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www.wasteadvantagemag.com December 2013 Vol.4, No.12

WasteAdvantage magazine

The Advantage in the Waste and Recycling Industry



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to Waste Materials Management

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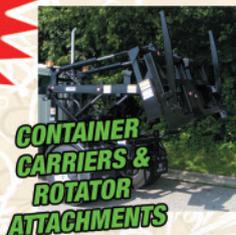
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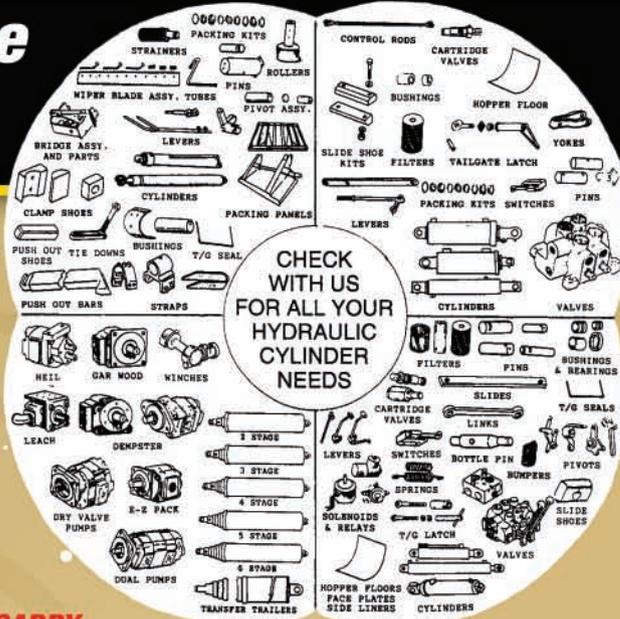
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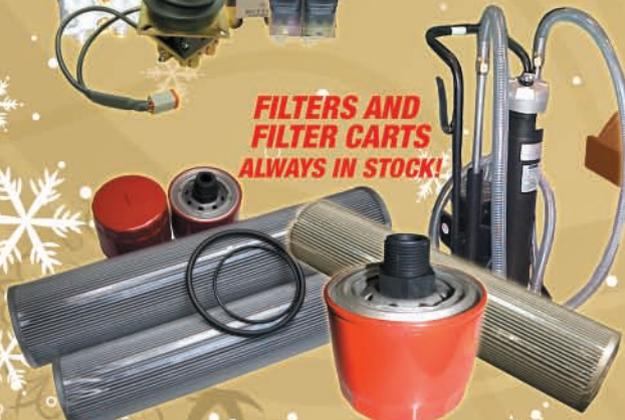
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Editor's Note



HAPPY HOLIDAYS TO EVERYONE! THIS

is the time to reflect as we wrap up the last issue of 2013. I've realized that not only has so much happened in the past year, but also in the last four years. Can you believe that *Waste Advantage Magazine* is entering its fifth year of publication? We are still going strong and intend to keep on growing and changing with the industry. In fact, next June we are debuting our new conference and trade show, the Fleet Management Expo. If you are involved in fleet management, whether it is as a manager or personnel, then this is the show for you. The goal of this event is to provide attendees with hands-on information and an opportunity to test the latest and greatest new trucks and equipment, as well as network with vendors who specialize in fleet maintenance, safety, government standards and more. We are excited about this great expo and look forward to traveling to the Indianapolis Marriott East in June. We want to see you there!



December's issue is full of great articles that cover subjects ranging from software and trailers to fleet management and strategies. "Dispelling Common Fleet Management Technology Myths" (page 20) debunks those misconceptions that get in the way of optimizing fleet operations, while "The Benefits of Electronic Billing" (page 28) makes the case for both large and small haulers to consider transitioning to an online billing system that will save businesses time and money. Additional important articles include one that discusses battling NIMBY-ism with better tactics in order to develop needed waste facilities (page 36) and "Choosing the Best Transfer Trailer Design to Meet Your Needs" (page 38) covers what you should look for in a trailer when considering what type of waste you are hauling. And don't forget to check out our cover story on Peoria Disposal Company in Illinois (page 14). They have continued to grow and look for ways to not only expand the business, but also handle a variety of waste materials that few facilities in the country are capable of dealing with. They are a company to watch in the next couple of years.

We look forward to providing you with the best, timely information for the next five years and always like to hear your comments, suggestions and questions. Your input is greatly appreciated.

Best Regards,
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AL MAIORINO

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JULIE MINK



On the Cover:

PDC owns and operates several Cat machines at their Indian Creek Landfill in Hopedale, IL. Shown is their Cat 836G landfill compactor and D6T dozer along with one of their company trucks.

Photo courtesy of Caterpillar.

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Trash Talk



Rumpke Showcases Commitment to Recycling By Opening One of North America's Largest Recycling Facilities

RUMPKE (Cincinnati, OH) unveiled its largest, fastest and most technologically advanced recycling facility in St. Bernard, OH. Following a devastating fire in April 2012, Rumpke vowed to rebuild a facility to ensure the region continued to have access to cost-effective recycling. The result was a \$32 million, 100,000 square foot facility that houses technology capable of sorting 55 tons of recyclables every hour. In all, the system designed by Machinex, has the potential to process 1 million pounds of material daily and will serve more than 4.5 million residents in Cincinnati and beyond. "We designed our new facility with the additional capacity to handle growth as recycling increases in the region as well as provide the ability to process additional types of materials as new recycling markets become available," added Rumpke. "We are committed to growing the recycling effort. By investing in technology, we have increased the efficiency of recycling and we continue to drive down the cost to recycle. Today, we can go to a home or business owner, examine their waste stream and identify a variety of waste solutions offering maximum recycling opportunities at the lowest cost possible, making recycling a win environmentally and economically."

For more information, call (800) 582-3107 or visit www.rumpke.com.

Wastequip Announces New Mobile Division President

WASTEQUIP® (Charlotte, NC) announces that John Defenbaugh has been promoted to president of the mobile division. In his new role, Defenbaugh

will assume responsibility for sales and operations for Galbreath, Pioneer, Mountain Tarp and Parts Place brands. In addition, Shawn King has been named president of Wastequip's technical division and will focus on growing Wastequip's market share for compactors and balers. Tim Phanco has been named vice president of sales for Toter and brings a track record of successful waste industry sales experience from past sales leadership roles at Otto and Rehrig Pacific. Phanco joined Wastequip earlier this year as vice president/general manager of the technical division.

"These moves will help Wastequip continue growing as overall business and competitive conditions change," said Marty Bryant, CEO of Wastequip. "Additionally, this organizational realignment allows us to continue developing top talent within Wastequip to ensure we have the best team in place to serve our customers."

For more information, call (877) 468-9278 or visit www.wastequip.com.

DriveCam, Inc. is Now Lytx, Inc.

DRIVECAM, INC. (San Diego, CA) announces it has changed its company name to Lytx, Inc. The company's flagship product will now be called DriveCam, powered by Lytx, and the company will continue to offer the same driver safety solutions and service that its clients rely on every day. "Our new company name reflects the evolution of our business and exemplifies our company vision," said Brandon Nixon, chairman and chief executive officer of Lytx. "We started out as DriveCam, and the name has served us well, but our value has never truly come from devices. It comes from the way we provide our clients with insights and understanding that form the cornerstones of their world-class safety programs."

The Company's RAIR™ Compliance Services is also now part of the Lytx family. RAIR helps DOT-regulated fleets comply with safety regulations, complementing the safety services offered through the DriveCam program. "We believe Lytx will take us into a future where we're building and managing a continually evolving database of expertise to help our clients maximize their safety and productivity," Nixon said. "Lytx stands for the entire process of Sense, Predict, Prevent™ (SPP), which uses our patented technology to advance the science of driving."

For more information, call (858) 430-4000 visit www.lytx.com.

E.L. Harvey & Sons Opens New Recycling Facility

E.L. Harvey & Sons has opened a new state-of-the-art single stream recycling facility to serve residents in the Hopkinton, Westborough and surrounding areas of Massachusetts. The materials recovery facility (MRF) was designed, manufactured and installed by Eugene, OR-based **BULK HANDLING SYSTEMS (BHS)**. The system is housed in a new 80,000 square-foot facility and is permitted to process up to 600 tons of residential recyclables per day. The highly-automated MRF recovers more than 95 percent of available recyclables, has created 35 new jobs with an additional 45-65 expected and provides surrounding communities with the opportunity to participate in single stream recycling.

"The Harveys have been leaders in this industry and in their community for decades, and it's an honor for them to place their trust in BHS," said BHS CEO Steve Miller. "E.L. Harvey & Sons has a great story and a long track record of excellence in operations. I have no doubt that this system will deliver performance for years to come for their business and the communities that they serve."

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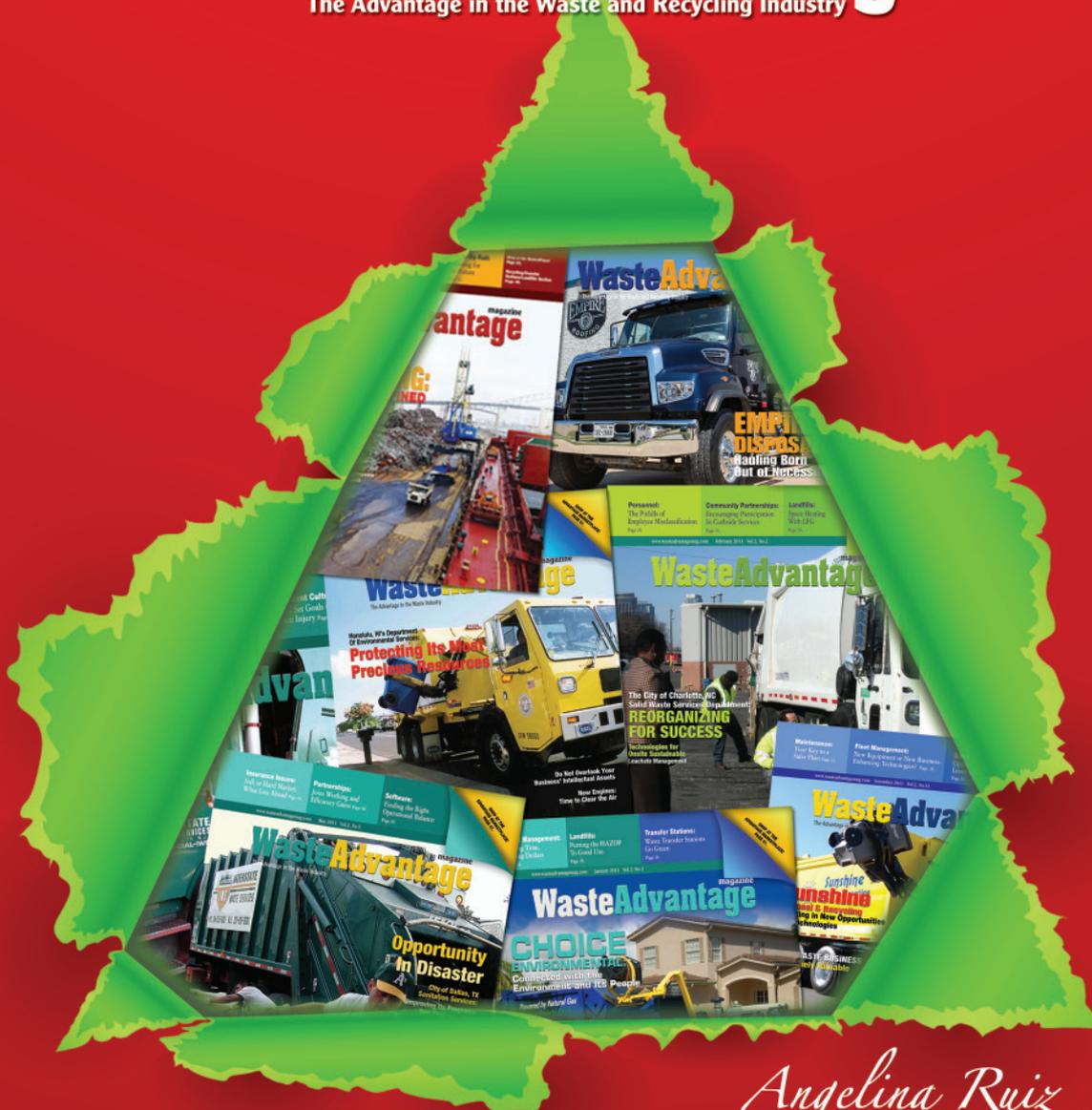
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We wish to thank everyone for all the support that has been given to us this past year.

From the *Waste Advantage Magazine* family to yours, we wish everyone a happy holiday season and a happy new year.

WasteAdvantage^{magazine}

The Advantage in the Waste and Recycling Industry



Noreen Cocron
Gary Orfe

Marcus Rubio
Sarah Winner
Elisa Weil

Angelina Ruiz
Heidi Jensen
Candace Schmidt

Mark Your Calendar



JANUARY 2014

21 – 23: 17th Annual LMOP Conference and Project Expo

Hilton Baltimore
Baltimore, MD
www.epa.gov/lmop/workshops/17th.html

21 – 23: World LNG Fuels 2014

George R. Brown Convention Center
Houston, TX
www.worldlngfuels.com

25 – February 1: SeminarFest 2014

Rio All-Suite Hotel & Casino
Las Vegas, NV
www.seminarfest.org

26 – 29: 22nd Annual U.S. Composting Council Conference & Tradeshow

Oakland Marriott City Center
Oakland, CA
www.compostingcouncil.org/conference

29 – 30: SWANA's Senior Executive Seminar

DoubleTree Hotel by Hilton - Grand Key Resort
Key West, FL
<http://ses.swana.org>

FEBRUARY 2014

27 – 28: Mia Green Expo and Conference

Miami Beach Convention Center
Miami Beach, FL
www.miagreen.com

MARCH 2014

2 – 6: WM Symposia

Phoenix Convention Center
Phoenix, AZ
www.wmsym.org

5 – 7: The Work Truck Show

Indiana Convention Center
Indianapolis, IN
www.ntea.com

9 – 12: Southeast Recycling Conference & Trade Show

Hilton San Destin Golf Resort & Spa
Destin, FL
www.southeastrecyclingtradeshow.com

11 – 12: Plastics Recycling Conference

Rosen Shingle Creek
Orlando, FL
www.plasticsrecycling.com

24 – 26: International Biomass Conference & Expo

Orange County Convention Center
Orlando, CA
www.biomassconference.com

24 – 26: SWANA Spring Training Center

Portola Hotel & Spa at Monterey Bay
Monterey, CA
www.swana.org/education/trainingcenters

24 – 25: SWANA's Road to Zero Waste

Marriott Monterey
Monterey, CA
<http://zerowaste.swana.org>

24 – 27: SWANA's 37th Annual Landfill & Gas Symposium

Portola Hotel & Spa at Monterey Bay
Monterey, CA
<http://landfill.swana.org>

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Government Gossip



Waste and Recycling Trade Group Announces New Name, Brand

The Washington, D.C.-based trade group that represents the private-sector waste and recycling industry in the U.S. announces that it is adopting a new name—the National Waste & Recycling Association. It also unveiled a new logo and tagline (“Collect. Recycle. Innovate.”). The change will officially take place on Monday, Dec. 2. The name change followed the merger of Environmental Industry Associations (EIA) and its sub-associations, the National Solid Wastes Management Association (NSWMA) and the Waste Equipment Technology Association (WASTEC). “The rebranding is a significant milestone in achieving the goals of the strategic plan we adopted in November 2012,” said Charlie Appleby, the Chairman and CEO of Advanced Disposal and the Chairman of the Board of the National Waste & Recycling Association (the Association). “The strategic vision for the group is the creation of a merged advocacy organization with leadership, expertise and programs that promote the Association as the most effective and trusted voice on ‘all things waste and recycling.’”

Sharon H. Kneiss, the President and CEO of the Association, added, “While the merger is now complete with this rebranding, our work continues to establish a number of programs within the organization. Our group is committed to the National Waste & Recycling Association being the unparalleled leader in industry advocacy, safety, waste technology, standards and statistics. Furthermore we are building a strong certification program and working to deliver excellent education opportunities.”

The group’s new logo includes symbols reflecting the industry’s involvement in the collection of waste and recyclables, recycling, organics and composting and the production of waste-based energy. The inclusion of the word “innovate” in the tagline highlights how technology is revolutionizing the way that waste and recycling is managed in America. “Our brand name and logo are important indicators of who we are and what we stand for. With this new name, we are taking the opportunity to strengthen and modernize how we represent our association and promote the industry to our members, government officials, the media and the communities in which we operate,” Kneiss said.

“The things we do as an industry help keep American communities clean and healthy. The new branding of the Association recognizes this and places a higher purpose on what we do,” Appleby said.

For more information, visit www.environmentalistseveryday.org.

EPA Proposes 2014 Renewable Fuel Standards

EPA has proposed for public comment the levels of renewable fuels to be blended into gasoline and diesel as required by Congress under the Energy Independence and Security Act of 2007. Developed with input from the U.S. Department of Energy and U.S. Department of Agriculture, the proposal seeks public input on annual volume requirements for renewable fuels in all motor vehicle gasoline and diesel produced or imported by the U.S. in 2014. The proposal seeks to put the Renewable Fuel Standard program on a steady path forward—ensuring the continued long-term growth of the renewable fuel industry—while seeking input on different approaches to address the “E10 blend wall.”

The proposal discusses a variety of approaches for setting the 2014 standards, and includes a number of production and consumption ranges for key categories of biofuel covered by the RFS program. The proposal seeks comment on a range of total renewable fuel volumes for 2014 and proposes a level within that range of 15.21 billion gallons. The 2014 proposal seeks input on what additional actions could be taken by government and industry to help overcome current market challenges, and to minimize the need for adjustments in the statutory renewable fuel volume requirements in the future. Looking forward, the proposal clearly indicates that growth in capacity for ethanol consumption would continuously be reflected in the standards set beyond 2014.

For more information, visit www.epa.gov/otaq/fuels/renewablefuels/regulations.htm.

OSHA Proposes New Rule to Improve Tracking of Workplace Injuries and Illnesses

OSHA has issued a proposed rule to improve workplace safety and health through improved tracking of workplace injuries and illnesses. The announcement follows the Bureau of Labor Statistics’ release of its annual Occupational Injuries and Illnesses report, which estimates that three million workers were injured on the job in 2012. The first proposed new requirement is for establishments with more than 250 employees (and who are already required to keep records) to electronically submit the records on a quarterly basis to OSHA. OSHA is also proposing that establishments with 20 or more employees, in certain industries with high injury and illness rates, be required to submit electronically only their summary of work-related injuries and illnesses to OSHA once a year. Currently, many such firms report this information to OSHA under OSHA’s Data Initiative. OSHA plans to eventually post the data online, as encouraged by President Obama’s Open Government Initiative. Timely, establishment-specific injury and illness data will help OSHA target its compliance assistance and enforcement resources more effectively by identifying workplaces where workers are at greater risk, and enable employers to compare their injury rates with others in the same industry.

