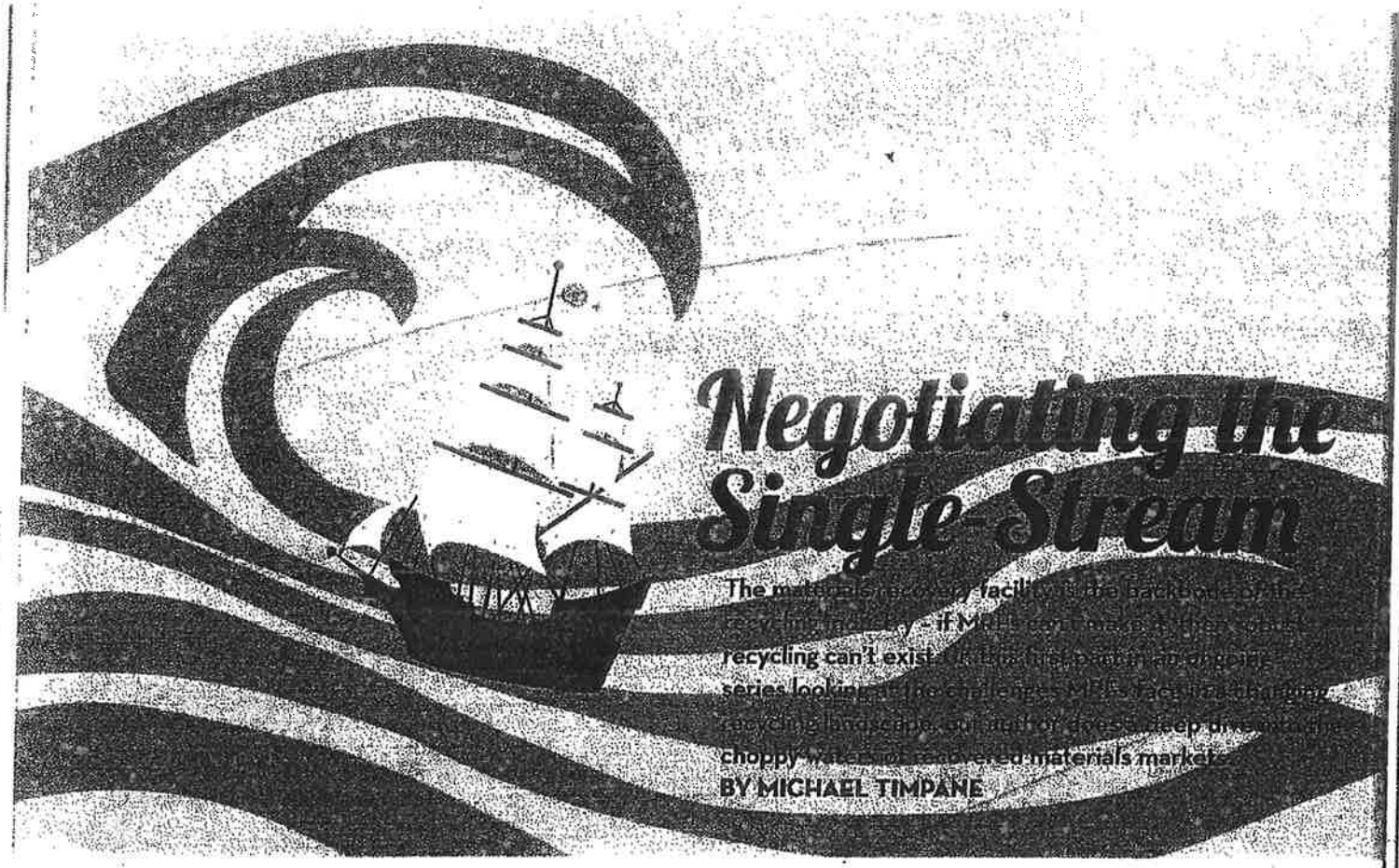

Negotiating the Single-Stream

The materials recovery facility is the backbone of the recycling industry. If MRFs can't make it there, then recycling can't exist. In this [illegible] series looking at the challenges MRFs face in the changing recycling landscape, our author dives deep into the choppy waters of recovered materials markets.

BY MICHAEL TIMPANE

Processing recyclables is a tough business and single-stream materials recovery facilities (MRFs) are again under pressures to maintain acceptable output, product quality and profit margins. Over the last two years, experts have cited multiple causes for the strong uptick of difficulty in this part of the municipal recycling value stream, focusing on two causes in particular: the quality of inbound single-stream collected materials and more voluminous tons resulting from lighter packaging. But there are other variables as well, and each conspires against complacency or restful sleep for MRF managers.

