

TESTING OPTIONS FOR COMMERCIAL FOOD RESIDUALS DIVERSION

THE CITY of San Jose, California hopes to build on the success of its residential yard trimmings recycling program by composting food residuals and nonrecyclable paper. While its curbside recycling program has captured the vast majority of the city's yard trimmings (see "Going Bulk For Yard Trimmings Collection," December, 1999), a study conducted in 1998 determined that other organics, primarily food residuals, comprise 24 percent of the material San Jose is sending to landfills. To test the economic and technical feasibility of composting these materials, the city's Environmental Services Department is funding three demonstration projects utilizing different composting technologies.

One of the projects is taking place at the University of California's Bay Area Research and Extension Center (BAREC) and utilizes vermicomposting to process clean, source separated produce residuals from grocery stores (see sidebar). The vermicompost will be used to grow different varieties of peppers on the site.

The other two projects are located at centralized yard trimmings processing facilities. Browning-Ferris Industries of California, Inc. (BFI) was awarded \$94,901 to compost 1,300 tons of San Jose food residuals at its Newby Island Landfill in north San Jose. Zanker Road Resource Management Ltd. received \$100,000 to compost 5,200 tons of San Jose food residuals at its Z-Best Composting Facility. The demonstration projects will last one year. The differing amounts are a result of the city's RFP for the in-vessel demonstration project, which asked proposers to tell how much San Jose food residuals they would compost for the amount of funding requested (reflecting



Food residuals and nonrecyclable paper are ground with yard trimmings and loaded into a container as part of BFI's pilot composting project.

San Jose funds demonstration projects to test collection and composting methods, and the quality of the finished product.

David Krueger

the type of technology to be used).

The BFI pilot began operating in November, 1999. BFI and San Jose hosted a "Zero Waste" kick off event from which all of the organics (food residuals, paper plates and napkins, biodegradable "plastic" utensils) were composted and the remaining materials (glass, metal, and plastic bottles and cans) were recycled.

BFI is using four aerated, stainless steel containers with airtight lids manufactured by Green Mountain Technologies. The containers are 8.5 feet high, 8.5 feet wide and 23 feet long (each with 40 cy capacity).

BFI also is testing an aerated static pile method that uses the same forced air system and biofilter as the containers. Currently, food residuals are composted in the containers for two weeks, then moved to an aerated static pile for an additional month. Operators are experimenting to determine the proper amount of residence time in the containers.

Zanker received its solid waste facility permit and the site is under construction. The permitting process delayed project start-up. Zanker estimates an August, 2000 start date. The Z-Best facility is located 40 miles south of San Jose between the cities of Gilroy and Hollister and is surrounded by agricultural land. As of May, Zanker was planning to use the Ag-Bag Environmental in-vessel composting system. The containers are aerated bags of 9-mm thick black plastic that are up to 200 feet long when completely filled. Zanker plans to compost the material in the bags for eight to 16 weeks.

BFI is grinding the food residuals and mixing them with ground yard trimmings and wood chips as bulking agents. BFI started with a ratio of two tons of bulking agents to every ton of food residuals, but has decreased the amount of bulking agent as the incoming

The plan is to service large commercial generators with compactors and loose roll-off bins, and to establish a front-load collection route for smaller generators, such as restaurants.

VERMICOMPOSTING PILOT

ATHIRD COMPONENT of the City of San Jose's food residuals composting demonstrations is a two-year vermicomposting research project at the Bay Area Research and Extension Center (BAREC). The project is being implemented in two stages. The first step was establishing vermicomposting beds in a BAREC greenhouse; the second is field production of peppers in soil amended with vermicompost.

Vaishali Tamhankar, who is associated with the Institute of Natural Organic Agriculture in India, set up two 20-foot vermicomposting beds in May, 1999. A four-inch layer of moist hay was put in the beds, then a one-inch layer of yard trimmings compost was applied. Ten pounds of worms were distributed throughout the beds and cov-

ered with chopped up grocery store food residuals that had been mixed with a small amount of horse manure. Everything was moistened, and a burlap cover was put over the beds. Food residuals are added once per week. The worms can compost a half-ton/month of vegetable and fruit residuals; the vermicompost is harvested monthly.

