The Evolution of the Transfer Station

Public perception and changing government regulations have led to more complex transfer stations. BY MICHAEL KALISH

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At Frederick County, MD, the transfer station was located on an unused portion of the landfill property adjacent to the composting area that maintained consistency in existing traffic routes onsite and siting the building along a hillside to take advantage of natural grades to accommodate the full depth tunnels.

Transfer stations initially became the answer to the problem of moving urban trash to rural landfill locations, efficiently and cost effectively. But changing attitudes of the public and government regulations are causing transfer stations to become so much more. During the Great Recession, municipal solid waste (MSW) generation rates actually decreased and have only recently started to increase again. However, throughout the same period, the amount of material that was recycled or composted continually increased. The budget crunches of the Great Recession have required facilities to do more with less. Thus, a transfer station which primarily just managed MSW is now being asked to provide more "processing" and become more like an MRF.

The Original Plan

In the 1990s, a significant number of transfer stations were constructed. The primary impetus for the development of these facilities was to manage solid waste efficiently. Smaller community-based dumps were closing as a result of the Subtitle D regulations, and transfer stations were needed so that the waste collection fleet could do its job best by not having to drive hours to the nearest landfill. Transfer stations could be developed either on the same property as the old landfill, or property closer to the centroid of waste generation, depending on the needs of the community and the planning process. But the key here is that the primary goal was the management of waste, bring it in using small trucks, consolidate it, and ship it out in large trucks.

But, plans change, and so does the waste industry. As time ticked along, the management of recyclables became a high priority for communities. Source separated recyclables needed to be managed separately from the wastestream to minimize the risk of contamination, thus creating an unmarketable product. The management of this material stream led to the development of MRFs, generally separate from the transfer station.

The Evolution

In the 2000s, the planning stages of the transfer station experienced a change. During this period, the number of landfills continued to decline giving rise to larger, regional landfills, thus increasing the need for individual communities to develop transfer stations. With a projected continu-

ance of this trend and the increasing fuel costs, facilities started to consider alternate to traditional transfer. Gone were the days of simply managing trash. Waste reduction and recycling are taking more leading roles in consideration of facility development. Transfer stations not only needed to manage solid waste efficiently, but due to the changes in regulations and the rising costs of transfer, facilities needed to reduce the amount of waste transferred and hauled to landfills. These considerations could be taken into account when siting and developing a new facility, but existing facilities had to make expansions to their operations to accommodate this change. In many cases, an easy "fix" was not readily available and required some significant planning.

In the early 2000s, the housing market was booming. Large amounts of construction and demolition (C&D) debris were being handled by transfer stations. Recycling facilities were developed specifically targeting C&D waste. The majority of this material, once separated could be quickly sold as aggregate materials, soil amendments, mulch, or repurposed. This helped to alleviate some of the strain on transfer stations.

Then the bubble burst. The Great Recession hit the solid waste industry, and with it a decrease in the solid waste tonnages being handled. Operating budgets were reduced, and large capital expenditures, like transfer stations, were put on hold. Fuel prices continued to rise and dominated the budgets of facilities. Suddenly, managers were being tasked with maintaining or even expanding the services that facilities were providing to the communities at a lower cost. With a focus on reducing costs, more emphasis was placed on looking at the wastestream and removing items that could be or were required to be diverted. The low-hanging fruit was household hazardous waste (HHW), yard waste, and electronics. More diverse wastestreams need larger areas within a facility to separate and manage the different wastestreams properly. Recyclables, household hazardous wastes, yard wastes, and electronic wastes all require separate areas within a transfer station. While causing an economic hardship, the reduced waste tonnages did provide some much-needed space to be able to manage the different wastestreams. Without the ability to physically expand facilities, managers had to do the best with what they had.

The other change to the industry that found more support was the move to automation on the collection side. Operating a collection fleet is the largest cost in the movement of solid waste, thus reducing these costs became an imperative. With a move toward automated collection, waste could be collected more cost efficiently, however, a chance to screen the waste is lost. The responsibility of screening for unacceptable or prohibited wastes now falls more on the transfer station.

The Continuing Evolution

It feels like the industry has made the turn. Facilities are running lean and mean operations. The past several years has brought a corresponding increase in the MSW generation rates. Recycling and composting rates continue to rise, national economic indicators show that the economy is starting to work again, and an increasing number of capital projects are being budgeted and advertised. The solid waste industry has moved away from strictly waste transfer over to sustainable materials management. Some might say that the evolution is complete, but change is inevitable. Facilities developed today are going to need to adapt to the future of solid waste.