For more information, visit www.osha.gov.

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Peoria Disposal Company: Transitioning from Waste Disposal to Waste Materials Management

From hauling to recycling and landfill management, PEORIA DISPOSAL COMPANY CONTINUES TO LOOK FOR INNOVATIVE PROCESSES AND NICHE MARKETS in order to grow their presence in the waste and recycling industry.

OPENING ITS DOORS IN 1928, PEORIA DISPOSAL Company (PDC) has grown from a small one-man operation to a major player in the greater central Illinois waste and recycling industry. In order to make a living for his family during the depression, current President and CEO, Royal Coulter, says, "My grandfather went to the alleys of West Peoria and asked people if he could pick up their trash. From there, he began taking barrels and putting the trash in garbage cans, again raising the bar in the 1940s by using a pickup truck to haul the trash. In the 1970s and 1980s, PDC stayed on the front end of the waste industry's drive to enhance services with increased automation and other process enhancements, such as routing optimization programs."

For 85 years, this family-owned company has emphasized how important it is to keep up with the changing industry, looking for new opportunities and expanding into strategic service areas in order to become more successful and diverse. Royal stresses, "I think that any time you can keep ownership in a family business strong and alive as well as taking it to

the fourth generation is an accomplishment. All three of my sons, Chris, Jeff and Matt are vice presidents in the company and have taken active roles. In addition, we take pride in a low employee turnover for a company our size—a lot of our senior managers have been with us for more than 20 years."

In 1989 Royal expanded outside of the Peoria area marketplace with the creation of Area Disposal Services, Inc (Area). PDC/Area presently employs approximately 550 employees, uses a fleet of 300+ trucks and 50 pieces of Caterpillar landfill equipment. The company currently provides waste collection services in central Illinois and a half dozen counties in MO and IA. PDC/Area also has a market presence in 13 States, providing hazardous waste and specialized environmental laboratory services.

More Than Just a Waste Disposal Company

In addition to PDC's hauling business, they also operate four landfills in the region. The first landfill



PDC owns and operates several Cat machines at their Indian Creek Landfill in Hopedale, IL. Shown is their Cat 836G landfill compactor and D6T dozer along with one of their company trucks. Photos courtesy of Caterpillar.

the company started was in 1968. Called the Peoria Disposal Company No. 1 Landfill (i.e., PDC Landfill No. 1), it started as a sanitary landfill when it received a permit to operate from the Peoria City/County Health Department. In 1979, the landfill was converted into a hazardous waste landfill—the first of its kind in the Great Lakes Region. In 1982, PDC won the operating contract for the Peoria City/County Landfill No. 1 Facility, which was a landfill owned jointly by the City and County of Peoria. PDC operated that facility until it reached the end of its disposal capacity in 1998. PDC also acquired the Clinton Landfill in 1989, which still operates today and went through a major expansion in 2002 to add 50 more years of projected service life. In 2004, PDC opened the Indian Creek Landfill in Tazewell County, which was expanded in 2007. In 1992, PDC acquired the Hickory Ridge Landfill, which is scheduled for an expansion in the near future. Finally, in 2009, PDC won a contract to run the new Peoria City/County Landfill No. 3 Facility (i.e., PCCL No. 3), which is projected to have a 40-year service life. This brand new site will be up and running by the time City and County of Peoria's current operating landfill is closed in 2020. PCCL No. 3 will include a Citizen's Convenience Center whereby Peoria County residents can drop off household hazardous waste free of charge. This permanent collection site that is located at a municipal solid waste landfill will be the first of its kind in the state of Illinois.

PDC Landfill No. 1 is more than just an industrial hazardous waste landfill. It also features a hazardous waste treatment center and a nonhazardous waste watertreatment plant. The hazardous waste treatment facility specializes in the treatment of the largest hazardous waste stream generated in the U.S. today, which is electric arc furnace (EAF) dust generated by steel mills. The waste

material from these steel mills is shipped to the PDC Waste Stabilization Facility which uses a proprietary process to treat the EAF dust and renders it non-hazardous. Once the treated EAF waste is tested and deemed non-hazardous, it is shipped to PDC's Indian Creek Landfill for disposal.

The second largest waste stream that PDC handles at its Waste Stabilization Facility comes from electronic waste processors like Kuusakoski Recycling—the largest metals recycling firm in northern Europe and the second largest electronics waste recycling firm in the world. "Right now, about one half of the electronic waste stream is the Cathode Ray Tubes (CRTs) from old TVs and computer monitors, and this source of electronic waste will continue to grow. Approximately half of the states in the U.S. have posted e-waste bans from landfills. As more states adopt this prohibition, coupled with the fact that people are not buying old computer monitors or TVs anymore, the stockpiling of CRTs will continue to occur unless viable, cost-effective and environmental friendly options exist to manage this challenging waste stream. Due to PDC's experience in dealing with the CRT waste stream, Kuusakoski approached us about managing their CRT glass. As the relationship evolved, Kuusakoski decided to build a CRT glass recycling processing center here in Peoria," says Chris Coulter.

This CRT facility became fully operational in early November 2013 and accepts whole TV sets and computer monitors. At the facility, e-waste is dismantled and the glass tubes will go through the processing line where they will be crushed and the steel band around the tube will be separated from the glass. The glass will also go through further processing whereby the leaded glass will be separated from the non-leaded glass. The leaded glass will go to the PDC Waste Stabilization Facility for treatment whereby PDC will render it

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The Coulter family and Caterpillar Chairman and CEO, Doug Oberhelman in October at the Indian Creek Landfill in Hopedale, IL. From left to right: Matt Coulter (PDC Vice President), Chris Coulter (PDC Vice President), Royal Coulter (PDC President and CEO), Doug Oberhelman, Jeff Coulter (PDC Vice President).

non-hazardous and ship it to the Indian Creek Landfill where the treated CRT material will be used as alternate daily cover. Meanwhile, the non-leaded glass will be recycled and made into other products, or will be used as alternate daily cover at the Indian Creek Landfill. "This is going to be the most cost-effective option available to handle the CRT glass waste stream in the U.S. and we have the capacity to take care of it through our unique partnership with Kuusakoski Recycling," says Chris.

Part of PDC's success has been their use of premium Caterpillar equipment throughout their landfill operations. This includes four 836H compactors, 13 D6 and D8 track dozers, three scrapers, three water trucks, eight excavators, seven backhoes, three generator sets, one skid steer, one telehandler and one forklift. Says Jeff Coulter, "We've always been a Cat user on the heavy equipment side and now we have eight of their tractor trailer and roll-off trucks that service our hauling customers on a regular basis, picking up industrial waste and trash. We have also started looking at acquiring their packer truck products."

According to Royal, PDC recently began incorporating railcars into its operations. They have bought rail gondola car boxes from Progress Rail Services, a division of Caterpillar, which they use to contain treated waste generated from PDC's Waste Stabilization Facility while the company waits for laboratory test results that confirm that the treated waste has been rendered non-hazardous. "We have a great partnership with Caterpillar. They stand behind their products and any time we need parts, Caterpillar is there to take care of us quickly, usually within 24 hours. The financial arm of Caterpillar provides creative financial structuring for asset acquisition and the Cat 'Access' account allows a customer-sensitive avenue to manage major repairs via multiple payment term options. We also use Cat rental so if a piece of equipment goes down, we can rent a piece of Cat equipment in order to continue operations."

Expanding the Recycling Side of the Business

In addition to hauling and landfill operations, PDC owns three permitted and operating transfer stations throughout central Illinois—Morgan County Transfer Station, Wigand Transfer Station and a transfer station in Clinton that operates at the landfill and processes recyclables. Says Matt Coulter, "We've always recycled cardboard and office paper, but within the last five years, our single-stream collection efforts have really taken off. This recycling boost is

primarily driven by the City of Peoria municipal contract, which was awarded to PDC in 2010. We've always provided recycling on the commercial side, but we've really started doing more on the residential side. Since being awarded the Peoria collection contract, it seems that every municipal contract that we've bid on or tried to extend, we have pushed for a single-stream recycling program. Even though most of our recycling collection contracts are concentrated in the Peoria area market, we are definitely providing this service in markets outside of Peoria such as the communities of Champaign and Jacksonville. It has become part of our business more and more."

Managing the Economy

Although PDC's customer base is shifting as a result of a constantly changing economy, Royal emphasizes that PDC continuously works on being out in front of its customers and not only tries to listen to, but also anticipate their needs. "In order to respond to the flat growth that we've experienced, we are trying to provide new services, get into new markets, get new contracts and tow the line on spending. By expanding our capabilities in the waste business right from the beginning, it has really helped us manage downturns in the economy. I think this partnership with Kuusakoski Recycling is an example of our company finding these market niches and developing them in order to help the company grow in the face of this downturn."

In fact, earlier this year, PDC acquired McCullough Disposal, the largest hauler in Woodford County. In late 2012, PDC also acquired Armstrong Disposal, a company north of Jacksonville, IL serving Menard and Cass Counties. These acquisitions have also assisted PDC in dealing with the economic downturn.

Community Involvement

PDC is very involved in the communities they serve. Royal, Chris, Jeff and Matt serve on different boards throughout the Peoria area, including the Peoria Production Shop, OSF Saint Francis Foundation, Salvation Army, Easter Seals, Boy Scouts and more. Says Royal, "We are very active in our local community here as far as raising funds and being out in front of projects for the disadvantaged population. We host tours of the facilities frequently and take a lot of pride in the appearance of our facilities. Last week, the Chairman of the Peoria City/County Landfill Committee addressed a group of interested citizens at our corporate office about the Peoria City/County Landfill Expansion project. We recently gave officials from Hopedale and Tremont, which are the two closest municipalities near the Indian Creek Landfill, a tour of the facility. We are constantly providing these types of outreach programs."

With the commodity price and tax benefits associated with compressed natural gas (CNG) more companies are developing natural gas filling stations. PDC worked with Clean Energy Fuels Corporation to strategically design, construct and operate a CNG fueling station at its West Peoria hauling operation. "On the CNG highway, we are actually the only CNG commercial fueling station between Chicago and St. Louis, Des Moines and Indianapolis—we've become a CNG retailer. When the station was opened in March 2012, a number of dignitaries attended our open house, including T. Boone Pickens, Doug Oberhelman, Caterpillar CEO and Congressman Aaron Schock. We are always looking to partner with other people as far as opportunities of that nature," explains Chris.

Training and Safety

When it comes to its own employees and their safety, PDC/Area implemented a behavioral-based training and incentive program a few years ago. Says Chris, "The

behavioral-based training program really helped us drive our EMR rating down. We are really proud that we are below 1.00 for the first time in the history of our company. However, because training and safety are constants to keeping employees safe, we are always looking for ways to re-tool that program.”

PDC's Health and Safety Officer, John Davis, and his Assistant, Dave Voss, visit the different landfill operations once a month to observe and do training. John and Dave also perform monthly safety audits and work with the managers to make sure that they are having daily and weekly safety meetings, driven by the corporate office. In addition, every facility has rotating signs that relay safety messages to employees, such as “Don't Lift Something Heavy”. For new employees, there is a rigorous screening process at the beginning of the hiring period in order to make sure they can perform certain tasks. Once they get through the pre-screening, supervisors spend a good week with them on the truck, showing them how to operate it and providing different safety techniques.

Investing in the Future

PDC is especially proud of the fact that it has expanded three landfills in the last 10 years which accounts for over 40 million new tons of disposal capacity. PDC/Area is also involved in a methane gas-to-electricity conversion process at its Clinton Landfill facility and is considering expanding this technology to its Indian Creek Landfill in the next couple of years. PDC expects to develop a methane gas-to-electricity plant at the Peoria City/County Landfill No. 3 Facility sometime after it is up and running and can justify the capital investment. “What's really getting difficult is that the public does not want to dispose of their waste in a landfill—they want to see more recycling, they want to see more reuse, they want to see more waste diversion from landfills. However, landfills are always going to have to be part of the equation. I think that these things we are doing, like the Citizens Convenience Center at Peoria City/County Landfill No. 3, single-stream recycling programs, investing in CNG fueling stations and strategic partnerships with international recycling firms like Kuusakoski will continue to shape and define our growing business. We're going to diversify more, we are going to expand into the recycling business, we are going to handle different waste streams because of new environmental regulations that are on the verge of implementation by the EPA,” says Chris.

PDC is also helping out the utility industry by managing coal combustion byproducts. Chris explains that EPA is currently looking at implementing a regulation that requires coal combustion byproducts to be disposed in Subtitle D landfills. Some of these utility companies don't have the land to build their own on-site landfill to accommodate their own generation of coal combustion byproduct waste. For those utilities that don't have the necessary space, they will rely on companies like PDC to take care of their wastes, but the material has to be treated and moisturized before disposal because it is extremely dusty and can cause fugitive dust emissions at the active face of the landfill. “We are always looking for niche markets to help grow the company because let's face it, the waste industry is a mature one,” continues Chris. “I believe we are turning from a waste disposal company to a waste materials management company, which means we are going to get more into waste processing and recycling. That's the path we are on.” | **WA**

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Dispelling Common Fleet Management Technology Myths

Martin Demers

DON'T LET MYTHS AND MISCONCEPTIONS GET IN THE WAY OF OPTIMIZING YOUR FLEET OPERATIONS. Keeping pace with changing transportation telematics ensures that fleet operations excellence will measurably benefit waste and recycling organizations, their employees and their customers.

FLEET MANAGEMENT SYSTEMS AND TECHNOLOGY

have come a long way in the past decade. According to a new report by Global Industry Analysts, Inc., the global commercial vehicle telematics market is set to reach US \$11.2 billion by 2015. A focus on next generation vehicle telematics applications, such as fleet operation management systems, is expected to stimulate significant market growth.

An increasing emphasis on convenience, safety and overall fleet efficiencies has spurred on the use of onboard fleet management systems in the transportation sector—particularly in the waste and recycling management industry. This growth is driven primarily by demand from waste management organizations to better manage the cost of fleet operations. New onboard fleet management technologies allow waste fleet owners to reduce costs by trimming unnecessary mileage, boosting productivity and improving overall customer service. Volatile fuel prices, which are forecasted to rally up as the economy rebounds, will offer an added impetus for fleet managers to adopt solutions that will help reduce energy and fuel costs and expand profit margins.

It's clear—fleet management technologies are on the rise and are field-proven to deliver compelling bottom line and operational benefits to waste fleets. Yet in spite of this, many misconceptions and barriers to adoption exist in the waste and recycling industry. This article sets out to tackle the top eight fleet management myths and misconceptions in order to provide a broader perspective into this market and what it means for waste fleets in North America.



Myth #1: Fleet Management Systems Are Too “Big Brother”

Many fleet managers and drivers mistakenly believe that onboard fleet management systems are primarily used to monitor or spy on employees. This notion completely misses the point of the potential value of these systems to the entire organization and, in particular, to drivers.

In reality, onboard fleet management systems are designed to empower, improve and protect the drivers. In terms of empowerment, onboard systems typically provide real-time feedback to drivers on performance thresholds (speeding, idling, hard-braking, etc.) so that they can modify their behavior before alerts are

sent to the back office. This takes the guesswork out of driving. Drivers can rely on real-time feedback to be able to adjust their activities as required.

Onboard systems further flag vehicle issues to ensure that the vehicle is properly maintained and running properly. Both drivers and fleet managers are assured of immediate ECM-related alarms to flag any issues for repair and maintenance. Drivers are safer and vehicles perform better.

Onboard computing displays will also significantly reduce the requirement for manual intervention, thereby reducing the amount of driver distractions and potential for human error. They provide the tools and training to help drivers self-monitor and self-improve in terms of safety driving and productivity. When accidents do occur, onboard computing systems will typically capture key data and photographic evidence to support both drivers and related insurance claims.



Myth #2: “Green” Fleets Are Too Expensive to Deploy

Green fleets are not only more responsible fleets, but also more profitable ones as well. The bottom line is that if your waste collection fleet is not managed effectively, you will use more fuel and generate unnecessary emissions and excess costs that impact your profitability. Today's economic conditions and environmental concerns are providing ample impetus for more and more waste fleet managers to implement green fleet policies and solutions.

In spite of this, the implementation of a green fleet is still considered by many to be an expensive and complex concept. This isn't the case. Put simply, green fleets are focused on reducing fuel consumption, mileage and exhaust emissions, and on driving more safely. Investing in new hybrid waste collection trucks and converting to alternative fuels—such as natural gas—will dramatically reduce emissions; however, these fleet upgrades may be out of scope for many budgets in tight economic times. The reality is that this only addresses some of the issues and should not stop you from implementing other green fleet practices to make a positive impact on your operations and the environment.

Onboard fleet management systems provide the tools to support leaner and greener fleets by improving



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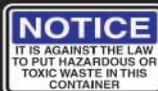
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Dispelling Common Fleet Management Technology Myths

fuel consumption, reducing overall mileage and reinforcing greener driving behaviors. For example:

- *Improving fuel consumption management*—Fuel costs account for a major portion of the total fleet operating cost and will vary according to vehicle type, driving style and mileage, so managing your fuel consumption is a critical part of green fleet management. Fleet management systems can help reduce fuel consumption—and your carbon footprint—by letting you optimize each truck's routes to reduce time spent on the road and the number of engine hours per day, reduce the amount of fuel burned by the engine as it is being used with idling alarms, and identifying aggressive driving patterns and vehicle maintenance issues so that engines can be repaired before problems escalate.

- *Reducing overall mileage*—Fleet management systems provide automatic driving directions to the driver, and will automatically re-calculate the route when a driver selects an out-of-sequence manual stop. This ensures that each route is optimized for time and distance, as well as reduced overall mileage.

- *Supporting driver excellence*—Driver behavior is fundamental to fleet efficiencies. Even the most fuel-efficient vehicles will perform poorly with an inefficient driver behind the wheel. Fleet managers need the tools to influence and educate drivers on more emissions-friendly driving approaches. Fleet mapping and monitoring tools allow fleet managers to work more proactively with drivers to ensure and reinforce better driving behavior.

In short: greening your fleet improves your bottom line. It's not costly—it's just common sense.



Myth #3: Fleet Management Systems are Costly and Eat Up Precious Capital Budgets

In the long run, it's far costlier not to have a fleet management system. There are three important points to be considered in terms of budgeting for fleet management technologies and their impact on operations. First, let's address the common refrain of "it's too expensive". The reality is that the potential ROI from a fleet management deployment quickly validates the costs. Indeed, it's too expensive not to take advantage of advances in technology that ensure optimal fleet performance. The automotive world is evolving rapidly to improve accessibility, performance and sustainability. Getting left behind is not an option.

Second, waste organizations that think all fleet management systems are created equal and seek the lowest cost option are seriously mistaken. Waste companies need to do their homework, understand their fleet objectives and carefully select reputable vendors that provide the most effective solution for their particular needs. Low-cost solutions are risky and often inadequate. The "you get what you pay for" rule of thumb applies here.

