

COMPOSTING EXPANDS DISNEY RECYCLING PROGRAM

Diversion of an integrated mix of materials — from beverage containers to hotel kitchen scraps and yard trimmings — are boosting recycling rates at the Walt Disney World complex in Orlando.

Robert L. Spencer

RECYCLING and composting are becoming a way of life at the unique conglomeration of theme parks, hotels, restaurants, offices, and shops that is Walt Disney World (WDW) in Orlando, Florida. In addition to its 34,000 employees, WDW receives millions of visitors, thereby requiring a different focus on solid waste recycling. Many of those visitors stay in one of the 19 hotels, or the large campground located on this 30,000 acre site. Given the practical difficulties of implementing a recycling program for visitors from all over the world to the three theme parks — EPCOT Center, Disney-MGM Studios, and Magic Kingdom — it is the employees who are doing most of the recycling.

At all Disney resorts, however, visitors can participate. The 10 Disney hotels have in-room recycling programs for guests, as well as about half of the nine other hotels operating on site. And at the Fort Wilderness Resort, a campground where recycling started in February, 1989, campers are given a plastic bag and list of items to be deposited in designated dropoff boxes.

GOING BACKSTAGE

Behind the scenes at Walt Disney World, employees are trained to incorporate recycling into their jobs. For example, at restaurants in the EPCOT theme park, workers separate different colors of glass, office paper, steel and aluminum cans, plastic beverage containers, and cardboard. These materials are collected and taken to the \$3.5 million materials recovery facility (MRF) which opened in the fall of 1992. The 28,000 sq. ft. facility is designed to process 110 tons per day (tpd) of paper, corrugated, glass, plastic and metal, although it currently averages 30 tpd. While acknowledging the high operating costs, Matina Wagner, superintendent of recycling for Reedy Creek Energy Services (RCES), a WDW subsidiary, reports that the program is being continued with greater emphasis on source separation instead of sorting commingled recyclables at the MRF. One part of this effort is the growing number of balers located in stores, hotels and restaurants, producing bales of corrugated for export.

RCES is responsible for solid waste management and recycling at Disney World, charging a service fee for garbage collection to the hotels, restaurants, and theme parks operating within the Reedy Creek Improvement District. On a seven day basis, approximately 400 tons per day of solid waste are generated in the district. Although daily or annual visitor totals to WDW are not made public, Wagner notes that waste management services are provided to the daily equivalent of a community of 120,000 persons.

RECYCLING RESULTS

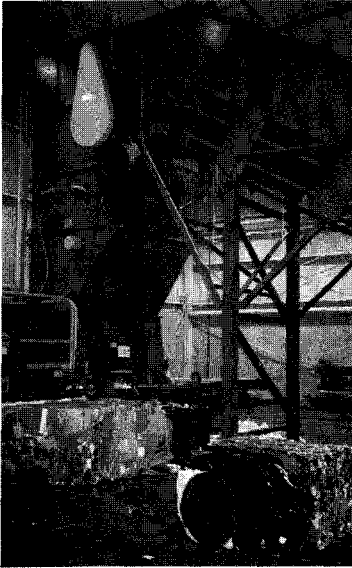
Each month, Wagner distributes a monthly summary of solid waste generated and recycled by the total of 36 theme parks, hotels, resorts, shopping plazas and restaurants participating in the recycling program. A review of April, May and June summaries indicates that the overall recycling rate for the Reedy Creek Improvement District ranged between 18.5 percent and 19.3 percent. The three theme parks range from 10 to 16 percent, and the 13 resorts from 6.5 percent to 60 percent.

At the high end of the percentages is the Food Processing Center, where approxi-



As part of a pilot begun this Spring, up to 60 tpd of food scraps from Walt Disney World hotels are being composted with yard trimmings and horse manure.

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The Reedy Creek MRF currently processes around 30 tpd of recyclables.

The recycling program at Walt Disney World has begun placing greater emphasis on source separation instead of sorting commingled recyclables at the MRF.

mately 85 percent is recycled. Wagner attributes that high rate to the combination of waste minimization, on-site baling of corrugated, the purchase of food products in recyclable containers and bulk units, and composting of food.

Another high rate recycler is the Hilton in Walt Disney World Village, which is consistently leading the other hotels in recycling with a 49 percent rate. According to John Steele, director of property operations at the Hilton, recycling began in the fall of 1990, making the Hilton the first hotel at WDW to implement a full-fledged effort. All Hilton employees recycle as part of their job, says Steele, and guests are invited to recycle by a tent card describing the program in each of the 813 guest rooms. Guests are asked to set newspapers, glass, plastic, and steel and aluminum cans on the table in their rooms so housekeeping staff can collect the items in a bag carried on the cleaning carts. On each floor, employees separate the items into centralized racks with eight separate bins, or 95-gallon rolling carts. Corrugated is baled on-site, as are steel cans.

