There has been an exciting development in municipal solid waste (MSW) technology, and a new quarterly publication is available that tells the story.

A new way of producing high-quality compost from municipal solid waste has been introduced into the U.S. from the Netherlands. It appears to be a real alternative to incineration and landfilling: up to 40 percent of municipal solid waste can be composted.[1] Another 20 to 40 percent can be recycled, leaving 20 to 40 percent for the landfill. If toxins have been removed, such a landfill need not poison the environment. No incineration seems to be needed.

The new publication is called COMPOSTING FRONTIERS and it provides impressively intelligent, even-handed explanations of composting technology, its promise and its pitfalls.[2] COMPOSTING FRONTIERS fills a need for all those communities seeking alternatives to the narrow "burn or bury" mentality that clouds the minds of many solid waste management officials. The new publication provides an international perspective on solid waste problems, and it combines scientific depth and accuracy with political savvy about what works and what doesn't.

The new composting technology is moving into the U.S. slowly but steadily. One pilot-scale MSW composting system has been successfully built and operated in Ocean County, New Jersey. The Ocean County Board of Supervisors (called, in New Jersey, Freeholders) has sent plans to the state Department of Environmental Protection and Energy (DEPE), seeking permission to proceed with construction of a full-scale system (250 tons per day initially; 500 tons per day eventually).[3] (Approval is expected because the New Jersey state waste management plan recommends composting over landfilling and incineration.)

The town of Bristol, Pennsylvania is even further along. Bristol is presently constructing a 425-ton-per-day MSW composting system, which is scheduled to begin operating in August, 1994.

A 300-ton-per-day system began operating in the City of Rotterdam, the Netherlands, in April, 1993, and numerous other systems are planned, under construction, or operating, in the Netherlands and in Canada.[4]

Composting has been around for millions of years. It is a natural process that occurs when invisible microorganisms (microbes) present in soil eat organic matter such as leaves, banana peels and wood; the resulting compost has the characteristics of topsoil--dark soil with no odor or a slight, pleasant odor. Clean composts make an excellent addition to the soil on farms, in parks and forests, or anywhere else good soil is needed. Leaves, grass, food wastes, paper, wood chips and sewage can all be composted readily. However, if there are toxins in the raw material, there will be toxins in the compost. Toxic compost is useless and dangerous. Thus, mixed municipal solid wastes cannot be successfully composted because they contain too many toxins (such as lead, mercury, and cadmium) to produce a clean, safe compost.

In the past, composting municipal solid waste has been tried with poor results.

As with vendors of incinerators and landfills, vendors of composting systems have made false claims for their technology. As a result, communities have been bamboozled into adopting bad composting systems that produced strong, unpleasant odors and/or a toxic compost that had limited uses or no uses whatsoever.

Failure of a large composting system typically involves loss of about $30 million. According to Professor Melvin S. Finstein of Rutgers University, notable failures include the Agripost facility in Dade County, Florida; the Reidel/Duino facility in Portland, Oregon; the Pembroke Pines facility in Florida; and the Pigeon Point facility in Delaware which operated for almost 10 years but was recently closed because of odors.

The new composting technology introduced from the Netherlands employs a closed metal container sometimes called a "Dutch tunnel" or a "mushroom tunnel." Professor Finstein, who was the first to advocate adapting such machines for composting solid waste, prefers to call the technology "air recirc containers" because their key feature is recirculation of air inside the container to give precise control of oxygen and temperature.

Such containers have been used successfully for 20 years for composting animal wastes such as cow manure. The resulting compost is used as a growing medium for mushrooms--a high-priced agricultural commodity. Because crop failure in the mushroom business is expensive, "mushroom tunnels" are high-quality computer-controlled machines, and their operation is thoroughly understood for composting animal wastes.

In 1991, Professor Finstein began advocating use of mushroom tunnels for composting the organic parts of municipal solid waste. At that time, Ocean County, New Jersey, had just gone through a bruising battle over a proposed MSW incinerator. After two county supervisors lost an election because they favored the incinerator, the entire county board turned against incineration and began looking for alternatives. The county hired Finstein to guide them in design of a pilot-scale composting facility. The project was constructed by Wehran Engineering of Middletown, New York using a mushroom tunnel provided by the Dutch company, Agrisystems Engineering and Construction, b.v.

