

In-vessel Composting Controls Odors, Leachate

By turning to sealed vessels, municipalities, institutions, and private industry are finding ways to take advantage of composting while controlling annoying odors and harmful runoffs.

Composting is proving to be a viable approach to meeting the challenges posed by the dwindling number of available landfills. However, composting is plagued by problems that can inhibit its use. Odor and leachate runoff are primary among them.

One solution is to lock the compost inside a sealed container and tightly control the entire process. That is the approach taken by a growing number of communities around the country, including Keene, NH.

Later this year, the City of Keene will bring on-line the largest container-composting operation in North America, boasting 21 modular units able to produce up to 150 tons of compost per week.

As an industry, in-vessel composting made its way into the U.S. in the 1980s as a fledgling, high-tech approach to waste management. As container technology evolved and became more adapted to the U.S. marketplace, the technique enjoyed wider popularity. Today, there are dozens of large, and perhaps untold hundreds of small, sites throughout the country using

sealed vessels for composting.

With in-vessel systems, compost is fully enclosed in containers for the entire life of the process. Inside this environment, all the critical conditions are controlled through automated built-in systems. In-vessel composting not only controls odors and collects leachate, but, since the compost is protected from the weather, there is no runoff to seep into groundwater and streams. Because compost is sealed in airtight containers, it also cuts down on unwanted infestations and rodents.

Containerized Composting. The technique selected for use by the City of Keene, which serves some 23,000 residents, is slated to begin operation this fall. According to Duncan Watson, Recycling Coordinator of Keene's Department of Public Works, the city reviewed five composting categories representing over 21 technologies. "We covered the gambit of what's out there," said Watson. "It came down to a number of variables including cost."

Watson estimates it will cost from the



Mixing augers shred and blend the mix of compostable material and bulking agent.

mid-\$40s to low-\$50s per ton of compost produced. And that figure includes transportation. Presently, Watson says the city is burying its sludge at around \$46 a ton, not including transportation costs.

Keene is installing an all-weather system that utilizes Green Mountain Technologies, Inc.'s (GMT) Containerized Compost System (CCS) to manage its wastewater treatment biosolids along with food and yard waste. Because of its modular design, another 11 units can be added as the need arises.

These modular, airtight containers can be moved and emptied by standard roll-off trucks. Each batch of compost is odor-controlled and monitored by computer to optimize decomposition with temperature data and moisture levels logged for permit recordkeeping on a Windows 95® software interface.

The aeration system integrates multiple containers into a single unit. Maintaining aerobic conditions and minimizing exhaust air are key to odor control. The aeration system captures all the compost



The compost mix is fed into sealed, weather-proof containers.



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air for treatment in a biofilter or for recirculation back to the containers.

The complete turn key system used by Keene includes integrated mixing, loading, and screening equipment.

The Process. In Keene's containerized process, the compostable material is placed in the loader's hopper with biosolids or food waste and a bulking agent like wood chips, paper, etc.

Mixing augers shred and blend the material then load it into the container. Weight scales indicate the amount of each ingredient for the exact compost recipe. High energy flails at the end of the conveyor break-up clumps and uniformly load the containers, which are then loaded through a gasketed door. Once the container is full, the operator closes it, attaches the aeration lines, and inserts temperature probes. The controller regulates sterilization during 10 to 24 days of active composting.

Once the container portion of the compost process is complete, the modular containers are picked up by a roll-off truck and the compost is dumped in a curing building for 30 to 60 days. The compost can be screened to recover bulking agent and improve the compost product.

The final compost is a marketable product. Keene is looking into procuring services of a marketing company that specializes in the sale of compost.

Container Design. The modular, airtight containers are built with a stainless steel aeration floor that evenly distributes pressurized air while capturing leachate. Walls are insulated and covered with a durable liner to prevent corrosion and freezing. The containers, dubbed CompTainers by GMT, have no moving parts. They use standard roll-off trucks for unloading and transport.

A heat exchanger and dampers rapidly heat compost mix and maintain a uniform temperature in each container. The aera-

tion system and biofilter can be installed in a roll-off container to make the entire system transportable.

The computer-based controller regulates blowers and dampers in the aeration system. Temperature feedback determines whether each container should be heated or cooled by delivering pressurized air through the aeration system. The computer continuously monitors and records internal temperatures to produce EPA compliance records. A Windows operator-interface allows monitoring and control of the entire compost process. The computer's flexible design allows up to 50 containers in a single facility.

For more information on the system, contact GMT in Whitingham, VT at (802) 368-7291; or in Seattle, WA at (206) 634-2625.

