclables. Three commercial haulers deliver residential recyclables to the Center. The Center generally receives two to three such deliveries per day.

The private haulers delivering residential recyclables to the Recycling Center include:

- Waste Management (which provides monthly curbside collection of recyclables to their customers);
- Joe's Disposal (which provides weekly collection of recyclables to their customers); and
- Susquehanna Disposal (which provides bimonthly curbside collection of recyclables to their customers).

The County does not charge private haulers a tip fee for delivering recyclables to the Center. They feel that this would discourage recycling. Curbside recycling materials include the "typical" recyclables listed above.

The County has an "all bottles" campaign, which is considered by many in the industry to be an effective way to simplify plastics recycling instructions, maximize the amount of PET and HDPE recycled, and minimize residue.

2.5.2 Residential Drop-off at Recycling Center

Susquehanna County's Recycling Center provides 2-cubic-yard bins, which are located at the front of the building for residents and commercial entities who wish to deliver their recyclables to the Center. Residents can drop off the "typical" recyclables accepted at the facility, which are listed above, as well as scrap metal (for a fee if refrigerants need removal), rigid plastics, and electronics (also for a fee).

A video security camera is located at the front of the building to monitor residents as they drop off materials. The video camera is there to discourage illegal dumping of trash at the facility. The monitor and video recorder are located in the front office. The County intends to relocate the video security camera to point more toward the entryway to the building such that individuals and vehicle license plates can be more easily identified.

Prison laborers continuously monitor the drop-off containers to ensure that the materials in the bins are sorted properly and do not contain contaminants.

On the weekends, residents have access to the drop-off recycling bins. High participation has prompted the Center to place an extra set of bins out on weekends. At times the Center receives bags of trash, along with recyclables, however the overall contamination rate for the facility is low.

Once the drop-off containers are full, a forklift operator delivers the containers to the receiving area and releases the bottom allowing the material to fall into the appropriate storage bunker.

Figure 2-2 shows the on-site drop-off area at the Recycling Center.

Figure 2-2
Susquehanna Recycling Center Drop-Off Area



2.5.3 Remote Drop-off Sites

Municipal remote drop-off sites are located in:

- Brooklyn Township;
- Clifford Township;
- Forest City Borough;
- Lenox Township;
- Liberty Township; and
- Rush Township.

The municipalities generally have recyclable drop-off hours (typically from 9:00 am to 12:00 noon) on one or two Saturdays per month, with the exception of Forest City Borough, whose recycling container is available from 8 am to 11 am every Saturday. Susquehanna County plans to add four to five more remote drop-off sites, which would each serve one or more municipalities. The remote drop-off sites collect the same materials described above, in two streams – fibers and commingled containers.

The County owns the 22-foot long roll-off containers that serve as drop-off containers. These containers generally have a compartment for each of the following materials:

- Commingled containers; and
- Mixed paper.
- Corrugated cardboard.

Additional municipalities that the County would like to target for drop-off recycling include:

- Little Meadows/Apolacon Township;
- Choconut Township;
- Susquehanna/Oakland Township;
- Thompson Township; and
- Gibson Township;
- Lawton/Rush Township;
- Springville Township; and
- Great Bend Township.

Silver Lake Township previously provided a remote location for recycling drop-off but now encourages residents to use curbside collection via the Township's preferred hauler.

2.5.4 School Recycling

Several schools in Susquehanna County participate in the recycling drop-off program. Recyclables collected from the schools include primarily mixed and corrugated paper, while Montrose High School also collects commingled materials.

The schools known to be participating in the recycling program are:

- Montrose High;
- Lathrop Street Elementary;
- Choconut Elementary;
- Elk Lake;
- Blue Ridge Elementary;
- Susquehanna School;
- Mountain View; and
- Forest City.

In some cases, there are two schools located on a large parcel of land; however recycling is only conveniently accessible to one of the schools, as they have only one roll-off container.

2.5.5 Commercial Self-Haul

Several local businesses deliver source-separated recyclables to the receiving area of the Recycling Center and unload the material directly into the appropriate bunkers. Most local businesses that self haul weigh in at the truck scale. These businesses receive a recognition letter at the end of the year to thank them for participating in the program.

2.5.6 Commercial Collection by County

Susquehanna County uses their box truck to collect corrugated cardboard and mixed paper from local businesses. The businesses served are generally located within a five-mile radius of the Recycling Center near Montrose. The charge for collection is \$45 per quarter, regardless of the number of times collections occur during the quarter. Six State and County offices provide mixed paper and/or corrugated cardboard; two non-profit organizations provide corrugated cardboard; and six private businesses provide mixed paper and/or corrugated cardboard. Some entities receive twice-weekly service, while others receive collection weekly, twice monthly, or monthly.

The County estimates that they receive 43.4 percent of their recyclables from commercial haulers and self-haul businesses, and 56.6 percent from drop-off locations.

2.6 Receiving

The Recycling Center has four receiving bays on the upper level. The east-receiving bay accepts the commingled materials (containers) for processing. This receiving area (bay) provides three to five days' worth of storage, which is generally adequate, but would be troublesome if the sort line or horizontal baler were inoperable for any significant length of time. When commercial haulers, the County collection vehicle, or self-haul commercial loads arrive at the Recycling Center, drivers weigh in at the scale at the front of the building. The secretary records the source of the materials and the gross vehicle weight. Next, the vehicles enter the processing and baling area where they empty their mixed paper compartment, then drive back to the scales for reweighing. The secretary records the type of material and weight tipped. If there is a second material type to tip, the driver then pulls around to the side of the building to re-enter the receiving area and tip the commingled compartment.

2.7 Processing

Processing at the Susquehanna County Recycling Center consists of unloading, sorting materials, and, in some cases, baling materials. In addition, most materials are loaded into vehicles by Recycling Center staff. These processes are described more fully below.

