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OCTOBER 2023
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Out of the ASHES

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After a battery fire destroyed its MRF in York, Pennsylvania, Penn Waste pulled off a rebuild in just under a year and is spreading the message of fire prevention and safety.

BY **MARISSA MCNEES**

Most recyclers agree that fire prevention and safety are among the biggest issues facing the industry today, with more and more fire-hazardous items—particularly batteries—continuously making their way into material recovery facilities (MRFs).

Last year, Penn Waste, part of Ontario-based Waste Connections' family of companies, was faced with the reality all MRF operators fear when it experienced a devastating fire at its facility in York, Pennsylvania. The blaze broke out March 8, 2022, destroying nearly all the equipment and electrical controls throughout the 96,000-square-foot MRF. A rechargeable battery was determined to be the cause.

More than 12 local fire departments responded to the fire, which was deemed under control approximately three hours after it sparked. A first responder sustained minor injuries, while the 40 employees inside the MRF at the time were unharmed.

Photo by Eric Forberger Photography

“There’s nothing more devastating than when you pull into a parking lot and your facility is on fire and your employees are standing in the parking lot crying and frustrated and upset,” says Shawn Query, site manager of the York MRF. “To see that, it’s heartbreaking.”

The team at Penn Waste, headquartered in York, was determined to get the MRF back up and running within the year, which Query admits is “unheard of,” but by using every resource available and remaining focused on the mission, the MRF resumed operations March 6 of this year—363 days after the fire rendered the site completely inoperable.

Now, with safety as its core value, Penn Waste, along with Waste Connections, has a new mission—spreading the word about the devastating effects of batteries in the recycling stream.

THE REBUILD

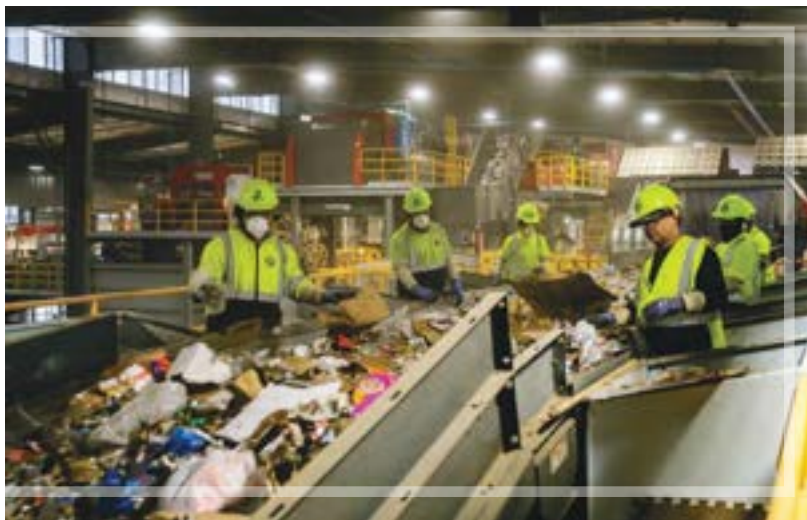
The Penn Waste and Waste Connections teams gathered right away to come up with the best approach for getting the York MRF operational as soon as possible, and it was clear everyone had their sights set on restarting within a year.

Initially, Penn Waste brought together its local and corporate teams on-site to assess the full extent of the damage, with the goal of the rebuild being to design a safer environment for employees and, through technology, improve the efficiency and quality of the facility’s recycling system.

Query says the timeline was a bit of a moving target because of challenges with supply chains and parts availability. The short-term mission was to restart the front portion of the system so the facility would be able to process material on a limited scale—from March 9, 2022, until Jan. 2 of this year—while the rest of the system was being rebuilt. Penn Waste had to rely on its sister company, American Disposal Recycling in Manassas, Virginia, to process material, too.

“We had a group of us that led the charge, and we set the groundwork of what we wanted, and it just all fell into place—schedules, making sure we have the parts, phone calls—a lot of hours were put into making it all come together,” Query says. “It was a lot of effort from everybody.”

*Shawn Query,
site manager of the
Penn Waste MRF in
York, Pennsylvania*



The first step in the process was to ensure safety and assess the condition of the supporting structure, electrical systems, air compressor system and machine centers.

