

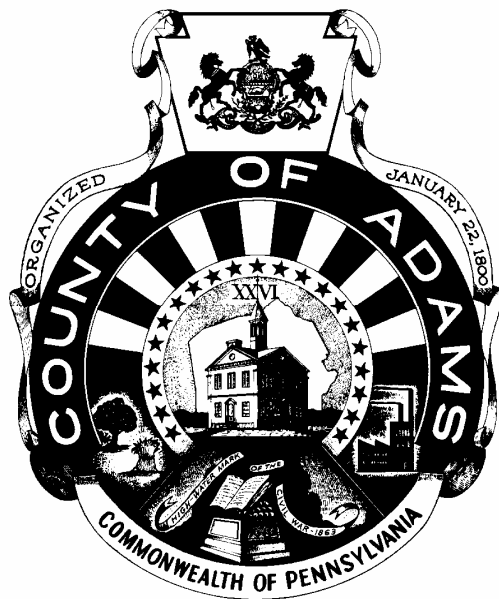
**SWANA RECYCLING
TECHNICAL ASSISTANCE STUDY**

**ADAMS COUNTY MATERIALS RECYCLING
FACILITY CONCEPTUAL LAYOUT
AND BLUE BAG ASSESSMENT**

FINAL REPORT

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ADAMS COUNTY



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HARRISBURG, PENNSYLVANIA

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SWANA RECYCLING TECHNICAL ASSISTANCE STUDY

ADAMS COUNTY MATERIALS RECYCLING FACILITY CONCEPTUAL LAYOUT AND BLUE BAG ASSESSMENT

Preface: *This SWANA Technical Assistance study was conducted for Adams County during a period when a number of interrelated projects and studies were in progress. Such projects and studies included the Hugh Ettinger co-compost process train re-evaluation; the Adams County Biosolids and Septage Management Study; the deer mortality composting project; permitting, design and construction of the infrastructure at the Adams County Facilities Center Site; Adams County Municipal Waste Management Plan Update, and other County studies and projects. When relevant information from these studies and projects was generated, it was considered in the context of this study and the long-term needs of Adams County. Because the concept and development of the co-composting project has a direct impact on the Materials Recovery Facility (MRF) and blue bag co-collection program that may be implemented in Adams County, this SWANA study was delayed to coordinate findings with these other related projects and studies. However, the work and research conducted under this study was unique and separate from other services provided by Gannett Fleming (GF) to Adams County. Further, the Pennsylvania Department of Environmental Protection (PADEP) has questioned the suitability of a blue bag system in Adams County, which places in question the opportunity to obtain Section 902 grant funding to help implement this MRF and blue bag program. With this understanding, GF conducted a more in-depth evaluation of blue bag systems as a component of this study. In 2005, GF updated its review of public information and case studies on blue bag systems in place in the U.S., to help offer a more complete recommendation to Adams County.*

1.0 INTRODUCTION

Adams County has conceptualized and planned a dynamic co-composting facility to process daily between 100 and 150 tons of municipal solid waste, with approximately 80 wet tons of sewage sludge and septage generated in the area. An integral component of this proposed project would be a Materials Recovery Facility (MRF) located near the co-composting facility, targeting the recovery of source-separated materials such as aluminum and bimetallic cans, clear glass, colored glass, and PET and HDPE bottles from Adams County residents and businesses. Adams County is a relatively rural county, and only two of the County's 34 municipalities are currently mandated to curbside-recycle under Act 101 (Gettysburg Borough and Conewago Township). A third, McSherrystown Borough, voluntarily operates a municipal curbside collection recycling program. The remainder of Adams County's recycling needs are currently served by either 1) a curbside and recyclables drop-off program run by the Adams Rescue Mission, or 2) voluntary contract or subscription recycling services from private waste collectors. Due to its rural nature, it is difficult to justify the economics of expanding curbside collection of source-separated recyclables in Adams County, beyond those now participating.

