



June 2, 1999

Ms. Kathy Tuttle
Susquehanna County Recycling Coordinator
P.O. Box 218
Montrose, Pennsylvania 18801

Subject: **County Recycling Center Redesign**

Dear Kathy:

The purpose of this letter is to provide Susquehanna County with the results of the collaborative effort of R.W. Beck and Clean Air Group, Inc., in recommending design modifications for the County Recycling Center. Susquehanna County has been operating its new Recycling Center for over six months and has encountered a number of operational difficulties. These difficulties have led the County to examine modifications to the existing structure that will improve material flow, reduce handling of materials, increase storage area and generally enhance the quality of the materials being marketed.

Specifically, the County has received larger quantities of commercial waste paper than what was originally anticipated. This has resulted in a large unmanageable pile of unprocessed materials clogging up the processing area. The dimensions of the production area available in the existing structure for processing and storage of unprocessed and processed materials is 60' wide by 100' long. Within this limited area, the pile of paper inhibits facility staff from operating the commingled processing line until the pile has been diminished enough to function around. It also disrupts material flow through the building, and forces staff to handle materials multiple times, driving up operating costs. In fact, staff sorts corrugated cardboard from the pile by climbing around on the pile and hand removing cardboard items.

Other problems include: glass storage; an inadequate horizontal baler that slows down processing time; excessive spillage of materials at the commingled in-feed line; and inadequate additional storage area for baled materials. These problems are compounded by the fact that the facility is situated on the site in a manner that restricts the expansion of the facility in any direction without incurring a significant cost. Also, revenues from material sales are less due to the County mixing different grades of paper in single bales and loading all three colors of glass in a single compartmentalized container for shipping because of limited storage.

Additionally, the County anticipates increasing the tons of materials processed annually in an effort to encourage the diversion of more recoverable materials from the County's municipal waste stream. Without making changes to the existing operation, the County will be limited from accepting any additional materials in the future and could restrict the development of municipal recycling programs.

ANALYSIS OF CURRENT SYSTEM

After two site-visits to the facility by staff from the two consulting engineering firms, a number of proposed solutions have been identified with input from the County Recycling Coordinator. Specific changes to resolve operating issues include:

- To open up the processing area, it would be beneficial to move the tipping area for incoming loads of commercial paper and residential newspaper. An area suggested for a tipping and storing unprocessed paper items was the present public drop-off area. This covered area that is on an elevation higher than the processing area could be closed in on the front with an exterior wall with an overhead door to reduce wind blow, with materials being fed down to the processing area by means of a chute using gravity.
- For glass storage, it was suggested that a grassy area along side the facility be excavated and three concrete bunkers constructed, one for each color of glass. Material would later be loader into a trailer for transporting to a market by means of a front-end loader equipped with foam filled tires.
- A new horizontal baler with automatic tie-off and a small sorting feed conveyor would improve the processing of materials and the quality of the bales by allowing staff the opportunity to remove contaminants.
- A roof over an area on the outside wall of the facility was suggested to provide additional bale storage area.
- Since the current public drop-off area would be used for loose paper tipping and storage, a new covered drop-off should be constructed and should be placed in the area presently being used for staff parking. An area for staff parking would than be developed just across the road providing traffic access to the front of the facility including the scale.
- The commingled in-feed door to the receiving hopper should be reworked for better material flow and to reduce wind blown losses.

Below is a more detailed description for implementing the measures suggested above and attached are two drawings depicting the changes as well as, associated cost estimates.

PROCESSING EQUIPMENT

The purchase and installation of a new horizontal baler with an automatic tie off and a small sorting feed conveyor should be a first step measure in resolving operational issues at

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the Susquehanna County Recycling Center. The new baler would be used to more efficiently produce quality bales of all recyclable goods. The small sorting feed conveyor would improve the processing of the commodities and the quality of the material in the bales by allowing the staff the opportunity to remove contaminants. The new baler would be strategically located for good traffic flow of sorted goods from the existing bunkers to the baler, and for flow of bales from the baler to an inside storage area.

Improvements to the commingled infeed to the main sorting line will serve to reduce blowing of material and unobstructed flow of materials. Presently, the commingled infeed is exposed, which allows spillage and windblown losses to the outside properties. A grated walkway through this infeed area allows life safety egress from the main sorting line; however, it acts as an obstruction to the normal flow of commingled goods from the tipping area. The walkway must be reworked so that it continues to allow safe egress, but it does not restrict commingled flow from the tipping area to the receiving hopper. The receiving hopper needs to be fitted with side shields to better contain the inflow and to inhibit spillage. The doorway from the tipping area to the receiving hopper must be modified to promote a smooth flow from the tipping area to the receiving hopper. Metal panel walls should be added to the existing steel framing that surrounds the receiving hopper and the staircase to reduce windblown losses. By improving the flow and capture of commingled materials from the tipping area to the receiving hopper, a significant housekeeping problem can be resolved so that staff time can be better spent on routine production tasks.

