

PAST, PRESENT AND FUTURE

# ASSESSING FOOD RESIDUALS RECYCLING POTENTIAL IN NEW JERSEY

*Analysis looks at how animal feeding and composting ventures are recycling some of the food residuals generated annually in the state, and what may be next on a recycling journey that began in the 1700s.*

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**O**N A national basis, food residuals constitute 21.9 million of the roughly 217 million tons of solid waste nationwide, or approximately 10.1 percent, according to the United States Department of Agriculture (USDA). Of the food residuals generated in America, reportedly only 569,000 tons — 2.6 percent of the total — were diverted to recycling options such as composting or animal feeding.

This article summarizes some past studies of the potential for growth in the New Jersey food residuals recycling industry, and briefly describes the history of two forms of recycling within the state, animal feeding and composting. Case studies are presented for these two forms of recycling. The paper's conclusion suggests some direction for action in the state, in order to further encourage this recycling.

#### **POTENTIAL DIVERSION THROUGH ANIMAL FEEDING**

In December 1984, a comprehensive study of the New Jersey food residuals feeding industry titled "Feasibility of Food Waste Recycling in New Jersey: Final Report to the Office of Recycling," was presented to the NJDEP by researchers at Cook College, Rutgers, the State University of New Jersey. It contained a series of recommendations to revitalize the industry: 1) Local regulatory relief; 2) Tax relief on farm buildings; 3) Listing of food resid-

uals generators and food residuals feeders; 4) Hiring of outreach personnel with a background in swine production to assist with animal nutrition, housing and health management; 5) Increased food residuals supplies through mandatory recycling; 6) Institutional support at the municipal/county/state level; 7) Creation of a food residuals recycling coordinating council; 8) Financial assistance in the form of grants and low interest loans to upgrade facilities; and 9) Research and development to expand the food residuals market including drying and pelletization.

These recommendations largely were ignored by the state government, ironically at a time when public policy was encouraging waste recycling including food residuals. Licensed feeders indicated that they could use an additional 600 tons/week over and above the 1,500 tons they were currently feeding in 1984. Not only would this have served as a savings to the taxpayer in waste management costs, but as a benefit for the rural community in the form of employment opportunities.

In 1996, Dr. Melvin Finstein of Rutgers University responded to a request by anti-incinerator activists in the Borough of Princeton for a presentation to the Borough Council on recycling food residuals. His presentation, "Feeding Mercer County's Food Residuals To Animals: An Approach That Is In Place, Lowest In Cost, And Best For The Environment," noted that of the 32,000 tons of food residuals generated annually in Mercer County, approximately 1,000 tons were being picked up and fed by pig farmers in Gloucester and Burlington counties. Finstein noted that the cost of this service was half that of traditional waste pick up for disposal in a landfill or incinerator—and opined that much more of the commercial food residuals could be accommodated through animal feeding markets.

#### **THE ANIMAL FEEDING NICHE**

The utilization of swine for food residuals recycling has been a time honored practice used for thousands of years. This occurs in many forms — from using a swine herd to utilize incidental food residuals from cooking and canning and freezing, to maintaining a few animals for eventual home use, to food residuals feeding farms comprised of hundreds of pigs as a commercial operation.

The first pig farming in the New Jersey area was in New York City, where pigs roamed the streets eating whatever food residuals had been dumped there, and generating complaints as early as 1720. When the Holland Tunnel opened in 1927, pig farmers were profitably able to locate in the Meadowlands/Secaucus area, because they could go to Chinatown and Restaurant Row in New York City each day and pick up food residuals to feed to their herd, obviating feed costs. At its height, the pig industry in this area may have numbered 40,000 animals. However, the pig farmers began to be displaced in

1959 with the construction of the New Jersey Turnpike, through 1976, when Giants Stadium opened and the odor of the remaining pig farms made attendance at Giants games unpleasant. Many relocated to southern New Jersey, particularly to Gloucester County. This location, in turn, has been supported by food residuals from Philadelphia. Unfortunately these residuals were sent with a high percentage of inedible material, creating a solid waste management issue on several farms during the 1990s.

Due to a number of contributing factors, however, the food residuals feeding industry has been on a steady and sharp decline in the number of operations and the number of swine. The number of pig farms licensed as "garbage feeders" has dropped from 250 in 1963 to 24 today (of the roughly 400 pig farms remaining in the state). It is likely that the growing international concern over disease outbreaks in Europe, such as spongiform encephalopathies (e.g. BSE) and foot-and-mouth disease will be a major contributor to additional decline in the industry.