Third, you need to think "future-proof" when you select an onboard computing solution. Installing a fleet management system is a strategic decision—not a single-solution tactical one. Your system needs to meet all your requirements as they evolve over time with upgrades, enhancements and advances in technology. Ironically, it will prove to be costlier for you to opt for a less expensive tactical platform that will address one dimension, but will require a complete replacement or parallel infrastructure to address any others. Good vendors should be able to show you a product road map with planned upgrades and new capabilities.



Myth #4: Fleet Management Systems are Difficult to Deploy

With any new technology system, there is always a danger for data overload, resistance to adoption and frustration with learning new things. Waste fleets that deploy their systems carefully and incrementally are most likely to succeed. The trick is to "think small".

Here's the typical scenario. You've done your research, you've selected a fleet management system vendor and you've purchased a new fleet management solution to help you run a better, smarter and more cost-effective fleet organization. Your vendor has just deployed the system at your facilities and in your trucks. Now a vast array of potential features, functionality and benefits awaits you. This is where the "think small" part comes in. While your new system may have dozens of capabilities—the reality is that these will overwhelm your team if you try to implement and launch them all at once. For optimal results, start small with a phased approach:

- Pick just two key objectives—for example, 1) to improve fuel efficiencies and 2) improve safe driving results.
- Baseline these two objectives so that you can easily measure their progress.
- Designate an implementation team for the two objectives (team lead, driver liaison, IT resource, etc.)
- Identify the reports required to drive and measure each initiative.
- Train staff on how to use the tools and reports for just these two objectives.
- Launch!
- Schedule regular meetings to monitor results and adjust as required.

Once staff has comfortably implemented the functions and have made them part of their daily routine, repeat the entire process with two new objectives. Ideally, you should easily be able to roll out two new objectives every two to three months. By thinking small, you will affect real change and improvements in a lasting and effective manner.



Myth #5: Route Optimization Solutions Are Too Limited

Well, technically we agree. This is not so much a myth as it is a misunderstanding of what a full routing solution should entail. Route optimization solutions are often too limited for the big picture perspective. Route management solutions, however, are a different story. Beyond route optimization software, fleet managers need to ensure practical and comprehensive 'on-the-street' route management to ensure that drivers are executing their routes and activities according to plan.

How does route management differ from route optimization, exactly? Route management is the governing practice of achieving the best efficiencies from fleet operations. Route management includes route optimization software as part of an overall solution, however getting the best performance from trucks and drivers requires an understanding of how to make efficiencies work at the street level.

Route management takes the theory of optimizing route efficiencies and combines that with the real-time fleet tracking and turn-by-turn driver direction to ensure that vehicles actually use those routes that minimize the distance, the amount of fuel used or the amount of time required to fulfill their duties. Route management also includes the monitoring of driver behavior and truck activity to ensure safe driving practices.

The benefits of a more comprehensive route management approach are compelling. Route and fleet management solutions are proven to reduce fuel

consumption with more efficient routing and by the monitoring of vehicles and drivers. The savings can be huge. ABI Research cites such benefits as more than 12 percent increases in service profitability, 13 percent improvements in vehicle use, and nearly 15 percent decreases in travel time with fleet and route management solutions. Not to mention the benefits of improved fleet safety practices.

Route management solutions typically encompass multiple capabilities including route optimization software that calculates the best way to service a list of addresses, fleet monitoring solutions that track vehicle's precise geocoding (GPS) of all data and events, fleet mapping software that creates a real-time map view of a vehicle's history of reported positions, real-time positioning features that presents a map view of your vehicles' current positions, driver direction capabilities that automatically provide driving directions to the truck's next stop, and reports and alerts software that ensures a high level of insight into your fleet's operational efficiency and assists in identifying those areas where you can reduce costs or improve productivity.

You need more than software that just tells you the next nearest address. This is only part of the picture. To run an optimally efficient fleet operation, you need an end-to-end and real-time view of trucks and routes, and the tools to manage this effectively.



Myth #6: Fleet Safety Programs are Hard to Enforce

They don't have to be. Fleet safety is about reducing risk and reinforcing safe driving behavior. With the potential threat of fatalities and injuries, and the related costs of

accidents, safety initiatives have become a critical concern for any waste fleet manager. Onboard computing solutions can provide managers with real-time visibility into driver activity and behavior.

In order to be truly effective, a fleet safety plan needs to take into consideration how you select and train your drivers, vehicle inspection and maintenance, and ongoing monitoring and data collection. A waste fleet manager needs to approach safety management in four ways:

1. First he needs to identify the high-risk drivers. Who are the drivers that constantly exceed speed limits, drive aggressively, accumulate complaints and are involved in the most accidents?

2. Secondly, these drivers need to be coached toward safer and more defensive driving techniques. Incentives can be offered to help motivate safer driving behavior.

3. Third, driving patterns and behavior need to be continuously monitored to reinforce behaviors on a daily basis. It's too easy to lapse back into bad habits. Changing and maintaining driving behavior is a long-term process.

4. And finally, systems and processes need to be put in place to deal effectively with any accidents that do occur. Accident management is an important piece of an overall safety program.

A fleet management solution will provide managers with real-time visibility into driver activity and behavior to support safety program KPIs. Fleet reporting software will deliver access to centralized fleet safety data for a completely transparent representation of your fleet's safety performance. These are essential tools to supporting and reinforcing driver excellence.

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- Ask the Experts Panel
- Lowering Your Fleet costs
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- Meeting Emission Standards
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- Diesel Vs. CNG
- Route Optimization
- New Government Regulations
- Going Green
- Keeping Fleets On the Go

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Dispelling Common Fleet Management Technology Myths



Myth #7: In-Cab Smart Displays Are Too Finicky for Rugged Waste Vehicles

Absolutely not. A smart display is typically a wireless touch screen device with built-in Wi-Fi and the ability to interact directly with the screen. These are quickly becoming the onboard computing hardware of choice for the most progressive waste fleets. Smart displays are mounted in-cab units that provide unprecedented real-time information to drivers and dispatchers about a truck's load-weight, route status, service completion, vehicular telemetry, driver activities and much more. Typically, they offer a wide range of inputs from a vehicle's on-board systems including cameras, scales, RFID readers, tire pressure and fuel monitoring, as well as other devices.

The most robust and rugged of these onboard smart displays have typically been developed for tough military environments. These are not finicky solutions. If they can hold their own in armored vehicles traversing rugged terrain under fire, they will withstand the rigors of a waste collection route. Look for vendors who can prove the durability of their solution in arduous physical conditions.



Myth #8: It's Hard to Quantify an ROI with a Fleet Management System

Definitely a myth! A reputable fleet management solutions vendor can demonstrate an ROI that is fact-based, achievable and measurable. Further, a fleet management solution should take into consideration all facets of the fleet operations business and not just a particular aspect or sub-set of issues. From up to 80 percent reductions in data entry times, to dramatically improved service efficiencies, a fleet management solution can help streamline your entire operation. For example, an "ROI calculator" should be able to project the bottom-line impact of a field-proven fleet management solution over the following key functions:

- **Driver and Administrative Labor**—With built-in calculators for low-to-high variables, many vendors can estimate the reduction in minutes per day for administrative paperwork, office support, route time and route efficiency based on your company's fleet size, routes, customers and other operational data. Savings in this area typically span \$2,500 to more than \$5,000 in annual cost improvements for every truck.
- **Vehicle Maintenance**—From monitoring and managing driving and braking patterns, to ensuring safer driving and reducing idling times, an ROI calculator can usually demonstrate how an onboard solution will ensure improvements of up to \$2,000 per truck annually.
- **Fuel Consumption**—By monitoring and managing idling percentages and speeding infractions, and by reducing the amount of unnecessary travel, an ROI calculator should be able to chart your fleet's projected savings for up to \$1,500 a year for every truck.
- **Service Delivery**—The "goodwill" benefits of satisfied customers are hard to quantify, as are the benefits of complete 360° visibility into track and driver activity. However, fleet system vendors should be able to demonstrate the revenue impact of reducing missed pickups and increasing service delivery. Additional roll-off benefits and extra commercial and residential revenues can also be calculated to show potential bottom-line impacts to your specific fleet operations environment.

ROI for fleet management solutions is definitely quantifiable. If you are in the market for such a solution, ask potential vendors for a measurable ROI calculation based on the specific details of your fleet operation. If you get only vague estimates, move on to the next vendor.

In Closing

Don't let myths and misconceptions get in the way of optimizing your fleet operations. In our increasingly connected world, transportation telematics are changing the way we communicate and work across industries and geographies. Keeping pace with these positive changes to ensure fleet operations excellence will measurably benefit waste and recycling organizations, their employees and their customers. | **WA**

*Martin Demers is CEO of FleetMind (Montreal, QC). He is a proven C-level technology executive with more than 20 years of experience in the technology and communications sectors. Martin joined FleetMind in 2007 as co-owner and became the company's CEO. Previously, he served as President and COO of Radialpoint, CEO of Interstar and as CMO of ACE*COMM. He has also held a number of leadership roles at Teleglobe Foxboro and CAE, where he managed large-scale international technology projects. Martin is a frequent contributor to industry publications and speaker at technology events. For more information, visit www.fleetmind.com.*

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Benefits of Electronic Billing

Makenzie VanderWerff

ELECTRONIC BILLING HAS MANY BENEFITS THAT CAN HELP not only large waste companies, but also small haulers too. It can better enhance your business by keeping it organized and efficient, while taking some of the workload off your business' shoulders.

HAVE YOU EVER MISSED A PAYMENT DUE TO misplacing the bill in a stack of papers? Perhaps it was even lost in the mail. Technology has advanced rapidly in recent years and there are tools today that can help mainstream your billing processes and keep everything organized and efficient. One of the most effective technological advances is electronic billing, which can save time and money as well as help with the future of your business.

There are many benefits in using electronic billing. In addition to saving time and money, payment reminders can be set so you will never miss a payment due date. By going paperless, it is estimated you will save 171 pounds of greenhouse gases, 63 gallons of water and 4.5 gallons of gasoline annually. However, some people are afraid that there will be problems associated with online billing. Some worry they may overpay a bill or they may have to change their e-mail address or lose

access to their bills and/or accounts. The article below addresses some of these issues as well as discusses some of the best features of electronic billing.

Integration

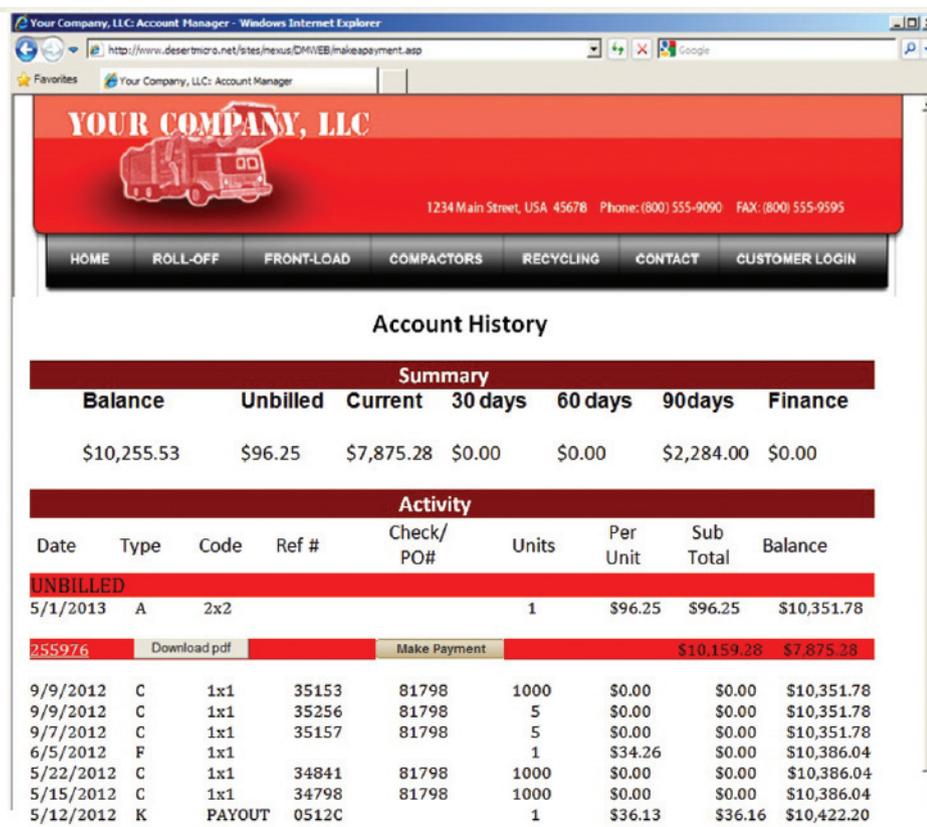
Electronic billing is beneficial for all companies no matter its size and is easily accessible. Some innovative developments have raised the bar for software solutions that are used to handle and enhance productivity in businesses in the waste hauling and recycling industry. Products are continuously advancing based on the needs of waste and recycling companies who are looking to eliminate inefficiencies through automation.

One feature of electronic billing is being able to integrate routing, dispatching, customer management, inventory control, billing and document management. Software like this is generally available for the single user or for use in a multi-user, multi-location environment; the software tracks service requests and schedules follow-ups. An online billing and payment system can allow customers to request or change service, receive, view or pay their bill(s) online.

Web-Based Features

By integrating a Web-based system, clients can better stay on top of customer billing and manage payments by tracking and organizing their transactions online through their own branded, secure Web sites. It gives customers the capability to reduce billing challenges by up to 42 percent. Complete paperless billing and payment systems with an online customer portal enable 24-hour customer service. A Web-based program can secure customer access and eliminate all security worries that customers may have. It allows profile updates at any time, giving users the ability to change their password at any time and not worry about old e-mail addresses. It will not let you overpay invoices because it allows you to select the invoice you wish to pay, and it also gives customers online support whenever they need it.

An example of an account history page where you can view all of your past invoices. Here, you can also choose to make a payment on the same screen.



The screenshot shows a web browser window with the URL <http://www.desertmicro.net/sites/nexus/DMWEB/makepayment.asp>. The page header includes the company name 'YOUR COMPANY, LLC' with a truck icon and contact information: '1234 Main Street, USA 45678 Phone: (800) 555-9090 FAX: (800) 555-9595'. A navigation menu contains links for HOME, ROLL-OFF, FRONT-LOAD, COMPACTORS, RECYCLING, CONTACT, and CUSTOMER LOGIN.

The main content area is titled 'Account History' and is divided into two sections: 'Summary' and 'Activity'.

Summary

Balance	Unbilled	Current	30 days	60 days	90days	Finance
\$10,255.53	\$96.25	\$7,875.28	\$0.00	\$0.00	\$2,284.00	\$0.00

Activity

Date	Type	Code	Ref #	Check/ PO#	Units	Per Unit	Sub Total	Balance
UNBILLED								
5/1/2013	A	2x2			1	\$96.25	\$96.25	\$10,351.78
255976		Download pdf		Make Payment			\$10,159.28	\$7,875.28
9/9/2012	C	1x1	35153	81798	1000	\$0.00	\$0.00	\$10,351.78
9/9/2012	C	1x1	35256	81798	5	\$0.00	\$0.00	\$10,351.78
9/7/2012	C	1x1	35157	81798	5	\$0.00	\$0.00	\$10,351.78
6/5/2012	F	1x1			1	\$34.26	\$0.00	\$10,386.04
5/22/2012	C	1x1	34841	81798	1000	\$0.00	\$0.00	\$10,386.04
5/15/2012	C	1x1	34798	81798	1000	\$0.00	\$0.00	\$10,386.04
5/12/2012	K	PAYOUT	0512C		1	\$36.13	\$36.16	\$10,422.20

A Web-based electronic billing system also gives customers the ability to access their accounts online, view their account history, online bill presentation, payment services, and reduce duplicate billing and collections. They also have the option of signing up for auto pay and/or paperless billing, reducing payment application errors by an average of 14 percent.

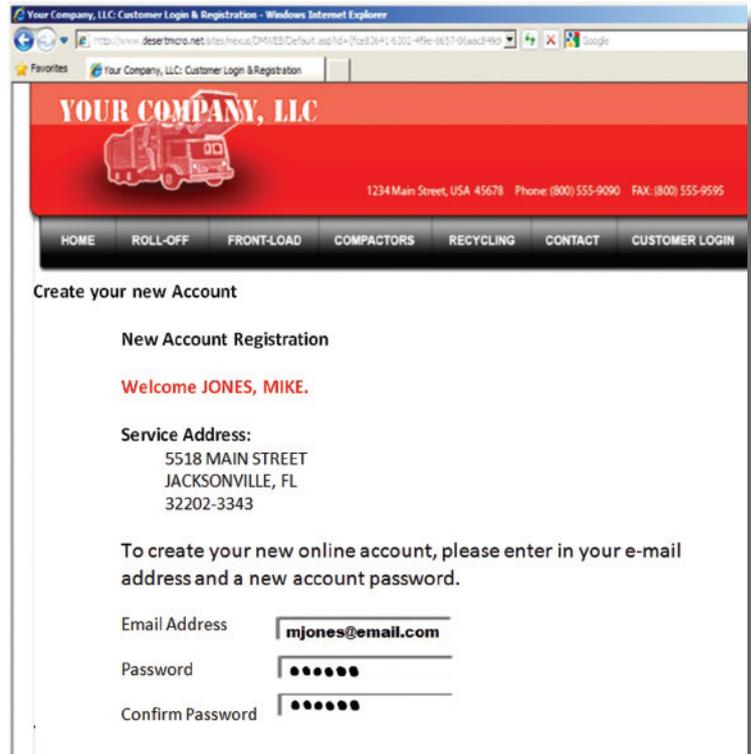
Benefits to Waste Companies

On the flip side, electronic billing gives waste companies a 24-hour online Web billing and payment portal, saving time and money. Payments are collected quickly, and customers have the ability to submit service requests or new service inquiries at any time.

Electronic billing does not just benefit large waste haulers; it also benefits small haulers. The small hauling company is often staffed with employees that must perform many different tasks. By redirected and automating this accounting task, small haulers can continue to focus on customer service and leave it up to another company to do their billing needs. It also continually reduces administrative overhead and paper storage.

Electronic billing has many benefits that can help not only large waste companies, but also small haulers as well. It can better enhance your business by keeping it organized and efficient, while taking some of the workload off of your business' shoulders. | **WA**

Makenzie VanderWerff is the Marketing Assistant at DesertMicro (Jacksonville, FL). She can be reached at (904) 247-4285 or via e-mail at marketing@desertmicro.net.



An example of a create a new account/login page.

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Solid Waste Collection Route Optimization and Implementation Plan

Ravi Kadambala, Abdul Mulla Saleh and Julio Brea

In early 2013, the City of Homestead, FL SUCCESSFULLY TRANSITIONED FROM COLLECTION OF RECYCLABLES AND BULKY WASTE from twice a month to once a week.