2.7.1 Unloading

Commingled Containers

Commingled materials are delivered to the facility from both drop-off containers and curbside collection programs. Commingled containers are sometimes placed in plastic bags by residents of the County. These materials, upon arrival to the facility, are tipped onto the tip floor, and the bags are opened and emptied manually by the Center laborers. Laborers then place the plastic bags in a trash container. The commingled materials are pushed onto the conveyor infeed line with a front-end loader. During the

site visit, it appeared that the workers do an excellent job of ensuring that plastic bags do not enter the sort line.

Mixed Paper Grades

Some fiber materials are collected mixed. For example, drop-off site roll-off containers have a compartment for mixed paper only, and some commercial loads may contain both cardboard and mixed paper. These materials are tipped in the processing/baling area and floor-sorted. If a specific fiber material is to be baled, it will be loaded directly into the infeed conveyor of the horizontal baler, and the other fiber material will be placed in a 2-cubic-yard container, which can later be tipped into the appropriate bin or into the baler infeed conveyor.

Pre-Sorted Materials

Pre-sorted materials include the following:

- Materials placed (primarily by residents) into the labeled 2-cubic-yard containers at the drop-off center;
- Materials delivered to the Center by commercial haulers with multiple-compartment collection vehicles;
- Materials that businesses self-haul to the Center; and
- Corrugated containers and mixed paper collected by the County from commercial establishments unloaded in the processing and baling area.

Pre-sorted materials are checked for contaminants and delivered to the proper storage bin. Two-cubic-yard containers are tipped from the upper level. Similarly, corrugated cardboard, mixed paper, and sorted glass are tipped directly into the appropriate sorted material storage bin. Multiple-compartment collection vehicles are tipped in front of appropriate bins, and materials are loaded into the sorted material storage bin, using the skid-steer.

Figure 2-3 shows a multi-compartment vehicle tipping at the Center.

Figure 2-3
Multi-Compartment Vehicle Tipping at Recycling Center



White Goods

When white goods are delivered to the Center, the Center Secretary or another Center employee greets the resident and indicates where the item is to be placed. The resident is then charged the appropriate fee for the item. Periodically a local contractor is called to remove the Freon from the items, and tag them. Items are then moved to another area near the scrap metal container or placed directly into the container.

2.7.2 Sorting

Commingled Containers

De-bagged commingled containers are pushed by a skid-steer loader into a chute that feeds two cleated belt conveyors elevating the material onto a sort line. The Recycling Center's sort line is a waist-high 57-foot long and 27-inch wide slider belt conveyor with a belt magnet above. The speed of the conveyor has a variable drive so the speed can be adjusted. Three prison laborers normally operate the sort line standing on one side of a platform, as the other side of the line is not accessible. The laborers positively sort all recyclable materials off the belt and remaining residue falls off the end of the conveyor into a 2-cubic-yard container. The first sorter removes green glass, which is then dropped into a chute that falls into a small portable bin outside the building. He also removes plastic bags, placing them into a trash receptacle on the platform and removes HDPE plastics, tossing them forward into a storage hopper. The second sorter removes PET plastic bottles, tossing them forward into a storage hopper. He also removes brown glass bottles, depositing them into a drop chute. Prior to the third sorter, a belt magnet removes tin cans from the sort line. The third sorter removes aluminum cans, tossing them forward into the aluminum can storage bunker, and clear glass, dropping it onto the slide chute. The glass containers are carried via a skid-steer to the outside glass storage bunkers, where they are tipped. During the site visit, the belt speed was observed running at a rate of 15 – 20 feet per minute. A sort

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conveyor speed of 30 – 40 feet per minute is considered typical. The recycling coordinator notes that when necessary, the belt speed is set at a faster pace, however keeping it at a relatively low speed when incoming volumes are light allows for better quality control.

Mixed Fiber Grades

The prison laborers sort mixed fibers on the concrete floor into the two grades of fiber – corrugated and mixed paper. The fiber is then moved with a skid-steer directly into the infeed conveyor to the horizontal baler (which is located several feet off the floor, thus requiring a bucket loader attachment), or into the proper storage bin. Due to limited tip/sorting floor space and staff, the sorters stop working on the commingled sort line to sort mixed paper immediately following delivery.

Figure 2-4 shows the commingled container sort line. To the right of the line and below are the amber and clear glass storage bins.

Figure 2-4
Commingled Container Sort Line



2.7.3 Baling

Aluminum cans and tin cans are baled at the facility using a Vertech vertical baler that was moved from the prior County recycling facility and is approximately 13 years old. Recently, the incline conveyor to this baler has not been working properly. The Recycling Coordinator intends to replace it with the paper incline feed conveyor (which is not being used).

All other baled materials (mixed paper, corrugated cardboard, PET, and HDPE) are baled using the Marathon horizontal baler that was purchased when the facility expanded in 2001. This baler has an automatic wire tie system.

The Recycling Center typically produces bales at the rates by material listed in Table 2-3 below:

Table 2-3
 Typical Bale Production Rate by Material at the Recycling Center

| Material | Weekly Bale Production Rate | Baler Cycle Time (Minutes) | Bale Density (Lb./Cubic Yard) | Average Weight Per Shipment 2005 (Tons) |
|----------------------|-----------------------------|----------------------------|-------------------------------|---|
| Mixed Paper | 10-12 | 5 | 1400 – 1500 | 21.4 |
| Corrugated Cardboard | 6 | 15 | 1300 – 1400 | 22.1 |
| PET Plastic | 1-2 | 15-20 | 1000 | 17.4 |
| HDPE Plastics | 1-2 | 15-20 | 1200 – 1300 | 18.6 |
| Tin Can | 2 | 20 | 1600 – 1700 | 18.7 |
| Aluminum Cans | 1 | 20 | 800 – 850 | NA |

2.8 Storage

Glass

Three covered outdoor concrete bunkers store flint, green, and amber glass providing 24 – 25 tons of storage each.

