SEARCH FOR FEEDSTOCKS

ISLAND OPERATION STUDIES C&D RESIDUALS FOR REUSE

Hawaiian company composts everything from yard trimmings to wood to manure to food residuals and is now studying new sources for feedstock.

HAWAIIAN Earth Products (HEP) has been composting yard trimmings and wood residuals since 1993 on 35 acres in Kapolei, Oahu, Hawaii. It is one of two composting facilities on Oahu. The company also makes custom mixes from screened soil, cinders, sand, and composted vegetable residuals and chicken and cattle manures. HEP accepts materials from commercial haulers, landscapers, tree trimmers, and city, county and state entities for composting. It receives 125tons/ day of materials. The end products, Menehune Magic organic compost, organic compost with manure, organic potting mix, screened topsoil, and lawn and garden organic blend, fly out of the operation so fast the company has a hard time filling orders. Sometimes for bulk orders, despite the fact HEP composts 30,000 tons of materials each year, the company has to mix organic compost, which meets HEP specs, from other sources into HEP compost to meet the demand. Right now, HEP's bag sales exceed 50,000 bags per year, a retail value in excess of $250,000/year, says Lorra Naholowa'a, HEP's marketing manager. Last year 20,000 cubic yards were sold in bulk. The recent purchase of a blower truck is also fueling product sales.

In 1994, the economy was pretty strong in Hawaii. HEP had no problems handling the flow of yard trimmings that was stepped up by municipal bans of green waste at county disposal facilities. But in 1995, the economy took a turn for the worse and HEP was left with tons of compost that simply weren't selling. The excess material led to several major fires. And even as finished product sales improved, previous fires left unsuitable material in the yard, leading to a few smaller fires. In November 1995, HEP reorganized, focusing on getting compost off site quickly. To do that, the company needed to develop a new marketing strategy based on quality products and name recognition. The marketing of Menehune Magic has proven successful, and professional landscapers, builders, homeowners and state, city and federal governments all use HEP's soil amendments. However, as competition in the composting industry increases, HEP's sources for feedstock could be challenged, company officials say. For that reason, HEP seeks to expand the types of feedstocks it can work with successfully.

Hawaiian Earth Products recently completed a study on gypsum drywall, borate treated lumber and non-lead painted untreated lumber for use in composting.

In 1999, in an effort to find new sources of raw material for composting, and to help divert the large construction and demolition (C&D) waste stream, HEP submitted a proposal to the Clean Hawaii Center, a branch of the Department of Business and Economic Development and Tourism, for a research

Hawaiian Earth Products is on the dry, windy side of the island of Oahu, making moisture and temperature challenges for a composting business.

In June, HEP used its new blower truck to apply compost for sod application on part of Prince Kuhio Beach Park along Waikiki Beach (left). The desired result of a park-like setting was achieved (right).

project on the composting of gypsum wallboard, borate treated lumber and non-lead painted untreated lumber. "Our first thought was to try composting the really nasty stuff, like CCA (chromated copper arsenate) lumber. But after some research and feedback from the state, that looked like a really bad idea," says Alan Gottlieb, managing partner of HEP. "We then decided to look at borate lumber, since boron is supposed to be the better environmental alternative, gypsum wallboard and non-lead painted lumber."

In late 2000, the project was approved and the necessary permits were secured. The composting was recently completed, and preliminary results indicate that all of these materials are suitable feedstocks for compost; gypsum at ten percent, borate lumber at five percent to 95 percent yard trimmings, and painted lumber at 15 percent. HEP did find that some feedstocks were more promising than others. The project was two pronged: Research, and market development of treated wood for reuse. The company concluded that gypsum and borate lumber from new construction can be composted easily. HEP employees who worked on the project say ten to 15 percent gypsum in a co-compost would be ideal to reap the benefits of the gypsum, which was found to aid in water retention while composting. Additionally, the gypsum lowered pH levels and added calcium. "I was surprised that the gypsum lowered the pH as much as it did, which is great for us. The high pH (8.0) in the compost always worries us a bit because people often plant things in the straight compost, like sensitive seedlings," Gottlieb explains. "Although Hawaii soils are generally low in pH and the compost and soils together work well, we continue to try to provide things that are foolproof."