THE CITY OF HOMESTEAD (FL) PUBLIC WORKS and Engineering Department, Solid Waste Division (SWD), is responsible for residential municipal solid waste (MSW), which includes garbage, single-stream recycling, and bulky waste collection and management for the city. Each waste stream has its own defined collection zones, for which SWD provides personnel and equipment to perform services. The city collects garbage twice per week, recyclables twice a month and bulky waste twice a month. The City hauls garbage and bulky waste to the South Dade Landfill and recyclables to Homestead Landfill and Recycling Facility owned by Waste Management. The City has recently passed

an ordinance that took effect on January 2, 2013, to increase collection of recyclables and bulky waste from twice a month to once a week.

Homestead is currently divided into 12 zones for garbage collection, as shown in **Figure 1**. The garbage is being collected twice a week from each zone. The collection days for garbage from each zone are either Monday and Thursday or Tuesday and Friday. The city wishes to maintain the existing zones and collection schedule for garbage. The main project objectives are to:

- Increase the collection of recyclables and bulky waste from twice a month to once a week.
- Align collection days for recyclables and bulky waste with their existing garbage collection days.
- Alternate bulky waste collection each week so that all the residents receive either Monday or Tuesday pickup every other week (early week collection once every two weeks).
- Optimize bulky waste and recyclable zones so that the collection time from each zone is as close as possible.
- Develop public communication plan for the revised schedule and zones to provide for smooth implementation of the new collection schedule.
- Train city staff for the new zones so that the implementation of the revised schedule takes effect on January 2, 2013.

Since the City wanted to coincide the days of recyclables and bulky waste collections with their existing garbage schedule, four zones were developed for recyclables/bulky waste collection by using the existing garbage collection zones as shown in **Figure 2**.

Data Collection and Assumptions

The city of Homestead has 12 zones for garbage collection and the days of collection are Monday, Tuesday, Thursday and Friday. For recyclables, there are five zones and the days of collection are Monday through Friday. Lastly, there are eight zones for bulky waste collection and the days of collection are Monday, Tuesday, Thursday and Friday. The city has provided the residents with 96-gallon containers, called super cans, for garbage and recyclables collection. The bulky waste is placed at curbside of each house without any containers.

The following data was required to model the existing garbage zones and new recyclables/bulky waste zones:

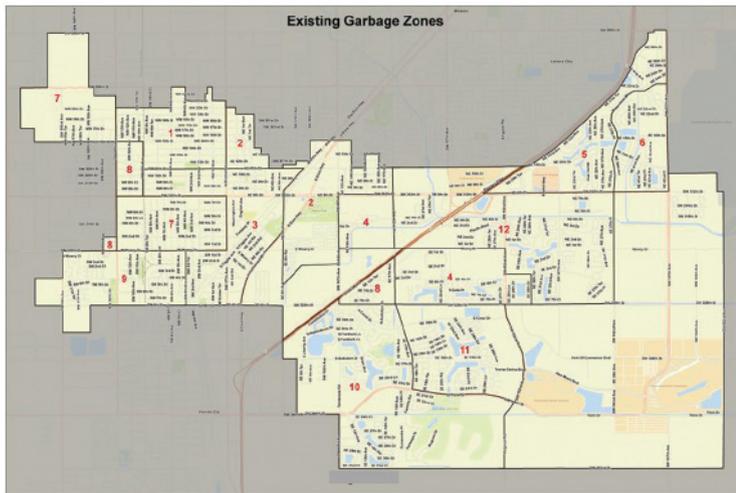


Figure 1
Twelve zones for existing garbage collection.



Figure 2
Proposed zones A, B, C and D for both recyclables and bulky waste collection.

Images courtesy of CDM Smith.

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Solid Waste Collection Route Optimization and Implementation Plan

Table 1: Revised Waste Generated by Household per week

Recyclables Generated by Household per week	4.11 x 3 = 12.33	Pounds
Bulky Waste Generated by Household per week	15.59 x 10 = 155.9	Pounds

- Number and type of collection equipment (e.g., trucks, cranes) for each type of waste collection
- Personnel available for each type of waste collection
- Size and capacity of collection equipment
- Average amount of waste generated per day per household for the various types of waste
- Average pickup time from waste collection equipment for the various types of waste
- Location of all city residents in GIS format with street-level details
- Location of SWD facility, South Dade Landfill and Waste Management's Homestead Landfill and Recycling facility

The average pickup time by collection equipment for the various types of waste was assessed by conducting field investigations and observations. CDM Smith followed the trucks for a day on each representative waste collection zone to evaluate the average pickup time at each stop. Video and pictures were taken for each representative zone. Several drivers were interviewed to determine the routes followed in all the zones for all three waste categories. The main objective of interviewing the drivers was to obtain their input on revising the collection zones for recyclable and bulky waste. The following assumptions (based on the conducted field observations and input from the SWD staff) were used for the average pickup time at each stop for the various waste categories:

- The average pickup time of garbage from an auto-side loader was approximately 12 seconds.
- The average pickup time of recyclables from an auto-side loader was approximately 12 seconds.
- The average pickup time of bulky waste using a crane and a dump truck was 1 minute.

Analysis of videos and interviews with the drivers indicated that not all the houses were generating recyclable and bulky waste. So, assuming that every house is generating recyclables and bulky waste in modeling waste collection zones may not be valid. Based on video analysis, interview with the drivers and discussion with the SWD staff, the following assumptions were made:

- Every third house generates recyclables
- Every tenth house generates bulky waste.

The city provided the data for waste generated during the year 2011 – 2012. Since it was assumed that only every third house is generating recyclables and every tenth house is generating bulky waste, Table 1 shows the revised waste generated by household per week to account for the total amount of waste generated.

Modeling and Optimization

Because one of the goals was to coincide the days of recyclables and bulky waste collection with the existing garbage collection days, the garbage zones were used as a basis for modeling the recyclables/bulky waste zones and collection routes. Four proposed zones were developed for recyclables/bulky waste collection (zones A through D) as shown in Figure 2. A GIS-based route optimization modeling software was used to model the existing garbage zones and the new recyclables/bulky waste zones for efficient and realistic collection routes for crews. The benefits of using this model include:

- Balances route times, service days and districts
- Maximizes productivity of vehicles
- Reduces labor/overtime costs
- Optimizes travel paths to reduce deadheading (travel vehicle time without pickup)
- Decreases fuel consumption, mileage driven and maintenance costs
- Reduces time and cost of updating routes and rerouting
- Easily integrates new customers into routes to facilitate expansion
- Improves customer service
- Proficiently trains new drivers

The 12 zones for garbage were modeled using the software and the assumptions described previously. Figure 3 shows a summary report for all the garbage routes for each zone. The waste collection time varied from 4.5 to

Route Statistics						
Route	Time	Quantity	Stops	Units	Mileage	Trips
	hrs	tons	(count)	(count)	miles	(count)
1	5:40	11.81	797	877	51.37	1
2	6:34	13.57	934	1002	66.17	2
3	5:21	11.68	502	861	44.33	1
4	6:49	15.51	1140	1144	59.62	2
5	7:38	18.88	1390	1392	57.18	2
6	7:17	18.40	1356	1357	50.45	2
7	6:16	12.10	662	892	71.81	2
8	4:33	9.60	470	708	40.70	1
9	5:17	11.95	748	881	42.83	1
10	7:43	17.29	1275	1275	70.68	2
11	6:52	15.50	1143	1143	62.02	2
12	8:05	19.24	1419	1419	69.41	2

Figure 3
Summary report for all the garbage routes for each zone.

eight hours. The average waste collection time was approximately 6.5 hours. The summary report estimated quantities of waste generated, number of homes serviced, stops made, estimated mileage and trips to the landfill facility for each zone. The summary report also provided analysis on the number of straight roads, left and right turns, U-turns and dead ends, and U-turns made in a zone during waste collection.

The existing garbage zones have six zones that are serviced on Monday and Thursday. Based on the garbage collection time obtained from modeling, the six zones were then grouped into two zones: A and B. The remaining six garbage zones are serviced on Tuesday and Friday. Based on the garbage collection time obtained from modeling, the remaining zones were grouped into two zones: C and D. The proposed zones were the same for both recyclables and bulky waste and were modeled and optimized based on the assumptions for recyclables and bulky waste zones respectively.

Results and Analysis

Modeling results for recyclables and bulky waste were analyzed and the GIS maps with the various waste collection zones were finalized. The recyclables collection time for the zones varied from 6.5 to 9 hours. The average waste collection time was around 8 hours. The estimated quantity of recyclables generated per zone was around 2.27 tons. The average number of residential homes serviced in a zone was around 3,340. The average mileage per trip was around 83 miles and the average trip to the Waste Management's Homestead



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Landfill and Recycling facility was estimated to be once. Since bulky waste collection, using one crane and two trucks for each crew, is different than garbage and recyclables collection using side-loading trucks, modeling parameters were adapted to reflect continuous truck loading and travel operation to the landfill until the entire waste is collected from each zone. The bulky waste collection time for the zones varied from nine hours to 11 hours. The average waste collection time was around 10 hours. The average number of residential homes serviced in a zone is around 3,340. The average mileage per trip was around 92 miles.

These results are based on estimated quantities from the collected data. Actual quantities may fluctuate based on seasonal and participating residence variations. A contingency plan has been developed to accommodate these variations with input from the SWD. The waste collection time for the various zones varied for both recyclables and bulky waste and is based on calculated waste quantities from the collected data. In reality, actual waste quantities and collection time varies for each zone based on several factors. These factors include lifestyle of certain communities, the degree of waste recycling and the size of lots in the communities. However, the results seem to be reasonable and conservative to a certain degree.

The proposed zones were finalized with input from the SWD staff. The finalized zones (A through D) are shown in Figure 2. The recycling schedule remains the same every week. Zone A, B, C and D will have Monday, Tuesday, Wednesday and Thursday recyclables pickup, respectively. One of the project goals was that the bulky waste collection be alternated each week so that all

the residents receive either Monday or Tuesday pickup every other week (early pickup). In order to accommodate this, Zones A and B will have an alternate Monday and Thursday pickup of bulky waste, and Zones C and D will have an alternate Tuesday and Friday pickup of bulky waste. The schedule for the zone A is shown in Figure 4, page 34, as an example. Similar schedules were developed for the remaining zones.

Implementation Plan

An implementation strategy was developed to educate the public on changes to the waste collection zones and schedule by creating a public communications plan. The SWD staff was provided with proper training to ensure that the revised schedule and zones for recyclables and bulky waste collection would be implemented smoothly on January 2, 2013.

As a member of the project team, Media Relations Group, LLC (St. Cloud, FL), worked with the City to develop the content of the public communications plan for this project. In the third week of November 2012, the residents were informed of the good news that the city was increasing the collection of recyclables and bulky waste from twice a month to once a week, beginning January 2, 2013, at no additional cost. The residents were informed via bill inserts sent to their homes along with their monthly billing statement. This message was also posted on the Web site. Several advertisements were also placed on local radio stations and the residents were also informed via postcards sent directly by the city. Once the final map and the zones were developed, it was posted on the Web site. A magnet calendar was developed for each of

Solid Waste Collection Route Optimization and Implementation Plan

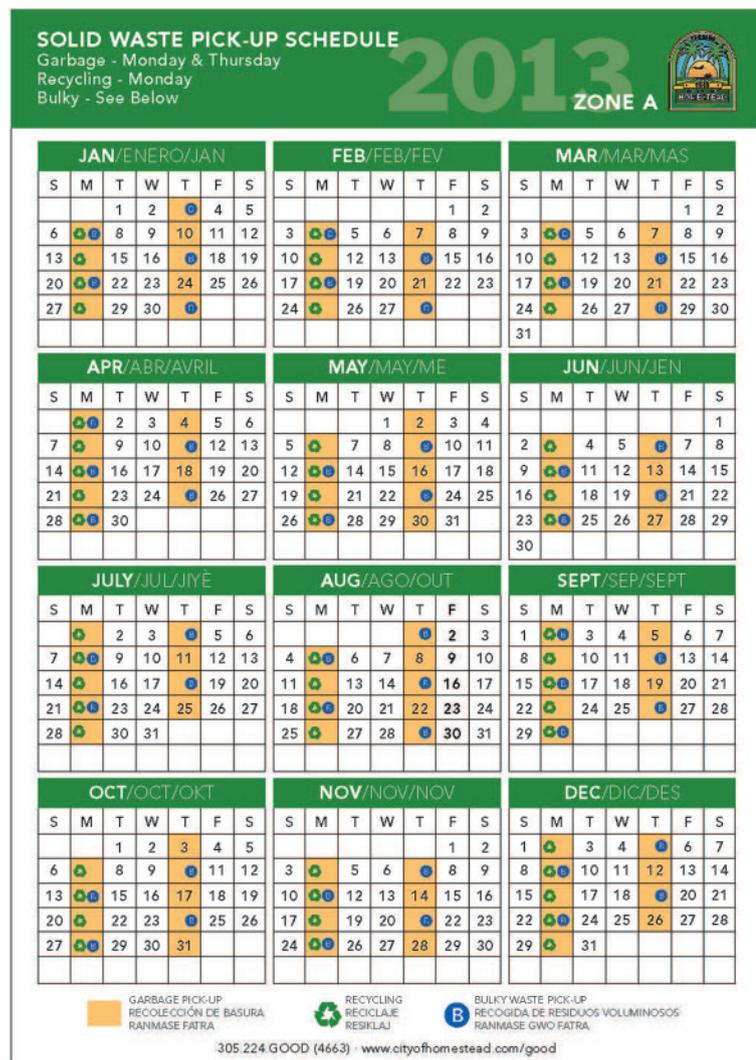


Figure 4
Solid waste pickup schedule for Zone A.

the four zones and included the entire year's schedule for garbage, recycling and bulky waste collection. The residents were instructed to stick their calendars to the refrigerator or any other visible area to easily remind them of their scheduled pick-up dates. As a follow up to the massive advertisement campaign, an information hotline was established to answer any questions that the residents may have in regard to the new service and changes. This hotline would remain active until the last week of January 2013.

CDM Smith (Cambridge, MA) conducted two training sessions with the city staff during the first three weeks in December 2012. Detailed maps for

the various zones and collection days for each waste stream were developed for training. Enlarged maps with turn-by-turn directions were also developed. CDM Smith provided training on the revised zones and schedule for recyclables and bulky waste collection. Training was also provided on turn-by-turn directions for all the zones to optimize the waste collection routes. CDM Smith emphasized to the SWD staff the changes to the recyclables and bulky waste collection routes, the annual calendars for the zones, and the importance of understanding and implementing these changes in the field successfully. Truck drivers will be given extra calendars for their zones to disseminate to the public, as needed, and assist them if they have any questions. CDM Smith also provided the City with an excel spreadsheet that includes residential addresses of all the zones in the City of Homestead that receive residential waste collection, along with a schedule for garbage, recycling and bulky waste pickup.

Waste Collection with the Revised Zones and Schedule

The city successfully implemented the revised schedule and zones for recyclables and bulky waste collection on January 2, 2013. The staff adopted the revised schedule and zones very well and did not have any issues. The residents also adapted the revised schedule without any problems. The residents welcomed the increased collection of recyclables and bulky waste and the smooth transition to the new waste collection schedule. | **WA**

Dr. Ravi Kadambala is an Environmental Engineer for CDM Smith and works out of the West Palm Beach, FL office. Dr. Kadambala has more than four years of design and field experience in solid and hazardous waste engineering, water and wastewater engineering. He has experience in designing and operating bioreactor landfills, designing and permitting municipal solid waste landfills, gas collection system and surveying. Dr. Kadambala can be reached at (561) 689-3336 or via e-mail at kadambalar@cdmsmith.com.

Dr. Abdul Mulla Saleb is an Environmental Engineer for CDM Smith and works out of the Tampa, FL office. Dr. Mulla Saleb has more than 32 years of landfill engineering and other solid waste management experience, including sustainable waste management cradle to cradle, zero waste, and carbon neutral concepts. He has sited, designed, permitted, managed, and provided technical guidance for solid waste projects throughout the country and abroad, including lined landfills and transfer stations, landfill closures, groundwater contamination assessment and remediation plans, drainage systems, and leachate collection and treatment systems. Dr. Mulla Saleb can be reached at (813) 281-2900 or via e-mail at mullasalebar@cdmsmith.com.

Julio Brea is Director of the City of Homestead's Director of Public Works and Services since 2003. Julio has more than 23 years of experience in the field of Civil Engineering, specializing in the design, construction and operation of public utilities and infrastructure. Before coming to the City of Homestead, Julio practiced Civil Engineering for over 18 years as a consultant specializing in water, wastewater, solid waste and environmental engineering for municipal utilities in the United States and abroad. He can be reached at (305) 224-4770 or via e-mail at jbrear@cityofhomestead.com.



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NIMBY

Waste Management Companies Must Battle NIMBY-ism with Better Tactics

Al Maiorino

In 2014 and beyond, COMPANIES SHOULD PLAN FOR NIMBY opposition to waste facility developments instead of waiting until it is too late.

AS THE ANTI-DEVELOPMENT MOVEMENT CONTINUES

to spread across communities throughout the U.S., it is affecting “business as usual” in more industries than ever before. Dissent within communities can arise instantly to oppose any type of development from wind and solar projects to real estate and housing developments and everything in between. Waste management facilities in particular have been subject to strong NIMBY (Not in My Backyard) opposition for years, affecting both project development and operations. Slate’s Brian Palmer shows just how effective NIMBY activists have been in this industry by reporting a 75 percent decline in the number of waste disposal facilities across the U.S. from 7,683 sites in 1986 to only 1,908 sites in 2009. Such a strong anti-development sentiment means companies will need to meet public opposition with better tactics throughout the planning and entitlement phases of project development for a successful project approval.

Companies need to look more closely at their strategies for building public support as a smooth entitlement process could be at risk if community opposition is not properly planned for prior to the announcement of waste management projects. When opponents create a unified voice to rise up against waste facility developments, numerous case studies show the devastating impacts to developers in terms of wasted time and resources. Often, the opponents’ promotion of myths about noise and odor pollution that would allegedly result from a new waste facility aim to portray waste management developments in a negative light to stall or prevent new facilities. As landfills continue to fill up, communities will be faced with more decisions about how to dispose of their waste, and in order to provide the most useful solutions, waste management facility developers must get ahead of the opposition to educate and build support for their proposals.

Baton Rouge, LA

NIMBY opposition just outside Baton Rouge, LA has resulted in two unsuccessful attempts since 1997 by Louisiana Land Acquisitions LLC to gain project approval for a new landfill. Though this new landfill would bring benefits, such as job creation, funding

for community programs and cleanup of the current site, public opposition remains fierce. However, in this third attempt at project approval, developers’ efforts are now supported by an organized group of about 50 supporters who attended the most recent Department of Environmental Quality hearing to speak out in favor of the proposal. This base of vocal supporters who are willing to attest to the benefits of the project are a vital resource to draw upon for letter-writing campaigns to local officials and newspapers to garner further support on a grassroots level. Community engagement for purposes of coalition building is one aspect that was lacking in the developers’ first two attempts, but it appears supporters in Alsen, LA no longer wish to silently allow the opposition to control the conversation surrounding this issue.