The resulting pilot system produced no odors and produced a compost that meets all U.S. standards and most foreign standards--a subject we will discuss more below.

The key to a successful composting program is, first, odor control. If the program cannot achieve odor control it won't survive politically, so the quality of the compost will not matter.

Once odor control has been achieved (and the "mushroom tunnel" technology seems to be the key here), then the quality of the compost becomes important. The problem is that we have allowed toxins to creep into the manufacture of thousands of consumer and household items, and if these items are composted, they contribute toxicity to compost. Even lawn clippings can poison compost because many people thoughtlessly and needlessly spray toxic pesticides on their lawns.

In the Ocean County project, the plan is to compost the following categories of waste: kitchen organics; disposable diapers; cat litter; yard waste from communities that do not offer leaf and grass composting; food waste from commercial establishments and institutions such as schools, hospitals, nursing homes, restaurants, and supermarkets; and that fraction of mixed paper, such as food packaging, that is currently not recyclable. They have set the modest goal of composting 20 to 22 percent of the waste presently going to the Ocean County Landfill (which is privately owned and operated, though in New Jersey private landfills are regulated as public utilities with rates set by a Board of Regulatory Commissioners, a public agency).

The Ocean County project will be located on the landfill property and will be privately financed by the landfill owner. The plan is to separate wastes at the source and to collect separated "green bag wastes" for composting. Wehran Engineering's Wes Gavett, manager of the Ocean County project [phone: (914) 3430660], told us that collecting green waste separately will increase the county's cost of collection 10 to 15 percent. The county will make up for this cost by having a two-tiered rate structure at the landfill. Separated green wastes will be accepted at the landfill for about $40 per ton; unseparated, mixed wastes will be accepted at the landfill for about $70 per ton.

Ironically, MSW composting in the U.S. may be defeated by poor regulations. The federal EPA [U.S. Environmental Protection
Agency has no regulations for quality of compost, and no plans for creating any. Under Section 503 of the Clean Water Act, EPA has created regulations for municipal sewage sludge and EPA takes the position that those regulations could apply to compost.

Unfortunately, EPA used risk assessment to establish its standards for sewage sludge, and the resulting standards are very permissive. For example, EPA defines sewage sludge containing 300 parts per million (ppm) of toxic lead as "high quality" and allows it to be applied to agricultural land. A buildup of toxic lead in soils would almost certainly occur after prolonged use of compost containing 300 ppm of lead. In contrast, present Dutch regulations only allow 120 ppm lead in sludge or compost, and after January 1, 1995, Dutch regulations will allow only 65 ppm. Germany only allows 100 ppm of lead in compost. The Canadian guideline for lead in compost is 83 ppm.[5]

The U.S. EPA's permissive standards will allow compost that is toxic to be defined as "clean" or "acceptable" or "high quality." Thus U.S. regulations will encourage production of compost that will poison soils, which will in the long run reduce public confidence in compost (and in government regulations).

To succeed with MSW composting, state and local governments will need to pay attention to the quality of compost themselves, and not be seduced by the dangerously permissive regulations of U.S. EPA.

--Peter Montague

[1] One composting operation, in Fillmore County, Minnesota reportedly is composting 50 percent of its municipal solid waste; see Tom Richard, "MSW Composts: Impacts of Separation on Trace Metal Contamination," COMPOSTING FRONTIERS Vol. 1 No. 3 (Spring, 1993), pgs. 13-22, but we have no information on the toxicity of the resulting compost, so we remain skeptical of the 50% figure. See footnote 2 below.

[2] An annual subscription to COMPOSTING FRONTIERS costs $35 for individuals, $20 for students, and $70 for government, consultants and businesses. GET: COMPOSTING FRONTIERS, 19 Girard Place, Maplewood, NJ 07040-3107; phone (201) 7624912; fax: (201) 761-5415.


[5] Compost quality standards are the subject of six articles in COMPOSTING FRONTIERS Vol. I No. 3 (Spring 1993). See especially the table on pg. 23 comparing various standards. See footnote 2, above.