Under this SWANA study, Adams County is evaluating a recyclables collection system where these recyclable materials would be placed in distinguishable blue plastic bags and co-collected (i.e. collected in one truck) weekly with municipal waste in standard packer trucks. These co-collected materials would then be delivered to the tipping floor of Adams County's proposed co-composting facility, where the blue bags (containing recyclables) would be removed by hand from the wastestream (either on a hand-sort line or off the tipping floor) and placed in roll-off containers. By eliminating the need for a second, recyclables-only, weekly curbside collection route servicing households, it is believed that this system could provide a cost-effective recyclables collection and transportation program, while at the same time expanding curbside recyclables collection to a much broader area of Adams County. Under the proposed blue bag co-collection program, fees for recyclables pickup would likely be included in each homeowner's trash collection bill, with homeowners responsible for purchasing their own blue bags from retail outlets, from municipal locations, or from the haulers themselves.

Because the recycling project stems from an outgrowth of the County's proposed co-composting facility, the interrelationship between the recycling operation and the co-composting activities are important to the County and are addressed in this study. The study contains a conceptual layout of the process train for a proposed materials recycling building and drop-off center.

2.0 BACKGROUND

Adams County has invested substantial effort and resources in the co-composting project over the past 10-12 years. It is anticipated that a well-planned MRF operation, operated in unison with a County co-composting facility, would expand the benefits of this operation and optimize recycling in Adams County. Also, PADEP has requested confirmation from Adams County as to whether or not a blue bag system could be implemented successfully within the County. In response to PADEP's interest, Gannett Fleming (GF) investigated blue bag case histories within the United States, and has identified how the blue bag system might be integrated into the proposed co-composting facility.

3.0 BLUE BAG CASE HISTORIES

3.1 Case Study Reviews, 2000-2001

Table 1 summarizes information gathered on a representative number of blue bag programs throughout the country, based on literature reviews and telephone inquiries made in 2000-2001. One surveyed program is located in each of the following states: Pennsylvania, Illinois, Kansas, Texas, and South Carolina. Two investigated programs are located in California.

Western Placer Waste Management Authority, El Dorado Disposal, and the City of Chicago co-collect blue-bagged recyclable material in the same packer truck with municipal solid waste. Pittsburgh, Pennsylvania and Hayes, Kansas each use a blue bag program where the recyclables are picked up by trucks other than those used for municipal waste collection. Mesquite, Texas uses a dual compartment collection truck for co-collection, and Myrtle Beach, South Carolina alternates collection routes for separate collection of garbage and recyclables, using the same collection truck. Detailed descriptions of these programs follow.

TABLE 1: Summary of Blue Bag Programs – Telephone Survey Responses

Name of Facility	Location	Phone Number	Contact	Comments
City of Pittsburgh - City Recycling Division	Pittsburgh, Pa	(412) 255-2631	Bill	Pittsburgh uses a separate truck to collect recyclables. Pittsburgh never tried co-collection. According to this source, it is estimated approximately 5 percent of the bags are received torn, but minor tearing has not hindered processing at the MRF.
El Dorado Disposal	El Dorado, California	(530) 295-8530	Tim Bees	El Dorado uses a blue bag program with co-collection. It is estimated that approximately 3 to 5 percent of the blue bags are torn in the truck.
Department of Environment	Chicago, Illinois	(312) 744-5721	Shellie Riedle	Chicago uses a blue bag system with co-collection. It is estimated approximately 33 percent of households participate.
Stuatsman (MRF)	Hayes, KS	(316) 662-2559	John	Hayes uses a blue bag system with a dual compartment packer truck. Approximately half of the blue bags reportedly arrive ripped or torn.
Western Placer Waste Management Authority	Placer County, Ca	(916) 645-5180	Eric Oddo	Placer County offers a voluntary "blue bag" program. Waste bags and blue bags are co-collected in the same packer truck.
City of Mesquite	Mesquite, Texas	(972) 216-6972	Dana	Mesquite collects their waste in separate compartments of the same truck.
City of Myrtle Beach	Myrtle Beach, South Carolina	(843) 347-1651	Ellie, Recycling Coordinator	Myrtle Beach uses the same packer truck for MSW and recyclables; however, the truck is used on separate routes.