Lindenhurst, NY

Public opposition is not limited solely to landfill-type waste management facilities. It extends beyond waste facilities to recycling centers, despite the overall positive effect of these types of facilities on the environment. In Lindenhurst, NY, one such existing recycling facility faces strong NIMBY opposition in response to its plan to triple its production to be able to move holding sites indoors. Opponents argue that additional noise and odor will hamper the quality of their lives, and they actively seek to prevent the facility from gaining necessary state approvals from the New York state Department of Environmental Conservation. An organized campaign by One World Recycling that would inform the community on the benefits of a capacity increase is crucial to the process of identifying supporters to voice their opinions to public officials. With the creation of a supporter database, a coalition could be mobilized for action such as, displaying lawn signs, writing to public officials or newspapers, and speaking at hearings. Lindenhurst Mayor, Thomas Brennan, acknowledged he might be more inclined to support the expansion if the recycling center was a better neighbor with less complaints. The Mayor’s position shows that the best way to mitigate the voices of the opposition is to amplify those of supporters, who can be mobilized easily once coded into a project database.

Campaign-Style Approach

Having been in the business of running public affairs campaigns to build public support for controversial projects for nearly 20 years, I can tell you that the key piece of the puzzle missed by developers in their public outreach strategy is the “campaign”-style approach that the opponents seem to do so well. Whether residents in a community band together to oppose a new facility or an expansion to an existing facility, or whether the facility is a recycling center or a landfill, NIMBY critics are no match for a properly executed project announcement. Too often, waste management companies do not offer up an aggressive public affairs campaign when they announce a project, often letting crucial time pass between the announcement of a proposal and when public outreach begins. Opponents use this time to build opposition and sway residents against these projects, creating a more difficult task for project developers. By running an initial political style campaign, you can reach all residents and stakeholders in the community, identify the supporters to add to the database and harness them into action in support of your project.

Once a project is announced, other measures of identification must be taken through direct mail and phone banking. Direct mailers, such as postcards with a tear-off component are often the best first step. These tear-off cards can be returned with information about how a resident is willing to show support, either by writing a letter or speaking at a hearing,

and e-mail addresses that are provided can be used for further, more cost-effective communication. Phone banking not only identifies supporters, opponents and those who are undecided, but it can also be used to gain additional demographic information that would aid in further strategically targeted outreach.

The key goal of these types of campaigns is to never allow the opponents an opportunity to seize the moment because of inaction by the developer. Just announcing a waste facility development is not enough to assume that everyone will be on board to support it. By running an aggressive campaign and identifying supporters, you have taken a key step of any successful campaign. Knowing what to do with the identified members of a community who support your project is the next step, and one that will allow vocal support to outnumber opponents—whether it be petitions, letters or crowds at public hearings.

In 2014 and beyond, companies should plan for NIMBY opposition to waste facility developments instead of waiting until it is too late. Meeting this challenge with proven grassroots techniques will be critical to making 2014 a success for these types of developments. | **WA**

Al Maiorino is President of Public Strategy Group (Boston, MA). Since 1995, his firm has developed and managed multiple corporate public affairs campaigns in a variety of industries such as gaming, cable television, retail development, auto racing, energy and residential projects. Additionally, his firm has worked on projects in 20 states and three countries. Al can be reached at info@publicstrategygroup.com.

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Choosing the Best Transfer Trailer Design to Meet Your Needs

Charlie Benton

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TRANSFER TRAILERS PLAY A VITAL ROLE IN OUR nation's waste management system. The high-volume capacity of transfer trailers provides long-haul shipments, transporting from waste transfer stations to a final disposal site, or transporting waste directly to the final disposal site, recycle center or metal reprocessing site.

When choosing a transfer trailer, it is important to first determine whether you will be hauling to a final disposal or landfill site equipped with a tipping platform, to a site without a tipping platform or transporting material for recycling. Transfer trailers are either built to use a tipping platform to empty a load at the landfill, or they come equipped with a Walking Floor®.

For a disposal or landfill site equipped with a tipping platform, you will want to select a Tipper trailer, typically used for high-volume and frequent movements. The tipping platform at the site allows the trailer to be raised so the load can slide out of the rear.

The primary advantages of a Tipper trailer are that it is less expensive to purchase and operate, it is easier to maintain and its lighter weight allows it to handle more payload per trip than a Walking Floor trailer.

The Walking Floor trailer is ideal for remote locations because it is self-unloading, and not dependent on a separate means of unloading. The primary advantage of the Walking Floor trailer is its ability to discharge the load without raising the trailer. However, a wet line kit is required, making each tractor-trailer a larger investment and heavier. It can be more versatile than the Tipper trailer because it can discharge its load anywhere. And, when using a Walking Floor trailer you are more likely to acquire backhaul loads such as recycling materials.

Interior Designs

Next, consider what type of material you will be hauling. These considerations will help you determine the floor and sidewalls for the trailer. Will you be hauling solid waste, construction and demolition (C&D), heavy, bulky material, plastic recyclables, heavy recyclables like car scrap or wet materials?

Standard floors are recommended for solid waste and recyclables. Thicker floors provide the support required for heavier loads like C&D, bulky items and crushed car scrap. If you will be hauling a combination of solid waste and C&D, consider upgrading to a thicker floor and sidewalls.

The Walking Floor trailer has floors that ensure fast, efficient unloading. You should specify the floor that matches your application, such as high-impact for solid waste or steel floors for heavy, abrasive loads.

The thickness of the interior aluminum sidewall within each trailer can be varied. The wall design allows additional aluminum to be applied where needed for longer wear, and/or extra height for increased capacity. This enables users to exactly match their trailer to their loads and wear patterns.

Higher sidewalls and longer trailers enable recycling haulers looking for maximum cubic capacity to haul more at one time. Since recyclables weigh less, these trailers usually cube out before they reach their weight capacity. The additional capacity allows more material. Many waste haulers specify thicker walls and floors at the last 4 feet of the trailer, which has the highest wear factor.



East transfer trailers combine the aerodynamics of the Genesis smooth-sided design with the advanced system of floor-to-wall attachment to provide the strength to handle the stresses of hauling refuse day in and day out. Photo courtesy of East Manufacturing.

For water content loads, you should consider a floor that prevents leakage. Tipper trailers are often used with wet materials. The trailer floor is a flat sheet, welded solidly around the perimeter with a watertight tailgate, making it resistant to leaking. A Walking Floor can be equipped with a subdeck and leak-proof drive unit for wet content, but the additional deck increases its weight.

Exterior Considerations

More and more waste haulers are purchasing smooth-sided transfer trailers. For instance, one design consists of extruded 2-inch vertical aluminum panels, providing more strength than 4-inch external post-style wall because it is welded inside and out using a patented process. Many other designs are welded inside only. The smooth-sided trailers are more aerodynamic and easier to clean. In addition, the smooth-sided walls will not show any pings and dings on the outside like the external post-style walls. However, external post-style walls are often an ideal choice at a less expensive price point. Factors that you may want to consider when choosing your transfer trailer's exterior include:

- *The length of the haul*—For a longer haul of 50 or more miles, smooth-sided walls are more aerodynamic, leading to a possible fuel savings of ¼ to ½ mile per gallon.
- *The size of the load and materials that will be hauled*—For a high-capacity load of lightweight materials, smooth-sided walls provide more capacity than the external post-style walls. For a bulky load that applies side pressure, look for smooth-sided wall trailers that provide more strength and resistance to

bowing without the use of a cross pipe. Not all manufacturers' smooth-sided walls may not provide that additional strength and resistance. And, the smooth-sided trailers carry more capacity than external post-style trailers.

- *The appearance of your trailer*—When appearance is important, look for double-wall construction of the smooth-sided walls to protect outer panels from dents and bulges, maintaining the trailer's appearance and adding to resale value.

Preventive Maintenance

To prolong the life of your trailer, it is important to inspect the trailer daily, paying specific attention to the rear area. While walking around the inside and outside of the trailer, you are inspecting the floors and sidewalls for wear or punctures. As aluminum wears thinner, it is more easily subject to punctures. Damage should be patched, reinforced with additional aluminum or repaired immediately to prevent further deterioration. Walking Floor trailers and individual slats can be replaced when damage has occurred. Since transfer trailers are an essential part of the waste management system, the right trailer designed to meet your application will provide years and years of productivity and profitability. | **WA**

Charlie Benton is Product Manager – Refuse Trailer for East Manufacturing (Randolph, OH). Charlie has worked for East Manufacturing since 1990 as Southeast Regional Manager, selling its full line of trailer products. In 2011, Charlie was promoted to Product Manager – Refuse. For more information, call (888) 405-3278.

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The Garbageman's Guide: Improve Your ROI By Tossing Out the Trash

Norm LeMay and Steven Kaufman

When you toss that trash, YOU'LL EXPERIENCE A HIGHER RETURN ON YOUR INVESTMENT and get the incredible results you deserve.

YOU KNOW HOW MUCH EFFORT YOU PUT INTO your day. Whether it's a project at work, family and friends, or your hobbies and volunteer activities, you invest a huge amount of time, money and effort into everything that you do. With all of that energy going out, you have a reasonable expectation that you'll get a benefit in return. Hopefully, those two are in balance with one another. When they're not, that's usually an indication that there's garbage in the system. That's what this article is about: how to improve your return on investment by tossing the trash.

What Is Garbage?

We're defining the term garbage as anything that has no value. That's pretty easy to visualize when you're talking about physical garbage like a broken mug or a banana peel. However, garbage can also include thoughts, beliefs, opinions, and ways of acting and thinking—all of the emotional and intellectual "white noise" that does nothing to further your goals or help you achieve what you really want out of life.

There's another important component to consider. Every department—accounting, sales or marketing—uses tools like paperwork, computers and a workflow. All of these tools form a routine that the department follows in order to get its job done. Unfortunately, there is usually garbage in that routine, like old, outdated

software, employee tensions that kill productivity and teamwork, or conflicting management styles that create confusion and chaos.

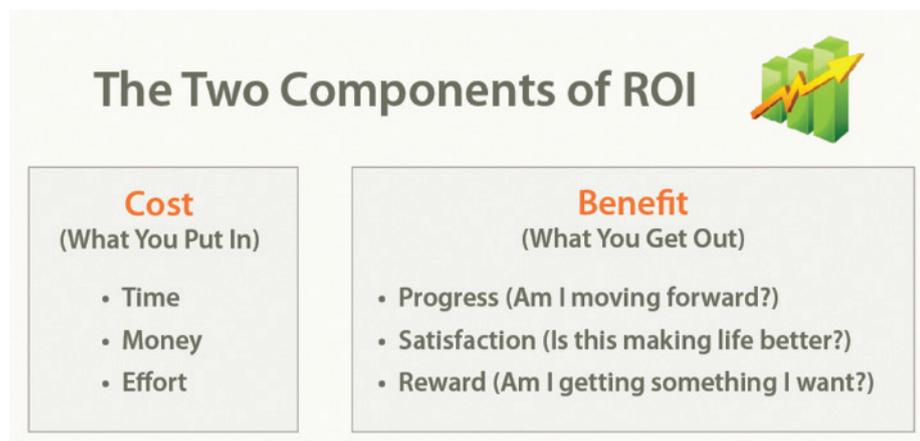
This garbage presents a unique challenge. Consider the saying, "One person's trash is another person's treasure." Beyond its obvious meaning that everyone values things differently, it also means that people won't always agree on what's garbage and what isn't. For example, let's say your company holds a staff meeting every Monday morning that employees can't stand. They see the time and effort they have to invest in the meeting as having no value at all. At the same time, the department manager uses the meeting as an opportunity to catch herself up on all of the projects her busy department is working on. To her, the meeting has real, honest-to-goodness value. It is the same staff meeting, but two completely different experiences of it.

If two people can't agree that there's trash in the routine, the rift between them is going to keep growing because garbage attracts garbage. If an employee doesn't like the staff meeting, they'll grumble about it. Someone else will agree and they'll grumble to the next person. That fuels the fire that the staff meeting is a waste of time. Like it or not, that kind of dissatisfaction goes right to the bottom line. It affects everything around the office in a negative sort of way. In business terms, we'd say that the staff meeting has little or no Return On Investment, or ROI.

ROI is a measurement of balance. Does the benefit you get outweigh what it costs you? Will you get more out in return for what you have to put in? Wouldn't it be great if every new project we started had an ROI label on it?

CAUTION!
78% of the time and 62% of the effort you are about to invest in this project will be wasted!

Labels like this would sure make life easier, wouldn't they?



The two components of ROI: Cost and Benefit. Images courtesy of The Garbageman's Guide, LLC.

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Improving the ROI: Search and Replace

Search

- Break down the flow of the routine
- Find the trash—big picture
- Examine each step of the routine
- What step is creating this trash? Why is that happening?

Replace

- Brainstorm the changes to the routine
- Ask: will this change increase the value?
- Measure the progress the changes are bringing
- Hold people accountable for the changes
- Go 3D: look at the problem from all angles

Use Search and Replace to get the garbage out of the routine.

Caution!

- Don't rush to fill the emptiness
- Watch out for sneaky garbage
- Don't let dominant personalities force changes



Can't Clear the Garbage?

- Find a work around it so YOU keep moving forward
- Make changes that will improve things for you

Tips to manage ROI leaks.

ROI: What You Put In vs. What You Get Out

Most businesses think of ROI in terms of money: for every dollar we spend, how many dollars will we get in return? However, there's more to ROI than just finances. When you look at return on investment from the point of view of value, there are three main costs:

1. Time
2. Energy
3. Money

There are also three main benefits

1. Progress (am I moving forward?)
2. Satisfaction (is this making life better?)
3. Reward (am I getting something I want or I feel I've earned after all my hard work?)

When you step back and look at the routines in your life, look at the balance between the cost you're investing and the benefit you're getting and ask yourself how much value you're receiving. Are you making progress toward your goals? Is the effort you have to put in backbreaking and exhausting? Is it financially draining? Then you measure the amount of progress, satisfaction and reward you're receiving. If you're getting very little value for all the time, effort and money you're putting in, you have a negative return on investment.

If that's the case, what can you change so you get a positive return on investment? An ROI turnaround can be boiled down to two steps: Search and Replace. First, look at how the routine runs, piece by piece and search out the places where it doesn't work; in other words, find the garbage. Then, you toss that trash and replace it with a new way of doing things that has value. Let's use the staff meeting as an example.

Step 1: Search for the Trash

Let's say that you've decided that it's time to get more value out of that meeting. The first thing you do is break down the meeting's routine. It starts with a management update. Then, the group reviews charts and graphs. Then, everyone discusses their projects. List out each of the steps in the routine from start to finish.

Find the specific areas in the routine that you think are garbage. Maybe the meeting is too long, nothing gets decided or people interrupt each other all

the time. You're not trashing the entire meeting. Instead, you're focusing on those specific areas where you see major problems; the parts of the routine that you feel have little or no value.

Now, look over the list of garbage you just made and ask yourself what's generating that trash. The meeting's too long because the updates take too much time. Nothing gets decided because the group never assigns action items. For each piece of garbage, perform a brief cost/benefit analysis. What do you have to invest in terms of time, money and effort? Ask what benefit you think you'd get from that if the garbage were to be thrown out. How much progress would you make? How satisfied would folks be? What new rewards could we reap? This cost/benefit analysis gives you a target to shoot for; a place to say, "Once we do some housekeeping, we could actually get the ROI that we really want."

Asking the question, "Where is there trash in the system?" brings this kind of analysis to the street level and puts it in terms that everyone can understand. It's remarkably effective because we all know what we should do with garbage: toss that trash! Plus, framing issues in terms of garbage means that everyone can have a hand in solving the problem, not just management. The more involved your staff is, the faster and easier your company will be able

to solve problems.

Step 2: Replace the Garbage

After you've finished with the Search step, it's time to move on to Replace. This is where it gets exciting. Once you toss the trash that's been gumming up the system, you're left with wide-open space: the magic zone—the place where you see things differently because the same old trash isn't there to block your view anymore. Now that you know what to stop doing, you use that valuable emptiness to ask, "What should we start doing?"

You start that analysis by brainstorming changes to the routine. If the staff meeting is too long, you might cut the time for updates from 20 minutes to 10 minutes. If nothing concrete comes out of the meeting, you might think about adding an action item review before everyone leaves.

For every one of these changes, ask yourself, "Will this increase value over time?" Keep going back to cost/benefit tradeoff: time, energy and money versus progress, satisfaction and reward. As you think about making a change to the routine, see if the tradeoffs result in a positive return on investment. This time, will you get more out from everything that you have to put in?

Once you start making changes to the routine, make sure there's a way to measure your progress. For example, time the staff meeting and make a graph of how long it's taking. Keep a list of decisions made versus decisions pushed off. The only way you'll know if things are improving is to measure where you're going versus where you've been.

Finally, find ways to make people accountable for these changes in the routine you've just made. Don't just assign action items at the meeting. Assign dates when they have to be completed. Have everyone report on his or her progress in front of the group. Because no one wants to stand up and say, "I dropped the ball," public accountability is a powerful way to make sure things get done.

At the end of the day, we all want to get a positive return on our time and effort. No one wakes up in the morning and says, "I'd love to waste a bunch of my time, energy and money today!" If you truly want to get more value out of a routine—especially one that's been very painful—Search and Replace is a great way to start making changes.

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ROI Pitfalls

As you think about throwing out old garbage from a routine, there are three potential pitfalls that could trip you up. The first is not to rush to fill up the emptiness. If you do that, you run the risk of replacing old garbage with new garbage. Change can be pretty unsettling. Once we let go of old trash, but we don't yet have something new to grab hold of, our instinct is to jump on the first thought that comes our way, especially if it feels familiar. Resist the urge to act quickly.

Second, stay focused on the problem itself and how it created the garbage that jammed up the routine. The more you remind yourself of the negative ROI it brought to you, the better the chances that you won't let the same old garbage back in again. Remember: trash can be sneaky. You need to keep a lookout so garbage doesn't find a backdoor into the routine.

Third, watch out for those people who want to impose their understanding of the problem on everyone else and then try and force-feed a solution they feel is right. That's going to fill the emptiness up with more garbage and torpedo any ROI that you hoped to get. In some situations, it's hard to avoid autocratic behavior, especially when there is one person who dominates and controls the department or the company. Wherever you can, fight for a group solution.

One final caution—some garbage can be very subtle and easy to miss, like tolerating, resignation, making excuses or giving in. These are called ROI leaks and they can slowly let garbage back into a routine. Pressure, lack of time, tension in a relationship or lack of a clear goal are also ROI leaks that can skew the way you look at the cost/benefit tradeoffs and inadvertently generate more garbage.

Having Difficult ROI Conversations

By mapping out the routine that's causing you problems, you're trying to increase the value of the time, effort and money that you invest in all the routines in your life. You're doing it by focusing on all the areas that don't work well and tossing that trash. To do that, you sometimes have to sit down and have a conversation about the garbage in the system.

Start by pointing out the garbage you uncovered and what you propose to replace it with. Then, step back and listen. In the case of the

staff meeting, listen to why your boss thinks the meeting adds value, even if she loves those things you think are garbage. What usually emerges is a compromise; areas where you both say, "Yup. That part could be improved."