The heavy news of lightweighting

Locally reported recycling program tonnages in sites with no change in collection technology has generally remained flat, or is only slightly declining, in North American curbside programs. However, due to more plastics and other lighter feedstock taking the place of denser printed materials and consumer packaging, the physical characteristics of inbound MRF volumes have pushed MRF operators to run at slower volume throughput in MRF operating systems. What is happening?

There have been precipitous declines in printed newspaper, office paper and magazines in the last five years in the curbside materials stream. The modern design of almost all single-stream processing facilities has, at its core, the separation of newspaper over screens designed especially for its capture. This is because this material made up over 50 percent of the inbound flow of materials when these plants were conceived. Now, loose compacted paper (200-500 pounds per cubic yard and making up over half of the incoming stream) has been replaced by compacted plastic containers (50-75 pounds per cubic yard, flattened), and other newer types of consumer products (e.g. juice boxes and multi-laminated film products, both around 75 pounds per cubic yard, flattened).

In fact, estimates from the U.S. Environmental Protection Agency show a decline in total paper in the waste stream by over 20 percent in recent years, while plastic waste generation has increased over 15 percent. Industry sources confirm that from 2009 to 2013, the total supply of newsprint in the U.S. shrunk from 10.8 million tons to 8.3 million tons, due to a combination of lightweighting and the digital replacement of printed materials – a 23 percent drop. The sharp downward plunge was similar in other printed paper supply categories.

Importantly, flexible film packaging and individual, custom single-use containers are also increasingly replacing previously recyclable larger and bulk packaging. "One serving per package" is now more the rule than ever and making more units more efficiently has become important for product manufacturers. Naturally, this accelerates as manufacturers seek to use less energy and material for greater savings along the production and distribution chains. The customization process unfortunately has made their products initially more expensive to handle in a MRF and potentially less recyclable.

One example is single-serve PET container usage, which has increased from 5 to 7 percent per year in usage over the last five years. NAPCOR, among others, reported that the weight of the containers themselves have gone down over 20 percent in a sim-

ilar time period. The same lightweighting trend is true for printed paper and all other recyclable container stock. In sheer volume, a ton may be as much as 10 to 15 percent larger in size – more physical volume – with individual pieces having less weight than just five years ago. This requires more time on a sorting belt, more storage for lighter units, and more overall units of material to make a ton in a MRF. It also results in less shipping efficiencies due to lighter bales.

Materials: more complex, more heterogeneous

Single-stream inbound material is also ever more dynamic, with new chemically diverse packaging entering the market at increasing rates, especially when it comes to plastics. In a striking example, most municipal single-stream collection programs have expanded contract definitions when new programs are started or contracts are renewed that cover all consumable plastic containers (Nos. 1-7), though the most reliable markets only exist for No. 1, No. 2, and No. 5 plastic bottles. The most valuable materials coming into MRFs are also receding, as new plastic materials replace traditional curbside recyclables with more present-day value.

Here is one of many examples of the growth of new categories. A February article in *Plastics News* reported flexible plastics had "annual growth … forecast at 4 percent during the next five years." Similar growth rates in other newer packaging solutions – including PET thermoforms (up 4.7 percent in 2013), high impact polystyrene and polycoated fiber materials – are accelerating due to their consumer popularity, overall efficiency and cost advantages.

New materials entering single-stream MRFs are likely to have lower recyclability, intrinsic value and structural market potential when they are first recovered (see text box on page 18). Sadly for the MRF, their inclusion into the single-stream flow leads to dilution of the overall value of a recovered ton and, where markets don't exist at all, higher residue at the MRF or elsewhere downstream (the plastic reclaimer and/or paper mill, for example). The cost of recovering therefore needs to be picked up elsewhere in the value stream for these products. The dilemma of the new materials is that their other benefits outweigh recyclability to producers and consumers.

Yet, getting to higher levels of recycling and diversion is a desirable public policy. Success rests upon adding new materials to a recycling program in a deliberate way, by engineering and understanding the impacts to the value chain. These new materials require more available sorting, storage and baling time as each product category is added. Without initial buyers – as many new materials do not have readymade end users – markets should be developed alongside a new product's acceptance into the recovery stream.

Nonetheless, demand for MRFs to accept new products is growing from all points of the packaging value stream – all in the quest for sustainability, higher landfill diversion rates and acceptance as "recoverable." The colliding trends have caused MRFs to find themselves in today's discomfort, where there is a widespread demand (without an initial return) for new technology, more available sorting stations, more storage space and markets that pay for recovery. In sum, MRFs struggle to keep up with the demand for access to easy consumer recycling for new packages that offer other attractive features.