3.1.1 City of Pittsburgh, Pennsylvania

The largest blue bag program implemented in Pennsylvania to date has been for the City of Pittsburgh (notes – in Pennsylvania, the City of Erie also operates a blue bag recycling program with bi-weekly pickup. The City of Wilkes-Barre uses blue-colored plastic garbage bags in a “pay-per-bag” program for garbage disposal, but this program does not use the blue bags for recyclables pickup). The City of Pittsburgh’s program, established in the 1980’s, requires residents to collect commingled recyclables in blue bags for curbside collection.

In Pittsburgh, residents typically get the blue bags during regularly planned shopping trips, and a large number of stores (including Giant Eagle and Wal-Mart) carry the bags. The blue bag recyclables are collected every other week by a split hopper collection truck. Although these routes are serviced on the same days refuse is collected, the split hopper vehicle is only used for recyclable material. Commingled recyclable containers and paper are separated upon pickup and then transported to a materials recovery facility (MRF). The City of Pittsburgh does not incorporate a composting facility into their blue bag program.

The following materials are recycled by the blue bag system implemented in Pittsburgh:

- Aluminum containers
- Clear and colored container glass
- PET (No. 1) and HDPE (No. 2) plastics
- Tin (bimetal) and steel cans
- Newspaper

Pittsburgh’s City Recycling Division estimates that approximately five percent of blue bags tear during transport (Note – a representative from the Allegheny County Health Department’s Division of Drinking Water and Waste Management estimates a much higher percentage of blue bag breakage, up to 50 percent). The Recycling Division explained that the minor tearing usually caused by sharp commingled objects does not hinder processing of these materials at the MRF. Additionally, the City Recycling Division believes Pittsburgh’s blue bag system has simplified commingled recycling for the City. Prior to blue bags, residents would use any container available for recyclables, but the current use of the distinguishable blue bags has eliminated inconsistency among residential handling. The blue bags are highly visible to the recycling truck operators and are light enough to be tossed easily into the collection vehicle.

3.1.2 El Dorado, California

El Dorado County uses a blue bag system where the waste bags and blue bags containing recyclable items are co-collected in the same packer truck. The truck is a rear-end loader that compacts the bags with a sweeping motion. Blue bags are kept to the right side of the truck to reduce sorting at the MRF. El Dorado Disposal estimates 3-5 percent of the blue bags tear during transport.

Some household solid waste is found in the blue bags. When this occurs, El Dorado Disposal sends a courtesy letter to the households in this vicinity, explaining guidelines on their recycling program. The blue bags from El Dorado Disposal are translucent, to discourage solid waste from

being co-mingled with recyclable material in the blue bags. Newspaper, aluminum cans, bottles, and tin cans are collected in the same bag. By printing directions for proper recycling on the outside of the blue bags, the cost of printing separate literature detailing recycling instructions has been reduced. By implementing the co-collection, El Dorado has reduced capital expenses by eliminating the need for a separate recyclable collection vehicle. El Dorado Disposal currently operates using a fleet of 35 collection vehicles.

Grand Effect Plastics supplies El Dorado County with blue bags for recycling. These bags come in two sizes: 30 inch x 35 inch and 24 3/8 inch x 32 inch. The larger bag is often used in urban areas, and the smaller bag is used more frequently in rural areas. These bags are pre-folded and come in a box of 250. The cost is approximately 7.5 cents per bag. They are made of polyethylene. Approximately 140,000 bags are distributed each year.

3.1.3 Chicago, Illinois

Similar to El Dorado, the City of Chicago uses a blue bag program where recyclable material and household waste are co-collected in the same packer truck. It is estimated that approximately 33 percent of the households that are eligible for the blue bag program actually participate. The Department of the Environment estimates that only 1-4 percent of blue bags break in transport. Participation remains low however, because many Chicago residents do not trust a program that collects their recyclables in a garbage truck. There is general (but believed to be unfounded) suspicion that when residents see blue bags being collected in the same truck as garbage, that they are landfilled with that garbage rather than being recycled. This is a public education issue that needs to be addressed.

