



Peeling BACK THE LAYERS

BY KRISTIN SMITH

Organix Solutions' co-collection and layered approach to recovering organics from municipal solid waste is capturing value from the waste stream while reducing the carbon impact.



Randy's Environmental Services began its first residential organics collection program back in the early 2000s—well ahead of other waste haulers. The city of Wayzata, Minnesota, located in Hennepin County, saw a need to divert organics from municipal solid waste (MSW) and had \$200,000 in grants to start a program.

"At the time, nobody even knew what source separated organics were," recalls Jim Wollschlager, who heads Organix

Solutions, an organic waste consultancy owned by Randy's Environmental Services that stemmed from this project.

The initial program started in Wayzata in April 2003. At the time, 35-gallon carts were provided to residents, and Randy's used separate trucks for trash and organics collections. As the program spread to other communities, it became clear the process was not sustainable long term.

"It wasn't a sustainable model to have an extra truck on the road and an extra cart to collect organics," explains Wollschlager. "The cost of it and the scattered routes were inefficient. We didn't see that as an economically sound model to take us forward."

DEFINING MOMENT

One evening while at a city council meeting in a small town discussing the future of the program, a professor from the University of Minnesota who was in attendance posed a question. Her question still resonates with Wollschlager to this day.

She asked, "Have you ever done a model around carbon impact as it relates to running that separate truck and collecting organics versus if that material just went to the landfill and how those two would compare?"

Wollschlager had not. As he drove home from the meeting that night, he thought, "There has to be a better way to collect organics other than a separate truck." The next day, he went to Mark Stoltman, Randy's CEO, and they devised a plan to develop a compostable bag. Instead of using a separate cart, the bag would be collected with the trash in the same cart.

"It had to be strong enough to make it through the collection process," he says of the compostable bags.

Wollschlager and Stoltman contacted composting consultant Craig Coker of Coker Consulting, Troutville, Virginia. Coker put them in contact with a biopolymer resin company that could manufacture the resin and a film manufacturing company that could make the bags.

"At that point, that's when Blue Bag Organics was born," says Wollschlager.

REFINING THE PROCESS

Bags began coming off the production lines, and since the initial launch in 2011,

the company producing the biopolymer resins went out of business and the company making the bags was sold off. Randy's bought the extruding equipment, and that's when Organix Solutions was founded to manufacture the bags and other biodegradable agricultural mulch film.

A distributor in Minnesota handles the compostable bag sales. The bags are provided to residential customers as part of their recycling fees, or they pay an annual subscription fee for the bags.

The compostable bags were designed to mirror a Hefty-brand trash bag in the home that can be pulled out of the kitchen trash can and tied closed without breaking or leaking. Other compostable biopolymer bags on the market didn't perform that way, says Wollschlager.

"You would pull them out of the can and the bottom would fall out. They would leak. It was a reason for people to say, 'This is a hassle. We are not going to mess with it.'" He adds, "We take all of that out of the equation."

According to Wollschlager, with the Blue Bag Organics program, residents don't have to remember to buy bags and wear and tear characteristics are no longer a problem. Additionally, by providing the bags, the concern of contamination from using the wrong bags goes away. The 13-gallon bags fully compost in 60 days at an industrial composting facility.

"From the point that a person puts that compostable bag in his or her trash can to the point that it goes to an industrial composting facility, we've controlled all those elements that we possibly could," he says. He adds that Randy's has never had more than 2 percent contamination using the bags.

The bags are certified by the Biodegradable Products Institute (BPI), meet American Society for Testing and Materials (ASTM) D6400 specification for compostability and have undergone rigorous tests at the lab level and by operators. One of the largest organic composters in the nation, Cedar Grove, Everett, Washington, performed tests on the 13-gallon bags, available in blue and in green, and has affirmed their compostability.

"We've done a lot of testing and gone to great lengths to create a durable yet compostable bag out of compostable materials that gives more stretch,"

Wollschlager says.

Other compostable bags that sit for a few months can get brittle as they are taken off the roll, he says. “We designed the compostable biopolymer resin mix of our bags so that doesn’t happen.”

DEPLOYING THE PROGRAM

The city of Wayzata was receptive to the Blue Bag Organics program. Neighborhood coordinators volunteered to help spread information to their neighbors.

“It was a community effort and the city was very much in support of the program,” Wollschlager notes. The city website and local newspapers shared information about the program. “Every time you can add another element of support to that organics program, that program is more successful,” remarks Wollschlager.

Households are given 60 bags for the year, which averages one bag per week, plus a few extras for parties or holidays. When the bags are filled, they are tied up and placed in the same trash bin as the trash bags. The food-scrap-filled compostable bags and trash bags are collected together on one truck.

When the loads are tipped, the easy-to-identify-by-color organics bags are removed by two or four workers at a portable sort line that moves at a speed of 15 tons per hour. In areas with smaller volumes, a floor sort with a skid-steer loader can get the job done. The organics bags are transferred to a composting facility.

In Minnesota organics are considered true recyclables. As Wollschlager describes it, “The apple core means as much as the water bottle.” Having that perspective makes a big difference in Wollschlager’s opinion.

“When people start to think about organics as not something to be diverted, but something to be recycled, it brings a whole other element to the discussion because you aren’t simply diverting it from the landfill, you are taking it to a higher and better use,” he says.

Communities and businesses everywhere are looking to reduce their impact on the environment and to create less trash. With organics making up 35 to 50 percent of what goes in the trash can, the potential to reduce waste and the associated pollution is huge. The Blue Bag Organics or Green Bag Organics



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compostable bags are now being used in 32 Minnesota cities and commercial accounts around the country, and according to Wollschlager, all communities have been supportive of the process.