Here's the beauty. By focusing on value, you take the sting out of the conversation. It's not personal. There's no finger pointing. Talking about cost versus benefit is a totally different conversation than, "I think this meeting stinks" or "I think this meeting is perfect." Value gives you a neutral point of view to start the process of change, of getting rid of the garbage in the routine.

Sometimes, these can be tough conversations that take preparation and thought before you jump into them. However, avoiding and procrastinating just keeps the trash in the system and continues to rob you of the return on investment that you deserve. In the long run, it's worth the effort, even if it's a challenge.

What happens if you can't sit down and have that conversation? Perhaps you've tried to work things out with the other person and they shut you down, or you're not in a position where anyone will listen to you or your suggestions. If this is the case, you'll need to say to yourself, "I'm going to find a way around the garbage in this routine. I'm going to make changes within my limited scope that will improve things for me." In the case of the staff meeting, maybe you're listening for ways to speed up the projects you're working on or you figure out how to work around your colleague who's always in a bad mood when he comes into the meeting. In other words, you're finding ways to sidestep the trash.

This may lead to some unanticipated results. When people ask you why you seem more productive, you answer, "I picked up a few things at the staff meeting" and you explain what you're doing in terms of garbage. Who knows? Maybe that person will listen a little closer at the next meeting and pretty soon, there's more garbage headed for the can!

The Final Word

Don't be afraid to use the word "garbage" when you're thinking about anything that gums up the routine. That word has so much power and it's so potent because it calls it like it is: this has about as much use as a hose with a hole in it. It's not a glamorous term, but who cares? How glamorous is it to dread doing the same thing over and over again? Using the word "garbage" makes it clear what you need to do next: get rid of it. Be careful, though, and exercise some judgment. Don't walk up to your boss and say, "You know, I think your staff meeting has a lot of garbage in it." Make sure you explain what you mean by that first. You want to educate people, not offend them!

You've been dealing with trash your whole life. This is no different. All you're doing is focusing on garbage in a different way. Search out the part of your life or the part of a routine that no longer has any value and replace it with something that does. This is about getting more value out of your days. It's an excellent opportunity to ask yourself where you want to spend your time and energy: on the garbage that holds you back or on the things that move you ahead. When you toss that trash, you'll experience a higher return on your investment and get the incredible results you deserve. | **WA**

Norm LeMay and Steven Kaufman, co-authors of the book The Garbageman's Guide To Life: How To Get Out of the Dumps, share more than 40 years in the waste management industry. These guys know trash, how to get rid of it and how to clear your mind for success. For a free video of this article, visit GG-ROI.com. For a free video on how to have difficult conversations, visit GG-Talk.com. For more information, call (800) 806-0301 or e-mail info@TheGarbagemansGuide.com.

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Planning Your Transportation Management Process

Julie Mink

Allowing your team some time to learn all the rules and review your plan often **WILL ENSURE THAT YOU ARE MANAGING YOUR TRANSPORTATION PROCESS** and it's not managing you.

IF YOU'RE IN THE LOGISTICS ROLE WITHIN YOUR waste company, your responsibility to understand transportation management can be quite cumbersome. We define the statement "Transportation Management" as the segment of logistics and transport options (truck, rail and barge) required to get your product from its source to its final destination. On the surface, the logistics chain may seem simple; however, there is a significant amount of detail required in arranging, preparing, releasing, tracking, resolving and delivering your shipment that requires forward thinking (and frequent quick thinking) to be successful. For waste shipments, the process can be as simple as a one-time load and transfer to a more complex move complete with several moves, transloading, sorting, packaging, re-loading, moving, delivering and finally unloading.

Considering the variables involved in our definition of "Transportation Management", your responsibilities generally encompass:

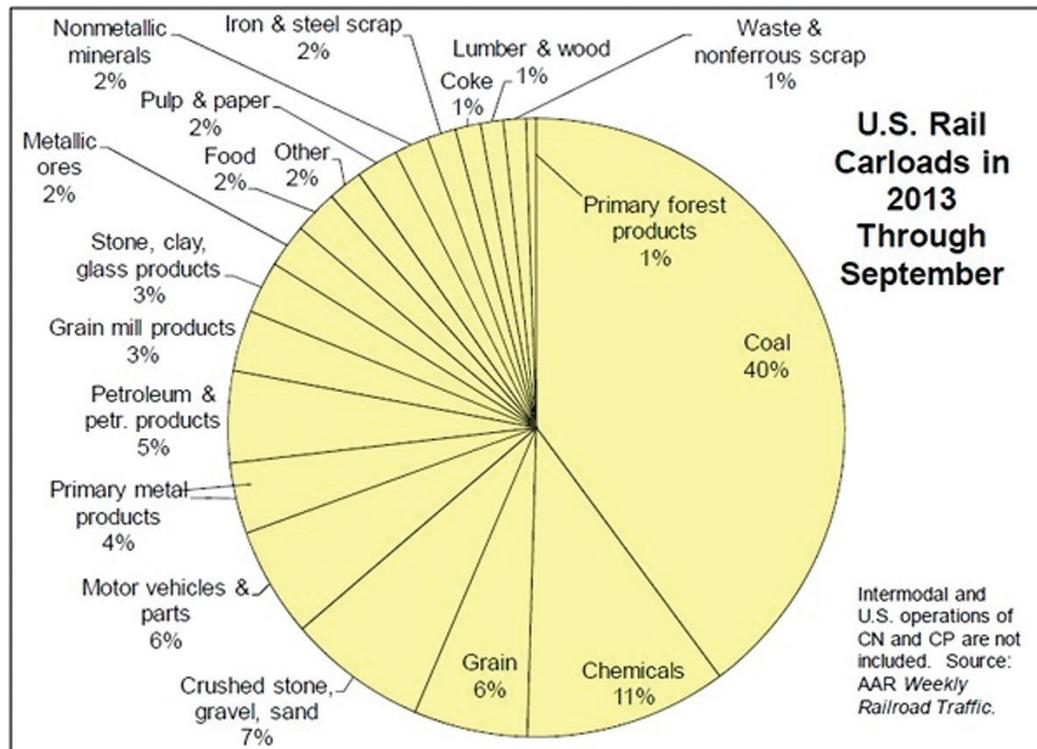
- Match up transport modes and rates with routes and service for the best combination of price and delivery options
- Match up rail equipment availability, type and capability with product load and unload requirements
- Consider all available modes of transportation for product movement in context of timing, cost and delivery capability
- Optimize the use of your infrastructure to seamlessly move product into and out of production
- Source rail equipment, reconfiguring rail yards, optimize multiple transport options in a production plant setting and understanding the flow of product

This month we take a look at the basics of shipping by rail and examine several questions that are frequently asked during day-to-day operations. Whether you're new to shipping by rail or a seasoned pro, we believe these questions can help you work through the shipping waste-by-rail more efficiently.

#1: I've Been Shipping via Truck, Should I Consider Shipping via Rail?

The decision to transition from shipping via truck to shipping via rail can often be a daunting one. If you're new to rail, allow yourself and your team time to learn about the overall rail environment and infrastructure. As you start your journey, realize that as of September 2013, only 1 percent of all U.S. rail carloads were waste and nonferrous scrap (see Graph 1). For September 2013, this equated to 14,740 waste and nonferrous scrap versus all 1,159,784 carloads (see Graph 2), so getting the attention of a regional and local rail carrier (also referred to as a Shortline railroad) may be easier than getting the attention of the large national carriers (also referred to as Class I railroads).

Hiring a qualified rail transportation consultant and having data prepared



Graphs courtesy of the Association of American Railroads at www.aar.org.

before meeting with rail carrier(s) representatives will help you support your case and potentially win a spot in the train. Contrary to most business relationships where you're in the customer role, your conversation with rail carriers will generally start with your pitch as to why the rail carrier should select your shipments for service—not the other way around. If you enter the initial phase with this point in mind, business dealings generally run smoother. Once you meet with the rail carrier customer service representative, you will be able to realize the costs and benefits of shipping by rail. Make sure you're prepared by asking yourself what your anticipated daily, weekly, monthly and yearly volumes will be and ensure that your volumes comply with any requirements your rail carrier may have.

You'll also need to understand the current infrastructure of your loading and unloading facilities to determine what type of railcars you will operate and if you want to lay down track onsite or if you'll opt for use of a nearby transloading facility that will require you to truck waste from the nearby rail site to the final destination.

#2: What Type of Equipment Options Will I Have?

Once you have established your yearly volume forecast and how you will load and unload, you'll need to understand the density

Commodity	Sept. 2013	Sept. 2012	Sept. 2011	Difference		% Change	
				'13-'12	'13-'11	'13-'12	'13-'11
Agricultural & food products	130,522	142,705	139,576	-12,183	-9,054	-8.5%	-6.5%
Grain	67,904	76,531	75,481	-8,627	-7,577	-11.3%	-10.0%
Farm products excl. grain	3,446	3,889	3,745	-443	-299	-11.4%	-8.0%
Grain mill products (1)	33,595	35,020	35,689	-1,425	-2,094	-4.1%	-5.9%
Food products	25,577	27,265	24,661	-1,688	916	-6.2%	3.7%
Chemicals and petroleum	167,971	163,459	146,933	4,512	21,038	2.8%	14.3%
Chemicals	116,823	117,136	117,160	-313	-337	-0.3%	-0.3%
Petroleum & petr. products (2)	51,148	46,323	29,773	4,825	21,375	10.4%	71.8%
Coal	465,671	478,565	544,472	-12,894	-78,801	-2.7%	-14.5%
Forest products	44,130	41,719	41,825	2,411	2,305	5.8%	5.5%
Primary forest products (3)	6,319	5,964	6,063	355	256	6.0%	4.2%
Lumber & wood products	13,377	12,182	11,172	1,195	2,205	9.8%	19.7%
Pulp & paper products	24,434	23,573	24,590	861	-156	3.7%	-0.6%
Metallic ores and metals	104,588	101,308	108,893	3,280	-4,305	3.2%	-4.0%
Metallic ores (4)	30,696	27,249	34,780	3,447	-4,084	12.7%	-11.7%
Coke	15,234	13,505	13,048	1,729	2,186	12.8%	16.8%
Primary metal products (5)	42,068	42,152	41,945	-84	123	-0.2%	0.3%
Iron & steel scrap	16,590	18,402	19,120	-1,812	-2,530	-9.8%	-13.2%
Motor vehicles & parts	69,222	61,793	58,665	7,429	10,557	12.0%	18.0%
Nonmetallic minerals & prod.	145,795	133,416	124,534	12,379	21,261	9.3%	17.1%
Crushed stone, gravel, sand	90,548	82,295	73,256	8,253	17,292	10.0%	23.6%
Nonmetallic minerals (6)	21,717	20,108	20,101	1,609	1,616	8.0%	8.0%
Stone, clay & glass prod. (7)	33,530	31,013	31,177	2,517	2,353	8.1%	7.5%
Other	31,885	29,224	31,022	2,661	863	9.1%	2.8%
Waste & nonferrous scrap (8)	14,740	11,801	13,620	2,939	1,120	24.9%	8.2%
All other carloads	17,145	17,423	17,402	-278	-257	-1.6%	-1.5%
TOTAL ALL CARLOADS	1,159,784	1,152,189	1,195,920	7,595	-36,136	0.7%	-3.0%
Trailers	119,319	116,063	130,961	3,256	-11,642	2.8%	-8.9%
Containers	908,203	868,404	818,628	39,799	89,575	4.6%	10.9%
TOTAL ALL INTERMODAL	1,027,522	984,467	949,589	43,055	77,933	4.4%	8.2%

(1) - flour, animal feed, corn syrup, corn starch, soybean meal, DDGs, etc. (5) - primarily iron & steel; some aluminum, copper, etc.
 (2) - crude petroleum and all products of petroleum refining (6) - phosphate rock, rock salt, crude sulphur, clay, etc.
 (liquefied gases, asphalt, fuel oil, lubricating oil, jet fuel, etc.) (7) - cement, ground earths or minerals, gypsum, etc.
 (3) - wood raw materials such as pulpwood and wood chips (8) - scrap paper, construction debris, ashes, etc.
 (4) - overwhelmingly iron ore, but some aluminum ore, copper ore, etc.

*Data are originations not seasonally adjusted. Includes BNSF, CSX, KCS, NS, UP, Birmingham Southern, Florida East Coast, Lake Superior & Ishpeming, and Paducah & Louisville. Excludes CN's and CP's U.S. operations. Source: AAR Weekly Railroad Traffic

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Planning Your Transportation Management Process

of your product in terms of weight (pounds per cubic foot) so that you can calculate which size and type of railcar you should use.

There are various types of railcars available to support your specific needs, and determining which equipment type matches your needs is critical in ensuring that your rail shipments are economical. Customers with dense and light loads (let's use un-compacted MSW with a weight of approximately 8 pounds per cubic foot as an example) will require railcars with a high cubic foot capacity as the product will fill the railcar to the top before it meets the load limit of the railcar. This is referred to as "cubing out before weighing out." A customer moving a denser and heavier load (let's use wet sludge for this example at approximately 45 pounds per cubic foot) will want to consider railcars with a lower cubic foot capacity as their load will typically meet the load limit of the railcar before the car is full to the top. This principle is referred to as "weighing out before cubing out".

Determining how you'll load the product into the car (will you bundle or package your product, load it into containers for flat car service or will it be loaded and unloaded loosely) will help you determine which car type is right for you. Depending on your capacity needs and total count of railcars required you might be flexible enough to work with the railroad for use of their system provided equipment. In the event the railroad requires that you acquire your own fleet of equipment or in the event that you desire a more predictable source of equipment, acquiring railcars for private use (leased or owned) might make sense for your company. Exploring the costs and benefits of each during both the startup phase as well as throughout the upcoming years will ensure that your transportation costs stay in check.

#3: What Rules Do I Need to Follow?

When you decide to move via rail, work with a customer service representative or a qualified transportation consultant to identify railroad rules that apply to you. Each railroad has designed and implemented rules and regulations for transporting various products on their rail line. These "tariffs", as they are called, provide guidance to the shipper in understanding the railroad's protocol for shipping the product safely. You'll first need to identify your products specific Standard Transportation Commodity Code (STCC) to ensure that you're applying the correct tariff. It is also important to understand that your individual freight rate will also vary based on this STCC. In addition, you'll need to obtain a copy of open top loading rules from the Association of American Railroads (AAR) to ensure that you are loading your railcars correctly. The consequence of shipping an overloaded railcar that is not in compliance with current open top loading rules can result in the railroad stopping your railcar(s) in transit and requiring you to bring the load into compliance where it sits. This can turn into a very costly chore, as initiating a crew to fix the load(s) and possibly transloading part of the load into trucks can eat up precious time and resources and unwillingly increase your freight expenses.

As you work with the railroad to establish a contract for rail service, be sure to address demurrage/private railcars storage issues before they arise so you can adequately plan for them before they occur. Be sure to define free days versus credit days as well. Rail carriers may charge daily demurrage fees for railroad owned railcars which sit loaded or unloaded on their property too long and rail carriers may charge demurrage fees for private railcars that sit on their line for a time longer than what is allowed by contract (also referred to as Private Car Storage). Rail carriers can also grant you a "free day" or a "credit", which is typically defined as a 24-hour grace period for say a particular day of the week/weekend or for a holiday. Knowing where the boundaries lay will help both your budget and your plan.

#4: I've Decided to Use Private Railcars Rather than Relying on Railroad Supplied Equipment. Now What?

Establishing a private railcar fleet can be a large undertaking, but the result is usually quite rewarding since operating a private railcar fleet generally allows the shippers to have a great amount of control in their logistics chain. Being able to spot, load and ship a car within the same 24-hour period is generally more desirable than requesting a car from the railroad and waiting several days or more for the car to be delivered. Contrastingly, operating and managing private equipment can easily become a full-time job.

Responsibilities to operating a private fleet will vary depending on if you buy or lease your cars but in general, some items to put on your to do list include:

- Register a private railcar mark with Railinc
- File paperwork with the Surface Transportation Board (STB)



NEW! Revised ANSI Z245.1 standard for safety requirements for mobile equipment. The 2013 approved version includes:

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- Sections addressing ladders, fall protection and battery disconnects
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To purchase this standard, or any of the ANSI Z245 standards, please visit www.WASTEC.org, go to the Publications/Resources tab, and click on the EIA store.



- Submit an OT-5 application (completed through Railinc) to run the equipment on the rail carriers line
- Define a process in the event a car is back ordered and needs repairs
- Establish a preventative maintenance program

#5: What Can I Do with Idle Private Equipment?

From time to time, you may find that the volumes you have predicted have dropped (either expectedly or unexpectedly), and that your plant may be stuck with excess cars. This is a pretty common occurrence so solutions are not too difficult to identify. A transportation specialist can assist you with this process and you may even find that your competitors have advice and even solutions to offer.

Railcar storage facilities boom when the economy is in transition or a lull and chances are good that you'll be able to locate a railcar storage yard close to your facility. When interviewing potential storage facilities, look for storage options where daily rates and switching fees (both in and out of the facility) are fair and reasonable. Identify if the storage facility requires that you move cars out in the order in which they were placed (typically this is a last in, first out arrangement) or if you have the option to cherry pick (hand select which railcars you want to move first) and identify if the railcar storage facility has access to a repair and maintenance crew as you may find that time spent in the storage yard is a great time to have needed repairs, maintenance or upgrades completed.

Another option for your idle assets is to offer the cars to another rail shipper within your industry for short time use under a lease or sublease arrangement.

This is typically a very good scenario as long as the product shipped is similar in nature to your own and initiating the cars into this alternative service does not cause you any undue stress. Ensure that you have a valid contract in place that outlines the responsibilities of both parties.

If you expect a long-term decline in volume, selling your equipment or working to lease your equipment out may be a better alternative. The location of your equipment, condition of your fleet and demand in the marketplace will all dictate the final price but allow your current book value be a starting guide. You will generally find that the pricing of your equipment will ebb and flow right along with the economy, and you might just find that you can turn a profit on your owned or leased assets.

By planning your transportation management process in advance as well as by having the right resources in your corner, your logistics chains should run quite smoothly. Allow your team some time to learn all the rules and review your plan often to ensure that you are managing your transportation process and it's not managing you. | **WA**

Julie Mink is Vice President of Tealinc, Ltd. (Forsyth, MT) and is located in the Elizabeth, CO office. Julie's career includes positions as Vice President Marketing and Administration and Manager Value Creation. Julie's tenor at Tealinc has spanned strategic and financial planning, project management, direct customer sales and customer support, development, refinement and installation of the e-commerce program, formulation and execution of marketing strategies and development and refinement of the company's extensive market database. Julie has eight years of direct experience creating value for Tealinc customers. She can be reached at (720) 733-9922 or Julie@tealinc.com.