In the Chicago program, recyclable containers, paper, and yard waste are separated by residents into blue bags and placed at the curbside for co-collection with municipal waste. After collection and delivery to the processing facility, bags are separated by workers on the tipping floor. Non-processibles (couch cushions, chairs, etc.) are removed at this point. A grapple machine places the remaining mix of blue bags and garbage onto a conveyer belt, and they enter the primary sorting area. Blue bags containing yard waste, recyclable containers, and clean paper are removed from the belt and placed down separate chutes. Containers are sorted using magnets for steel cans; glass is separated by color (clear, brown, and green); plastic is separated by number (1 and 2); and aluminum is placed into a separate storage container. Clean paper is separated for resale, and contaminants are removed. When enough "clean paper" (e.g. cardboard) is collected, it is bundled and sold. The yard waste that is collected is separated and composted (note - it is illegal in Illinois to dispose of yard waste in a landfill). Chicago is working on a pilot project for the composting operation that envisions using a hammermill to reduce broken glass into sand-sized particles, and thus minimize glass contamination of the final compost product.

The Chicago Recycling Coalition, a private group critical of the City's blue bag program, estimates that only 20 percent of eligible households participate in the program. The Coalition also estimates that approximately 25 percent of the blue bags break, an appreciably higher percentage than the 1-4 percent breakage reported by the Department of the Environment. When these bags break, it is much more difficult to separate the recyclables from the garbage, and the contamination by garbage significantly reduces the value of the loose recyclable materials.

3.1.4 Hayes, Kansas

Stuatsman is the name for the Material Recovery Facility operated in Hayes, Kansas. This facility processes blue bags from Hayes residents. Residents purchase the bags at several local grocery stores. Approximately eight percent of the material found in the blue bags is household waste, and occasionally, hazardous waste is found in the bags. Approximately half of the bags that arrive at this MRF are reportedly ripped or torn to some degree. This high bag breakage rate may be caused by a combination of low tensile strength of the plastic bags, combined with excessive compaction pressure in the collection trucks. This is particularly evident in bags containing glass. The co-mingled glass is often broken in transport, causing the bags to be easily ripped by glass fragments. At the MRF, workers hand-sort the recyclable material after arrival onto the tipping floor. These manual labor positions at the MRF have a high turnover rate due to what is reported to be an unfavorable working environment.

3.1.5 Placer County, California - Western Placer Waste Management Authority

Western Placer Waste Management Authority is located in Placer County, California. In 1996, the County instituted a blue bag program as an incentive to recycle. The County uses a co-collection blue bag program. The blue bags are collected and transported by the same packer truck used for municipal waste collection. Residents participate in this program on a voluntary basis. Western Placer estimates approximately 10 to 15 percent of the bags rip during transport. Workers separate the recyclables out of the waste stream at the materials recovery facility.

Due to marginal educational efforts, negative public perception, and press stating the blue bag MRF was sending recyclables to the landfill, participation in the Placer County program has been very low. Approximately 3-5 percent of the residents participate in this program. Spurred by the negative press, a Grand Jury has since investigated the MRF operations and concluded the MRF was processing the blue bags correctly and was recycling the contents at a satisfactory rate. The Grand Jury made recommendations that the MRF should increase the volume processed and should decrease contamination through better public promotion and through education efforts.

3.1.6 City of Mesquite, Texas

The City of Mesquite, Texas offers curbside recycling on a voluntary basis through its blue bag program. Dependent on their location within the city, residents have a designated day for blue bag recyclable material pickup. This pickup is separate from waste pickup, and uses different collection vehicles for the recyclable materials.

Mesquite accepts the following items for recycling in its blue bag program:

- PET (No. 1) and HDPE (No. 2) plastics
- Newspaper
- Aluminum cans
- Steel and bimetal cans
- Telephone books
- Magazines

In Mesquite, the blue bags can be purchased at any local 7-11 store or through the City Cashier. Bags cost \$5.25 per role of 50. Public participation is described as fair. Close to 25 percent of the collected blue bags arrive at the MRF torn.