From the new proposed paper drop-off area at the front of the facility, a feed chute or conveyor is required for transfer of paper items from the front tipping area to the main sorting line. The existing doorway should be reworked so that it can be used for this paper transfer, as well as for the transfer of aluminum from the public drop-off containers to the interior bunker below the main sorting line. Paper transfer would pass through this doorway, possibly from a receiving hopper and conveyor to the main sorting line. Aluminum cans could be swept through a bottom door, which would be opened whenever a public drop off container of aluminum becomes full. This modification would allow staff to sort cardboard, old newsprint, and magazines into the large concrete bunkers below the main sorting line. This ergonomic presentation of the goods on the main sorting line to the sorters would be a notable improvement over the present hand picking from the pile as the sorting operator climbs through the existing pile.

A front end loader with foam-filled tires is also required to handling glass from the proposed bunkers. This machine will be needed to transfer broken glass from the three new exterior concrete glass storage bunkers whenever trucks are loaded for shipment.

The processing equipment described above is estimated to cost approximately \$398,440 installed. Detailed cost estimates are shown in Attachment No. 1.

CONSTRUCTION, ACQUISITION, AND MODIFICATION OF BUILDINGS

Modifications are proposed to the existing structure and for the construction of a new public drop-off area to improve storage and handling of recyclable materials delivered to the facility. Modifications recommended are described below.

- Construct a new weather-protected public drop off area on the existing small parking area just outside the existing offices. This expansion would be covered by a roof, while the front wall would be left open for ease of public access and drop-off of materials. The existing handicapped parking spot would be retained under this roofed area. The addition will be constructed so that an existing office window provides the office staff with visual control of this new public drop-off area. Staff may remain inside the office area performing other work until a vehicle pulls into the public drop off area. Staff could easily see the entering vehicle, and assist in the drop-off of recyclable goods if necessary. By relocating this public drop off area to this new addition, the large open front of the facility can be used as a tipping area for commercial loads of paper materials.
- A new exterior wall with protective bollards would be constructed across the front open face of the existing structure. Large overhead doorways would allow the entry of commercial trucks, and tipping of either commingled goods, or of mixed paper goods. These two commodities would be kept separate by newly constructed, movable tall concrete barriers. The existing skid steer loader would be used to shovel or grapple the goods from either tipping area, through modified doorways, into receiving hoppers with conveyors that would take the incoming goods to the main sorting line.
- A small area just beyond the entrance road would be black-topped for employee parking. This area would make up for the parking spots lost due to the construction of the new public drop off area.
- Presently, the facility does not have adequate glass storage space. Excavating an area just outside the facility, building a retention wall to support the nearby truck road, and constructing three concrete bunkers for the three colors of glass is a recommended measure to address glass storage. On the main sorting line, glass would be sorted by color to three existing vertical chutes with conveyors that will deposit sorted glass into small dumpsters. When a dumpster is full, a lift truck will transport the dumpster out of the facility along the truck road to the rear of the new glass bunkers for tipping. The dumpster will be emptied into the appropriate concrete bunker where it will be further crushed by the front end loader's bucket before being transferred to a hauler truck. An alternate to this would be that the dumpster would be emptied into a hopper above the concrete bunkers. The hopper would be equipped with a conveyor that would meter the glass into an existing, but relocated, glass crusher. The glass crusher would then discharge broken glass into the appropriate concrete bunker.

- The glass storage bunkers will be covered by a roof for weather protection. By adding the roof, stormwater will not contact the recyclable waste stream and the nearby existing stormwater catch basin will not be adversely influenced.
- For similar reasons, an outside storage area for baled plastic and steel will be weather protected by a new roof. This area presently has a concrete wall, which easily serves as a push wall for stored bales. Bales of plastic and steel could be stored outside without adversely influencing the product quality, but this area should be weather protected to prevent stormwater contact with these recyclable waste streams. Interior storage of baled goods could then be used for paper products.
- Finally, a new fire/smoke/freeze detection and alarm system, which are considered to be the basic and fundamental alarms that should be provided at all recycling facilities as the minimum first alerts to potential catastrophic events, should be installed. This alarm system should be installed to protect investments previously made in this facility.

For the above described building construction and modifications, the total budget is estimated at \$387,610. Detailed cost estimates are included in Attachment 1. Also, drawings of the proposed structural changes are included as Attachment 2. (NOTE: Attachments not included. For copies of attachments, contact R.W. Beck at (717) 730-0404.)

CONCLUSION

- Susquehanna County is having difficulty successfully recycling materials in the existing facility due to space constraints and an ineffective baler.
- Changes to the Facility proposed in this Report would enable the County to offer more efficient recycling processing and marketing services into the future and handle additional volumes of materials.

RECOMMENDATIONS

- The County should implement all or some of the changes proposed in this Report to improve operations, material handling, material quality and storage and to make better use of existing processing equipment.
- The changes should be implemented in phases with highest priority going to replacing the existing baler. Priority of other changes should be a function of availability of grant money to fund changes.
- A grant application should be prepared and submitted requesting funding to assist with implementing the proposed changes to the Project.

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If you have any questions relating to the materials presented, please do not hesitate to call me at (717) 730-0404.

Sincerely,

R. W. BECK, INC.

Richard Schlauder

Director of Environmental Services

cc: Kathleen Kilbane, SWANA
Carl Hursh, PA DEP
Debbie Miller, R. W. Beck