Other waste haulers are participating in the program as well, though Wollschlager notes, haulers sometimes are slower to want to adopt additional programs.

“The hauling industry has always been the last to step into an opportunity that gives them more handling costs,” he says. “Whether that was recycling 20 years ago, it is organics now. They are going to do those things, but they are going to do them as sustainable models are developed to address the opportunity.”

Randy’s and Organix Solutions have a different take on organics collection. “We are a hauling company, and we are a solutions company. On the hauling side of this, we look at organics as another income opportunity within that trash cart,” Wollschlager explains.

THE NEXT LEVEL

Randy’s has a material recovery facility (MRF) in Delano, Minnesota, designed and installed by Machinex, Plessisville, Quebec. The system was designed to process MSW and single-stream recyclables.

“We ran a night shift that processed all of our solid waste. We would remove the organics and create an RDF

(refuse-derived fuel) fraction with the balance,” says Wollschlager. “During the day, we would flip that over and run single-stream [recyclables].”

Organix Solutions developed its trademarked Layered Approach to increase organics recycling and processing and to support circular economic and environmental values. Wollschlager describes how it is being implemented in Randy’s Delano facility and how the equipment plays a major role.

Layer 1 is source separated organics, which is accomplished through the Blue Bag/Green Bag Organic compostable bag co-collection program.

Layer 2 is the MRF. When the co-collected materials arrive at Randy’s, they are dumped onto the tipping floor and transferred to the initial presort line. Then between four and six people pick off items that aren’t desirable for further processing in the system, including the blue/green bags filled with organics and other bulky or low-value materials. The blue/green bags go directly from here to the local composter.

To recover the rest of the organics, recyclables and fuel feedstock, the remaining materials go into a 40-foot trommel. The first 20 feet of the trommel are made up of 2-inch holes. The second 20 feet are made up of 10-inch holes.

In that first 20 feet, sand, grit and glass and organics less than 2 inches fall

through the trommel and into a roll-off box. Wollschlager notes that the first trommel screen removes 20 to 30 percent of the inbound weight.

The rest of the material continues through the remaining portion of the trommel, where it is separated into flat material and round material. Materials larger than 10 inches head to the paper lines to be sorted. Materials less than 10 inches fall through the holes.

A ballistic separator further sizes material down to 2 inches and removes any additional sand, grit and glass. The remaining materials then go through the container sorting lines, where magnets pull off tin and eddy current separators take off aluminum. Plastics are hand sorted. Any materials remaining join up with the paper fraction to become RDF.

Randy's again worked with Coker to determine what percentage of the 2-inch-minus material was organics. He determined it was made up of about 57 percent organics.

Wollschlager says that material has no problems digesting in a dry fermentation digester and produces gas in a 21-day cycle. About 400 tons of the material also have been composted. "At this point, 10 percent of the waste stream was diverted with the organics-filled compostable bags, and another 20 to 30 percent was diverted with the first screened material," says Wollschlager.

The next step was figuring out what to do with the organics larger than 2 inches but bigger than the 10-inch hole. Randy's initially captured it at the end and reran it through the system until it was gone, but that proved too time consuming and cost prohibitive.

That is where Layer 3 comes in. Randy's was approached by Cornerstone Resources, Acworth, Georgia, which had the design for a machine called the BurCell Recovery System. Environmental Solutions Group (ESG) Chattanooga, Tennessee, is now manufacturing the BurCell. ESG sent one to Randy's, and the company ran it for around eight months, conducting about 1,000 tests with it.

"It is designed to separate everything that is organic from everything that is not organic," says Wollschlager. "You load the remainder of your waste material into the BurCell. You run it through a cycle, and what comes out of the BurCell is a process engineered feedstock (PEF) for anaerobic digestion. When you screen that, the flat fraction plastics will go one way and the organics will go the other way."

According to Wollschlager, soiled and nonrecycled paper typically provides little or no value when it is composted or digested. The BurCell changes that, however. The BurCell operates under a deep vacuum, thereby fracturing the lignins of the paper. This results in a significant uptick in gas value from typical organics

when put into the digester.

"We are seeing 20 percent increases in our testing," he reports. What little glass is left in the PEF can be handled by a Torxx kinetic pulverizer.

The final layer, or Layer 4, is anaerobic digestion or composting. In Randy's case, the company is working toward building a dry anaerobic digester to produce compressed natural gas (CNG) from the processed organic waste to fuel its fleet of trucks. In-vessel composting also will provide Class 1 compost suitable for soil remediation.

"We are implementing our Layered Approach in Delano," says Wollschlager. "We are breaking ground this year to build an anaerobic digester to generate CNG for our fleet of vehicles and provide other energy uses for our facilities."

A BIG IMPACT

Wollschlager never forgot that professor who challenged him that one evening on carbon footprint. A few years later, he had the opportunity to finally see just how much impact the Blue Bag Organics program was having. Randy's and Republic Services recently had switched over a contract they had shared in Elk River, Minnesota, from a separate organics cart to Blue Bag Organics.

Wollschlager asked Randy's operations group to gather figures on collection costs, miles, fuel and man-hours, etc., and compare it with the Blue Bag Organics program. He sent the data to Wenck Engineering, Windom, Minnesota, to do a carbon study, and the results were astounding.

"The separate truck was 100 times greater in carbon impact on the environment when compared to co-collecting it with the trash," Wollschlager says.

Many communities are looking to reduce their carbon impact on the environment while at the same time looking at how they can divert material from the landfill. When they run a separate truck program, Wollschlager says, they can be hurting their other goal.

"It's kind of cool that [Blue Bag Organics] addresses both of those needs," Wollschlager says. **wt**

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