One reason the Hilton has one of the highest recycling rates is the fact that 36 percent of the total solid waste recycled at the hotel is food waste. Recognizing that it would be difficult to achieve the 30 percent state recycling goal without including food waste, the Hilton and several other hotels started separating kitchen preparation scraps in March, 1993 as part of a pilot composting program. The financial savings for the Hilton are substantial, explains Steele, since RCES picks up the food daily at no charge to the hotel. As a result, the hotel's collection and disposal costs have been reduced to \$1,200 from \$6,000 per month.

REEDY CREEK COMPOSTING FACILITY

Just as most guests are oblivious to behind the scenes recycling, most also are not aware of the Reedy Creek composting program for biosolids, hotel food scraps, construction and demolition wood chips, and yard trimmings. Located across the service road from the MRF are the wastewater treatment plant, and the six acre composting facility.

Composting started at WDW in October, 1988 when a Taulman-Weiss in-vessel system started processing biosolids from the 8-9 mgd wastewater treatment plant. According to Charles Reed, RCES superintendent of water, wastewater, and compost, use of the Taulman system was discontinued in 1992 due to "many failures with the drag chains, as well as high operation costs such as \$250,000 per year for kiln dried wood amendment." There also was short circuiting of the air flow through the vessel, adds Jerry Vollenweider, compost operation supervisor. Although the resultant odors did not become a problem off-site, due largely to the 1.5 mile buffer zone to the nearest receptor (a golf course), Vollenweider remembers the odors being a nuisance in the vicinity of the plant. (The current operation is

designed to scrub odors through a biofilter, as described later in this article.)

In February, 1991, Reedy Creek started using the aerated static pile (ASP) method on an outdoor composting pad as a backup to the Taulman system. To intercept rainfall and gain greater control over the ASP process, a roof was constructed over the compost pad. In September, 1992, use of the in-vessel system was discontinued.

The 40 wet tons per day of dewatered sludge (20 percent solids) produced by the treatment plant are mixed with two to three times that amount of woodchips, and constructed into piles over aeration piping on the floor of the covered, open sided composting pad. The wood chips are made from recycled, untreated construction and demolition wood that is processed at the landfill. The piles are mixed with a Scarab windrow turning machine. The facility tried using shredded yard trimmings instead of chips, but Vollenweider notes it seemed overly retentive of moisture. After approximately four weeks, the material is moved outside for curing, and then final screening. By constructing large piles of curing compost, operators are able to keep the compost sufficiently dry for final screening. A portable Royer one-quarter inch trommel screen is used; a stationary back-up trommel, originally intended for use in final screening, is available in an enclosed building. RCES estimates the costs of sludge composting are \$450 per dry ton, including O&M and debt retirement.

COMPOSTING EXPANSION

In addition to the opportunity to improve the overall recycling rate, another impetus for expanded composting at WDW came from the use of garbage disposals by food service operations, which created problems at the wastewater treatment facility. According to Reed, when the disposals were being used, biological oxygen demand (BOD) of the wastewater flowing to the plant exceeded 400, about twice the design loading. Reedy Creek engineers also determined that the high BOD loading was very costly to the operation of the wastewater treatment plant — more so than taking the food to a landfill. RCES asked that food scraps no longer be disposed of through the sewer system.

As a result, some of the hotels looked for options other than landfilling. Three hotels signed on with pig farmers who pick up the food scraps, while others are trying the composting option offered by Reedy Creek. Excess prepared food (that has not been touched) is donated to a coalition of organizations serving homeless persons.

RCES started collecting and composting food scraps from hotels in March, 1993, and currently serves five hotels, and the food processing center. The program is limited to preconsumer food scraps generated during food preparation, so the incidence of inorganic contamination is very low. In the kitchen, scraps are put in 30-gallon con-

tainers (not lined with plastic bags), which are then dumped directly into 69-gallon wheeled carts. Material is collected daily in a rolloff truck with a modified container. A hydraulic lift on the truck picks up the carts and empties them. After collection, containers are pressure washed to minimize odors and flies. Food from the six locations peaked at 60 tons per week during the summer, but had fallen back to about 40 tons per week by early September.

The food waste is composted separately from the biosolids. When a load arrives at the compost facility, it is dumped on a bed of shredded yard trimmings and then covered with more of the shredded material. Piles are constructed under the roof of the sludge composting hanger in a ratio of four parts yard trimmings to one part food waste, and mixed with a Scarab turning machine (food waste is not shredded prior to mixing). Reed says the food was a welcome addition since it improved the ability to compost yard trimmings by providing needed nitrogen. Grass clippings and horse manure from the Ft. Wilderness stables are also added to the mix. After one week under roof, the windrow is moved outside where it is still turned daily, and then eased back to three times per week, and finally once turning per week. After eight weeks, the compost is final screened to one quarter inch.

