Solar Recycler
Bayshore Recycles Everything Under the Sun
Shingles in Highway Environment Recycling Concrete with LBP
Buyers Guide 2010
It all starts with the sun. Solar panels located on the roof of Bayshore Recycling Corp. in Keasbey, N.J., collect the sunlight and transform it into energy. This energy is then used to help power an “eco-complex/energy-campus” that accepts all types of industrial materials, from concrete to metals to contaminated soils to mixed C&D and turns almost all of it into viable end products for a variety of markets.

“This is one of the most progressive and innovative recycling centers in the United States,” said Valerie Montecalvo, president, Bayshore Recycling, one of the five companies located on the sprawling 52-acre site located on the Raritan River in central New Jersey. The owners are acquiring another 17.4 acres of industrial property nearby. “We have built the facility to keep the carbon footprint small, and our different recycling operations are synergistic with each other. We are setting a model for the rest of the country to emulate,” Montecalvo said.

Strong words, but the facility is permitted to take in specific amounts daily of as much as 12,000 tons of mixed C&D, bulky waste, contaminated soils, contaminated or clean dredge, concrete/asphalt/brick/block and scrap metal. There are more than 400,000 sq ft under roof at the former brick factory, located in highly urban, Woodbridge Township in central New Jersey, just across the Raritan Bay from New York. While the eco-complex term has been bandied about, it really does apply at this site. When material is taken in at one facility, such as the concrete with rebars at the Class B facility or scrap metal in a mixed C&D load, it is extruded out, accounted for and then sent to the onsite scrap metal recycling company creating a by-product synergy between all of the operations.

Valerie and Frank Montecalvo are the husband/wife team who own and operate all of the companies. This works well because for some of the businesses, Valerie is president; and for others, Frank steps forward. There is no overarching holding company so it is difficult to get a total recycling rate for the site. Each of the processing operations is run as separate entities, for a couple of reasons. The obvious one is that it is easier to tell the financial status of each. The second is that New Jersey has different licenses and permits for each type of business. It is better to separate them so only a recycling permit is needed for concrete and asphalt recycling, but a full-blown solid waste permit is required for the material recovery facility.

Fortunately, all of the companies enjoy a good reputation with the local community and with the county, state and federal regulatory agencies. This is no mean trick in New Jersey, as the state is long noted for the industrial pollution that has occurred over the decades when industry boomed. The NJDEP is now very stringent on what goes where and is definitely trying to improve New Jersey’s green image and recycling rates. The Bayshore/Montecalvo’s positive environmental image is well burnished by an aggressive marketing campaign. Unlike many other recyclers who prefer to work in the background, the Montecalvos have long done marketing buys in local publications and other media, in addition to supporting a plethora of community and civic venues. Why? “It’s done for educating the public about our industry,” said Valerie. It began as part of an outreach when Bayshore Recycling, the concrete/asphalt recycling company, started up in 1995.

“Recycling was not as popular 15 years ago when we began,” said Valerie. “Nobody realized how easily you could recycle concrete and asphalt. This inert material just went to a landfill where if it was reused and regrind it would have eliminated unnecessary quarrying of land in a natural pristine environment. We had to demonstrate over and over that we could run a successful recycling business where it was paramount to preserve our dwindling natural resources.”

The Montecalvos also have a big commitment to the local community, they sponsor waterfront festivals, music in the park, breast cancer walk-a-thons and numerous other charitable causes. It helps to get the company name out there in a positive light while promoting the benefits of recycling. This approach promotes the entire recycling and solid waste industry not just the Bayshore facility, Frank and Valerie volunteer much of their time to promote this important message.

It was more than 15 years ago the original company, Montecalvo Contracting, was performing road projects in competition with other local contractors. “Once we started doing roadwork, we generated tons of excavated concrete and asphalt,” said Frank. “At that time, the only place to go with it
was to a landfill. We just didn’t think that was the right approach.”

