

Municipal Wastes: Trying to Make Molehills Out of Mountains of Trash

by Tom Mather

Barely a generation ago, garbage disposal in North Carolina was rarely a front-page news story. City governments were still handling trash as they always had—they dumped it in noxious, rat-infested mounds and burned what they could. The smoke and the stench could be detected miles away. Then came a revolution in technology—the sanitary landfill, in which governments could dump trash and garbage, compact it with enormous machines, and cover it all with a thick layer of dirt. That was considered an environmentally sound way to handle our refuse—until cities began running out of land, groundwater started becoming polluted from poisons leaking out of landfills, and environmental agencies began applying stricter landfill controls that are driving up the cost of this once-standard method of solid waste disposal. Are the new landfill rules workable? What are the alternatives, such as incineration or recycling of garbage? And what special environmental problems do the alternatives pose?



New Hanover County faced a problem 10 years ago that now is emerging as one of the key environmental issues for cities and counties across the nation: How to dispose of garbage safely and economically.

In the late 1970s, New Hanover County was running out of space at its aging landfill. At the same time, several groups were suing the county for polluting nearby ground and surface waters.

"We were the first to have to face the issue," County Engineer C. Ed Hilton Jr. says. "The county was in a predicament . . . For almost a week, New Hanover didn't have a place to put its waste. The closest place that would take our waste was in Wake County."

The county dealt with the dilemma in two ways. It built a \$13 million incinerator for burning most of its garbage. And it constructed a new \$3.2 million landfill—complete with liners and other pollution-control equipment—to handle excess trash, non-burnable items, and incinerator ashes.

"The key factor for us, as far as the incinerator, was the cost of landfilling in this county," Hilton said. "That was a very, very expensive landfill."

Many North Carolina counties soon will be facing similar choices. A third of the state's 119 city- and county-run landfills are expected to run out of space within the next five years, according to estimates by the N.C. Solid Waste Management Section of the state Department of Human Resources. "We've got 12 county landfills that have less than two years of space left," says William L. Meyer, head of the section, the primary state agency dealing with garbage disposal (see table, p. 43-45, for more). And 35 landfills have less than five years to go.

Moreover, state officials in 1987 began enforcing stricter guidelines for permitting landfills¹ in the face of mounting evidence that old-style sanitary landfills pollute the state's groundwater system. State officials also adopted a new policy agreement in June 1987 aimed at phasing out conventional landfills and relying more on incineration, recycling, and other types of waste reduction.²

"The intent is to preserve and protect the groundwater as a potential drinking water source," says Meyer. "As a policy, we should minimize our dependency on sanitary landfills. The more [waste] we put in the ground, the more of these resources [land and groundwater] we are tying up and having the potential to contaminate."

Meyer and other state officials acknowledge

that new regulations will make waste disposal more costly—perhaps five times more expensive than with conventional landfills. But they say such restrictions are necessary because more than half of the state's homes and industries depend on groundwater [through water wells]. "The real cost is the pollution to the environment," says R. Paul Wilms, director of the state Division of Environmental Management. "Groundwater is a very precious and limited commodity—and it needs to be protected. The counties are going to have to charge more for [trash] collection. They're going to have to recover their costs somewhere. And certainly the consumers and taxpayers are the ones who are going to have to pay."

The June 1987 agreement between the Department of Human Resources and the Department of Natural Resources and Community Development seeks a 90 percent reduction in the volume and toxicity of landfill waste over the next 20 years. That's no small order. North Carolina now generates about 25 million pounds of solid waste daily—or about four pounds per person each day, Meyer's office estimates. Most of that garbage ends up in the state's 150 industrial and public landfills, most of which are operated by county governments.