Baled Materials

Baled materials are stored inside the building and in the covered enclosure that was added during the expansion. During the site visit, metal bales were located outside the perimeter of the south side or lower level of the building. The Recycling Coordinator was hoping to see an increase in aluminum prices, and had stockpiled all aluminum baled in 2005 on site. In addition, the Coordinator had been expecting an increase in steel can prices, so bales of steel cans were also awaiting shipment. Figure 2-5 shows the metal bales stored outside of the facility.

Figure 2-5
Aluminum and Steel Can Bales Stored Outside



Scrap Metal

Scrap metal items are stored beside a roll-off container provided by Weitzman's, the local scrap metal dealer. Because the roll-off is located on a ramp several feet below the building, it is easy to access and see into this roll-off. Figure 2-6 shows the scrap metal roll-off container.

Figure 2-6
Scrap Metal Roll-Off Container



2.9 Loading Materials

A Recycling Center worker uses a clamp truck to load product bales into trailers located at the loading docks in the southwest corner of the building. Employees use skid steer loaders to load glass into trucks at the lower level of the glass bunkers. Similarly, materials (after refrigerants are removed, and the items are tagged) are placed into the scrap metal roll-off container using a clamp truck.

2.10 Materials Processed by Commodity Type

Table 2-4 shows the estimated amount of each commodity processed in 2005.

Table 2-4
2005 Amounts of Materials Processed

| Material | Tons Processed | % of Material, By Weight |
|----------------------|----------------|--------------------------|
| Corrugated Container | 351.5 | 16.5 |
| Mixed Paper | 791.6 | 37.3 |
| Scrap Steel | 200.8 | 9.5 |
| Tin Cans | 143.2 | 6.7 |
| Aluminum Cans | 32.1 | 1.5 |
| Flint Glass | 234.0 | 11.0 |
| Amber Glass | 72.0 | 3.4 |
| Green Glass | 118.5 | 5.6 |
| Mixed Glass | 5.4 | 0.3 |
| PET Plastic | 77.8 | 3.7 |
| HDPE Plastic | 92.9 | 4.4 |
| Rigid Plastics | 4.5 | 0.2 |
| Total | 2,124.3 | 100.0 |

2.11 Residue Management

Residual fines from the infeed conveyor fall into a 2-cubic-yard container. Residue and contaminants from the sort line fall off the end of the conveyor into a 2-cubic-yard container at the opposite end of the sort line. All residue and contaminants from the facility are combined into an 8-cubic-yard container that is emptied every four to six weeks by Joe's Disposal. Recently the County has recorded the weight of the residue in the 2-cubic-yard container and determined an average weight of about 1,107 pounds per container. The County estimates that they fill 68 of these containers per year, for a total of 75,276 pounds (37.6 tons). A private hauler hauls away an additional 630 pounds per month, or 3.8 tons per year at no charge. This is a total of 41.4 tons of residue per year. Deducting the scrap metal collected at the Recycling Center, the

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residue rate is 2.2 percent by weight. This is an excellent residue rate, particularly considering that some curbside recyclables are delivered in plastic bags to the Center, and considering the fact that the Center's drop-off area is unattended over the weekend.

The Center paid \$160 per month, plus \$40 per additional pull, for waste removal in 2005. The total cost of residue management was \$2,700, for collection and disposal of roughly 37.6 tons or \$71.80 per ton (excluding the waste collected at no charge by a private hauler).

Section 3

RECYCLABLES MARKETING

Susquehanna County has no contracts in place for the sale of materials, but instead relies on the spot market. All materials are sold baled, with the exception of glass. As mentioned previously, the Center did not market aluminum cans in 2005, as they expected an upturn in this commodity's price. The average price for aluminum cans has been increasing steadily since October 2005, with a peak in February. The Center's decision to hold onto aluminum, therefore, appears to have been wise. Recently the Center sold their aluminum for .85 per pound.

Table 3-1 summarizes how the County markets their recyclables

Table 3-1
Material Market Summary

| Material | Most Recent Price (\$) | Transaction Date | Regional Average Price/Date ¹ |
|---------------|-----------------------------|------------------|--|
| Aluminum Cans | .87/lb. (\$1,190.00/ton) | 4/21/2006 | .80 - .85 ² (3/28/06) |
| Steel Cans | 109.09 / ton | 12/13/2005 | \$145.00 - \$150.00 ² (12/12/05) |
| Scrap Metal | 45.00/ton | 12/22/2005 | \$50.00 - \$60.00 ³ (1/20/06) |
| Clear Glass | 23.00/ ton | 1/19/2006 | \$20.00 - \$25.00 (1/20/06) |
| Brown Glass | 8.00/ ton | 7/15/2005 | \$5.00 - \$15.00 (7/15/05) |
| Green Glass | 5.00/ ton | 8/4/2005 | (\$20.00) – (\$5.00)/ton (8/5/05) |
| Mixed Paper | 45.00 /ton | 3/1/2006 | \$40.00 - \$45.00/ton (3/28/06 for Soft Mix) |
| Cardboard | 55.00/ton | 3/3/2006 | \$60.00 - \$65.00/ton (3/6/06) |
| PET | .17 /lb (\$340 /ton) | 9/2/2005 | \$0.17 - \$0.21/lb. ³ (\$340 – 420/ton) - (8/5/05) |
| HDPE (Mixed) | .31/lb (\$620/ton) | 1/18/2006 | \$0.38 - \$0.40/lb ³ (\$760 – 800/ton) - (1/20/06) |

NA – Not Available.

¹ All published pricing is FOB (freight on board – buyer pays freight charges, seller loads onto truck) unless specified.

² Delivered (seller pays freight).

³ Picked up.