Less maintenance of inbound streams

The trends of greater non-recyclable composition, more difficult-to-recycle materials and growing residue rates have grabbed more attention from around the industry recently, with multiple public companies, government agencies and NGOs, such as Curbside Value Partnership and Keep America Beautiful, drawing attention to the issue. They point out that some of the problem is due to a lack of recycling program "maintenance."

Consider the "Quality Alert" issued by the large MRF operator ReCommunity last year: "Unacceptable items – such as garden hoses, plastic grocery bags, diapers, needles and other medical waste, propane tanks, yard and food waste – expose industry employees to unsafe working conditions, lower productivity, increase disposal costs and reduce end-market material quality," the company wrote. "It is an industry-wide issue." This is a current hot button topic directly affecting MRF market credibility. It is also a lesson lost.

Early on in the curbside recycling evolution in North America, in the classic "Handbook of Solid Waste Management," the very definition of a recycling program was asserted to include the following: publicity and educational activities as well as ordinances and enforcement activities. Except for some notable exceptions, such as steps taken in Seattle recently, the idea has been disregarded that such drivers are necessities.

There has been a singular lack of continuous maintenance of the inbound recycling stream through social marketing, outreach, enforcement and feedback systems (such as regular material audits) by the municipalities, MRF operators and haulers. At the outset, most programs included this component, and it often came through in the momentum of program launches. But as U.S. curbside programs matured, belt tightening and other pressing priorities cut out education and enforcement. The palpable results testify to the fact.

A recent study of over 35 curbside recycling programs by Government Advisory Associates (GAA) showed an average residual rate of 16.6 percent. Residue for disposal over 10 percent was rare just five years ago. Recently, some program non-recyclable rates have been reported as high as 25 or 30 percent.

The rising contamination is also affecting the ability to sort. A report from the Container Recycling Institute found that unacceptable material in paper bales could be as high as 18 percent. The cost stress (in both disposal costs and product down-

Markets needed

A "chicken and egg" dilemma exists when it comes to the marketability of new materials heading toward MRFs. When enough of a new material is captured in a region, the supply reaches a predictable flow, allowing investment in marketing infrastructure and downstream uses. But such development will not take place earlier, and the process of building the infrastructure takes time. MRFs must take the leap and accept material if a market is ever to form, but the MRF is in a bind when market development has not completed. Household rigid polyethylene (i.e., toys and lawn furniture) and the emerging market for polypropylene (yogurt cups) are examples of material types that have recently achieved the critical supply-demand balance.

grades) stemming from this level of contamination at MRFs can be precipitous.

The quality concern has been exacerbated by challenging export market conditions. China's Operation Green Fence customs enforcement action and other export control efforts have increased costs for MRFs. These efforts have resulted in either more quality control sorting on recycled paper and other materials, or facilities facing lower prices and load rejections. Rejected loads can be expensive – whole shipping containers or even entire lots of shipping containers have been denied entry into ports from violating locations. These relatively recent efforts by historically more permissive consumers, such as outlets in China, have not faded away.

Falling single-stream commodity values

In February 2015, the public indexes of recycled materials all reported the following average commodity price trends year-over-year: ONP had lost 14 percent of value, OCC down 20 percent, PET fell 28 percent, aluminum 2 percent, and natural HDPE was "optimistically" off 1 percent. Several dynamic forces are responsible:

- Large exporters (well over 40 percent of single-stream paper flows toward export) have reduced market share due to economic factors. This new condition has curtailed an over-five-year positive demand trend from export that masked falling domestic paper mill consumption.
- Shipping disruptions due to a lengthy strike on the West Coast further increased supplies and backlogged inventory, lowering prices to almost desperate levels. One persistent rumor from industry sources has inventories of bales waiting for shipping containers to be recycled still in the hundreds of thousands of tons. A telling development here is that the ability to substitute feedstock bound for recycled mills by China from sources other than the U.S. is growing as Asia creates its own burgeoning consumer recycling infrastructure and forestry industry. One mill executive told me, "I was shocked when I went over there (recently) by their internal consumer recycling efforts. None of the mills seemed disrupted by the loss of (U.S.) paper from the strike."
- Accordingly, a February 2015 industry report showed recovered pulp and paper prices approaching their second-lowest level since 2001.
- The commodities issue is not unique to recyclables; oil prices dropped dramatically beginning last fall and are almost 60 percent lower than last year. In fact, most of the world's recognizably traded commodities have experienced large price falls recently.
- The strength of the U.S. dollar (at press time at an 11-year high compared with other currencies) does not help either. In December, *US News and World Report* summed up the chilly seas for U.S. exports: "Global commodities are priced in U.S. dollars… [and] suddenly [are] more expensive to purchase." The U.S. dollar has improved (on-average) over 10 percent relative to the basket of world currencies in the last three years. Markets cannot afford "expensive" commodities and have adjusted to the strong value through price controls or substitution, threatening the over 40 percent of MRF-produced commodities which end up overseas.