3.1.7 City of Myrtle Beach, South Carolina

The City of Myrtle Beach, South Carolina uses a blue bag program for recyclables collection. Recyclables are collected in the same packer truck that is used to collect municipal waste, but on different days. The trucks are rinsed out after the municipal solid waste is removed. There is reportedly an issue with contamination of recyclables from the leachate. The City of Myrtle Beach estimates a 10 percent diversion rate. Close to 30 percent of the bags arrive at the composting facility ripped.

3.2 Programs Update for 2005

In the spring of 2005, Gannett Fleming conducted a web-based search for updated information on blue bag recycling programs in the United States. Based on the initial review of blue bag programs (reported in Section 3.1 of this report), and recognizing the negative complaints surrounding the Chicago and Pittsburgh programs, one may expect to find many of the blue bag programs in the U.S. to be shut down, with few new ones started. This is far from true. The first indication that blue bag recycling programs are actively being considered or implemented across the country is the fact that a simple search of web sites with references to both “blue bag” and “recycling” yields nearly 10,000 “hits.” Without doing an exhaustive search of all of these web links, several observations were made:

- The City of Pittsburgh’s blue bag program is still active and functional. Actually, it is referenced in some of the literature of other blue bag programs as being a model program in some aspects, including its unique use of humor in its public education campaign and its use of recycling mascots in its PR work. Its web site describes a very comprehensive recycling program. Pittsburgh is now cracking down on homeowners to comply with mandatory recycling provisions, and assessing fines for non-compliance. This program is adapting to become stronger.
- Although a recent study indicated that Chicago’s program only has a 13.3 percent participation rate (2003) and that the actual quantity of recyclables diverted is low, the City has just launched a \$700,000 two-year educational campaign to promote blue bag recycling in the City. Chicago is also opening its four sorting centers to provide access by private haulers, since nearly three-quarters of the waste in Chicago does not flow through the City’s blue bag program. Again, this appears to be a program with past issues that are resulting in program adaptations for improvements. Chicago’s program is being used as a model by some other large municipal recycling programs.
- A large number of municipalities, both small and large, that were not included in our earlier telephone survey, reportedly have operational blue bag recycling programs in the U.S. Some of these programs, not reported earlier, are:

- | | |
|-----------------------|-----------------------|
| - Dallas, Texas | - Erie, Pennsylvania |
| - Baltimore, Maryland | - Jonesboro, Arkansas |

- | | |
|--|--|
| - Presque Isle, Maine | - City of Virginia, Minnesota |
| - Muncie, Indiana | - Letcher County, Kentucky |
| - Chattanooga, Tennessee | - Pasco County (Tampa Bay area), Florida |
| - Columbus, Ohio/Franklin County, Ohio | - Bedford, Ohio |
| - Richardson, Texas | - Pleasanton, California |
| - Elyria, Ohio | - Gillette, Wyoming |
| - Horry County, South Carolina | - Tahoe City and Truckee, California |
| - Columbia, Missouri | - Mt. Shasta, California |
| - Bentonville, Arkansas | - Lakewood, Ohio |

- In addition, references to Canadian blue bag programs either in place or under consideration were found for :

- | | |
|------------------------|-----------------------------|
| - Toronto, Ontario | - Kelowna, British Columbia |
| - Edmonton, Alberta | - London, Ontario |
| - Guelph, Ontario | - Markham, Ontario |
| - Halifax, Nova Scotia | |

These findings support the conclusion that blue bag recyclables collection systems are far from a dying or failed recycling technology. Rather, the information indicates that many cities and counties have determined that blue bag recycling programs can be technically sound and economically justified. This evidence warrants keeping an open mind when reviewing the feasibility of blue bag recycling in Adams County.

4.0 RECYCLING AND CO-COMPOSTING INTERRELATIONSHIPS

Adams County recognizes that a waste and recyclables collection program that allows both municipal waste (MSW) and recyclables to be collected with one pass of a collection truck can be cost-effective in a predominantly rural county like Adams. Therefore, the feasibility of using a blue bag co-collection program in Adams County is of great interest. To better assess the implementation of this type of a blue bag recycling program within Adams County, GF reviewed the interrelationships between the recycling operation and co-composting facility. One possible conceptual co-composting facility layout for Adams County is presented in Figure 1 at the end of this report.