The gypsum compost also had no negative effect on the composting area and no negative effect on the leachate test water or soil under the gypsum compost in the leachate trial. "At 20 percent, the gypsum really made the whole pile pretty white/gray, which is not desirable because it looks strange to the customer," Gottlieb says. The 20 percent gypsum compost did not have an odor during composting, but emitted a sulfur odor during screening and curing. "Some of the customers who used the compost thought it was manure-based because of the odor," Naholowa'a says. Gottlieb says lowering the gypsum to ten percent should solve both the white pile and odor problems. HEP is composting at those specs now and is waiting for definitive results.

CCA-TREATED LUMBER RECOVERY A SLOW PROCESS

As part of his dissertation research, Delton Alderman of the Center for Forest Products Marketing and Management at Virginia Tech University in Blacksburg, Virginia, recently surveyed more than 2,800 contractors in Georgia, North Carolina and South Carolina to determine factors that affect recovery of CCA-treated lumber. He modeled the factors that concern the contractors' intention to recover this lumber and through extrapolation, found that nearly 2.3 million cubic meters of treated lumber were removed in 1999 from the demolishing of decks. The primary reason for deck replacement was decayed wood and the majority of respondents directed CCA-treated wood to municipal solid waste landfills. Alderman found that the wood was landfilled primarily because of a lack of facilities to recover the lumber. However, the research also uncovered that most contractors have at least thought about CCA recovery as a necessity. CCA is already banned or regulated in several European countries.

Alderman interviewed three state and four local level waste management officials, three building inspectors and nine contractors. One state level official was in favor of banning CCA lumber for use and the two remaining officials indicated they believed CCA lumber disposal wasn't a problem. None of the local officials indicated that spent CCA lumber was a problem nor did they have plans to separate and recover CCA residuals. Building codes in three counties Alderman visited required the use of CCA lumber for all outdoor decking and sills.

Alderman concluded that recovery facilities and programs were found to be nonexistent. Financial incentives, convenient drop-off locations and changes in how officials feel about CCA lumber would be needed to implement recovery facilities, he says.

In the borate treated lumber tests, the main concern was making sure the borate levels were diluted enough to avoid phytotoxicity. The boron did leach out of the finished compost through dilution from inoculation and went from an average of 36.7 ppm in the preleached borate compost to .62 ppm in the postleached borate compost in piles that were 12 to 13 percent ground borate treated lumber. While the boron in the soil under the compost in the leaching trial did go up, it only went up a small amount from .43 ppm pre leaching to .72 ppm post leaching. It was concluded that borate treated lumber should be diluted five percent to 95 percent yard trimmings. HEP would also like to continue to study the potential for the boron lumber to be ground, instead of composted and used as a ground cover around homes where homeowners wish to provide insect control. Boron is already used around homes as an insect control for ants, cockroaches, termites, and the like and could have good market potential.

The Hawaiian Earth testers found painted lumber to be difficult to work with, primarily because most painted lumber comes from demolition and is contaminated with nails, glass or other building materials. "It will be difficult to find a clean supply, as demo material would probably come contaminated with glass and other problem materials," Gottlieb says. If clean, non-lead painted lumber could be found, HEP concluded that it has no effect on the composting, and could be safely added at 12 percent or as much as 20 percent.

There is a lot of construction currently taking place on the island of Oahu and Gottlieb says the C&D debris could prove to be good feedstock. There are currently no state or county landfill bans on C&D debris or wood residuals, but both are diverted from the municipal landfill to a private landfill for commercial construction tipping. Some household C&D debris enters county disposal sites if it is collected through municipal collection services. In 2000, 165,000 tons of rock, concrete and asphalt were recovered and 11,000 tons of untreated wood waste were ground and composted throughout the island. However, yard trimmings — including palm, which many companies reject or separate — still make up 90 percent of HEP's feedstock. Palm has a waxy residue on the surface of its fronds, making it difficult to breakdown. It does compost, but it takes longer than average, Naholowa'a says. The fronds are also difficult to grind because of a stringy, moist make up, so HEP has to mix the fronds with other greens before grinding. Twenty-five percent of HEP's yard trimmings are palm fronds.