Typically, a rebuild of this scope would take approximately 80 weeks, Querry says, with one original equipment manufacturer (OEM) supporting the project. But Penn Waste enlisted seven OEMs as well as other vendors and entities to shorten that time frame to about a year. Vendors included:

- CP Group, San Diego;
- Van Dyk Recycling Solutions, based in Norwalk, Connecticut;
- Pellenc ST, France;
- Amp Robotics Corp., Denver;
- Georgia Pacific, Atlanta;
- Keystruct Construction, a York-based full-service construction company;
- Incendia Engineers and Consultants, a Rockville, Maryland-based fire protection design consultancy;
- Scenic Ridge Co., a commercial builder in Lancaster, Pennsylvania;
- Gohn & Stambaugh Inc., an Emigsville, Pennsylvania-based plumbing

- and HVAC service provider;
- 1st Fire Safety, a supplier of fire protection equipment based in Cedar Park, Texas;
- Green Peak Automation, an industrial machinery control design and programming provider based in Monroe, Oregon;
- DM Electric, an electrical services provider based in York, Pennsylvania;
- Compressor Maintenance Co. and PennAir, sister companies of York-based Conrad Co.; and
- Spayd's Industrial, a provider of industrial maintenance, excavating and demolition, custom welding and metal fabrication and equipment services headquartered in Elizabethtown, Pennsylvania.

"We have multiple different vendors, and we had to pull them all together to coordinate for us to be able to get back up and running," Querry says. "We wouldn't have been able to get it back up and running without all those folks as quickly as we did—363 days to get the machine back fully operational; it's pretty amazing."

"We put in what we thought was going to be the quickest way to get us back up and running."

CP Group Sales Engineer Branden Sidwell was one of the first to arrive on the scene to assess the damage and make a determination on how to proceed with an installation.

"We all went in with the mindset that we were each going to do whatever we could individually to get the facility

“

The success of the rebuild goes back to the employees we had working and that stuck around to help clean and paint and do all these not exactly glamorous jobs that still needed to be done. They had such pride of ownership, and I think that's what definitely helped make it a success.”

– Amanda Moley,
regional marketing/
CX manager,
Waste Connections

rebuilt as quickly as possible," he says. "That meant breaking up the scope of work amongst various suppliers. We each worked on isolated aspects of the project to best utilize our respective production capabilities in order to accomplish one common goal: to get the plant back up and running."

Penn Waste was able to keep very close to the facility's original layout but added a room to house its new air compressor systems.

Additionally, the situation provided Penn Waste an opportunity to address some operational inefficiencies.

"We wanted to focus on the overall material stream and how we could improve capture as well as purity," Querry says. "This gave us the ability to really bring balance to the process."

Six optical sorters were added to

bring the facility's total to 11. The MRF features CP Group's MSS optical sorters on its fiber lines and Pellenc optical sorters on its container lines, and Querry says the additional optical sorters have allowed the MRF to take a "major step" beyond its previous system.

"We now can process higher volumes with more refined separation in the same footprint as the previous system," he says. "Right now, we're taking in about 10,500 tons a month, but we're able to process about 47 to 50 tons an hour where prior we were processing



35 to 40 tons an hour."

The bulk of the damage was incurred where the fiber screens were in the MRF, and CP used that opportunity to install two new, wider screens as well as a Scalping Auger Screen that Sidwell says can accomplish greater throughput while also reducing the time allocated to maintenance.

The system also features Amp Robotics' single-cell robotics and its artificial intelligence-powered Vortex technology for film removal and recovery; CP fiber, container, auger and glass breaker screens as well as its metering drum; and an Elgi air compressor paired with an Aero master controller from Airtec Global LLC, Dallas.

The fully automated fiber line, in particular, has allowed Penn Waste not only to create cleaner mixed paper bales but also essentially to create a sorted residential paper and news (SRPN) grade by separating the old corrugated containers and chipboard. "We're creating two more valuable streams where they've had three of less value before," Sidwell says.

The company's final investment totaled \$23 million for both the rebuild and the supporting systems.

DESIGNING FOR SAFETY

Querry says Penn Waste's core value is safety, and ensuring the protection of employees and creating a secure work environment were top priorities when it decided to rebuild.

The site's updated fire suppression equipment includes a system on its tipping floor from Farmington Hills, Michigan-based Fire Rover, two compressed air foam (CAF) Tri-Max 30 units from Anderson, California-based Tri-Max and two Enforcer 60 portable wheeled CAF systems from Peachtree

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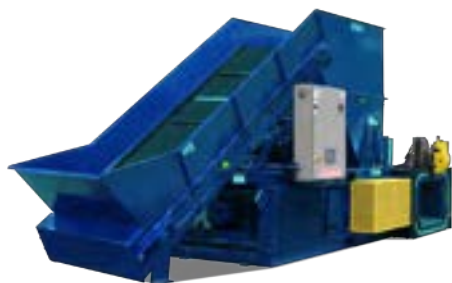
City, Georgia-based EnforcerOne. Additional foam units were added into the bunkers for extra protection, and Penn Waste has introduced more fire suppression training for its staff.

