

OPERATIONS AT THE CAPE MAY COUNTY, NEW JERSEY, INTERMEDIATE PROCESSING FACILITY

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SUMMARY

This paper will address the realities of Materials Recovery Facility operations when procurement design criteria differ substantially from material actually delivered to the facility. One such facility is the county-owned and privately operated Intermediate Processing Facility (IPF) in Cape May County, New Jersey.

BACKGROUND

In April of 1988, Resource Recycling Technologies, Inc. (RRT) responded to a Request for Proposals issued by the Cape May County Solid Waste Management Authority for a full-service bid on a two-stream Intermediate Processing Facility processing paper (old newspaper, old corrugated cardboard and mixed office paper) and commingled containers collected from a largely resort community. The special nature of the community that made it unusual is the approximately 7 : 1 ratio of Summer to Winter population and the almost 10 : 1 ratio of weekend to weekday population.

The RFP design requirements called for processing 102 tons per day capacity for paper on a single shift basis and 123 tons per day capacity for commingled containers on a two shift per day basis during peak seasonal periods. In its response to the Request for Bids, RRT projected 68 operating personnel for each shift at peak operations and 34 for non peak operation, including supervisory personnel. Peak operations are defined as Memorial Day to Labor Day. Non-peak hours are the remainder of the year. Construction began in July 1989 and was completed in 8 months at a cost of \$5.2 million and was considered State-of-the-Art at the time. Operations commenced April 1990.

POST START-UP OPERATIONS

Paper Line

From the commencement of operations in Spring of 1990, the paper received at the plant represented a major problem. The feedstock was much richer in cardboard (OCC) than either the owner or operator had anticipated. It was proving difficult to sort down to a baleable mix of OCC and newspaper (ONP) with mixed paper. The waste paper composition anticipated by the owner and defined in the RFP was to include 12–14% OCC. However, the paper delivered to the facility was a mix with over 40% OCC. The mix could be separated by employing a considerable number of sorters, but not at the throughput capacity required. In order to maintain daily capacity, a high fiber mix was baled and marketed at a negative \$30 to \$40/ton plus transportation. Neither the Operator nor the County was happy with the operation. The Owner and Operator considered several options for change:

- (1) That the County change the method of pickup to bring in source separated paper, or.
- (2) Redesign the system to sort OCC automatically, to generate two streams.

- a. OCC
- b. Mixed Paper

Since it would have been politically difficult for the County to change their method of pick-up, they selected the second option. The County and RRT collaborated on a redesign of the system, and revised the financial structure as well, extending the contract from 5 years to 10 years.

The fiber system originally installed included a single infeed conveyor discharging to a sorting conveyor with four bunkers below for storing sorted material. As many as 18 sorters were employed on the fiber line during peak

operations to sort out cardboard, news, high-grades and mixed paper. In addition, the facility produced a "Marcal" mix consisting of magazines, inserts, etc. for delivery to Marcal Paper, Elmwood Park, New Jersey, a tissue mill.

The redesigned system includes the original infeed conveyor, a 9 foot diameter trommel with modified 12 inch holes, the original sorting conveyor for "overs", an unders processing conveyor, reversing bunker belt conveyers, and an inground baler feed conveyor. The trommel removes, as unders, almost all mixed paper and news and allows almost all cardboard to discharge on the overs sorting line. By negative sorting of the cardboard with a single sorter, a clean commodity is achieved at minimum cost. The unders sorting conveyor employs 3 to 4 sorters to remove OCC, Kraft, and contaminants from the resulting Number 6 pack. (A mixture rich in ONP and mixed office paper with a maximum of brown paper less than 1%).

With the changes in place, Operations realized the following improvements:

- (1) Improved quality of commodities.
- (2) Reduced labor costs.
- (3) Reduced maintenance costs.
- (4) Increased revenue from a better quality product.

From Memorial Day to Labor Day (peak operations), 1993, approximately 105 tons per day of paper and 80 tons per day of commingled containers were received on average. Peak hours were 10 tons per hour of commingled containers and 12.5 tons per hour of paper. After Labor Day, tonnage drops to approximately 65 tons/day of paper and 35 tons per day of containers. At peak operations during the summer of 1991, 101 people were employed operating 3 shifts (2 for paper, 1 for containers). After renovations to the IPF equipment during the summer of 1992, employment dropped to 27 people operating over 1½ shifts. Non-peak employment dropped from 35 to 12 for a single shift operation.