Waste disposal "is on the verge of becoming a statewide issue of utmost importance to the counties," says Ed Regan, assistant executive director for the N.C. Association of County Commissioners. "The issue is double-edged for counties. On one hand, the state's efforts in protecting groundwater are going to make traditional ways of solid waste disposal greatly more expensive. Although we realize the short-term conversion away from the conventional landfill is going to be expensive, we realize it's necessary. We now know that [landfills] pose a serious threat in many cases to groundwater."

Problems With Landfills

Twenty-five years ago, many communities viewed sanitary landfills as an environmentally sound alternative to more traditional ways of disposing of solid waste, such as open dumps and outdoor burning. Local governments responded to prodding by state officials then to open sanitary landfills, and now there are new pressures. Local, state, and federal officials have begun to seek alternatives as they realize that landfills can pollute ground and surface water, consume huge tracts of valuable property, and lead to controversial siting disputes.

Tom Mather is a reporter covering the environment for The News and Observer of Raleigh.



Robert Llewellyn

Municipal and county landfills are rapidly filling up in North Carolina, and 35 have fewer than five years of life left.

(Groundwater is water tapped into by wells; surface water is the state's system of river basins and tributaries.)

Landfills contain a concentration of potential pollutants—ranging from discarded oil to bacteria-infested food scraps—and those contaminants often leak into nearby groundwater and streams. At 50 percent of the sites they've sampled, state investigators have found "acutely toxic" levels of pollutants in water—called leachate—that leaks from landfills, says Wilms. Those findings have prodded the state into pursuing the tighter groundwater controls. The U.S. Environmental Protection Agency also has been developing tougher standards that would require states to regulate groundwater pollution more strictly. Those rules are to be announced in 1988.³

For years, the state has encouraged counties to put their landfills near rivers, wherever feasible. The point was not that rivers could help carry away whatever pollution leaked out of the landfills. Rather, the state contends, it was aimed at protecting groundwater, an assertion that environmentalists have not accepted universally. The state's theory was that leaking pollutants would show up quicker in the river surface water, and sanitation engineers could act quickly to treat the pollution and to pinpoint and halt the source of pollution. "Groundwater has minimal effect on streams, and thus the

river would tell us if there were any effect," says Meyer. "And rivers can attenuate whatever pollution leaks from landfills."

Such quick detection was impossible when landfills were not located near rivers. Sometimes pollutants leaked from landfills and were carried far away by groundwater, only to show up in a distant water supply where it was impossible to detect the source of the pollution.

Environmentalists oppose the practice because such landfills are a source of contamination, especially for towns down river that depend on the water. "Dilution is not the solution for pollution," says Lark Hayes, former executive director of the Clean Water Fund of North Carolina, and now director of the N.C. office of the Southern Environmental Law Center in Chapel Hill. Under stricter landfill rules adopted by the state, conservationists contend, landfills no longer need to be located near rivers. State engineers, on the other hand, say the policy remains in effect. "We think it's a good policy, especially if you do have a leak in the liner," says James Coffey, an environmental engineer in the Solid Waste Management Section.

Under the new state guidelines, most landfills must use engineered barriers such as liners, caps, and leachate collection systems to prevent pollution. Liners are clay or plastic barriers, roughly the thick-

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Projected Life for Municipal/County Landfills