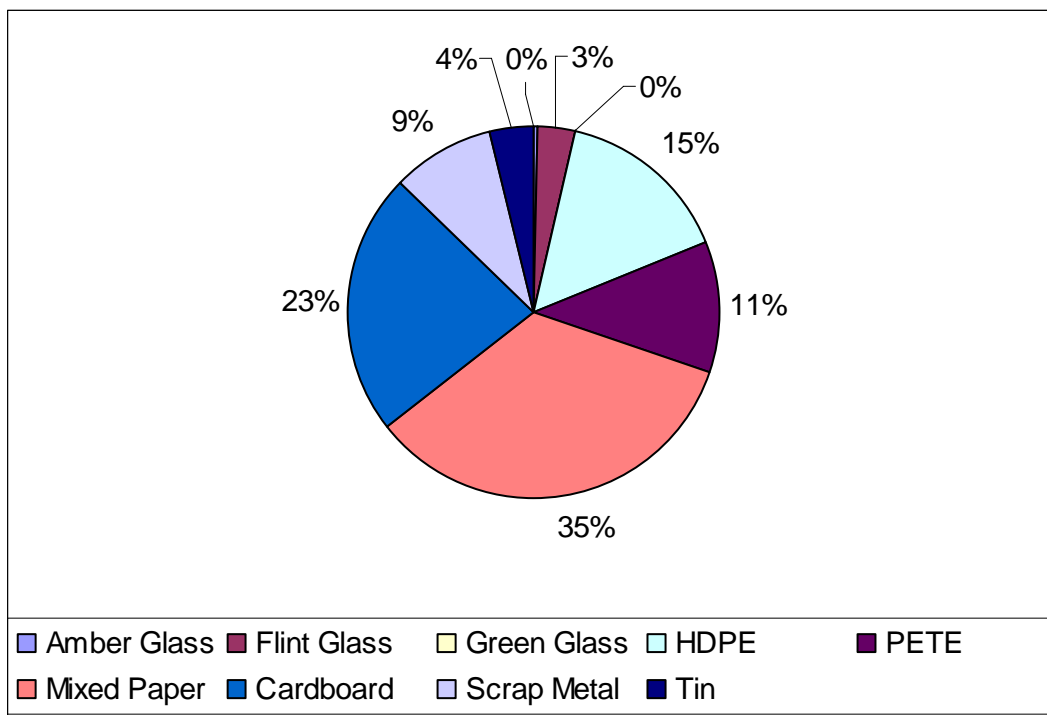
Section 3

In the past year, the Center has not had any materials rejected or downgraded. The primary obstacle faced in marketing materials is the somewhat remote location of the Recycling Center (approximately 12 miles from I-81) which increases transportation costs, and thus decreases prices paid FOB (freight on board). Material storage constraints are also limiting.

Figure 3-1 shows the relative portion of revenue each commodity contributed to total sales revenues in 2005. As Figure 3-1 shows, fiber materials combined were responsible for nearly 60 percent of the Center's revenues in 2005. Aluminum cans, however, were not sold in 2005. If they had been, this would likely have been around \$39,000 in revenue (assuming 30 tons of cans, sold at an average price of \$0.65 per pound). This would mean that fiber would have been closer to 40 percent of the Center's sales revenues and aluminum would have contributed approximately 28 percent of the Center's revenues from the sale of materials.

The Center markets all of their materials with the exception of scrap steel through brokers. They are doing relatively well, price wise, with all of the glass grades and mixed paper. Scrap metal, steel cans, and corrugated cardboard prices appear to be somewhat lower than the regional averages. The published price for steel cans, however, is delivered, thus it is expected to be somewhat higher than pricing that does not include delivery. The County's corrugated cardboard market, however, is tolerant of imported cardboard; therefore, the County is not having to pull out the imported OCC to bale separately.

Figure 3-1
2005 Material Sales Revenues by Commodity



Section 4

FINDINGS AND RECOMMENDATIONS

4.1 Observations

The following observations were made during our site visit, or gleaned from the data provided.

4.1.1 General Operations

- Although labor costs are the major category of operating expenses, the Center saves approximately \$45,760 per year by using prison laborers, assuming an average of four work release laborers per day, with an alternative wage of \$7.00 per hour.
- Center laborers and the facility itself are not fully utilized. The Center is reportedly designed to process six tons per day, but receives an average of 5 tons per operating day (less scrap steel) for a utilization rate of 83 percent.
- During the site visit, the belt speed was operating at a very slow speed (15 to 20 feet per minute). Typical sort lines operate at a speed of 30 to 40 feet per minute.
- The Recycling Center employees and laborers appear to do an excellent job of keeping the Recycling Center clean.
- Traffic flow at the Center is not clearly marked. Trucks arriving at the Center for the first time would not know where the scale is, or which direction to enter the scale. Also, there is inadequate signage for residential and commercial drop-off traffic.
- Traffic flow at the Center is not ideal, in that tractor-trailers and other collection and delivery vehicles have to cross the residential line of traffic, and back up into an area where residents may be entering the drop-off area. Ideally, truck traffic would enter in a counter-clockwise direction, cross the scale, and circle the building in the same direction to re-weigh, if necessary. This would limit the need for trucks to back up toward the drop-off area. This traffic configuration is not possible at this site, however, because there is not adequate space on the rear side of the building, and due to grading and property lines, expansion is not feasible.
- Storage space for sorted materials (particularly HDPE plastics) and baled materials is limited. Because the Center was holding onto aluminum and steel cans in hopes of a price increase, bales of material were stacked in various locations in and around the Center. Although the steel bales stored outside had oxidized, the Recycling Coordinator indicated that this did not impact his pricing.

4.1.2 Materials Marketing

Because the Susquehanna County Recycling Center is located approximately 12 miles from a major highway interchange, transportation costs are expected to have a slight negative impact on the prices the Center is able to receive for materials. It appears that many commodities have a higher regional published price than the Center receives; however, the regional price is for the entire Northeast region of the U.S. In general, recycling facilities closer in proximity to end markets are likely to receive higher prices. This is likely why the Center has relatively good pricing for its glass commodities. Also, generators with a larger quantity of materials are usually able to negotiate higher prices. The best way to ensure good pricing is to:

- Contact several vendors when preparing to sell a load of material;
- Maintain working relationships and sell end product to more than one vendor for each commodity, if possible;
- Continue to produce a high-quality end product; and
- Know the market – keep an eye on Waste News and/or other published pricing so that marketing decisions can be made based on current information.