The quality of food residuals for feeding varies depending on its nonedible/nonfood content, water content and the food residuals source. The very best food residuals are those which are blended, cooked, dried and pelletized, resulting in a high value product with a long shelf life. Processed bakery waste (pulverized, dried and wrappers removed) is also a very high quality product normally used in bulk (not packaged).

#### **WILENTA CASE STUDY**

Wilenta was one of the pig farms displaced from the Meadowlands area. It had been hauling waste to its pigs from such New York City restaurants as the Waldorf-Astoria and Mama Leone's. Although it maintains offices and facilities for consolidating food residuals in Secaucus, the actual pig farm is now located in Lakewood, New Jersey. Wilenta is run by two Wilenta brothers, one of whom owns the pig farm and the other the trucking company. Many of their current customers are processing firms; bakery waste provides especially good feed for the pigs.

Until two years ago, Wilenta was not charging many of its customers to haul their residuals, which caused severe financial strain. While Wilenta maintains hauling rates below those of the prevailing tipping fee in any given area, their profit is made on this end, since the pork market has not been particularly vital in recent years.

Wilenta only services generators who are willing to let it do the hauling, since otherwise its chief source of revenue disappears. On the other end of the business, the processing required for feeding to the pigs is relatively minimal or not required at all (produce, bakery and sweet waste), thus costs are relatively low — offset somewhat by the sale of animals. The Wilentas fear that any change in processing requirements will increase costs, and reduce their relatively slim profit margin.

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#### **ENVIROFEED CASE STUDY**

In the mid 1990s, Enviro-Pak was formed to "recycle heavy food residuals from restaurants." In 1995, a swine feeding program was established; from 1996 to 1998, a collection system was developed and expanded, with such customers as Princeton University signing on. The food still went to a swine farm. At the same time, planning began for a feed plant. By 1998, a Research Development and Demonstration permit had been obtained from NJDEP for a plant to be called EnviroFeed. Work was well along on siting and outfitting the plant, with full production scheduled in 1999.

The collection system created, utilizing MacNeil Trucking, involved sorting of food residuals into 32-gallon carts, with or without plastic liners, by trained employees at each generating facility. The small size of the containers and the ability to dump them manually into the back of a standard waste truck allowed MacNeil employees to remove any non-food residuals during this process. The end result was extremely clean and highly desirable food residuals. Collection from each generator occurred every two or three days.

At the EnviroFeed plant, food residuals were tipped out and directed onto a conveyor belt, where any remaining contaminants are picked out. Magnets and other equipment were installed to remove further contamination such as silverware. The cleaned materials were mixed and pulped, then wheat middlings were added to reduce overall moisture levels, which could be as high as 76 percent. From there, the mixture was pressed out into long ropes of feed, and dehydrated. This step removed remaining moisture, and heated the feed to the temperature required by the United States Department of Agriculture.

One of EnviroFeed's most satisfied customers was the Newark Airport Hilton. Marco Foelske, the hotel's Director of Food and Beverage, had been looking for a way to avoid the odors and leaking created when food residuals were mixed with the hotel's other trash in the dumpsters. When approached by the salesperson for EnviroFeed, Foelske was immediately attracted to the collection system, which helped him maintain the clean environment that he felt was so necessary to the hotel's image and business. Food from the restaurant areas as well as from room service tray returns were diverted. The stewarding department oversaw employee performance on separation on a daily basis. Foelske was able to implement the system at the Newark Hilton without extra labor costs; at the Hilton in Short Hills, New Jersey, an extra person (a recycling manager) was hired. Foelske estimated cost savings at \$250/month, since EnviroFeed charged less than he had been paying to dispose of the food residuals along with other waste.

While EnviroFeed was careful to set collection and hauling rates that were cheaper

than a conventional hauler, there were other advantages than economic ones. Because food residuals sat for less time, flies did not build up. The wheeled carts did not require employees to lift heavy bags into a dumpster, meaning a decreased risk of back injuries.

However, market and other conditions proved increasingly unfavorable to EnviroFeed. A great deal of trial and error was required to develop the equipment to properly sort and process the food residuals, and the wheat middlings were an expensive additive. Odor complaints from neighbors led to an air permit that required construction of a taller stack. On the feed end, the material, which was expensive to produce, was competing with feed corn, for which the market price was at a 30 year low (and kept getting lower). Tipping fees remained low, affecting the amount that EnviroFeed could charge the generating facilities for hauling their food residuals. EnviroFeed began to divest itself of its supermarket customers, whose purely vegetative food residuals were typically the highest in moisture content and lowest in protein, both problematic to the feed process. Recently, EnviroFeed discontinued service to its restaurant/food service customers. It is hoping to reopen if market conditions improve. The New Jersey Solid Waste Policy Group at the Department of Agricultural, Food and Resource Economics at Rutgers University – Cook College was able to partner many of these supermarkets with the Woodhue composting facility (see below), using the same hauler and collection system.