Name of Landfill	Year Opened	Total Acres	Acres Used	Acres Remain	Ave. Depth	Remaining Life (Years)*
Alamance County	1979	20	16	4	50	-1
Alexander County	1979	25	10	15	30	+5
Alleghany County	1982	14	5	9	33	+10
Anson County	1979	13	13	3	30	+2
Ashe County	1971	100	25	75	50	+10
Avery County	1972	14	8	6	45	+2
Beaufort County	1978	60	41	19	12	+5
Bertie County	1973	101	88	13	13	+2
Bladen County	1972	57	25	20	16	+2
Brunswick County	1984	54	12	42	8	+5
Buncombe County	1973	90	60	30	60	+2
Burke County	1988	318	0	318	35	+30
Cabarrus County:						
Charlotte Motor Speedway	1973	110	0	110	35	+5
Cabarrus County	1974	242	62	180	40	+2
Caldwell County	1975	60	45	15	125	+2
Carteret County	1984	30	10	20	20	+5
Caswell County	1975	10	5	5	18	+5
Catawba County	1973	90	75	15	30	+2
Catawba County	1981	170	30	140	25	+5
Chatham County	1973	79	40	39	25	+10
Cherokee County	1972	16	12	4	20	-2
Clay County	1976	87	75	100	27	+10
Cleveland County:						
Cleveland Container Service	1975	116	10	106	40	+10
Columbus County	1973	50	50	4	10	+10
Craven County	1983	120	40	80	16	+10
Cumberland County	1980	200	90	110	38	+5
Currituck County	1974	0	0	0	15	+2
Dare County	1982	30	5	25	20	+5
Davidson County:						
Davidson County	1984	60	10	50	15	+2
Lexington, City of	1972	33	28	5	18	+2
Thomasville, City of	1961	105	80	25	40	+5
Davie County	1981	60	52	8	35	+5
Duplin County	1973	100	80	20	13	+2
Durham County:						
Durham, City of	1974	130	95	25	45	+2
Edgecombe County	1974	271	35	60	35	+10
Forsyth County:						
Winston-Salem, City of	1975	176	43	123	85	+10
Winston-Salem, City of	1969	50	18	32	45	+2

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*** Key:**

Bold type indicates fewer than 5 years remaining.

"+" in front of a number indicates more than; "-" indicates less than.

Projected Life for Municipal/County Landfills

Name of Landfill	Year Opened	Total Acres	Acres Used	Acres Remain	Ave. Depth	Remaining Life
<i>Forsyth County, continued:</i>						
Kernersville, City of	1976	68	17	51	35	+5
Franklin County	1984	45	30	15	30	-2
Gaston County	1987	322	0	322	25	+10
Graham County	1974	15	15	0	50	-1
Granville County	1976	66	42	24	30	+2
Granville County	1982	42	37	5	40	+2
Greene County	1982	65	5	60	12	+10
<i>Guilford County:</i>						
High Point, City of	1981	47	37	10	40	+5
Greensboro, City of	1978	184	103	81	40	+5
High Point, City of	1980	125	0	125	0	+10
Halifax County	1981	110	16	94	45	+10
Harnett County	1977	350	90	260	20	+10
Harnett County	1978	61	51	10	15	+5
<i>Haywood County:</i>						
Haywood County	1982	20	20	0	60	-1
Canton, Town of	1975	20	15	5	50	+10
Henderson County	1965	25	15	15	50	+10
Hertford County	1973	49	44	5	10	+2
Hoke County	1974	20	14	6	20	+5
Iredell County	1979	90	45	20	60	+2
Jackson County	1969	18	10	8	50	+5
Johnston County	1973	125	90	35	20	+5
Jones County	1972	20	7	13	7	+10
Lee County	1972	226	110	116	37	+10
Lenoir County	1981	60	20	40	15	+5
Lincoln County	1986	300	0	0	0	+10
McDowell County	1972	25	24	1	35	+2
Macon County	1975	10	10	0	30	-1
Macon County	1975	10	10	0	20	-1
Madison County	1980	12	12	0	18	-1
Martin County	1973	59	54	5	12	+2
Mecklenburg County	1972	105	60	45	35	-2
Montgomery County	1972	27	21	6	14	+5
Moore County	1972	276	55	221	30	+10
Nash County	1977	57	43	14	35	+2
New Hanover County	1981	191	15	125	30	+10
Northampton County	1971	35	27	8	25	+10
Onslow County	1984	90	35	55	15	+5
Orange County	1970	205	35	170	18	+10
Pamlico County	1981	50	10	40	10	+10