4.1 Materials Handling Concept

After a co-collection vehicle (picking up both MSW and blue bag recyclables) completes its curbside route and is filled with waste and blue bag recyclables, the truck will return to the co-composting facility and dump its contents onto the tipping floor in the designated waste receiving area of the composting facility, as shown in Figure 2. The mixed MSW and recyclables bags are then pushed into an infeed conveyor hopper that supplies a pre-sort processing line. At this point, sorters pull the blue bags off as they move along the pre-sort

conveyor with compostable and non-recyclable waste. The pre-sort conceptual design also includes equipment to mechanically and manually separate non-compostables from the waste stream prior to composting. This is done with the recognition that not all recyclables will be source separated by residents and businesses of Adams County (neither 100 percent participation nor 100 percent efficiency of separation). The pre-processing equipment at the composting facility will prepare as clean a compost feedstock as possible. Therefore, even if some of the blue bags break and their contents mix with MSW in the collection truck, pre-sort facilities can remove and recycle these non-compostable materials.

4.2 Blue Bag Processing/MRF Concept

Once blue bags containing recyclables are separated from wastes (on the pre-sort line), they are conveyed to a roll-off container for temporary storage until the roll-off contents (blue bags) are delivered to the proposed on-site County MRF. Figure 3 presents a conceptual layout of the proposed MRF. Blue bag recyclables are deposited in the tipping area of the MRF. After passing through the MRF's infeed conveyor, a bag opener, and a conveyor pile "leveler," recyclables are sorted through a combination of mechanical (magnet, eddy current separator) and manual sorting stations to remove designated Act 101 recyclables. Sorted recyclables are temporarily stored in bunkers until they are baled and/or shipped to materials markets. Process residues are landfilled off-site at a permitted facility.

This facility will also be designed to receive and process segregated and drop-off recyclables from the County's residents and businesses that are not captured in the blue bag program.

4.3 Organics Processing Concept

After the blue bags and other non-processibles have been removed from the pre-sort conveyor (Figure 2), material that remains on the sorting belt (i.e. negative sort) such as food waste, paper, clothing, and all remaining miscellaneous organic and inorganic waste continues by conveyor to the co-composting digester drum (see Figure 2). The digester drum tumbles and agitates the material for two to three days. During the agitation process, the material undergoes size reduction, homogenization, and the process of composting begins. Material discharged from the digester drum is conveyed to a trommel screen, where organic and inorganic materials are separated. Small inorganics such as broken glass and bottle caps that pass through the trommel screen openings with the organics are removed by a final product screening at the end of the composting process, to ensure a clean compost end-product.

4.4 Interrelationship Key Points

- One process train receives the entire waste stream and sends the organic waste to the digester for composting.
- As the amount of inorganic material removed (glass and other materials) increases prior to reaching the digester drum, the amount of material that needs to be composted decreases. This creates a more dense compost feedstock, and results in either a longer compost detention time (which is beneficial) or a greater throughput capacity to process organics (which is also beneficial).

- Removing the bagged recyclable materials at the front end of the sorting line improves the market value of the material by keeping the recyclable material clean.
- Because the proposed recycling facility and the proposed composting facility are at the same site, Adams County would provide management for both facilities. The obvious benefits of consolidation at one central location are management simplification, consistency, quality control, and reduced transportation costs.
- If the co-composting system operates successfully, it can potentially extend recycling access to 90,000-100,000 County residents with little or no additional collection costs. This could also significantly increase Adams County's current (25 percent, +/-) recycling diversion rate.

5.0 CONCEPTUAL LAYOUT

As presented by Figures 1, 2, & 3, the conceptual layout of the recycling and co-composting facilities envisions a site with one initial processing train for all waste material and blue bag recyclables co-collected in Adams County. The recyclable blue bags will be pre-sorted directly into roll-offs for consolidation at the on-site MRF, and organic materials will be composted after non-organic materials are removed.