The vermicompost is being applied at different rates in plots used to grow Cayenne chili peppers. The growth and health of the peppers will be compared to others grown in soil amended with standard yard trimmings compost and soil with no amendments. The growth trials and analyses of soils amended with vermicompost are being conducted by Maria de la Fuente.
— Karin Grobe

material contains more cardboard and less food residuals than originally anticipated. Z-Best will use similar bulking agents and also will experiment with mix ratios. The compost from both sites will be screened and will be sold in bulk. Z-Best is targeting both the agricultural and landscaping markets, while BFI is marketing compost primarily to landscaping companies.

PERMITTING ISSUES

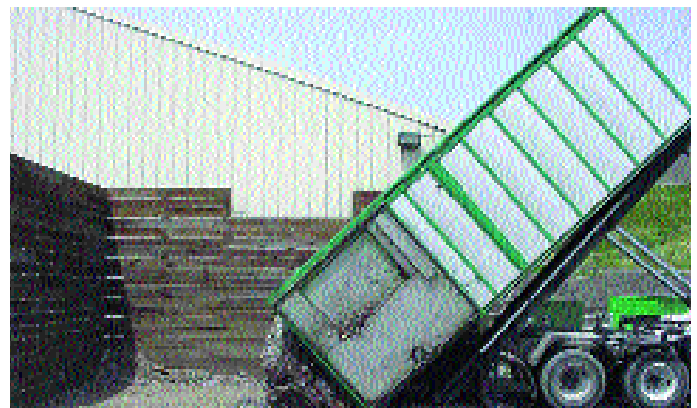
Two primary permits are required for these projects — a state composting permit and the local land use permit or Conditional Use Permit. California has a "tiered" permitting system for composting operations. Adding postconsumer food residuals to a composting operation moves it up to the top tier. (Vegetative preconsumer food residuals are allowed under a lower tiered permit.) Zanker applied for a full solid waste facility permit — the same type a landfill is required to obtain — whereas BFI's Newby Island Landfill already has one for its landfill operations, and thus only had to amend its composting permit to include the food

residuals pilot. The cost of getting a state permit for a temporary composting pilot led Zanker to pursue one for a full-scale permanent facility.

Conditional Use Permits are issued by the local planning agency. BFI is in the City of San Jose's jurisdiction and Z-Best is in the County of Santa Clara's jurisdiction. Local planning departments are given a lot of leeway in the conditions they can place on a certain use. They can limit the number of truck loads and tons, and even operating procedures. For instance, Santa Clara County required Zanker to enclose its Z-Best food residuals tipping area in a 20,000 sq. ft., \$600,000 building. Z-Best is permitted to put up to 700 tons/day of material into the bags. About half will be food residuals and half bulking agents.

The City of San Jose tried to facilitate permitting by discussing the projects with the regulators beforehand. Examples of operating procedures and restrictions from other food residuals operations in the state were provided. Regulators were allowed to comment on the draft contracts between the

After two weeks in the container (left), the contents are unloaded (center). A layer of wood chips is put on the bottom of the container (right) to help the material slide out more easily when unloading.



COMPOST PRODUCT ANALYSIS

THE VIABILITY of the San Jose food residuals composting demonstration project hinges upon the ability of BFI and Zanker to produce saleable products. Finished product will be sent quarterly to an independent lab to be tested for nutrient value, contamination and pathogen reduction. In addition, San Jose is funding a three-year field test of the finished compost on various crops at the University of California's Bay Area Research and Extension Center. These field tests are a part of San Jose's Agriculture in Partnership program designed to promote the use of compost products.

María de la Fuente, principal investigator and Santa Clara County farm advisor, will study the effect of the food residuals compost on crops. The compost will be applied at two, three and four tons/acre to plots that will be used to grow chili peppers, tomatillos and potatoes. The yields, growth and health of the crops will be compared to others grown in soil amended with standard yard trimmings compost and soil with no amendments.

Soil improvement also will be evaluated. Laboratory studies will be conducted to estimate stable organic matter production in the soil. Soil samples will be analyzed for physical, chemical and microbiological properties initially and at regular intervals throughout the experiment. — Karin Grobe

city and the composters and to include contract language about contingency plans.

COLLECTION STRATEGIES

Both composters are targeting large commercial generators such as grocery stores. BFI currently collects garbage in roll-off compactors from many San Jose grocery stores. Because 90 percent of the material



in these compactors is compostable (e.g. food residuals and waxed corrugated), BFI is not asking for source separation at this time. As a result, the composting program is "invisible" to the customer. BFI does not have enough containers to efficiently compost all of the food residuals from any individual store. Whenever a container is emptied, materials in the next compactor from a San Jose grocery store that comes to the landfill are diverted to composting.