While the Recycling Center seems to be doing relatively well with respect to pricing on fiber commodities (particularly mixed paper) and glass, regional average pricing suggests that it may be possible for the Center to negotiate higher prices for steel cans, scrap metals, and plastics. However, the prices being paid for these commodities are only slightly lower than the regional average. One factor that may partially explain the relatively low scrap steel prices is that the scrap metal dealer leaves his roll-off container on site. However, the Center may be able to find higher pricing for scrap steel through another vendor, as steel markets in Pennsylvania are usually strong.

Although the Center sells relatively few loads of plastic per year (two loads each of PET and HDPE), it would be beneficial for the facility to determine whether low bale weights are having a negative impact on plastics pricing and to explore other markets, or whether a plastics perforator might make plastic bales dense enough to improve pricing.

4.2 Recommendations

Recommendations for enhancing Center operations, based on the site visit and subsequent analysis, are presented below for consideration.

4.2.1 General Operations

- ***Improve signage to the Recycling Center.*** Provide more directional signs along the approach route as well as a new entrance sign in order to improve visibility of the Recycling Center in the community.
- ***Improve signage on bins in the drop-off area.*** The 2-cubic-yard drop-bottom bins are labeled with small lettering only. Research shows that clear, easy to read signs and pictures of what is allowed in the container are helpful in minimizing

mis-sorting. Figure 4-1 shows a label used on recycling bins in Ashland Borough, Schuylkill County. Obviously, each bin would require a different sign at the Susquehanna Recycling Center.

Figure 4-1
Recycling Bin Sign in Ashland Borough



- **Revise educational material to encourage residents to remove caps and lids from glass and plastic bottles and jars.** Removal of lids from glass bottles will reduce residue and improve product quality. Removal of caps will improve the bale density of plastic bottles, although if a perforator is purchased this benefit would be reduced.
- **Continue to use the “All Bottles” education message.** As mentioned above, this message has been proven to increase plastics recycling by simplifying the message to residents, while decreasing contamination with non-recyclable plastics.
- **Increase the amount of recyclables processed at the facility by targeting additional communities for drop-off recycling.** One way to accomplish this is for the County to purchase a roll-off truck to service additional containers, thereby providing residents of additional communities with recycling opportunities. In a rural area with mostly voluntary communities, the Recycling Coordinator feels that providing more drop-off opportunities is crucial to expanding recycling in the County. The County anticipates painting the truck such that it would serve to promote the recycling program, and would make it available for display at special events to further promote recycling. Increasing tons processed at the facility will make the Center operate more cost effectively, as the laborers are not fully utilized, nor is the facility itself, and additional revenues will result in spreading capital and operating costs among more tons.
- **Continue to monitor residue being generated.** The Center recently started weighing the residue containers being emptied into the trash dumpster to estimate the quantity of waste being generated at the Center. Similarly, Center staff has developed an estimate of the waste being hauled by Waste Management at no

charge. Ongoing monitoring of residue weight will result in more consistent waste estimates.

- ***Improve operating/sorting efficiency by:***
 - *Increasing the speed of the sort line conveyor to increase sorting efficiency.* The belt speed should be operating at a speed of 40 to 50 feet per minute.
 - *Removing the unused paper infeed belt conveyor located adjacent to the sort line.* This would allow sorters to easily throw materials forward, which is the most efficient way to “toss” materials. Currently this conveyor blocks some materials as they are tossed into the bin. Figure 4-2 shows how this partially impedes sorting.

Figure 4-2
Unused Infeed Conveyor Over Sort Line



- *Adding a perforator to the bottom of the HDPE plastics chute.* Ideally, this perforator would be mounted relatively high so as not to impede significantly on the HDPE storage bin capacity. The plastics perforator will provide increased storage in the bin below (by around 50 percent or more) and denser bales (by about 20 percent). It is estimated that the total cost of such a perforator would be around \$15,000 to \$20,000, installed.
- *Replacing the incline conveyor of the vertical baler with the incline conveyor of the unused paper infeed conveyor.*
- ***Meet with businesses and haulers to help increase recycling, and identify the best role for the County to take.*** The County should develop a two-year action plan detailing how they will increase recycling tonnages coming into the Center. Soliciting input from local businesses, municipalities, and haulers, will better enable the County to develop strategies that attract additional material suppliers and will help the County move forward with the support of local stakeholders. Issues/questions to be explored include:

- What factors are keeping businesses and municipalities from recycling currently?
- What do haulers see as the County's role in collecting recyclables?
- What role do haulers wish to take in collecting recyclables?
- What can the County do to encourage local businesses to self-haul recyclables to the Center?
- What can the County do to encourage private haulers to deliver recyclables to the Center?
- What are most businesses and municipalities willing to pay to recycle?