“We have huddles every morning,” says Querry, who served as a volunteer

firefighter in Dover, Pennsylvania, for 15 years. “We talk about different things, and, if something comes up or if we did a good thing, we talk about it. If we do a bad thing, we talk about. The biggest thing is communication and just showing people how to do it, what to do [and]

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where to go if they need help.”

“[We] don’t want our employees to be firefighters, but we do need them to not panic when it happens so they can be safe and make safe choices for themselves and their team members,” adds Amanda Moley, regional marketing/CX manager at Waste Connections.

Part of designing a safer MRF also meant reducing headcount, and a major point of emphasis was its paper quality control line. “With new technology out there today, they were able to design [the fiber quality control] so we could do it without a single person there, and that’s where we’re taking that person out of harm because they’re not sorting through that stuff,” Querry says.

Before the fire, the York facility had two shifts and 67 employees. Currently, the MRF operates on one shift with 35 employees.

Querry says the company tried to keep as many employees as it could, but some restructuring was necessary. During the rebuild, being fully staffed was unnecessary, so individuals were offered positions within Penn Waste’s hauling division or at different MRFs until the York site was back up and running. Some chose to stay in the hauling division, while others chose to part ways with the company.

The employees who stayed on-site also were involved in the rebuild.

“The success of the rebuild goes back to the employees we had working and that stuck around to help clean and paint and do all these not exactly glamorous jobs that still needed to be done,” Moley says. “They had such pride of ownership, and I think that’s what definitely helped make it a success.”

CONTINUED ON PAGE 135



LEARNING FROM EXPERIENCE

Since the fire, Penn Waste has increased its education efforts around proper battery disposal after discovering a lack of education available for consumers. But a point of frustration, Moley says, is mixed messaging along the value chain that often includes misleading guidance about recycling.

"This is a huge hurdle for us," she says. "We don't want anybody even saying it that way. It's 'how to properly dispose of,' because as soon as people hear that word 'recycling' they think, 'OK, I can put it into my curbside trash and recycling,' and that's not the case."

Waste Connections launched a battery disposal campaign on Earth Day called "Don't Start the Fire" to combat misleading narratives. The campaign purposely does not include any Waste Connections branding to avoid confusion and, hopefully, broaden its reach.

The company also has an ongoing social media effort as well as billing inserts, news releases and truck wraps with battery disposal messaging.

"Since this is an industrywide problem and other haulers bring material to our recycling facility, we left the messaging unbranded so consumers wouldn't get confused by seeing one of our entities' logos and think the messaging doesn't apply to them if they're not a direct consumer," Moley says.

"We're trying to be at the forefront of putting out really simple, informative information for consumers so that they know how to properly dispose of [batteries]. What we found is that people want to do the right thing, they just don't know what the right thing is."

Proper education does not stop at the consumer level for Penn Waste. Query emphasizes employee training, too, arming his team with every tool necessary to address battery fires.

"The biggest thing is making sure we have the proper equipment and ... the tools [so] if we do approach a battery fire again—which we've had several of them since—we have more training in firefighting and fire suppression and [know] what to look for," he says. "That's really our approach now is

being in that defense mode so, if we see something like this, how do we handle it safely?

"[It's about] not letting our guard down, because as soon as you do, that's when it gets you."

Moley adds the most important step, however, begins at home.

"Consumers need to realize their careless actions can have life-changing consequences for the employees who work for us." **RT**

The author is managing editor of *Recycling Today* and can be reached at mmcnees@gje.net.

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A MORE POWERFUL COMBINATION

**Automate your MRF's QC line by pairing AI with air jets
for a high-volume sorting solution.**

Recently, artificial intelligence (AI) and robotics have been getting a lot of attention. AI sensors combined with robotic arms were introduced to material recovery facilities (MRFs) around 2016/2017. Ever since then, a few hundred of these units have been installed in North American MRFs, many with mixed success on the extraction front. For some people, robotics and AI are synonymous. However, robotics is not AI, and AI is not robotics.

AI: Success!

The AI sensor aspect of these machines certainly has lived up to and even exceeded expectations. AI's deep-learning capabilities and unmatched levels of available granularity provide finer classifications of individual product and material categories. AI sensors have identification capabilities beyond those of conventional optical sorters. They can be used to sort cat food cans and cooking foil from used beverage cans (UBCs) and polyethylene terephthalate (PET) thermoforms from PET bottles, for example. AI units that are used in similar applications



also can learn from one another, creating even more robust AI models. This unique capability has further increased the accuracy and range of available material categories that AI technology can identify.