#### **THE COMPOSTING NICHE**

Until recently, large scale composting by municipalities or commercial operations has been limited in New Jersey to yard trimmings. The first large scale food residuals composting in the state was performed at American Soil Inc. (ASI) in the early 1990s.

ASI, founded in 1986, had been permitted since 1987 to accept leaves and grass. Initially, the company applied for a Research Development and Demonstration permit from NJDEP to begin composting food residuals. At least five months were spent doing advance education on food residuals composting, and the pilot project lasted six months. Since the program had been a success, ASI applied for a permanent permit, which NJDEP initially refused. A full food residuals permit was issued in 1993; ASI used it to compost vegetative residuals and cardboard from supermarkets, several vendors from the Paterson Farmers' Market and occasional vegetative food residuals from the United States Custom House. The composting site was sold to another company, which subsequently sold it again.

#### **WOODHUE CASE STUDY**

Woodhue Farms in Wrightstown, New Jersey consists of two adjoining composting sites (Woodhue Ltd. and the Bryony Limit-

ed Corp.). Since 1980, Woodhue has been permitted to compost food processing residuals. By 1986, it was handling all Ocean Spray processing residues amounting to about 20,000 tons/year. Later, Woodhue was permitted to accept vegetative residuals and crop residues, biosolids and potable water residuals. In 1996, three years after ASI had been granted the first permit to accept and compost supermarket residuals, Woodhue applied for and received a permit for the same material. This occurred just before the solid waste regulations changed and required a new permit, i.e. a Class C permit. Woodhue's application for this permit was administratively complete in January 1998. As of this date, the permit has still not been issued.

The existing permit was grandfathered in, which allows Woodhue to compost only vegetative and bread-based food residuals, not any meat or dairy products. Woodhue also is permitted to compost cardboard along with the food residuals, including waxed cardboard. Composting takes place in windrows turned periodically by a Wildcat compost turner.

The Woodhue-Bryony sites have only one neighbor, a woman who raises sheep, on the northwestern corner of the site. This neighbor has made repeated complaints about the site, and as a result the NJDEP has classified her property as a sensitive land use, requiring a buffer of 1,000 feet for food residuals and grass composting.

In 2000, the American Soil site ceased taking supermarket residuals; about the same time EnviroFeed began to phase out its supermarket collection. Much of this material now is brought to Woodhue using the collection services of MacNeil Trucking. This increased the number of supermarkets sending materials to Woodhue from about 30 to 35 to about 125. Woodhue is phasing in supermarkets from several new chains, as fast as personnel at each supermarket can be trained to properly sort the appropriate food residuals into collection containers. (A complete report on Woodhue Farms will appear in the next issue of *BioCycle*.)

## CONCLUSIONS

Recycling food residuals by direct feeding to animals, particularly pigs, continues to be a niche that works economically because it provides the farmer with free feed — and indeed over time, the farmers have begun to

charge a tipping fee to cover collection and other costs. Moreover, only minimal processing is required, normally cooking to a certain temperature for a specific period of time to meet the requirements of the Swine Health Protection Act, if the residuals include meat or other processed foods. Recently, the practice of feeding food residuals has been called into question because of concerns with BSE and foot and mouth disease. There is a nationwide effort underway to determine whether any changes should be made to the federal regulations that govern the conditions for feeding food residuals to animals.

Pelletizing, which could represent the future of animal feeding because of its creation of a product that is readily transportable and has a long shelf life, has not been feasible due to market conditions and lack of legal infrastructure or incentives to support it. Composting exists in New Jersey largely through the tenacity of one private firm, and through its association with the New Jersey Solid Waste Policy Group. Like direct feeding of food residuals to animals, this requires relatively minimal processing. The food residuals feeding industry, in particular, is at the mercy of the marketplace for grains and meat prices, as well as government regulations. In order for the food residuals recycling industry to remain economically viable, there must be a well defined public policy, including mandatory recycling for the larger food residuals generators, local/county/state institutional support, and financial assistance in the form of grants and low interest loans to both generators and recyclers. The case study accounts here reflect the most innovative entrepreneurs in the state, and if they do not prevail economically, then attrition will continue, until there is no longer any food residuals recycling in New Jersey. ■

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