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The screenshot shows a web browser window displaying the account history for 'YOUR COMPANY, LLC'. The page includes a navigation menu with options like HOME, ROLL-OFF, FRONT-LOAD, COMPACTORS, RECYCLING, CONTACT, and CUSTOMER LOGIN. Below the navigation is a table titled 'Account History' with a 'Summary' section showing Balance, Unbilled, Current, and Finance amounts. A 'Summary' table shows: Balance \$10,255.53, Unbilled \$96.25, Current \$7,875.28, 30 days \$0.00, 60 days \$0.00, 90days \$2,284.00, and Finance \$0.00. Below this is an 'Activity' table with columns for Date, Type, Code, Ref #, Check/PO#, Units, Per Unit, Sub Total, and Balance. The activity table shows several transactions, including an 'UNBILLED' entry for 5/1/2013 and a 'PAYMENT' entry for 5/12/2012.



MOBILE AWARENESS, LLC (Cleveland, OH), a provider of transportation safety products, announces the release of MobileTRAQ Vue, integrated with TireStat TPMS sensors. MobileTRAQ Vue is the first highly integrated and field upgradeable, commercial-grade monitoring and maintenance system, designed to grow with fleets and changing industry demands. It is a rugged, flexible asset-based monitoring system for both connected and stand-alone truck and trailer monitoring. Featuring an intuitive, programmable color touch-screen display that allows the driver to see and hear warnings, the MobileTRAQ platform was developed to readily connect with Mobile Awareness wired and wireless sensors, the first of which is TireStat TPMS.

TireStat TPMS is an innovative flow-thru tire sensor mountable inside the tire or externally on the valve stem. These unique TPMS sensors transmit data every 60 seconds to the MobileTRAQ monitor, with pressure and temperature events triggering the system to alarm in real-time. This rapid reporting is as much as five times more frequent than most other TPMS systems. With a battery life of up to 10 years and an operating temperature of -40°F to 257°F, TireStat is the ruggedized sensor choice for commercial tire maintenance and monitoring.

MobileTRAQ Vue integrated with TireStat TPMS offers the user unique early warning indications, as well as adjustable tire alarm levels. Additional features include various integrated telematics communication interfaces for monitoring inside the vehicle and remotely, all provided with a three-year warranty. The fleet owner's investment is further protected since MobileTRAQ will provide updates and feature upgrades including voice enunciation, driver logs and inspection forms. Reducing tire expense and increasing fuel economy while limiting costly tire breakdowns, positions MobileTRAQ integrated with TireStat as the future of vehicle monitoring.

FOR MORE INFORMATION, CALL (866) 653-5036 OR VISIT WWW.MOBILEAWARENESS.COM.



HEIL ENVIRONMENTAL (Chattanooga, TN) announces the launch of a new 23-yard model of their Half/Pack® Freedom front-loading refuse collection vehicle. Known as the lightest, most durable front loader on the market, the Half/Pack Freedom is now offered with the option of a smaller body and shorter wheelbase, perfect for maneuvering through narrow streets and alleyways and around MRFs, transfer stations, and dump sites.

The increased maneuverability of the smaller body of the 23-yard Half/Pack Freedom delivers cost savings, especially when used for residential applications. When equipped with a Curotto-Can automated carry can on the front forks, the Freedom becomes an automated front loader (AFL) transforming the refuse vehicle from commercial pickup to residential curbside pickup. The benefits of using an automated front loader for residential pickup include: more stops picked up per day, increased fuel efficiency, decreased downtime, enhanced safety for the operators who are always looking forward and the ability to see exactly what is being dumped into the hopper to minimize contamination.

To ensure the Half/Pack Freedom maintains its long-term durability, Heil has equipped it with an innovative load-control system called the Heil Optimal Payload System™ or HOPS™. HOPS uses axle scales, accurate to within two percent, to determine the vehicle's gross weight. When a driver is on-route collecting containers, he receives a warning light in the cab when the gross vehicle weight nears the maximum allowable weight. Once the maximum allowable weight is reached, HOPS prevents the operator from collecting any additional containers by demobilizing the front forks.

FOR MORE INFORMATION, CALL (866) 367-4345 OR VISIT WWW.HEIL.COM.



AKRO-MILS (Akron, OH) announces the expansion of its ShelfMax® line with the introduction of 23 sizes of ShelfMax8™ 8" high plastic storage bins. These new 8" bins include sizes designed for shelving systems and many Vertical Carousel Automated Storage Retrieval Systems. Extra-large ShelfMax8 bins feature even greater storage options for end users—including up to 95 percent more holding capacity than traditional 4" shelf bins, and 65 percent more capacity than 6" bins. Bins feature a wide hopper front for easy access and a built-in rear hanglock to allow complete access to contents when tilted out on shelving. The oversized label area easily accommodates a 2" high adhesive label, or multiple labels for divided bins holding multiple SKUs. An innovative new divider design allows for more secure bin partitions, and easier installation and removal of optional width and length dividers. ShelfMax8 colors include red, blue, yellow and clear.

FOR MORE INFORMATION, CALL (800) 253-2467 OR VISIT WWW.AKRO-MILS.COM.



HENDRICKSON BUMPER AND TRIM (Crest Hill, IL) officials announce the launch of the AERO CLAD® Coronado SD bumper. The addition of the Coronado AERO CLAD bumper is the latest in an entire line of lightweight, corrosion resistant bumpers offered as part of Hendrickson's All Makes bumper-product offering. The Coronado SD bumper in AERO CLAD offers a bright mirrored finish that promotes better corrosion resistance and weight savings. Over 150 pounds lighter compared to the OEM steel bumper, the Coronado SD bumper from Hendrickson provides a lightweight durable option to fleets. AERO CLAD is a bi-metal material that bonds stainless steel and aluminum at a molecular level. The result is chrome like finish that will not rust, peel or fade over time. In addition, the material is much lighter than traditional steel bumpers while maintaining higher yield strength, producing a bumper with the utmost durability. Hendrickson backs the durability and quality of AERO CLAD with a five-year limited warranty. Coronado SD bumpers in AERO CLAD are available today through the Hendrickson All Makes Program and can be purchased through Freightliner dealers.

FOR MORE INFORMATION, CALL (800) 356-6737 OR VISIT WWW.HENDRICKSON-INTL.COM.

OTTO ENVIRONMENTAL SYSTEMS NORTH AMERICA (Charlotte, NC) now offers multi-colored permanent branding technology for residential waste and recycling carts. Recently introduced by Otto, ColorFUSE™ graphics revolutionize cart markings. Where a hot stamp is limited to a single color, ColorFUSE branding allows multiple colors; perfect for customers who want to maintain their brand identity colors or who seek to stand out in a white foil world.



ColorFUSE technology uses colored resin in place of standard foils or inks, creating a resin graphics. Through heat, pressure and dwell time, the ColorFUSE graphic is literally fused with the base/lid of the plastic cart, becoming part of the base/lid itself. The ColorFUSE graphic cannot be scratched off, peeled off or chemically removed; it is essentially tattooed or fused with the plastic.

There are several benefits of ColorFUSE cart branding technology in addition to allowing for any number or combination of colors. The ColorFUSE graphic is extremely durable because once the graphic is fused with the cart plastic, it is the cart. Fine details appear sharp and crisp, providing aesthetic benefits. In addition, graphic sizing and color options can be tailored to fit budget requirements.

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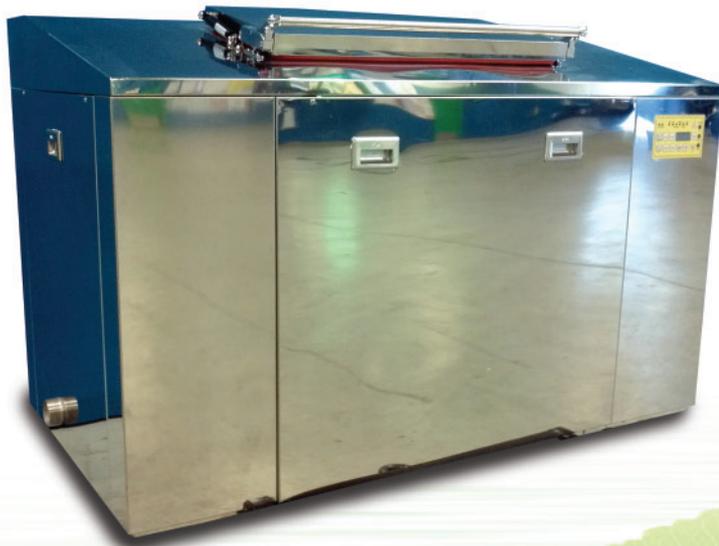
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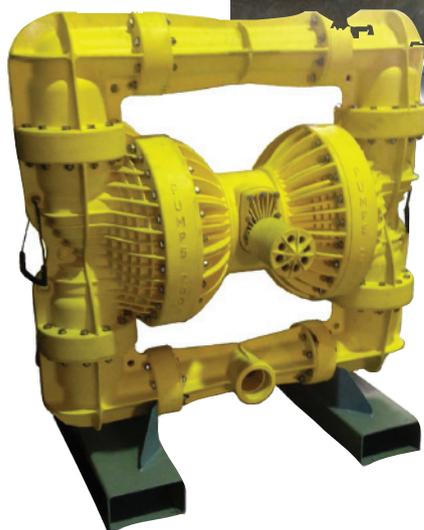
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Recycling

An Analysis of the U.S. CRT ‘Glass Tsunami’ Recycling Challenge

Christina Seibert

CATHODE RAY TUBE (CRT) GLASS COMPOSES THE LARGEST PORTION OF

the U.S. e-waste stream according to a 2011 report released by EPA. These tubes are found in older model televisions and computer monitors. Recycling of CRTs into new CRTs has been the most common management method. However, having become obsolete through the popularity of flat screens, the market for new CRTs is dwindling dramatically. The result is an industry plagued by high profile bankruptcies and abandoned warehouses of stockpiled CRT glass, leaving property owners and State or federal agencies to pick up the costly pieces (see Figure 1).

There are only a few operations in which recovered CRT glass may be used to produce new CRT glass—none of which operate in the U.S. Moreover, the implementation of CRT disposal bans in 19 states and e-waste program laws in 25 states have resulted in significant quantities of CRTs being collected, where they historically may have been disposed in landfills. With CRT stockpiles mounting nationwide, the pressure is only increasing on electronics manufacturers and States to prevent further dead-end scenarios. Today, the CRT challenge is so large that California recently announced emergency regulations to allow for the disposal of residual CRT glass in hazardous waste landfills if recyclers cannot find a suitable reuse for the glass. The urgency to pursue a short-term solution to CRT recycling is critical to the viability of the e-waste industry.

Due to limited capacity currently available at existing CRT glass processors, demand for less expensive processing costs, and social and environmental implications, there are many layers to consider in this recycling dilemma. The recent white paper entitled *An Analysis of the Demand for CRT Glass Processing* in the U.S. diligently examines these various layers, as well as a new CRT recycling solution that takes a novel approach to the challenge that is expected to cost 40 percent less than conventional approaches.

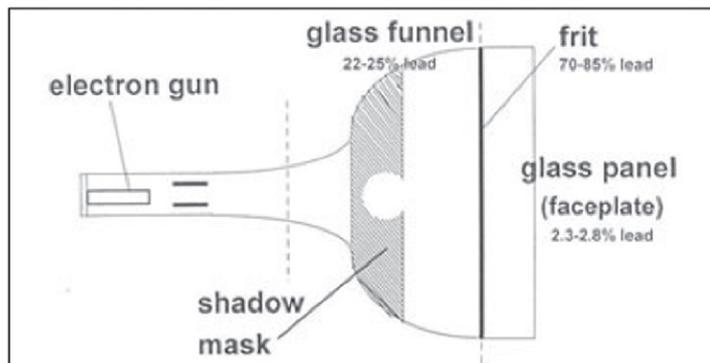


Figure 1: CRT components. Image courtesy of Florida Department of Environmental Protection, Bureau of Solid and Hazardous Waste.

Scope of CRT Challenge

In total, an estimated 6.9 million tons of CRT devices will require management from 2013 to 2033. Using the historical sales data for CRT devices, EPA developed a model to estimate annual quantities of CRT devices (and other components of the e-waste stream) reaching their “end-of-life,” at which point the CRTs would be collected for recycling or disposal. Based on end-of-life calculations contained in the EPA model, all computer monitors containing CRTs are projected to reach end-of-life by 2023 and televisions by 2033.

If all CRTs projected to reach end-of-life are recovered for recycling (i.e., 100 percent recovery), the annual quantity of CRTs recovered would range from 925,000 tons in 2013 to 280,000 tons in 2022, ultimately dropping to 0 in 2033.

Assuming a 50 percent overall CRT recovery rate, over the next 10 years (2013 – 2022) an average of 206,000 tons per year of CRT glass would need to be recycled. Compared to the estimated capacity of the four current CRT glass North American processors, there is an apparent shortfall in capacity of 78,000 tons per year, even assuming that all of the capacity was made available to U.S. recyclers. This capacity shortfall, dubbed the ‘glass tsunami’, may explain recent reports of CRTs being stockpiled and the subsequent bankruptcies of several recyclers (see Figure 2, page 59).

Unfortunately, existing processing facilities do not provide sufficient capacity to manage the quantity of CRTs being recovered currently nor over the next 10 years. There are only four CRT glass processing facilities operating in North America, with only one operating in the U.S. Notably, these facilities are located in the far Northeast, far Northwest and far Southwest relative to the Continental United States, which means that CRT glass must be transported long distances to a glass processing facility. Only the Doe Run facility in Missouri is centrally located within the U.S.

Wrestling with Processing Costs

In addition to the limited capacity currently available at existing CRT glass processors, the rising cost of processing is an increasing concern. Processing costs are cited by a number of agencies (e.g., U.S. International Trade Commission, Transparent Planet and Wisconsin Department of Natural Resources) as a reason for collected CRTs being stockpiled. CRTs are generally more costly to process than other components of the e-waste stream because of the cost incurred to manage the CRT glass.

Processing costs at existing and proposed CRT glass processors generally range from \$0.07 to \$0.12 per pound, with most proposed facilities having costs at the higher end of this range, indicating that the cost to process CRT glass in the future will be at least as high as it is currently. Additionally, though development of new facilities may reduce transportation distances, the limited

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number of CRT glass end-use markets will continue to present challenges for recyclers.

Electronics manufacturers (OEMs) are reportedly reducing funding for e-waste recycling on a unit basis (price per pound), which may not be sufficient to cover the costs of CRT recycling now or in the future. In States where OEMs are responsible for funding a portion of recycling efforts through e-waste program laws and meeting an annual recycling goal, more e-waste may be collected than the OEMs are required to fund, further straining those declining funds.

Adding New Processing Capacity

In response to the decline in historical markets for CRT glass, several new processing options are currently being proposed. Three companies are seeking to develop new glass processing furnaces to separate lead from the glass and provide feedstock for production of new glass products. Closed Loop Refining and Recycling has proposed two glass furnaces in Arizona and Ohio. Regenesys Glass Processing has proposed a glass furnace in Texas and NuLife Glass has proposed a glass furnace in New York.

The four new facilities proposed for development may ultimately provide an additional 198,000 tons of domestic CRT glass processing capacity. Three of the facilities are in the permitting phase, and one facility is under construction. However, development of new processing capacity requires significant leadtime to identify a suitable site location, secure necessary permits and construct facilities, not to mention significant investment capital. It is suspected that CRT stockpiling is a result of collectors storing CRTs in the hope that a cost competitive solution will emerge before the one-year limit on holding the hazardous material runs out.

Environmental Implications of Primary Processing Methods

The current primary methods of CRT glass processing are glass-to-glass recycling and secondary lead smelting. Due to the lead content, there are potential environmental impacts associated with the recycling of CRTs and other electronic devices, hence their hazardous material designation.

An EPA background report on processing of CRTs for glass-to-glass recycling identified public health and environmental impacts that may arise from a number of steps in the glass-to-glass process, including airborne lead and particulate matter, leaded washwater and slag, among others. The EPA also points to the shipment of CRT glass as generating transportation-related emissions.

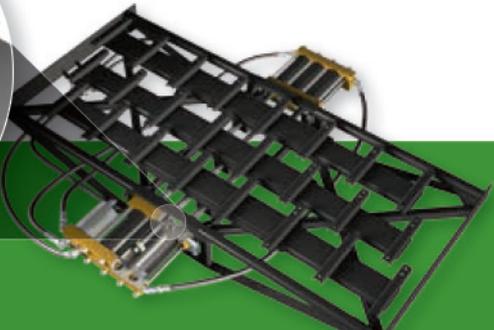
Secondary lead smelters process lead-containing materials to recover the lead for reuse through an energy-intensive process. During this process, materials are heated to a high temperature that results in air emissions that must be managed. Some airborne lead emissions may ultimately settle on the ground and in surface water.



The resulting KleanKover treated glass.



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Smelters also generate slag as a by-product of the lead recovery process, which is often characterized as hazardous waste.

Like smelters, landfills are subject to federal and State regulation. When CRTs are placed in landfills (which is still allowed in many States), the primary environmental pathway for leachable metals is groundwater, which is protected by the landfill liner and leachate collection system.

SWANA completed a municipal waste landfill research study in 2004 which specifically including a review of lead leachability from CRT glass. It pointed to previous study, performed by the University of Florida in 1999, that measured the leachable lead content of mixed, broken CRT glass using the TCLP. It found that the lead concentration of the glass averaged 18.5 mg/L, well above the federal regulatory lead threshold of 5 mg/L (above which material is designated a hazardous waste). The SWANA study went on to detail findings from other additional studies to demonstrate that, under actual landfill conditions, the concentration of lead leached from CRT glass would be lower than indicated by laboratory TCLP results.

The SWANA study concluded that “MSW landfills can provide for the safe, efficient and long-term management of disposed products containing RCRA heavy metals without exceeding limits that have been established to protect public health and the environment,” containing them at levels that “protect public health and the environment for extremely long periods of time, if not forever.”

A Pivotal Point for CRT Processing

Based on this information from EPA and SWANA, management of CRTs through a process that renders the lead virtually un-leachable and uses the end product as Alternative Daily Cover (ADC) in landfills can be viewed as a pivotal moment in the drama of the ‘glass tsunami’. The process provides a recycling option that is in demand for the processed CRT glass and at a significantly reduced cost.

Landfill operators must cover all disposed solid waste at the end of each day to control odors, vectors, fires, litter and scavenging. While federal regulations

Case Study Kuusakoski Recycling Treated CRT Glass for Beneficial Use as Landfill Alternative Daily Cover

For more than 85 years, environmental services firm Peoria Disposal Company (PDC) has provided a wide range of waste management services, including hazardous waste transportation, treatment and disposal. From 1989 to 1998, PDC accepted crushed CRT glass from Zenith Electronics’ manufacturing facility for treatment and disposal at its PDC Landfill No. 1 facility in Peoria, IL.

Kuusakoski Recycling partnered with PDC in 2012 to find a beneficial use for Kuusakoski’s treated CRT glass in the U.S. The collaboration resulted in the KleanKover Recycling Solution, recently announced this year at E-Scrap. PDC filed a provisional patent application for the CRT glass treatment technology and a service mark application for the CRT glass treatment process, KleanKover (the treated CRT glass product), in July 2013.