Ideally, the County's services should complement versus compete with those provided by private haulers. It is important for the County to develop a positive rapport with commercial haulers, in order to encourage them to supply the Center with recyclables. Also, it may be possible for the County and private haulers to develop a public-private partnership to increase recycling among commercial and institutional entities. Potential solutions/outcomes of the stakeholder involvement and planning process might include one or more of the following scenarios:

- *The County will collect recyclables from County offices, municipal drop-offs, and school drop-offs, but not from private entities.* The County would have to purchase a roll-off truck with a hoist system in order to provide this service. Under this scenario, the County could charge customers a fee for providing this service. At a minimum, the fees should cover labor and fuel costs.
- *The County will also collect recyclables from private entities, for a fee, but only within a certain mile radius.* Under this scenario, the County could charge a service fee based on the number of collections per month, rather than a flat \$45-per-quarter fee. To establish fees, the County should carefully review labor and operational costs, as well as capital costs, to see what a reasonable charge would be for providing this service. The County should further compare this cost to what private haulers charge.
- *The County will issue an RFP and contract for collection services for municipal drop-offs and school drop-offs.* Contracting for service would most likely result in more cost-effective pricing for all municipalities and schools. This option might require the purchase of additional drop-off containers. However, the County should also check with surrounding counties to see if there are extra drop-off containers not being used that could be transferred to the County.
- ***Consider forming a Commercial/Institutional Recycling Committee.*** Such a committee would be comprised of representatives of various institutions and commercial establishments, and members would have an ongoing role in promoting recycling and the benefits of recycling in the community. These members could be trained by the Recycling Coordinator to perform waste audits, and could help convey the benefits of recycling. Often members of such a group

have insights into potential barriers to recycling, as well as examples of how such barriers have been overcome.

- ***Consider developing a revenue-share program, such that entities (haulers, municipalities, and/or schools) are rebated a portion of revenues from the sale of commodities at the end of the year, based on the quantity of recyclables delivered, and revenues earned from these recyclables.*** Other possible incentives include raffles, recognition programs, and contests among schools and municipalities. The Center could seek corporate sponsors to furnish prizes.
- ***Consider modifying the County's recycling ordinance.*** The County's recycling ordinance could be modified to stipulate that haulers providing trash collection service in the County to residents must include recycling collection services at no additional cost to the resident. Although haulers' rates would likely increase slightly, they would find their recycling routes to be more cost-effective, as they would be collecting more materials, and their disposal fees would decrease.

4.2.2 Safety/Loss Prevention

- ***Improve traffic flow signage at the Center.*** Consider placing a sign with arrows clearly indicating where vehicles should go to enter the scale area, as well as where residents should enter the drop-off area. This sign could be located on the grass median at the entrance to the Center.
- ***Improve security at the Center.*** Consider adding chain link fencing and additional video monitoring with warning signs to increase security at the Recycling Center. In addition, provide a large sign located near the front of the facility indicating that the site is monitored by security cameras. The metal bales are at a high risk for theft, as some are stored outside the building.
- ***Improve the amber and clear glass chutes to enhance safety.*** Currently there are "gaps" in the amber glass drop chute, which provide an opportunity for glass shards to drop out of the chute onto workers or the floor below. One way to remedy the situation is to install a flexible connection at the bottom of the drop chute to prevent damage from impacts by rolling stock. Clear glass slides down an open chute posing a safety risk to the prison laborers. By installing an enclosed drop chute for the clear glass leading to the portable storage container the Center could enhance safety. This chute should be placed such that it does not impede walking traffic on the sort floor walkway. The current chute impedes the walkway, as it is placed at such an angle that sorters have to make a concerted effort to step over it. This could be problematic in the event of an emergency. Figure 4-3 shows the chute for amber glass. Figure 4-4 shows the open chute for clear glass.

Figure 4-3
Amber Glass Damaged Drop Chute



Figure 4-4
Clear Glass Chute



- ***Develop an orientation and training program.*** Due to the high turnover rate of prison laborers, the County should develop an orientation and training program. As part of the program, laborers should be instructed to wear proper personal protection equipment (safety glasses, safety vests, longer gloves, and ear protection).
- ***Paint brightly-colored OSHA safety markings on the floor to indicate unsafe areas for workers near balers.***

- ***Improve spacing of the infeed conveyor to the vertical baler.*** Relocate the infeed conveyor and vertical baler about 10 feet further away from damaged roll-up door entrance to provide more loading space. Figure 4-5 shows the proximity of the infeed to the vertical (yellow) baler to the door.

Figure 4-5
Baler Area



4.2.3 Materials Marketing

- ***Work with other counties to collect additional rigid plastics.*** The County is the first in the area to attempt to bale and sell rigid plastics. Other nearby counties with recycling centers (such as Wyoming) might be willing to deliver rigid plastics in order to develop a full load of material more quickly. Rigid plastics are often cited as a major contaminant, and most recycling Centers are unwilling or unable to attempt to develop markets for these materials.
- ***Continue to monitor market pricing.*** One way to monitor pricing is by reading trade journals and publications such as *Recycling Today* and *Waste News*, or by subscribing to services such as *Waste News Pricing*. Although the Recycling Center is in a more remote area and may be further from some markets, it is beneficial to know the direction the market is taking, and the magnitude with which pricing is moving.
- ***Investigate the extent to which it would be advantageous to sort incoming metal by selected grades to include copper, brass, and aluminum scrap and to market selected items such as lawn mowers and bicycles for refurbishing and resale.*** Performing metals upgrading will require dedicated labor but could pay off in increased revenue.
- ***Routinely contact at least three or four end markets to check pricing, when ready to sell a commodity.*** Although it is wise to be cautious with new vendors due to the risk of non-payment, calling several vendors will provide for a check

on prices being obtained from existing markets, and may help the Center obtain better materials pricing.

- ***Periodically market each material periodically to more than one market.*** Although this takes additional effort, and despite the fact that markets are currently strong, it is important to have an established relationship with more than one broker or market for each commodity, should something happen to the predominant market.

Section 5 FINANCIAL SUMMARY

5.1 Annual Operating Costs

Table 5-1 provides a summary of annual operating costs for the Susquehanna County Recycling Center.