5.1 Transportation Requirements

As shown by Figure 1, the layout would result in minimal transportation costs, because the roll-off containers for recyclables in the co-composting facility's pre-sorting area would be staged less than two hundred feet from the proposed MRF. And inherent in the blue bag co-collection system is the elimination of a second (recyclables) collection truck and crew, thereby providing cost-effective recycling collection services to all areas of Adams County. Lower equipment, labor, and fuel costs would benefit all citizens of Adams County.

5.2 Drop-off and Salvage Area

The conceptual site layout also proposes a drop-off area and salvage area (Figure 1). The drop-off area would provide roll-off containers for residents to bring metals, glass, plastics, and other recyclables as identified by Adams County. The roll-off containers could be emptied regularly at the nearby recycling facility. The salvage area, sometimes referred to as a "take it or leave it" facility, would be a small covered building adjacent to the drop-off site. This building would provide residents a place to "take or leave" used bikes, doors, windows, textiles, and other used items. Use of the salvage area would complement the County's recycling program and potentially decrease illegal dumping of these used items along Adams County's roads and streams.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Experiences with blue bag recycling programs in the U.S. and Canada are mixed. While some programs reportedly suffer from low participation and diversion rates, high percentages of broken bags, and contamination problems, other programs have succeeded. By using a good

public education program and utilizing blue bags with a high tensile strength, it is believed that Adams County can develop a cost-effective blue bag co-collection program in conjunction with an integrated composting and recycling project. If it is ultimately determined that co-collection doesn't work effectively (say, for example, a lot of broken bags and contamination issues), these blue bags can still be collected in either a dedicated recyclables truck or in a dual-compartment truck, which essentially eliminates these concerns.

Perhaps the most encouraging factor in deciding whether blue bag programs are effective is the fact that roughly twenty programs in the U.S. and over a half-dozen programs in Canada are currently in operation or under serious consideration. Many of these are fashioned after programs that have been in operation for approximately 10-15 years in Pittsburgh and Chicago. These new programs include very large cities, such as New York City, New York; Dallas, Texas; and Toronto, Canada. These cities, with extensive consulting resources, have determined that blue bag programs can be successfully developed. Even the Pittsburgh and Chicago programs, which have dealt with multiple operational problems over the years, continue to modifying their blue bag programs and continue to operate with high expectations of improvement.

Several of the case studies reviewed in this report strongly suggest that a blue bag recycling program can be implemented successfully in Adams County. Combining recyclable materials pick-up with residential trash collection minimizes transportation costs. Co-collection can do away with the need for additional trucks and drivers for recyclables collection. Consequently, co-collection can eliminate the associated capital costs, operational cost, and salaries required for start-up and implementation of a recycling program where separate vehicles are used for recyclables collection. Limiting capital cost is a key component to co-collection; however, it should be noted that a nominal cost remains to residents or the municipality for purchasing the bags (typically between 7 and 15 cents per bag).

Although there are potential cost savings that may be seen through use of a co-collection blue bag program, it must be recognized that blue bag programs may experience problems that could become cost burdens to the program. Some of the problems that may be experienced by a blue bag co-composting program include: contamination of blue bag contents with undesirable wastes; bag breakage during handling and transport (which is a function of both the type of bags used and the degree of compaction in the collection truck); contamination of the compostable waste during sorting and processing from inorganic recyclables (especially glass) that must be removed from the compost end-product for the compost to retain its value; low public participation, often due to the negative perception of mixing garbage and recyclables; the cost of manual labor to separate blue bags from refuse, and; lack of education about the program (i.e. acceptable materials, proper handling methods, etc.).

6.1.1 Blue Bag Quality and Procedure

In consideration of the identified potential problems, a successful blue bag co-collection program must be aware of the quality of the bags used and of the proper handling procedures. The blue bags must be of a high quality (tensile strength) to minimize ripping and tearing that may contaminate the compost feedstock. To reduce contamination and to expedite the composting

process, the glass must be removed as completely as possible during pre-sorting, before the compost feedstock reaches the digester drum. Although some blue bag programs indicate a problem with contamination due to a high percentage of torn bags, bags with minor tears typically should not cause handling problems at the recycling facility. Any inorganic material that falls from an opening in a bag should be screened from the final compost product. Unfortunately, the blue bags cannot be recycled with other film plastics (e.g. garbage bags) because the colored pigment is considered a contaminant.