Bayshore Recycling was originally formed to crush material for use in the Montecelvo Contracting road projects. However, according to Frank, they were also trying to sell material to competing contractors. “They viewed us as a competitor and not a supplier.” That was not well accepted, he said, so “after a while, we stopped bidding on road projects and became exclusively a supplier. The imaginary wall came down and the floodgates opened.” It certainly didn’t hurt the operation to have a thriving road contractor who successfully demonstrated the use of recycled aggregates for road base. The experience proved the new Bayshore Recycling facility had already overcome the engineering doubts on the specifications for recycled aggregate material. They were also armed and ready with plenty of information for their customers.

Indeed, Frank contends recycled aggregate is better than virgin products in many applications. “The recycled aggregate from an impactor crushes and fragments the stone differently than a jaw crusher would at a quarry,” said Frank. “The method the material is crushed creates an open face in the aggregate. Recycled stone has more friction so when two pieces of it rub together as opposed to the smoother face of trap rock it compacts better. Also, there is the unhydrated cement left in the design mix. Once you place the recycled material, get some water on it, compact it properly—the road really comes together.”

The impact crushing system Bayshore Recycling uses is an Eagle Jumbo 1400 crusher with a self-contained 6-ft x 16-ft triple-deck screen. “We make three products at once off that system. One product meets NJDOT spec for base. A second is a 3/4-inch clean stone that matches a 57. The last is a 2½-inch clean stone for tracking pads and the like,” said Frank. A magnet removes metal, and the system is closed circuit. Bayshore also has a smaller track-mounted Extec impact crusher with an S-5 screen that can produce the same products.

It was purchased because the company received an order for 1.5 million tons of one type of product needed for a project within an abbreviated time schedule. Bayshore immediately acquired extra equipment to
fill the order. “It bailed us out for that project, and now we run the two plants full time,” said Frank. The company also operates three E7 screeners. “The market for recycled aggregate is not as strong as it was a few years ago due to the down economy. What you have to do is work harder, smarter and faster to get the business.”

The most recent addition to the eco-complex is an upgrade to the site’s mixed C&D sorting line. About three years ago, a small, portable 12-station sorting line with a trommel screen to remove fines was installed as part of Montecalvo Disposal Services transfer station/materials recovery facility. The company had a licensed solid waste roll-off service to pick up waste and deliver material, but they decided to expand the license to accept and recycle C&D waste. The line was only good for minor sorting and minimal tonnage, but did allow the company to determine the composition of its incoming material and estimate how much tonnage it could expect through its doors. The recycling rate was higher than originally expected and most of the by-product went on site to the other recycling operations. So it was decided to upgrade the C&D sorting system, using some of the 400,000 sq ft of available warehouse space. This concept would allow for easier sorting since the NJ Department of Environmental Protection requires all processing to be under roof except for concrete and asphalt recycling.

The Montecalvos and their experienced crew of employees set out to upgrade and renovate the 100-year-old building. The roof needed to be raised to 65 ft high to allow for tractor trailers to be able to tip inside the building. Some of the original walls of the facility were left in place but extended. Sections of the old building were able to be used as a tipping floor, and the feeding section of the sorting system was disassembled so the vertical space on the tipping floor could reach 65 ft. It was a salvage job, as much of the steel generated from project was set aside and then reused in rebuilding the new walls and roof. The 65 ft was to avoid equipment problems and the wide open tipping floor was designed to allow the excavator operator plenty of room to swing the boom around. The added benefit was no truck had to worry about scraping the roof when tipping.

A lot of careful planning went into the new system due to the design of the century-old building. The 400,000 sq ft are connected but spread out in a couple of adjacent buildings. The design had to allow for structures that could not be moved. Erin Recycling Systems incorporated all of Frank’s engineering ideas into a design that would work with that restriction. Ultimately Erin supplied most of the new equipment for the system. The operation is currently permitted to handle 1,000 tpd, but the company is going for an expanded permit to take in 4,000 tpd of mixed C&D, which the new system can easily handle.

According to James Bray, recycling manager, Montecalvo Disposal, one of the most important guidelines for the system was troubleshooting—what if it breaks? “Even with a new system, we knew something could break,” said Bray. “We had to be prepared. So every belt is reversible; and there is more than one way to feed it, and more than one way to run it. This was one of Frank’s ideas. This way if one component is not functioning, it doesn’t stop us from using the rest of the system. This was a major problem with our first plant. Once the material starts coming in, it doesn’t stop. You have to be able to run the plant.”

