PROVIDING sufficient wastewater treatment capacity has been a major problem in Austin, Texas due to the rapid growth experienced in the last decade. During the past four years, construction of new and renovation of existing wastewater treatment facilities (WWTFs) has been necessary. All Austin WWTFs operate on the activated sludge process, so the treatment and disposal of waste activated sludge has been a significant part of the improvements program.

Approximately 50 dry tons of sludge are pumped daily from three major WWTFs to the Hornsby Bend WWTF, the City's centralized sludge treatment and disposal facility. Recent improvements at Hornsby Bend include construction of eight new anaerobic digesters, five acre sludge drying basins, a greenhouse-enclosed water hyacinth facility, and a 160 acre on-site irrigation system.

In the past, the City lagooned all waste sludge, but this method of disposal accumulated into a major solids inventory problem requiring the removal of approximately 950,000 yd³ of sludge to be land applied onto local farmland. Rather than continued lagooning or landfilling, a decision was made to approach the disposal problem as a potential resource by recycling stabilized sludge products combining land application and composting in a new reuse program.

**COMPOSTING PROGRAM**

The Hornsby Bend Compost Facility operates on a modification of the Beltsville windrow process developed by EPA in the early 1970s. E&A Environmental Consultants, Inc. was contracted in February, 1987 to assist in the start-up of the pilot facility, and since that time the operation has gained momentum to a point where 10 dry tons per day of digested sludge are composted.

At Hornsby Bend, anaerobically digested sludge is first dried to approximately 40 percent total solids content and then windrow composted into a final product known as "Dillo Dirt." This material has been through an EPA approved "Process to Significantly Reduce Pathogens" (PSRP) prior to composting. PSRP is a minimum requirement by the Texas Department of Health (TDH) for sludge to be marketed and distributed in a "controlled use" program such as land application for agricultural purposes. TDH requirements state that sludge must be treated by a "Process to Further Reduce Pathogens" (PFRP) prior to marketing and distribution in an "uncontrolled use" program to the general public. The EPA time/temperature criteria for windrow composting to meet PFRP standards require interior windrow temperatures exceed 55°C a minimum of 15 days with at least five turnings.

Over 90 percent of the bulking agents used at this facility are from a local tree trimming company contracted by the Austin Electric Utility to remove tree branches and brush interfering with power lines. The contractor has a fleet of 10 yd³ covered trucks with towbehind shredders. Shredded material varies in size from pulverized leaves to 6 inch slivers of wood. Larger branches are hand sorted, and some of this material is used by employees as firewood. In the past, shredded tree waste was hauled to the City landfill for ultimate disposal. Water hyacinths harvested from the on-site hyacinth pond facility are also used as a bulking agent.

Dried sludge and bulking agents are initially mixed together in equal parts, although wetter sludge having a total solids concentration less than 40 percent usually requires mixing in more bulking agents. Heavy equipment specifically designed for turning windrows is used to mix the sludge/bulking agent mixture. A 3 yard front-end loader shapes the compost mixture into a 5-6 foot high windrow.

Internal temperatures of the windrows are measured daily with a four foot long probe connected to a digital readout display. Temperature readings are taken near each end and at the middle of the windrow. Data is entered onto a computerized data base to track the daily temperatures and as a record keeping system to verify that the windrow has met PFRP standards.

The composting process takes approxi-
mately 30 to 45 days, and after composting, the windrows are stored for an additional 30 to 60 days for curing. After curing, the finished compost is fed into a screening device to remove large woodchips and other unwanted foreign material. Two finished products are generated: A compost topsoil and a compost mulch. The compost topsoil consists of composted sludge and woodchips that can pass through a \( \frac{3}{8}\)" screen, whereas the compost mulch contains the same that can pass through a 1" screen. Material that is too large to pass through the screen is recycled into new windrows as a bulking agent.

In addition to the PPRP requirement, the Texas health department also has maximum heavy metal and PCB concentration limits for composted sludge to be distributed for “uncontrolled use”. Austin is not a heavily industrialized city, and industries that discharge heavy metals and toxic organic pollutants are closely monitored by the Industrial Waste Control Section of the Water and Wastewater Utility. As a result, Austin has a relatively clean sludge with respect to industrial pollutants. Table 1 lists the 1987-88 average results for the Hornsby Bend finished compost. Semi-annual monitoring is required by the TDH, however, samples are collected and analyzed monthly.

TDH requires that records of the names and addresses of all end-users be maintained. Also, each end-user must receive a “Notice to Consumers” warning with each load or bag of compost sold as follows:

**NOTICE TO CONSUMERS**

This product is a nutrient rich soil conditioner, but the consumer should be aware that the Texas Department of Health recommends that the product not be used for growing crops for human consumption (i.e. home vegetable gardens). Use of this product should be restricted to areas such as lawns, flower gardens, and other home landscaping projects. A recommendation of application rates for different types of vegetation is available upon request.

The consumer should be aware that this compost is a sewage sludge product which has been treated in a manner to “further reduce” but not completely eliminate disease-causing organisms. Inhalation of, or other direct contact with this product should be avoided as much as possible.

Thus far, composted sludge has been used within City departments, and mainly in the Parks and Recreation Department. Marketing of the final product to the general public is expected late in the Fall, 1988. The proposed marketing plan is to sell compost to bulk users only, in lots of 3 cubic yards or more. The vendors may bag the product or sell to customers in bulk, but records must be maintained on all customers and mailed back to the City monthly. An annual registration fee will be required of vendors wishing to participate in this program.

**POSITIVE PUBLIC ATTITUDE**

The citizens of Austin are recycling conscious, so public attitude toward this program has been very positive. Due to the poor local soil conditions, there is a large need for nutrient rich soil conditioners. Although “Dillo Dirt” is presently not marketed to the general public, calls are received regularly from landscapers, topsoil vendors, local citizens and others requesting the material. Local media coverage has also been very helpful in promoting the program.

When combined with agricultural land application, composting of sludge gives the beneficial reuse program flexibility to prevent an inventory problem during all seasons of the year. Everyone in the Austin Community can benefit when past disposal problems are converted into a potential resource.

Jim Doersam is Composting Manager and Engineering Associate for the Austin, Texas Water and Wastewater Utility.

**REFERENCES**


Texas Department of Health. Municipal Solid Waste Management Regulations, Austin, Texas (1986)


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*Table 1. 1987-1988 Laboratory Results for Hornsby Bend Compost*

<table>
<thead>
<tr>
<th>pH</th>
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<td>K</td>
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</table>

**TDH “Uncontrolled Use” Limits:**

| N/A | N/A | N/A | N/A | 25 | 1000 | 200 | 500 | 2000 | 2     |

* N = Nitrogen, P = Phosphorus, K = Potassium

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