The primary noncompostable contaminant in these loads is film plastic, which BFI removes by screening after composting. So far operators have been able to screen out enough of the film plastic to make a saleable product. However, a significant amount of wood chips and other partially composted organic items are screened out with the film plastic and end up being disposed with the plastic. BFI and San Jose may consider increasing source separation or front-end sorting to ensure that less plastic enters the in-vessel composting system.

Zanker will utilize a third-party commercial hauler to collect San Jose food residuals. Its goal is to collect 100 tons/day of food residuals from restaurants and grocery stores. The plan is to service large commercial generators with compactors and loose roll-off bins, and to establish a front-load collection route for smaller generators, such as restaurants. Compostables collected from restaurants will include pre- and postconsumer food residuals, meat scraps, and nonrecyclable paper such as napkins and waxed cardboard. The front loader route also will collect other compostables, including commercial yard trimmings and material from florist shops.

The hauler will transfer the food residuals from San Jose to the Z-Best facility through GreenWaste Recovery's (Zanker's sister company) materials recovery facility in north San Jose. Zanker also plans to have its hauler offer separate collection of cans and bottles to restaurant customers, in part to prevent the organics from being contaminated with glass fragments. (Commercial recycling is voluntary, and many restaurants do not have a beverage container collection service.)

POTENTIAL SAVINGS

It is BFI's and Zanker's responsibility to obtain food residuals for composting. San Jose has an open market for collecting garbage and recyclables from businesses. Twenty-four franchised haulers and over 40 private recyclers compete with each other for commercial accounts. BFI has the largest share of the commercial hauling market, including grocery store accounts. Zanker will have to market its food residuals collection program to new customers. However, it does not expect to have a problem because restaurants and grocers should be able to reduce their garbage bills by signing up for the service.

In addition to county and state fees,

The cost of getting a state permit for a temporary composting pilot led Zanker to pursue one for a full-scale permanent facility.

The partially composted food residuals/yard trimmings mixture is put into aerated static piles for an additional month. The pilot project is located adjacent to the working face of the Newby Island Landfill.

Whether haulers pass on the savings to their customers depends upon how competitive the marketplace is.

San Jose has a landfill tax and a volume-based franchise fee on commercial garbage. Using a conversion factor of 150 lbs/cubic yards (cy) of garbage, these add up to a total of \$65/ton or \$5/cy of garbage service. Waste materials that are recycled or composted are not subject to these fees and taxes. (However, any contaminants removed from the compost and landfilled are subject to the disposal tax.) The savings due to diversion can be significant. For example, if BFI takes a 40 cy compactor containing ten tons of food residuals and composts instead of landfills them, the resulting savings in fees and taxes on that one pull would be over \$600.

Given these fees, it appears that the hauler needs the financial incentive more than the generator. The city has found that for generators, the amount of money they can save by composting or recycling is a very minor percentage of their overall expenses. However, for the haulers, San Jose's fees and taxes represent a very large part of their expenses, which is an incentive to work harder to get their customers to participate in the recycling and composting programs.

Whether haulers pass on the savings to their customers depends upon how competitive the marketplace is. BFI is not doing so for its food residuals customers, who are existing accounts. Other haulers not already possessing any restaurant or grocery store accounts may have to pass at least some of the savings on to the customers to entice them to switch hauling services. As there will be at least two haulers competing to collect commercial organics, BFI may have to pass some savings on to its accounts in order to retain customers. Zanker has surveyed many of the food residual generators in San Jose, found out what they are paying for garbage service, and figured out what their hauler would have to charge to be competitive.



IMPACT ON DIVERSION RATE

If the demonstration projects prove to be economically viable, San Jose will encourage BFI and Zanker to continue collecting and composting commercial food residuals as a private enterprise. The fact that Zanker permitted its facility to accept 350 tons/day of food residuals shows a level of commitment. If the program is successful, it will result in lower garbage bills for commercial generators, a new business opportunity for Zanker and BFI, a new supply of compost for local growers and landscapers, and an increase in waste diversion for the city. At that point, San Jose will consider whether to pilot the program in the residential sector. According to waste composition studies, if the majority of the commercial and residential food residuals and nonrecyclable paper were composted, the city's diversion rate would climb from 43 percent to over 60 percent. ■

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