In early 1994, the City and County of Honolulu, in which Kapolei lies, instituted

Composting tip fees are less than landfill tip fees on the island.

"We give an A+ to the city for banning green wastes from landfills," says Lorra Naholowa'a.

a ban for loads containing more than 50 percent yard trimmings at the county landfill and H-POWER, a garbage to energy plant. Today, the ban includes any load with more than ten percent green waste. If disposal site operators know in advance that a truck exceeds the limit, the truck will be diverted to a private recycling center or landfill. Trucks are also monitored as they are unloaded and drivers are warned if they exceed the limit. Companies are restricted from county disposal sites if warnings are excessive. "Our goal is to divert as much as possible from our disposal sites," says Suzanne Jones, recycling coordinator of the City and County of Honolulu. "Disposal site tip fees are higher than composting tip fees, so composting makes economical sense as well as environmental sense." The City and County of Honolulu estimates the annual yard trimmings stream on Oahu that is composted or mulched is 60,000 tons. Of that, 20,000 tons is estimated to be mulched or composted by homeowners, institutions and businesses, Jones says. HEP and the other composting facility on Oahu take care of the remaining 40,000 tons of yard trimmings. Honolulu does separated curbside collection for almost every home on the island twice a month. Right now, Honolulu picks up yard trimmings that are left in 35-gallon containers or in plastic trash bags. In the near future it will offer 96-gallon carts. "We feel participation will increase," with that measure, Jones says. Public education also is an ongoing activity that is stepped up after Christmas so people know what to do with their trees. "We give an A+ to the city for banning green waste from landfills and an A+ for getting their curbside pick up program going," Naholowa'a exclaims.

Producing compost in the hot, dry, windy conditions of leeward Oahu is not easy. The facility is on the southwest side of Oahu where less than five inches of rain fall annually and temperatures are almost always in the high 80s. The Pacific Ocean is less than a mile away, making for daily average winds of ten to 15 mph. "Keeping moisture consistent is a challenge," Naholowa'a says of the 25-employee operation. The north side of windrows on the 35-acre facility usually run close to ten degrees cooler than the south side of the windrows, affecting the turning schedule — just as the wind often dictates the grinding and screening schedule.

The ground materials are soaked with hose water immediately. Windrows on a mulch padded coral base range from 200 to 500 ft. long, 13 to15 ft. wide, and 6 to 8 ft. high. The windrows are topped off with screened overs, manure, vegetable residuals and syrup residuals from a Coca-Cola plant in Honolulu. A system of PVC pipes with sprinkler heads every ten feet can be found on each windrow. A Scarab windrow turner, acquired by HEP when an island-based food residuals composter closed its doors in 1999, is used for aeration — a front-end loader was used previously. Temperatures are monitored two or three times a week, and HEP is well aware that piles can reach 160° F within 48 hours if the windrows are not monitored and turned. "It is a challenge to keep the piles at a 40 to 60 percent moisture level," Naholowa'a explains. Materials are composted for a minimum of three months. "As we get to the end of our process, we send samples in for both nutrient and microbial testing, then we screen to one-half inch through a trommel," she continues. The compost is certified under the U.S. Composting Council's Standard Testing Assurance Program.

The resulting compost is offered in every major garden center on Oahu, and in many of the chains on the neighbor islands. It also is bagged by another company for sale in other large chains. In several instances, this locally recycled product has replaced imports from the continental United States. This is a major goal of the island and public education efforts have helped speed up the process. To ease application woes, the company recently bought a Blotech blower truck. Customers are mainly landscapers and homeowners. However, the truck was used in a city and county application at Prince Kuhio Beach Beach Park in June. HEP charges $20 to $30/cubic yard in addition to product cost for delivery and spreading, depending on quantity and travel time. — A.S. ■