Starting the plant off is a Caterpillar 320 excavator, a relatively small unit used because it is so nimble on the tipping floor. “Even on top of the pile it can’t take out a door unless it is next to the wall,” said Bray. A larger Cat 330 is used on the floor to do some pre-crushing of material, trying to help downsize it to make it go through the system more smoothly. Pre-shredding was considered, but was waived in order to get the company’s preferred picking size of 2 to 3 ft. Drywall is removed as much as possible.

C&D is fed onto a steel apron feed conveyor that cascades over a series of Erin finger screens. The first two are in tandem and remove the 10-inch minus, which goes onto an A-line for picking. That belt starts out at 6 ft and goes to 5 ft so the material can be-
ter flip over for easier picking. An overhead magnet removes metal from the 10-inch minus that is on a short jump conveyor going over to a double-deck secondary finger screener designed to remove the 2-inch minus, which produces the company's shaping and grading material for landfills. This particular finger screener has rods rather than fingers to reduce spiking and it pulls all the fluffy material out.

The 2- to 10-inch overs are sent off to a General Kinematics de-stoner dual air knife that has a containment chute for the light materials that are blown off. Coming out of the air knife are two more lines, a 24-inch C-line for the aggregate and a 48-inch wide B-line for the rest of the material. “We get a very clean aggregate product on that C-line, don’t need a lot of QC there, only two pickers,” said Bray.

Pickers are something Bayshore relies a lot on. There are 56 positions along the entire system where employees could be deployed. Currently the operation has 30. The reason for more positions is as the company gets into more esoteric materials, such as vinyl, windows and others, the system will not need to be upgraded.

Bayshore believes in so many employees because they are easy to direct. “Everyone who visits our plant wants to know, ‘Why so many pickers?’ It’s the only way to do quality control,” said Bray. “I can designate one person to pick only blue tiles today, or red bottle caps, whatever.” But recycling is predicated on providing a clean product, and Bayshore believes the best way to do it is with human contact. Each picker has two chutes next to them. One is for the specific item they are responsible for, while the other is for clean wood, which can be as much as 60% of what comes into the facility. Under each clean wood chute is a conveyor running directly to a model 5400 CBI horizontal grinder that grinds it immediately. “When a guy throws wood onto the belt, it comes out a finished product,” Bray said. The grinder has twin 250-hp motors on it—only one runs when there is light duty, and the other kicks in automatically when there is a surge of wood on the infeed. There is also a 58-foot feed hopper from the tipping floor that can feed the grinder if warranted.

The product produced is mostly mulch. Due to the lack of trees removed in northern New Jersey, wood is more valuable as mulch than as fuel. It is ground to 6 inch so the buyer can check it for contamination before regrinding it to spec. Besides the usual products of aggregates, metals and wood, Montecalvo Disposal is also processing mattresses. The labor intensive method is done on the shop floor by workers wielding knives. They remove the metals and depending on the market, the foam. While brute force is part of the process, Bray said there is a science to disassembling them. It is cost avoidance more than a profitable item, as landfills don’t really like bulky items.

One new waste stream being processed is styrofoam. A machine has been installed that will take bulky styrofoam, grind it, run it through a heat auger which basically removes all of the air in it and makes a fluffy-like final product. Plastics is the next material likely to be tackled. Plans are being made to put in a bailer to ship the plastics properly to the market place. Asphalt shingles and tires will also be accepted in the near future.

More Markets
If this all sounds like the plant has just started up, it is true. Bray estimates the current recycling rate is 80%, but expects that figure will rise as more end markets are added. The material won’t be picked until there is a market because Montecalvo Disposal is not speculative in its stockpiles. “We are not going to sit on a commodity hoping to make a killing,” said Bray. “Get the material in, process it and get it back out.” Most of the product is transported to another operation onsite at the eco-complex. The aggregate goes to the Bayshore Recycling crushers. The metals from both the concrete/asphalt recycling and mixed C&D recycling operations go to the Montecalvo Coastal Recycling facility, a scrap dealer.