So what is the future of solid waste? If the past is any indication of future trends, it appears that regulations in solid waste are moving toward eliminating organics from landfills and removing anything recyclable. This is already occurring in the Northeast where organics are banned from landfills and is gaining momentum in many other jurisdictions. Solid waste management in California is utilizing separation technologies on the MSW stream (dirty MRFs) on a more frequent basis. The goal here is to separate out everything in the wastestream that is recyclable or compostable. There are also a number of jurisdictions that are interested in alternative waste technologies to find a beneficial use for solid waste (e.g., convert waste to fuel, digest it, compost it, etc.).

Increased separation and segregation correlate to additional space needs in transfer stations. Given the move to automation in solid waste collections, it is reasonable to assume that the processing of MSW is going to move toward automation as well. So what are a few of the key considerations for the development (or redevelopment) of a transfer station today?

Why are transfer stations needed? This may be the most basic of questions, but it is still the key to the development of a facility that serves the needs of a community both for today, and for tomorrow as well. With increased pressure on the reduction of waste to landfills, transfer stations are going to be tasked with maximizing the separation of divertible materials. The management of recyclables, household hazardous wastes, yard wastes, and electronic wastes are all wastestreams that are commonly managed today and may be the reason for building a facility, but sustainable materials management programs plan for the future as well.

If redeveloping an existing facility, operators probably understand their current needs and how well their facility meets those needs. In many instances, the development of a whole new facility to handle the future of solid waste is probably not an option. Thus, the existing facility will need to be optimally utilized to maintain a safe and efficient operation. Considerations should probably be made for a continuation in the consolidation of operations. This may include collection fleet parking, a maintenance shop to accommodate collection vehicles and transfer vehicles, and other public works type operations. Expansion of services at an existing transfer station site can be limited by the available land and surrounding buffer areas and may require a prioritization of facility goals.

When developing a new facility, in addition to the waste handling capabilities, office space, equipment maintenance areas, scales, and the scalehouse must also be considered when planning a transfer station. It is also to understand the anticipated wastestream as the handling of different materials will require different processing and storage requirements. When starting with a clean slate, build as much flexibility into a site so that further solid waste changes can more easily be accommodated. In this instance, bigger is probably better.

What time period is being considered for a facility? When planning to either redesign an existing facility, or develop a new facility, the future waste handling needs must be considered. As communities grow, the amount of waste being received and managed by the local waste management facility is increased, even as the amount of waste to a landfill is decreased. A facility that is

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designed to handle the current waste needs is quickly undersized and unable to serve that community properly. Future waste projections and processing requirements are necessary when planning a facility. These projections are used for planning facility expansion and in determining the proper design accommodations for that future expansion. Expansion capital costs can be phased over time by planning for a series of smaller expansions to be constructed as a community grows, rather than constructing one large facility that is expected to last a longer period of time. Having different options to accommodate the life of a facility provides a higher level of flexibility.

What is the preferred mode of transfer? After the general needs of a facility have been identified, it is time to get into the details. Transfer of waste via transfer trucks is still the most common method of facility operation. With the total number of landfills decreasing, larger, more remote landfills are becoming more commonplace. The need to transport waste further distances is becoming standard. The transfer of waste via rail haul is typically considered during the planning process. When selecting preliminary sites for a transfer station, it is not imperative that the site is adjacent to rail lines, but for long-term planning purposes, it should be considered. Sites close to an accessible rail yard or property that is adjacent to rail lines that can be developed into a rail yard are most desirable. Here again, flexibility in site development is a key goal.

In addition to planning how waste is transferred, the technology of the transfer station itself must also be designed. If open top trailers are going to be used to transport waste, a sloping site or grading of a flat site will be required in order to provide the elevation differential between the transfer station floor and the trailer thruway. Tipping floors with either full-depth or partial-depth tunnels are most commonly used to create these elevation changes. Compactors or pre-compactors may also be desired to maximize trailer payloads or to load out waste into rear loading rail containers. In all instances, contingencies should be planned for so that when disruptions occur in the movement of waste (e.g., the train doesn't arrive), the facility can maintain safe operations.

What level of processing is desired? It seems that most transfer stations today incorporate some level of waste processing. It may be something as simple as segregating loads of commercial waste that is mostly cardboard all the way up to fully automated MRF-type systems to pick through every bit of the wastestream. With the theme of flexibility in mind, plan for the future solid waste needs of your community and understand the site restrictions that will be imposed by each level of processing. An increase in the processing capability of a facility has a corresponding increase in capital costs. The recovery of the solid waste industry may improve the economics of these more capital intensive projects.

When evaluating the need for a transfer station, there are many things to consider. Having an understanding of the recent history of solid waste management may be the key to the beginning of the planning process. The development of design criteria that meets the regulatory requirements and the future needs of the community will aid in determining how best to repair or modify an existing transfer station, or site and design a new one. In all instances, the key to a successful project is the development of site criteria and the implementation of them. MSW

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