Table 5-1
2005 Recycling Center Operating Cost Summary

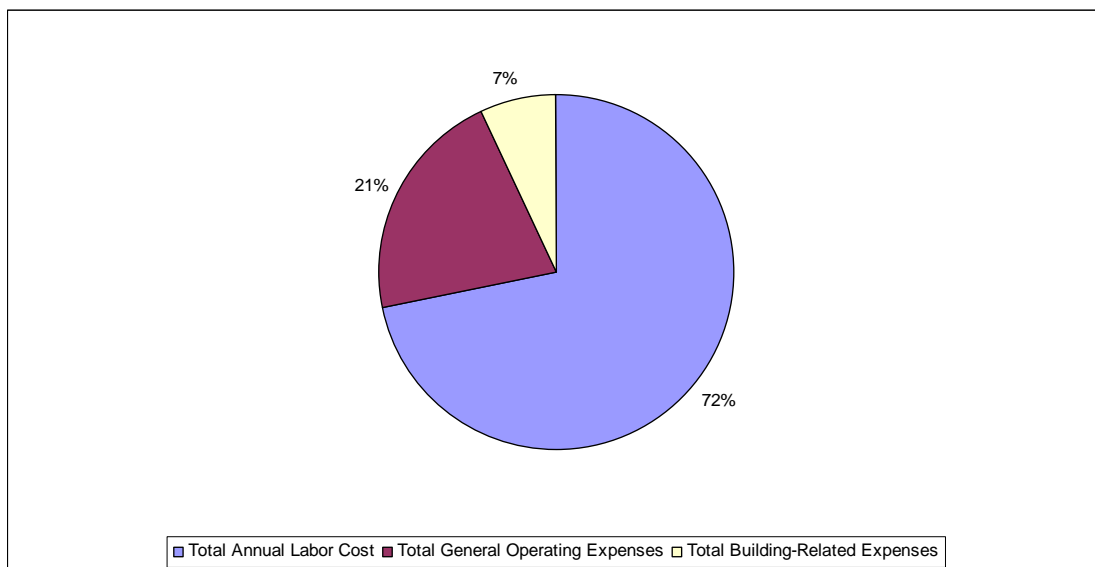
| Item | Amount |
|---|------------------|
| Labor: | |
| Employee Salaries | \$105,919 |
| Employee Benefits | \$63,723 |
| Work Release Labor Costs | \$22,534 |
| Total Annual Labor Cost | \$192,176 |
| General Operating Expenses: | |
| Waste Disposal | \$2,400 |
| Equipment Maintenance & Repairs | \$26,580 |
| Maintenance Supplies | \$1,609 |
| Maintenance Agreements & Supplies | \$1,217 |
| Materials & Supplies | \$6,405 |
| Vehicle Operation | \$4,202 |
| Miscellaneous Capital Costs | \$4,000 |
| Miscellaneous Admin Expenses/Other | \$10,705 |
| Permit & Fees | \$180 |
| Total General Operating Expenses | \$57,298 |
| Building-Related Expenses: | |
| Fuel, Electric, Water, & Sewer | \$18,099 |
| Telephone & Fax | \$418 |
| Total Building-Related Expenses | \$18,517 |
| TOTAL ANNUAL OPERATING COST | \$267,991 |

Note that the Recycling Center labor hours and some maintenance and repair costs include collection activities. Because the Center plays an integral role in the County’s commercial recyclables collection system, it would not be meaningful to separate out all costs associated with collecting these tons. Instead, when comparing to other facilities and MRF operations, it is important to have a clear understanding of activities and services included in these costs. Although the County has a separate budget for solid waste and recycling, those budgets are combined here, as nearly all labor hours and revenues are attributable to recycling efforts.

With annual operating costs of \$267,991 and processing 1,620 tons per year, the Center’s operating cost is \$165.43 per ton.

Figure 5-1 shows the primary operating cost areas for the Susquehanna County Recycling Center.

Figure 5-1
Primary Operating Cost Areas for Recycling Center



5.2 Annualized Capital Costs

To estimate annualized capital costs, the original purchase price of the Recycling Center and its equipment, where available, was escalated by 2.5 percent per year from the original purchase date to estimate 2005 equipment purchase prices (replacement cost) for each capital item. The estimated current purchase price for the Recycling Center and its equipment were then individually divided by the expected lifespan of each capital item. The total annualized capital cost for 2005 is estimated to be \$116,788. Table 5-2 shows the results of this analysis.

Table 5-2
Estimated Annualized Capital Costs

| Capital Equipment | Estimated 2005 Purchase Price | Lifespan in Years | Annualized Cost |
|---|-------------------------------|-------------------|------------------|
| Original Building | \$1,009,194 | 30 | \$33,640 |
| Building Expansion | \$483,559 | 30 | \$16,119 |
| Water Treatment System | \$5,519 | 15 | \$368 |
| Fire Alarm System | \$6,513 | 15 | \$434 |
| Phoenix Truck Scale | \$55,512 | 15 | \$3,701 |
| Roll-off bodies (15) | \$130,622 | 15 | \$8,708 |
| Compartmentalized Trailers (2) | \$41,692 | 15 | \$2,779 |
| 45-cy Transfer Roll-off Bodies (5) | \$31,269 | 15 | \$2,085 |
| 45' Trailer | \$3,067 | 20 | \$153 |
| Municipal Collection Pavilions (10) | \$47,071 | 15 | \$3,138 |
| Tarps (5) | \$734 | 5 | \$147 |
| Hoppers (10) | \$9,414 | 10 | \$941 |
| Sorting System | \$95,689 | 15 | \$6,379 |
| Paper Conveyor | \$16,557 | 10 | \$1,656 |
| Vertical Baler | \$61,668 | 12 | \$5,139 |
| Horizontal Baler/Conveyor/Auto Tie | \$158,397 | 12 | \$13,200 |
| Bobcat Skid Steer | \$32,802 | 7 | \$4,686 |
| Toyota Skid Steer | \$23,639 | 7 | \$3,377 |
| Komatsu Fork Lift/w Bale Clamp Attachment | \$30,874 | 7 | \$4,005 |
| New Holland Skid Steer/w Attachments | \$36,771 | 15 | \$2,451 |
| Dumper System Attachment | \$5,374 | 15 | \$358 |
| Misc. Tools | \$4,526 | 15 | \$302 |
| Ice Melter/Spreader | \$409 | 7 | \$58 |
| Signs | \$1,934 | 15 | \$129 |
| 48-cubic foot boxes (32) | \$18,756 | 15 | \$1,250 |
| Tippable Boxes | \$5,943 | 15 | \$396 |
| OCC Bin | \$1,752 | 15 | \$117 |
| Office Equipment & Furniture | \$10,698 | 10 | \$1,070 |
| TOTAL ANNUALIZED CAPITAL COST | \$2,329,957 | | \$116,788 |