Coastal Metal’s processing starts out in the yard where ferrous and non-ferrous metals are separated. A Caterpillar outfitted with an Ohio magnet is used for separation, and other Cat 345s equipped with long reach booms and Young rotating grapples stockpile the material. Ferrous stays outside, while the non-ferrous is treated indoors, where it is further broken down into the various grades, such as copper one and two, etc. Stationary Allied-Gator shears inside the building do the prep work. Outside, two Komatsu PC-400s outfitted with LaBounty shears size the materials, usually to 3 or 4 ft, depending on market demands. The grapple loads onto the company’s trailers for shipping off to the mills. “Our goal with Coastal was to cut out the middleman,” said Frank. “We now upgrade all of the metals. We remove all of the concrete from the metals because the mills won’t accept it otherwise.” Since the company is located near water, there are options to ship metal overseas, if the price is right.

To ensure what is in the Montecalvo Disposal roll-offs containers are correctly designated, they are painted different colors; red for the hauling company and black for Coastal Metals. It matters which truck hauls what because of New Jersey’s strict permitting requirements. As there are different permits for the different companies, there is a need to prohibit putting solid waste into the metal company’s recycling
boxes. The Montecalvos operate eight roll-off trucks for its 10-20-30- and 40-yard boxes, and two of those trucks are kept on site just to jockey boxes around the eco-complex.

Bayshore Soil Management is another component of the Montecalvo compilation of recycling companies. This entity strictly processes contaminated soil. A load is tipped on the floor in a building adjacent to the transfer station. Then it is screened by an Extex E-7 to remove overs. The soil is fed into a hopper which conveys the material to an Astec low-temperature, soil desorption unit that remediates the dirt contaminated with any of the following: oil, gasoline, kerosene, jet fuel, coal tar and/or MGP impacted soils. This material comes into the facility under the Bayshore Recycling license, and the permit allows them to accept up to 2,500 tpd.

There is also a deepwater docking station that allows the site to take in dredge materials and to ship and receive material from across the bay in New York and other ports. “It’s another way to reduce our carbon footprint,” said Valerie. “Each barge equals 100 truckloads of material, keeping that many less trucks off our crumbling infrastructure and further reducing diesel emissions.”

Such steps are important in the New York City/Northern New Jersey area, an EPA non-attainment district for air pollution. “We have converted from diesel to electric for much of the equipment to avoid diesel emissions,” Valerie said. “As recyclers, we are big energy users.” To help offset power use, the company would like to add a gasification or anaerobic digestion system. “We want to replace natural gas, which powers our low-temperature thermal desorber,” said Valerie. “Instead of using the systems to turn a turbine and put it back on the grid, we could create a syngas and use in our own remediation efforts.”

And of course there is the solar energy program on the site. There are 9,365 solar panels that generate 679 kW, which provides 40% of the thermal desorption electricity needs. “You can’t just put solar panels on old rooftops,” said Valerie. “Our research shows you have to have at least a 25-year plan for solar on a rooftop. So, when you install solar on an older roof that requires maintenance, you wouldn’t be able to get under those panels very easily. Nor would you want to put additional weight on a roof that is already halfway through its lifetime. A new roof is the perfect time to incorporate solar panels on the rooftop to provide green energy.”

All of the Montecalvo recycling efforts began years ago when Frank bought his first dump truck. It has been built up to its current multi-million dollar level through hard work, perseverance and the help of its employees, some of whom have been with the Montecalvos for more than 25 years. The all privately-held companies feel the need to be cautious in their approach to what is coming into the facility. Haulers are required to have a manifest form designating where the material is coming from and contaminated soil has to be profiled. Concerned that contaminated material might be getting by the scale house, they are using an XRF analyzer that can almost instantly provide information on what is on or in a material, including lead, asbestos and other contaminants. “The expensive handheld piece of equipment is used all over the site,” said Valerie. “It’s all about responsibility. Once it crosses our scale and is accepted into the facility, we have taken ownership. You can never be too cautious.”

She admits the company would like to expand into other recycled markets, such as shingles, glass, vinyl and crumb rubber. Currently the drywall received onsite is shipped to Pennsylvania for processing, but they would rather process it at the eco-complex site. “We think all recycling centers and solid waste facilities should be designed along these lines in the future,” said Valerie. “Put everything in one little neighborhood rather than seven different recycling centers all over a city or area. Creating one big happy family of synergy that generates green-collar jobs.”