Many of these converging trends have also shown signs of accelerating in the last two months, even with the settling of the port issues.

Moving beyond current conditions, the well-known volatility of sharp upward and downward swings in paper, based on regional panic for supply, has now been displaced with a permanent-seeming stagnation. In the strange new world of commodity markets for recycled paper, large players and controlled export markets are dominant while smaller independent mills have closed. Sharp upward swings, meanwhile, have been few and far between.

In addition, there has been a marked change in the recognized grade of the material that makes up the highest tonnage in single-stream collection programs. The majority of MRFs have evolved from recovering a mostly ONP bale, one with high demand and selling as an ONP grade, to a curbside soft-mixed printed paper bale. This is true whether it is labeled as a #8 ONP ISRI designation, a more truthful #1 Residential Mix designation or a #2 Soft Mix designation with more limited demand due to the decline in newsprint consumption. The Curbside Mixed Paper bale has supplanted real ONP bales as the predominant non-brown grade from curbside recycling programs. Prices and sales grades have generally reflected the change; it can be more than $10 between the two. With approximately 40 percent of the almost-20-million-ton curbside market now gravitating toward this grade, the impact of the change to the industry is in the hundreds of millions of dollars.

For these interacting reasons, North American markets for single-stream collected materials (North American markets for all commodities averaged and publicly reported) hovered around $95 to $105 per ton recovered for nearly three years up to November 2014. Though increases in commodity pricing of oil/virgin resin

allowed a growing price for HDPE and PET to mask the structural changes of paper, when oil prices started falling late last year, the overall recovered value of the MRF ton (referred to as Blended Value, Average Commodity Revenue or Average Material Value) began to fall with it. Now it is down close to $80 per ton, and it's even lower in many parts of the country.

Increased labor cost pressures

Despite the growth of impressive technologies in the space, MRF sorting protocols are, by and large, still very manual processes. This makes the primary and quality sort positions (along with grounds-keeping labor) the single-largest variable cost component in single-stream facilities. Increasing minimum wage standards across the U.S have outstripped inflation adjustment rates in many public contracts in the last 18 months. This does not allow many operators to recoup full increases in the cost of these standards, especially if MRF contracts have a fixed rebate. Added to that, the higher turnover from improving job opportunities in less demanding environments has pinched MRF operators on the cost side as wages must be increased to attract reliable workers.

Contract dependency is also a concern. Though exact numbers are elusive, it is estimated that the vast majority of single-stream processing facilities – around 80 percent – are public-contract dependent. These contracts are generally long term, ranging from three to 10 years. Most have renewal clauses that usually favor municipalities, though recent pushback by the industry is now making these more balanced agreements. A contract four years ago may have reliably bet on a commodity revenue stream 30 to 40 percent higher per ton than that which can be garnered today. The average MRF commodity value over the last three years, when adjusted for inflation, has continued going down painfully, particularly in the last seven months. MRF costs have also risen significantly in the last three to five years due to the cited factors. Thus, rebates offered just a few years ago are likely tough to meet in today's market.

What's a MRF to do?

MRF operation is a tough business and always has been. Yet some MRFs generally make money, while other MRFs are seldom profitable. What are the differences? The hard downturns of the early- and mid-1990s, which shuttered up to one-third of the fleet, and the 2001 and 2008 fallbacks in commodities are the kinds of hurdles that will always confront a MRF operator. Today, MRFs face similar crises. With rising costs, falling revenues and long-term contract obligations, there are more than a few stories of insufficient revenues to cover operations costs and contract responsibilities like commodity rebates and public education programs.

But fortunately, strategies and solutions do exist. This rundown of the state of MRF affairs surely has had a gloomy element throughout. However, in the second chapter of this holistic look at the MRF landscape, coming in the May issue of *Resource Recycling*, we'll analyze how materials recovery facilities can meet and overcome these challenges through good management, savvy marketplace negotiation and more. RR

Michael Timpane is affiliate vice president for Resource Recycling Systems. He can be reached at mtimpane@recycle.com.

MRF Design outdated
packaging changes
Changes Green wall
Quality 30% to Landfills / Contamination
Market conditions
All MRFS nationally be affected
... Mr. dust (...)