Maintenance costs were reduced substantially, mostly in the baling operation.

Because the system design incorporates minimum sized tipping areas, and operations contracts generally include zero downtime, *all* incoming feedstock must be processed. The renovated facility with its subsequent operating changes allowed greater flexibility in allocation of floor space to accommodate peak periods. There is never a need to divert materials because of storage problems. The facility went from 3-5 different commodities before improvement, (OCC/ONP/High Grade/Mixed Paper/Marcal Mix) to only OCC and No. 6 pack after improvement.

Container Line

The commingled container system was designed to process approximately 10 tons per hour, but could only process 5 to 6 tons per hour due to the high percentage of mixed broken glass coming into the facility. Because of the nature of the County, transfer trailers are used to bring

in loads of containers, picking up material from the various drop-off centers located throughout Cape May County. As a result of the constant re-handling of material the percentage of mixed broken glass can exceed 60% of the total incoming glass.

To enable the operating personnel to keep up with this incoming glass load, a new air sort system was installed which used a mesh screen conveyor and dual air flows for separation of light materials from the heavies. Additionally, an automatic trash separation system, an Eddy Current Separator for Aluminum recovery and individual crushers for the four glass commodities (mixed broken, flint, amber, green) was also installed. The capacity of the shaker screen was increased by replacing the single tier screen with a three tiered unit of similar configuration, which increased the screening surface substantially. As a result of these changes, the glass sort operation was reduced from two lines to a single line and the light/heavy separation efficiency increased from 85% to approximately 98% with less glass being blown along with lights (plastics and aluminum). The net result was more glass recovery for aggregate and less residue from the plant.

The ECS increased plant efficiency and reduced operating costs. As originally designed, sorters would positive pick the trash and leave the aluminum on the line. With the addition of the ECS, all trash and aluminum remain on the line and the ECS separates out the aluminum automatically, saving at least 2 pickers.

Included in the renovation was the installation of a small (12") ECS on the mixed broken glass line after crushing and trommelling. The mixed broken crushing system uses impact-type cage crushers which do not shred the aluminum cans and plastic jugs that slip through the fingers on the vibrating screen. Consequently, when the glass discharged from the crusher is screened to produce a uniform cullet, the large broken glass pieces are recirculated and oversize materials, mostly paper, plastics and aluminum cans are processed on the ECS prior to discharge to the residue stream, a substantial amount of aluminum is automatically recovered.

The original plant design included a single, three-compartment glass crusher where flint, amber and green glass was crushed and directed to separate bunkers. This produced inferior products (the cullet was not uniform), had high maintenance and had high cross-over contamination of colors. The installation of the separate individual crushing systems produced more consistent product, decreased down time, decreased maintenance and decreased residue. The mixed broken and flint glass crushing systems have two stage screening trommels, recirculating large pieces of glass to the crusher and producing the desired size cullet. The amber and green glass systems have single stage trommels and the overs are returned to the tipping floor.

Other plant modifications included removing a small biscuit type baler for aluminum and reconfiguring the

bins to allow baling of this commodity plant by the large single-ram baler. The original design of the facility included individual biscuiters for tin cans and aluminum cans. These small baling devices are high maintenance items and require individual operators. By utilizing the main baler for aluminum, the plant eliminated one operator and one machine to maintain.

The installation of an automatic trash removal system with a compactor not only reduced disposal costs, but along with the other operating innovations, reduced plant residue from 5% to 3-3½%.

The overall results of the extensive plant modifications were:

- Increased efficiency of the entire operation
- Decreased housekeeping costs
- Improved morale—with a cleaner, neater facility workers were more inclined to accept the facility as their “home away from home” and were happier.
- Greatly improved profitability for the Operator and Owner. The Owner benefits because they share in the revenue from commodities. Operations expenditures for supplies (operations and safety) were reduced because of the decrease in operating personnel.
- Lost time accidents were reduced because the plant has a less frenzied pace, it has a better equipment