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Name of Landfill	Year Opened	Total Acres	Acres Used	Acres Remain	Ave. Depth	Remaining Life
Pasquotank County	1984	150	8	142	30	+10
Pender County	1973	25	13	12	15	+5
Perquimans-Chowan County	1979	50	14	36	7	+10
Person County	1973	40	20	20	13	+5
Pitt County	1974	100	50	50	15	+10
Polk County	1979	35	11	24	35	+10
Randolph County	1986	95	0	95	40	+10
Union Carbide/Ever Ready	1984	5	1	3	12	+10
Richmond County	1985	125	10	110	16	+10
Robeson County	1985	179	10	169	20	+10
Rockingham County	1979	12	9	3	55	+2
Rowan County	1978	48	44	4	20	-2
Rutherford County	1975	23	10	13	35	+10
Rutherford County	1974	127	27	100	35	+10
Sampson County	1984	90	6	84	20	+10
Scotland County	1980	100	40	60	15	+5
Stanly County:						
Albemarle, City of	1973	50	11	39	20	+5
Stokes County	1987	25	0	25	20	+5
Surry County	1983	45	20	25	20	+5
Surry County	1986	80	16	64	30	+10
Swain County	1972	30	29	1	30	+2
Transylvania County	1975	12	12	0	150	-1
Vance County	1974	64	39	25	12	-2
Wake County:						
Raleigh, City of	1972	160	85	75	25	+10
Wake County	1980	300	100	100	10	+5
Sorrells	1970	60	30	30	75	+5
Wake County	1986	219	3	186	45	+10
Warren County	1984	12	4	8	20	+2
Washington County	1980	30	25	5	10	+2
Watauga County	1968	40	17	23	40	+5
Wayne County	1974	130	30	100	20	+10
Wayne County	1974	85	10	75	20	+10
Wilkes County	1972	32	30	2	35	-2
Wilkes County	1975	22	8	14	10	+5
Wilson County	1974	120	60	60	15	+5
Yadkin County	1972	51	31	20	15	+2
Yancey/Mitchell County	1969	30	29	1	40	+5

Source: Solid Waste Management Section, Division of Health Services, N.C. Department of Human Resources

Note: Not every county operates a landfill

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ness of a matchbook cover, that block pollutants from leaking into groundwater. Some environmentalists fear that these liners may create a sort of bathtub effect, and that eventually they will fill to the point that poisons leak over the top or into the ground through punctures in the liner and contaminate ground and surface waters. To prevent that, leachate systems collect pollutants that settle to the bottom of landfills and pump them out so they can be treated. And special caps are designed to prevent water from entering a landfill in the first place.

"All new landfill permits are expected to meet these standards," Meyer says. "Probably more than 95 percent will require these high-technology or highly engineered sites to prevent ex-filtration [leaching of pollutants]." The New Hanover landfill, for instance, is lined, and other urban landfill operators face lining theirs when opening new landfills or expanding existing ones. So far, the liners have not been required by federal or state law or regulations, but Ron Levine, director of the Health Services Division of the Department of Human Resources, says the department is considering putting the liner requirement into the N.C. Administrative Code.

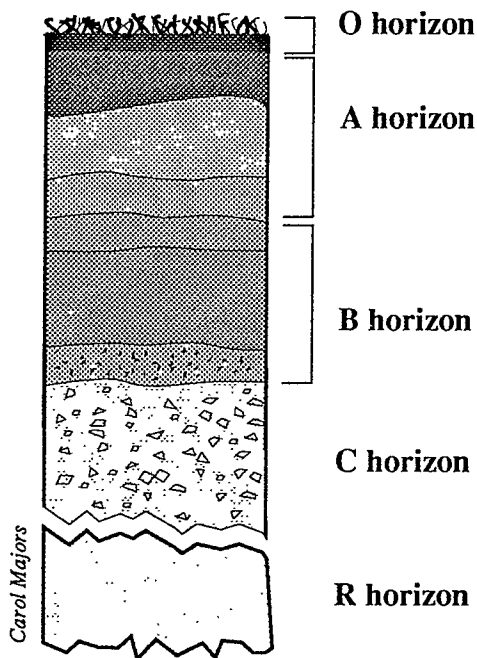
Communities can apply for variances if they can demonstrate their sites contain natural barriers, such as thick, impenetrable clay soils, that would prevent groundwater contamination. But for most landfills,