RCES has applied for a solid waste permit from the Florida Department of Environmental Resources (DER) to compost a much larger volume of food than is being handled through the pilot, adds Reed. The expanded program will not take place until construction is completed on the new covered compost area, which will double the present size. The expansion was designed to handle projected increases in wastewater flows and associated biosolids which will result from the ongoing expansion of WDW. However, now that the food composting program has worked so well, that expansion will have to be factored in. "They're lined up waiting to start bringing food to us," reports Reed.

As to the potential quantities which will be composted, Wagner estimates 150 tons per day of food waste considering that there are "a large number of restaurants on site, with 35 food locations at Magic Kingdom, 33 at EPCOT, and 11 at Disney-MGM Studios." Once the expanded facility is ready and permitted, the amount of food coming in will be slowly increased, says Reed.

Vollenweider is looking forward to completion of the new composting area this fall and the DER permit so they can try different mixtures of the food and other materials, including paper. The new facility also will have sufficient space to mix materials and cure the compost under roof. Space for a second biofilter is also included. It has not been determined if the increased quantities of food which are anticipated will be composted with the ASP method, or if the existing program of turned windrows will be adequate.

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THE COMPOSTABLE LUNCH

IN JULY, two companies teamed up with the staff of the Hilton Hotel at Walt Disney World Village to host a public demonstration of a compostable meal. A bagged lunch was served to 400 members of the American Association of Botanical Gardens and Arboreta, who were holding their annual convention at the Hilton. The cutlery, yogurt container and lid — as well as the garbage bags used for collection of discarded items — were made from Novon Products biodegradable polymers. The cellophane-like sandwich and cookie wrap, and the liners for the paper lunch bags were manufactured by Flexel.

The garbage bags were then taken to the Reedy Creek composting facility to be mixed with other hotel

food scraps and yard trimmings, and composted. Clark Gregory, The Compost Man, was retained to monitor and report on the biodegradation of the Novon materials in the pilot project.

In a related project this summer, more than 5,000 elementary and junior high school students learned about composting and the potential value of food service products made from biodegradable polymers at the Frost Valley YMCA in upstate New York, a large residential environmental center. At the center's cafeteria, students used forks, knives, and spoons made with biodegradable polymers. Materials were then taken to Frost Valley's barn, where food scraps and paper from the cafeteria are composted.



Cutlery, containers, sandwich wrap and bag liners — all made with biodegradable polymers — were composted at Disney World.

ODOR AND FLY CONTROL

The ASP facility was designed to operate primarily with negative aeration to pull air down through the piles and through a biofilter. Then a contractor working on the construction of the new composting area inadvertently destroyed half of the biofilter. "We switched to positive aeration and found a number of benefits," explains Vollenweider, "including more consistent moisture content and better distribution of air in the piles." Another odor control technique which Vollenweider has found to be effective is covering the aeration piping with a layer of wood chips before constructing the piles. Fresh chips apparently absorb more leachate than chips screened out from the finished compost, which reduces plugging of the aeration piping. Covering the piles with about a foot of screened compost product also has reduced odors.

A switch to positive aeration at the compost facility promoted more consistent moisture content and better distribution of air in the piles.

Flies associated with both the food waste and sludge mixtures have been substantially reduced by using a Bobcat loader to scoop up compost which spreads out along the edges of the piles. Mixing it back into the active windrows appears to help break the fly breeding cycle.

NURSERY AND LANDSCAPING BENEFITS

The extensive horticultural operations at WDW involve hundreds of thousands of trees, and over two million bedding plants each year. For the last several years, the sludge compost product, termed Vista Green, has been used extensively by WDW nursery and tree farm. Katy Moss Warner, general manager of parks horticulture explains that they have "determined the highest value uses of compost — as fertilizer, a soil amendment, and mulch from the screened chips — and are using it on a daily basis." Using a manure spreader, one major application is as a top dressed soil amendment along tree farm rows. Compost also is spread as a fertilizer on the WDW roadways. For bedding plants, a rototiller usually is used to work compost into the soil prior to planting.

Large full grown trees are frequently moved within the property, or brought in from outside locations, and compost also is used in transplanting. Warner has found the principal benefit of compost to be the addition of organic matter to sandy soils, thus increasing moisture retention and nutrients.

In the nursery where most all of the containerized plants are raised for use at WDW, the standard soil mix is 65 percent fresh pine bark, 20 percent compost, and 15 percent sand. Roy Mecklenburg, manager of the nursery and tree farm, has been working to determine what compost mix works well. "We need soluble salts low enough for good growth, and we need to know the nutrient content so we can amend with other nutrients," he says. For example, the food/yard trimmings compost, known as Chef's Special, has good concentrations of potassium, whereas the sewage sludge compost is low in potassium.

The other important characteristics Mecklenburg looks for in a compost product are maturity and stability. Using a reheat test, if the compost does not increase more than 10°C he considers it mature. Researchers also have been evaluating different ways to mechanically spread the compost to minimize the creation of dust, a concern when applying compost in a heavily populated area like Disney World. All of the compost produced by Reedy Creek is used at WDW, and is free to employees, subject to availability. ■

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