Total annualized costs reflect the estimated annual cost to ensure capital equipment is replaced, as appropriate. The annualized costs reflected in Table 5-2 assume that the Center would pay 100 percent of the cost of the items. The Center has been fortunate

to have some equipment donated, and 90 percent of much of the equipment paid for with DEP grants. If DEP grants paid for 90 percent of all of the capital, the Center's share of annualized capital costs would be \$11,679 per year. Although grants for equipment have been available in the past, the potential exists for availability to some time in the future. Examining annualized capital costs excluding the impact of DEP grants gives the Recycling Center an indication of the level of revenues that would be required to make the Center financially sustainable if DEP grants were not available. Factoring out future DEP grants, the County would need to establish a reserve fund for equipment replacement. These figures apply to current-day pricing, and would have to be adjusted for inflation over time. Note that revenues required to offset the capital costs shown in the above table would be considerably lower if:

- DEP grants are available in the future for capital equipment replacement; or
- Service life of the equipment and facility is prolonged past the lifespan indicated (which is common with public facilities).

For example, without DEP grants, total annual costs (operating and annual capital) would be \$384,779 per year, or \$237.52 per ton (based on 2005 tons). However, if DEP grants are available in the future and if they cover 90 percent of capital costs, annual capitalization costs in current dollars would be an estimated \$11,679 per year. Total annual costs, then (operating and capital) would be \$279,670 per year or \$172.64 per ton.

5.3 Revenues

Facility revenues attributable to the Recycling Center operations consist of:

- DEP recycling performance grants;
- DEP county recycling coordinator grants;
- DEP grants for HHW and tire recycling programs;
- Administrative fees;
- Licensing fees;
- Commercial weighing (from \$5 per vehicle weighing fee);
- Sale of recyclable materials;
- New York bottle deposit redemptions (reimbursement for beverage cans purchased in New York);
- Contributions (donations);
- Reimbursements (net revenues from Freon removal and electronics recycling fees); and
- Program income (fees for collecting recyclables using the County box truck).

From an accounting standpoint, grants for equipment are also considered to be revenues, but they are excluded here because they have been discussed with capital costs above.

As described above, this analysis does not mirror the County’s accounting system, in that the County has a separate budget for solid waste management and recycling, where the recycling coordinator/solid waste manager’s and the secretary’s salaries are included. In actuality, however, both staff members spend the majority of their time dealing with recycling issues. Also, in the County’s budget, several recycling grants cover solid waste management costs. Here, the budgets are combined so that expenditures and revenues are clear.

Administrative fees in the County are \$4 per ton of disposed waste. The County weighs commercial trucks on the Recycling Center scale for a nominal fee of \$5 per weighing.

Because the private sector is challenging the legality of administrative fees in various counties in the state, the DEP encourages communities to strive to seek additional funding sources. Charging municipalities and private entities for processing recyclables is one way to raise some revenue, however, the County fears that charging a processing fee to commercial entities for recycling will discourage recycling, as it is not mandatory.

Contributions are donations received at the Recycling Center’s contributions box. Reimbursements are net revenues from refrigerant removal of refrigerators, air conditioners, and dehumidifiers received for recycling. Program income is revenue received from the County’s commercial recyclable service provided to local businesses.

Based on this analysis, the Center’s revenues for 2005 are as summarized in Table 5-3 below.

**Table 5-3
Summary of 2005 Center Revenues**

| Revenue Source | Amount | Percent |
|--|------------------|---------------|
| Performance Grants | \$13,438 | 5.4% |
| Recycling Coordinator Grant | \$22,401 | 9.0% |
| DEP Grants for HHW and Tire Recycling ¹ | \$19,587 | 7.8% |
| Licensing Fees | \$10,950 | 4.4% |
| Administrative Fees | \$69,284 | 27.7% |
| Commercial Weigh Fees | \$368 | 0.1% |
| Sale of Materials | \$109,089 | 43.6% |
| Contributions | \$1,349 | 0.5% |
| Reimbursement | \$2,400 | 1.0% |
| Collection Fees | \$1,328 | 0.5% |
| TOTAL | \$250,194 | 100.0% |

¹ DEP grants reimbursed 50 percent of 2004 program costs.

5.4 Recycling Center Profitability

Based on the costs and revenues described above, the Recycling Center profitability is as summarized in Table 5-4.

Table 5-4
2005 Estimated Recycling Center Profitability

| Item | Amount |
|---|--------------------|
| Revenue | \$ 250,194 |
| Operating Costs | \$ 267,991 |
| Net Operating Revenue (Expenses) | \$ (17,797) |
| 2005 Recapitalization Requirement | \$ 116,788 |
| Net Surplus (Shortfall) | \$(134,585) |

As shown by the figures in the table above, the Center is operating in the red with respect to net operating costs versus revenue. Further, if the Center desires to provide for recapitalization of equipment, it will need to find other sources of revenue to cover the costs of doing so. Implementing the recommendations identified in this report will help to improve operational efficiency and address some safety concerns that currently appear to put the Center at risk; however, these recommendations are not expected to result in substantial operational cost savings, if any. A certain amount of labor is working at a very reduced cost to the County already, and the recommended changes are unlikely to reduce the need for existing labor. The Center could work to increase tonnage flow into the facility and to increase revenue from the sale of material both of which could improve per-ton net costs, but may also result in additional costs such as the need for more staff or a new baling system.