Robots: Fail!

The robotic arm aspect of these units, however, has been a much bigger disappointment, mostly given its limited speed, low picking efficiency depending on the commodity and high cost per pick.

The cost of replacing expensive suction cups every shift and the high use of expensive compressed air make the per-pick cost for a robotic arm 10 to 12 times more expensive than conventional high-pressure air ejectors used in conventional optical sorters.

Would you accept personnel whose sorting effectiveness was less than 50 percent for certain items? Probably not, but that's what MRF operators often see when the suction system of a robotic arm encounters crumpled or 3-D items. Add that to the robotic arm's inability to keep up

with the required picks per minute, and sorting effectiveness for certain targeted materials can be less than 50 percent. That is not an acceptable level of performance in our view as we are held to much higher standards on conventional optical sorters.

Decoupling sensor technology from the extraction method

At MSS, we firmly believe that sensing needs to be completely decoupled from extraction because one has nothing to do with the other. The right detection technology, which can be a single sensor or a combination of them, must be paired with the most appropriate extraction method for the application.

We also know that AI is here to stay and will grow in prominence in recycling applications in the next decade, which is why MSS introduced Vivid Air™, our AI sensor platform, earlier this year in partnership with Recycleye, a U.K.-based AI technology company.

MSS Vivid Air™: A perfect pairing

While robotic arms will continue to be employed in tight retrofits and low-volume facilities where air jet units simply won't fit, we don't expect notable further progress in vacuum-based robotic extraction. This technology has changed little since its introduction to our industry about seven years ago.

Instead, MSS pairs established AI technology with our proven air ejection system that enables the sorting of material at higher throughput and without the limitations of robotic arms. Using established positive pressure air valves allows us to use wider belts where necessary and without the need for multiple parallel robotic arms. Belt speeds can be increased and pick rates boosted 10-fold over the same conveyor width to maximize throughput and sorting efficiency. And, as mentioned previously, compressed air valves require much less maintenance than mechanical arms.

Success story: Aluminum QC

One of the most prominent applications is sorting cat food cans and cooking foil from UBCs. At a recent installation on the West Coast, the MSS Vivid Air™ identifies the categories "UBC," "Non-UBC Aluminum" and "Non-Aluminum," ejecting "Non-Aluminum" separately from "Non-UBC Aluminum" and "UBC" in a dual-eject configuration. Should a particular market allow for "Non-UBC Aluminum" to stay with the "UBCs" then only a single-eject configuration would be required.

The Vivid Air™ ejector configuration is purposely designed to be very compact so it can be retrofitted on existing manual QC stations with minimal modifications.

Success story: PET QC

Another MRF application with great potential for Vivid Air™ is the quality control of near-infrared-sorted, or NIR-sorted, PET. In many cases, this application calls for the identification of the categories "PET Bottle," "PET Thermoform" and "Non-PET." Similar to the aluminum QC, the PET QC unit can be installed in a single-eject or dual-eject configuration, depending on available market outlets.

Other promising Vivid Air™ applications

Several other MRF and PRF, or plastic recovery facility, applications come to mind for the compact and versatile configuration of Vivid Air™:

- **PE QC** – Similar to the PET and aluminum QC, the QC of NIR-sorted PE calls for the identification and separation of the categories "PE Natural," "PE Color" and "Non-PE." These materials can be sorted separately from each other using a dual-eject



configuration. Using a robotic arm for this application is not recommended as the required number of picks per minute by far exceeds the robot's capability and the 3D- nature of PE bottles makes vacuum-based pickup very ineffective. Air jet arrays will ensure a high and accurate pick rate to prevent valuable PE Natural from ending up in PE Color, which would reduce the overall blended-ton value.

- **Food grade (FG) PP from Non-FG PP** – AI really is the only sensor solution available for this application. While still challenging, AI's ability to learn and become better over time means that sorting FG from Non-FG PP shows a lot of promise.

Perfected pairing

When automating manual QC lines, MRF operators should consider a technology platform that pairs the right type of sensor with the appropriate extraction method for the task at hand. Coupling AI with air jets, as is the case with the MSS Vivid Air™, provides the best of both worlds: identification capabilities that complement those of conventional NIR and color sorters, plus the proven compressed air jet extraction that provides higher belt speeds, pick rates, throughput and efficiency without the limitation and maintenance cost of a robotic arm.

Talk to a vendor that understands these nuances. We at MSS are ready to have that conversation with you.



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