6.1.2 Blue Bag Reliance on a Processing Facility

Once recyclables are segregated and collected in blue bags, they need to be processed in a recycling (MRF) facility. Figures 1, 2, and 3 present one conceptual layout for an integrated waste and recyclables processing, composting and MRF facility in Adams County.

A recent independent study (Ettinger, 2002) was conducted for the Adams County co-compost facility that identified potential issues associated with implementing a co-composting processing facility, to process solid waste containing both degradable and non-degradable materials. Contamination and cost were highlighted in the study as concerns of implementing this type of program. The independent study concluded that in order to properly equip a facility to remove inorganics from the compost feedstock, the resultant cost of co-composting cannot directly compete in the current marketplace with current landfill tipping fees, and would have to be provided as a value-added service for residents wanting an alternate (disposal method) to landfilling, serving residents that would be willing to pay for this value-added service.

6.2 Recommendations

- Although cautiously optimistic, it is believed that a successful blue bag co-collection and processing program could be developed to serve Adams County. In order to be successful, it is critical that the County learns from the experiences of other successful and unsuccessful blue bag programs. Critical components of a successful blue bag co-collection program include:
 - Use of strong, distinguishable blue bags that have the tensile strength to withstand the compaction pressures of garbage trucks with minimal breaks and tears;
 - Coordination of the blue bag collection program with the ability to properly process the blue bags at a MRF or other facilities;
 - Allowance for sufficient planning time to develop and implement the recycling program. Consider phased implementation of the program in the service area as opposed to full implementation on “Day One”;
 - Use of an aggressive and comprehensive advertising campaign, including properly educating the public that co-collection does not mean co-disposal of recyclables with waste in a landfill;
 - Use of multi-media public information/education campaigns that may include the use of local news media, direct mailers and newsletters, radio spots, creative/funny PR angles that appeal to all ages, and reinforcement in school education programs;

- Continued promotion of the blue bag program and reinforcement of the education campaign, and proper funding for these activities;
 - Consideration of giving out free blue bag samples, coupons, door hangers, magnets, stickers, and calendars supporting the program;
 - Use of utility bill inserts to reach lower socio-economic groups with educational information;
 - Use of community organizations, homeowner associations, and public service groups to support and spread the word on the program;
 - In bi-lingual areas, printing of proper information and instructions in multiple languages;
 - Identification of corporate sponsors to help fund program costs and help spread the word on the program;
 - Consideration of regulations that require participation in the blue bag program as a way to maximize participation rates;
 - Promotion of the program at special events;
 - Consistency with program requirements and changes throughout the service area, to minimize confusion, and;
 - Flexibility to modify the system as needed based on experiences in Adams County as well as continuous observation of what does and does not work with blue bag programs elsewhere.
- At this time, it is not recommended that a program using blue bags for recyclables co-collected with municipal solid waste be implemented, until the supporting processing network of a proposed County co-composting facility and MRF project moves forward. A final determination on the use of a blue bag co-collection system (versus conventional commingled or source-separated bin programs) should be made at that time.
 - If Adams County elects to implement a blue bag co-collection program or another variation of a co-collection system, the County may wish to complete an Act 101 Section 902 Recycling Development and Implementation grant application, for reimbursement of up to 90 percent of the capital costs for MRF facilities, equipment, and education.

FIGURES 1, 2, AND 3

(TO BE PROVIDED WITH FINAL HARD COPY ONLY – NOT INCLUDED IN ON-LINE REPORT)

- 1 - PROPOSED CO-COMPOSTING FACILITY LAYOUT PLAN**
- 2 - WASTE RECEIVING/ SORTING CONCEPTUAL LAYOUT**
- 3 - MATERIALS RECYCLING FACILITY CONCEPTUAL LAYOUT**