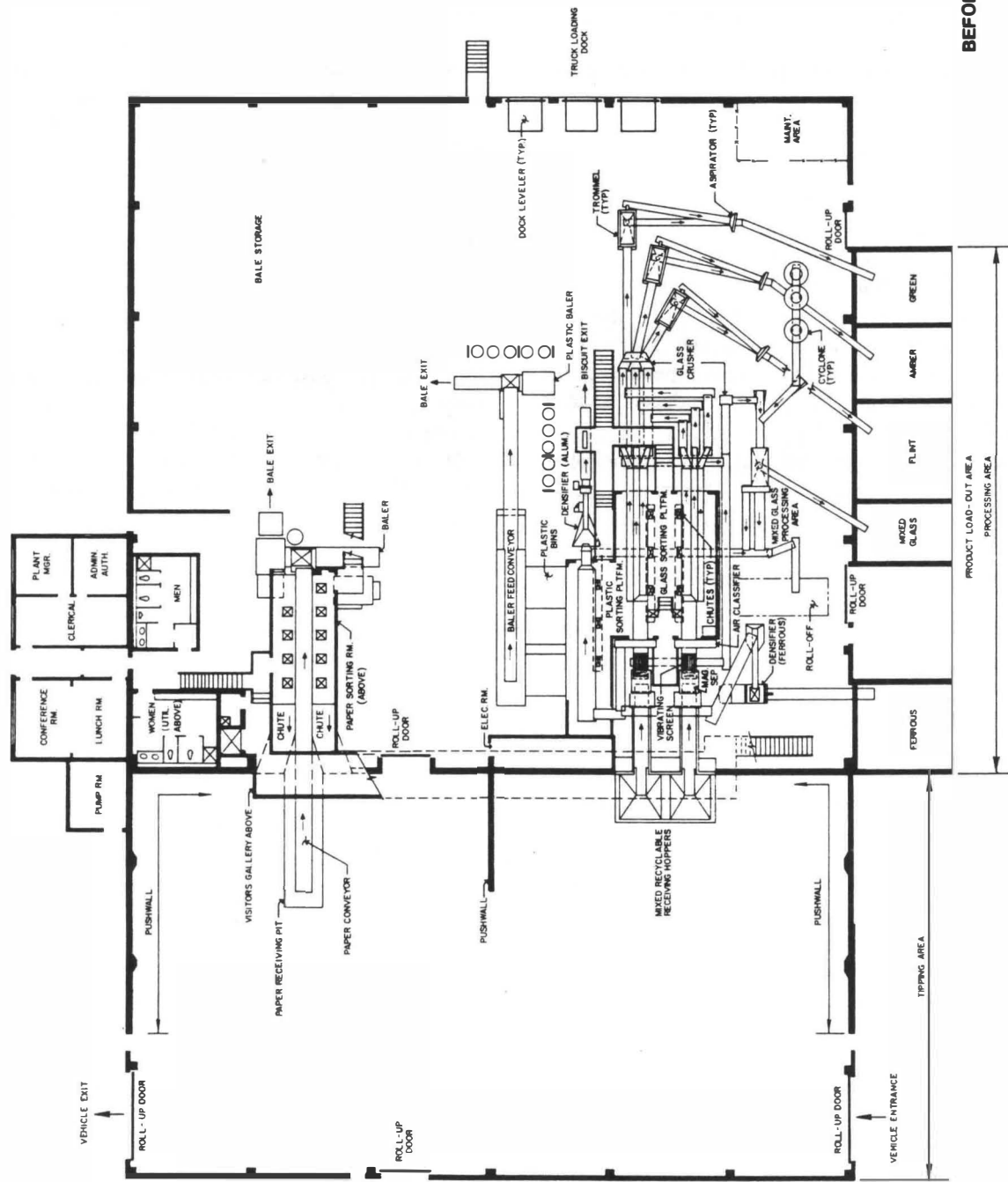
layout—mobile equipment moves better, there are less accidents,

- The modifications improved an already good working relationship with the owner.

The plant modifications further impacted positively on plant operations due to improved marketing. The leaner cardboard bales (less contamination) improve pricing. The ONP No. 6 pack quality improvement allows for improved revenue as well as less rejection from purchasers. The furnace ready cullet of high guaranteed quality enhances revenue to the plant, as does the fact that since less manpower is used to produce the same tonnage of aluminum in bales as opposed to biscuits, the aluminum revenue has increased.

Because the owner and the operator of the Cape May County facility had developed an open and mutually respectful relationship, they were able to work together to rectify a situation which could have had serious financial consequences if left unresolved. By pooling experiences and communicating openly, both parties to the contract improved their positions, both financially and environmentally.

The authors wish to thank Mr. Thomas J. Hroncich, Solid Waste Manager, Cape May County Municipal Utilities Authority for his contribution to this paper.



BEFORE RENOVATION

FIG. 1