How It Works

Crushed leaded or mixed CRT glass from Kuusakoski’s Peoria recycling facility (which accepts both whole and dismantled CRTs) is delivered to PDC’s Waste Stabilization Facility. The facility is permitted to receive and treat CRT glass and is currently operational.

Crushed glass is placed in a mixing unit until the size is reduced to 2" or less. A proprietary chemical treatment reagent blend is then introduced. Adding water facilitates rapid and thorough ingredient blending, initiating the chemical reaction treating the heavy metals present in the CRT glass.

The resulting material is permanently stable. Every batch is tested in the PDC laboratory to ensure the lead is non-leachable. PDC tests the KleanKover to see that it is unaffected by acidity, alkalinity, extreme heat and extreme cold, ensuring that it passes the Land Disposal Restriction treatment standard for lead in Illinois. With compliance confirmed, the batch of treated CRT material is removed from storage and shipped to PDC’s permitted municipal solid waste landfill in neighboring Tazewell County, Indian Creek Landfill, to be used beneficially as ADC.



KleanKover used as ADC at Tazewell County Municipal Landfill.
Photos courtesy of Peoria Disposal Company.

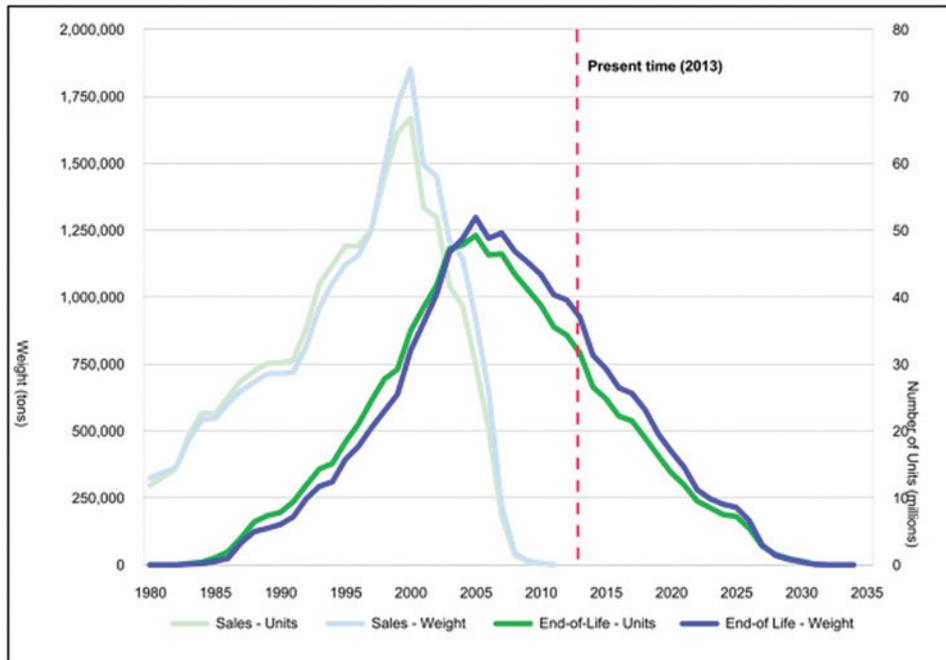


Figure 2: RT Devices: Annual Sales and End-of-Life Management Projections (1980-2033).

Image courtesy of U.S. EPA, Electronics Waste Management in the United States through 2009, May 2011.

require landfill operators to use 6 inches of earthen materials as daily cover, alternative materials in lieu of earthen materials to cover waste at landfills are also recognized. These materials are referred to as ADC.

Using alternative materials recycled as ADC provides value by preserving clean soil excavated during landfill construction to be used for other commercial purposes. Beneficial use of many materials, such as foundry sand, shredded tires and wood chips as ADC, is recognized as recycling or diversion by a number of states.

A process to treat crushed CRT glass, stabilize the lead to prevent leaching, and beneficially use the treated material as ADC to support operation of a municipal waste landfill has been developed and permitted by Peoria Disposal Company (PDC) in Illinois. This novel methodology proposes a new end-use market and additional CRT glass processing capacity that will serve the U.S. for decades.

The treatment and beneficial use of CRT glass by PDC provides access to an additional, domestic CRT glass processing facility and end-use market, at a cost up to 40 percent less than conventional methods. Beneficial use of treated CRT glass, in conjunction with other existing and proposed processing facilities discussed previously, will help to address the immediate and long-term demand for CRT glass processing (see Case Study sidebar).

Looking Forward

Although recovery and processing of CRT glass may result in increased quantities of glass and lead available for use in other products, the quantities recovered represent a relatively small fraction of the lead and glass recovered through other recycling processes. Additionally, there are capacity, transportation and other challenges associated with recovering these materials from CRTs. The current capacity shortage and subsequent CRT stockpiling is leading the e-waste recycling industry into a downward spiral.

Using treated CRT glass as ADC provides an environmentally and socially sound option that offers an additional end-use market that provides a dual purpose: preserving virgin soil, while also creating an answer to the CRT glass recycling problem. The time has come for the industry to pivot toward this new, beneficial direction. | **WA**

Christina Seibert is a Project Manager and Solid Waste Planner with CB&I, Inc. (St. Charles, IL). She is responsible for performing technical and economic feasibility analyses for diversion and disposal alternatives, conducting market assessments, developing local and regional solid waste management plans, and developing and facilitating education and outreach strategies related to the management of all types of resources on behalf of both public sector and private sector entities within CB&I's Solid Waste Services group. For more information, e-mail asbley@technicommunications.com.

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Recycling

From Handling Raw Material to Partnering with an Electronics Recycler: Taking Multiple Steps to Ensure the Quality of the Environment

Jori Pascarella

ELECTRONICS RECYCLING HAS BEEN ON THE RISE IN THE ENVIRONMENTAL

industry due to increased State laws and the awareness of the dangers that can derive from improper recycling. Special handling of the material is required to ensure proper disposal. In 2011, 3.41 million tons of e-waste was generated in the U.S. Only 850,000 tons or 24.9 percent of this amount had been recycled, according to the EPA. The rest of the material was either put in landfills or incinerated.



A worker demanufacturing e-waste with a hand held tool.



An assembly line of workers demanufacturing e-waste.
Photos courtesy of Intercon Solutions.

Disposing of Raw Materials Properly

Basic raw materials that exist in electronics consist of aluminum, steel, copper, lead, gold, precious metals and various plastics. Each raw material is used in multiple industries to create new products. It is the recycler's responsibly to make sure that they are sending their raw materials to a

legitimate manufacturer. Visiting the manufacturer, auditing their facilities, requesting MSDS and obtaining an end result product are all ways recyclers can make sure that the raw materials are being used properly. In turn, this will help the recycler obtain certain certifications, such as the R2/RIOS and eStewardship, that are sought out in the e-waste industry.

In order to ensure proper recycling, businesses and consumers have to also do their part. To start, they need to research and find a responsible certified recycler that is capable of handling the product and the raw materials that are generated through the demanufacturing process. The demanufacturing process is when the product is carefully separated and labeled, then sorted based on the manufacturer of the product and equipment type. At this time the product is disassembled by hand using hand held tools. Each raw material is extracted and then sorted. Once there is enough accumulated of the same kind of raw material, the material is then packaged specifically to the downstream manufactures needs.

Providing Training and Safety

Recycling facilities need to provide proper training to their employees with regards to handling the various types of products that can come through their doors. There are specific certifications that a company can obtain to help them provide a safe environment for their employees such as the ISO 9001 and OSHAS 18001. Safety classes should be done on an annual basis. Audits should be performed on recycling facilities to help the recycler improve their process and better understand the need for properly disposing of the materials. Basic steps would include setting up an appointment with the facilities manager. The next step would be to go to the facility for a site tour. At this time you would look at the operational process and the recycling equipment to see how the company handles the material. Once you have gathered the information, you can decide if partnering up with that recycler fits best for your companies needs.

Partnering with an Electronics Recycler

When a company is looking to create a partnership with an electronics recycler, there are some qualifications that they should look for. They should go to the company's Web site and see if they display any certifications pertaining to the e-waste recycling industry. Most companies would boost the fact that they carry these certifications. If you are not familiar with them, the basic ones consist of: ISO 9001, ISO 14001, OSHAS 18001, AAA NAID, R2/RIOS and eStewardship. These certifications guarantee that these companies have taken multiple steps to ensure the quality of the environment and their employees while handling these types of products.

Other qualifications would be for a company to do their own audit of the recycling facility. If it is a legitimate recycler, their doors will always be open. Finally, always ask questions. Examples would be, how long have you been in business? Have you ever been hit with any fines from the State or Federal EPA? All of these concerns will better help you in choosing the proper recycler for your specific needs. Just don't pick a recycler based on the cheapest cost. Cost should play a factor as the bottom line is important, but proper recycling should always be a must.

A Healthier Future

As manufacturers continue to improve our technology, consumers and corporations will always upgrade to the next big invention. E-waste will continue to rise year after year, which leaves us to be more responsible in the choices when it comes to the disposal of the obsolete products. Each step we take to improve our environment promises for a healthier future. | **WA**

Jori Pascarella is a Business Developer for Intercon Solutions (Chicago Heights, IL). She has been working for Intercon Solutions for almost five years. She has always cared about the environment by not wasting water and not littering. Her first job in the environmental industry, she started working at Intercon to open up her understanding of how important the environment is, and it has become not only her career, but also her passion. Jori's biggest obstacle is educating people on why it's important to recycle and how you can make that happen. She can be reached at (708) 756-9838, via e-mai at jori@interconrecycling.com or visit www.interconrecycling.com.

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Landfills

Public Health, Safety and the Environment

THE PUBLIC HEALTH, SAFETY AND ENVIRONMENTAL CONCERNS FALL INTO three categories: subsurface migration, surface emissions/air pollution and odor nuisance.

Subsurface Migration

Subsurface migration is the underground movement of landfill gas (LFG) from landfills to other areas within the landfill property or outside the landfill property. (Most subsurface migration occurs at older, unlined landfills because there is minimal barrier for lateral migration. The Resource Conservation and Recovery Act (RCRA) began requiring all new or expanded landfills to be lined as of October 9, 1993. This requirement decreases the likelihood of subsurface migration.) Since LFG contains approximately 50 percent methane (a potentially explosive gas), it is possible for LFG to travel underground, accumulate in enclosed structures and ignite. Incidences of subsurface migration have caused fires and explosions on both landfill property and private property.

Surface Emissions

Possibly the biggest health and environmental concerns are related to the uncontrolled surface emissions of LFG into the air. LFG contains carbon dioxide, methane, volatile organic compounds (VOCs), hazardous air pollutants (HAPs), and odorous compounds that can adversely affect public health and the environment. For example, carbon dioxide and methane are greenhouse gases that contribute to global climate change. Methane is of particular concern because it is 23 times more effective at trapping heat in the atmosphere than carbon dioxide. Emissions of VOCs contribute to ground-level ozone formation (smog). Ozone can reduce or damage vegetation growth and cause respiratory problems in humans. Finally, exposure to HAP can cause a variety of health problems, such as cancerous illnesses, respiratory irritation and central nervous system damage. Thermal treatment of non-methane organic compounds (or NMOCs—a category that includes HAPs and VOCs) and methane through flaring or combustion in an engine, turbine, boiler or other device greatly reduces the emission of these compounds.

Odors

The final concern related to uncontrolled LFG emissions is their unpleasant odor. Compounds found in LFG are associated with strong, pungent odors. These smells can be transmitted off site to nearby homes and business. Unpleasant odors can lower the quality of life for people who live near landfills and reduce local property values.

EPA Protections

EPA promulgated Criteria for Municipal Solid Waste Landfills (40 CFR Part 258) under RCRA on October 9, 1991. The criteria contain location restrictions, design and operating standards, ground water monitoring requirements, corrective actions, financial assurance requirements, LFG migration controls,

closure requirements and post-closure requirements. Under the design standards, new landfills and lateral expansions that occur on or after October 9, 1993, must be lined on the bottom and sides before waste is deposited. In addition, all landfills operating after October 9, 1991 must place a final cap over the surface. The placement of liners and caps reduces the potential for subsurface and surface LFG migration and ground water contamination.

Recovery and combustion of LFG will reduce emissions of organic compounds that would otherwise be released from the landfill. Because of the benefits of collecting and controlling LFG, the 1996 EPA Standards of Performance for New Stationary Sources (NSPS) and Guidelines for Control of Existing Sources, as well as the 2003 National Emission Standards for Hazardous Air Pollutants (NESHAP), require “large” municipal solid waste (MSW) landfills to collect LFG and combust it to reduce NMOC by 98 percent (or to an outlet concentration of 20 parts per million by volume). A “large” landfill is defined as having a design capacity of at least 2.5 million metric tons and 2.5 million cubic meters and a calculated or measured uncontrolled NMOC emission rate of at least 50 metric tons (megagrams) per year. Landfills are meeting these gas destruction standards using flares or energy recovery devices, including reciprocating engines, gas turbines and boilers. In addition to gas destruction requirements, the NSPS and NESHAP require that gas collection systems be well-designed and well-operated. They require gas collection from all areas of the landfill, monthly monitoring at each collection well, and monitoring of surface methane emissions to ensure that the collection system is operating properly and to reduce fugitive emissions. Smaller MSW landfills are not required to control emissions by the NSPS or NESHAP, but can still greatly reduce emissions of NMOC by collecting and combusting LFG for energy recovery or in a flare.

Reducing Greenhouse Gas Emissions

LFG recovery projects are a highly effective way to reduce overall greenhouse gas emissions from landfills, whether the LFG is combusted by flare, electricity generation equipment, or another end use system. By using the otherwise wasted methane contained in the collected LFG to generate electricity or directly as a fuel, fossil fuels such as oil and coal are displaced. This displacement of fossil fuels is an environmental benefit, the magnitude of which would depend on the actual amount of electricity generated or LFG used.

For example, if a 3 megawatt LFG electricity project starts up at a landfill with previously uncontrolled LFG, the project would have a direct methane reduction of approximately 6,000 tons per year (125,000 tons of carbon dioxide equivalent per year) and a fossil fuel displacement of approximately 16,000 tons of carbon dioxide per year. The combined emissions reduction of 141,000 tons of carbon dioxide equivalent per year would be equivalent to any one of the following annual environmental benefits for 2008:

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- Carbon sequestered annually by 29,000 acres of pine or fir forests
- Carbon dioxide emissions from 299,000 barrels of oil consumed

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Reducing Non-Methane Organic Compounds Emissions

LFG energy projects involve collecting and combusting LFG. The process of combustion destroys organic compounds, including methane and NMOC. During combustion, these organic compounds chemically react with oxygen in the presence of heat, breaking apart to form water vapor, carbon dioxide and other less volatile compounds. Combusting the gas in a reciprocating engine, gas turbine or boiler to generate energy also reduces pollution associated with the extraction and use of fossil fuels to produce the same amount of energy.

Dioxins and Furans

Dioxins and furans are a group of toxic chemical compounds, known as persistent organic pollutants, that share certain similar chemical structures and biological characteristics. Dioxins/furans are released into the air as byproducts of many combustion processes, such as incinerating municipal waste, burning fuels (e.g., wood, coal or oil), and some industrial processes such as the bleaching of pulp and paper. Some of the conditions that are conducive to dioxin/furan formation are the combustion of organic material in the presence of chlorine and particulate matter under certain thermodynamic conditions such as low combustion temperatures and brief combustion times. Sources of dioxins/furans include, but are not limited to: MSW combustors (incinerators), residential and commercial coal combustion, residential and commercial oil combustion, backyard trash burning, residential fireplaces, cars, cigarettes, forest and brush fires, and the combustion of LFG. Relative to many of these combustion sources, the characteristics of LFG combustion are less conducive to dioxin/furan formation.

EPA's review of the available data indicates that dioxins/furans can be released in small amounts when LFG is combusted by flare or for recovering energy. Based on national and international source tests, the concentration of dioxins from LFG combustion ranges from non-detectable to 0.1 nanograms (10⁻⁹ grams) of toxic equivalents per dry standard cubic meter of exhaust, at 7 percent oxygen. Because of the health threat from uncontrolled emissions of other organic compounds in LFG, EPA found, in developing emissions standards, that LFG destruction in a proper control device (e.g., flare or energy recovery unit) with minimal byproduct generation of dioxins/furans is preferable to the release of uncontrolled LFG. In summary, EPA believes that the potential for dioxin emissions from the combustion of LFG is small.

Landfill Gas Combustion

Although it is present throughout the environment, mercury is a health concern because it can bioaccumulate through the food chain as methylated mercury, an organic, more toxic form of mercury. Sources of mercury in MSW landfills can include batteries, fluorescent light bulbs, electrical switches, thermometers and paints. Once mercury enters the waste stream, it will ultimately be released from the landfill and is contained in uncontrolled LFG. However, combustion of LFG reduces the toxicity of LFG emissions by converting the organic mercury compounds, including methylated mercury, to less toxic, less hazardous, inorganic mercury compounds. According to EPA's 1997 Mercury Study Report to Congress, MSW landfills contributed less than 0.1 percent of the total mercury released from all artificial sources in the United States in 1994. When compared on an annual basis, mercury emissions from LFG are significantly less than mercury emissions generated by small, oil-fired boilers used in homes and apartments. | **WA**

— www.epa.gov/lmop/faq/public.html



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Process and plant engineers responsible for operations involving biogas, landfill disposal site gas recovery and digester gas at wastewater treatment plants will find the highly reliable Model ST51 Mass Flow Meter from **FLUID COMPONENTS INTERNATIONAL (FCI)** (San Marcos, CA) comes with stringent safety approvals that include: FM, CSA/CRN, Class 1, Div 1, Groups B, C, D; Class 1, Div II, Groups A-D, ATEX Zone 1, II 2 G Ex d IIC T6 ... T3, II 2 D Ex tD A21 IP67 T90°C...T300°C. The ST51 Flow Meter is ideal for the measurement of methane and other combustible greenhouse gases. Designed for high performance, the ST51 Flow Meter is an explosion-proof instrument that is easy-to-install and requires virtually no-maintenance to deliver a truly best cost solution. The ST51 features a no-moving parts design that is non-clogging and operates over a wide flow range with low-flow sensitivity. It is packaged in an explosion-proof transmitter, and the calibration is matched to the user's actual gas composition and installation conditions. FCI has designed the ST51 Flow Meter specifically to measure biogas and all methane composition gases including natural gas. It features a thermal mass, insertion-style flow element with flow accuracy to ± 1 percent of reading over a broad flow range from 0.3 to 400 SFPS (0.08 to 122 MPS), and repeatability of ± 0.5 percent of reading. The flow element is available for use in line sizes from 2 to 24 inches diameters. It operates over a wide turndown range of 100:1, which is essential due to the variable gas flows in landfill gas recovery and wastewater treatment. It operates at temperatures from 0 to 250°F and withstands pressures up to 500 psig.



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