the new regulations will increase disposal costs significantly. How much? That depends upon each site, but perhaps 10 times as much, according to one estimate. "Instead of having to pay \$5,000 to \$10,000 an acre in developing that landfill site, now we're talking about \$100,000 to \$125,000 an acre for landfills with liners," says Regan of the Association of County Commissioners. Mecklenburg County is developing a new landfill on a 547-acre tract along the South Carolina border. The county estimates that a liner for the entire tract would cost \$47 million.

New Hanover County spent more than \$2 million—excluding land costs—constructing the first 10 acres of its lined landfill with a leachate treatment system, county engineer Hilton says. A newly opened five-acre segment cost \$620,000—or about \$125,000 an acre.

In Alamance County, which ran out of burial space at its landfill in July, officials postponed a decision to open a new site after state officials told them it had to be lined. Landfill operators have since been mounding garbage on top of the ground until the county's board of commissioners decides whether to build a lined site or pursue other alternatives. Meanwhile, daily operating costs have increased from about \$1,400 to \$3,000 by having to mound rather than bury garbage. (That's what Virginia Beach, Va., once did. It now has a man-

A Profile of the Soil



Soil is the essential pathway between the mineral and organic worlds. Through the soil, vegetation acquires its nutrients which are passed through the food chain and returned again. The chemical, physical and organic content of soil develops from decomposition and mineralization of the vegetation and the rock materials. Thus, all soil has its own distinctive profile.

Soils have four major horizons, each with concentrations of a particular property. Generally, these horizons are:

The O horizon: is the surface layer composed of fresh, matted or decomposing organic matter.

The A horizon: begins as a dark colored layer of high organic content and mineral matter. Heavy leaching and weathering result in the loss of soluble minerals to the next horizon. Resistant minerals concentrate in the lighter layers.

The B horizon: is usually deeper in color and contains the highest concentration of clay minerals or of iron and organic matter. It is firmer in structure.

The C horizon and R horizon: are composed of weathered material and consolidated bedrock, respectively.

made municipal mountain, dubbed Mt. Trashmore, as the centerpiece for a new city park.)

"We can mound until the cost becomes prohibitive," says Commission Chairman Leonard Alcon. "We can go out and bring in 140 dump truck loads of dirt to cover the garbage, but the cost may become prohibitive. I would consider it a crisis. If there is no landfill and there's nowhere to dispose of garbage—how does business operate? I think we may be discouraging industries that are thinking of locating in Alamance County."

The county would need a landfill, he says, even if it eventually built an incinerator or pursued other waste reduction options. "Regardless of what type of disposal alternative you have, you're going to need a landfill," he says. "Once we get a landfill, then we can look at other alternatives."

State officials agree that landfills can't be eliminated entirely. But they say that increased landfilling costs ultimately may force most communities to seek other waste disposal alternatives. "With the new rules that are in place—the groundwater rules and the new federal standards—the cost of landfilling is going to go up drastically," says Gordon Layton, solid waste supervisor for the state. "As the cost of this alternative goes higher, it's going to make waste recovery, recycling, and other alternatives more desirable. Some of the thrust behind this effort is going to have to come from the legislature," he adds.

Most alternatives to landfills involve waste-reduction methods such as recycling, garbage compaction, and shredding. But the most efficient way to reduce volume, some state officials say, is by incineration.

Incineration as a Disposal Alternative

Of the 90 percent waste reduction sought by state officials, Layton estimates that about three-fourths of that cutback could be achieved through greater use of incinerators. New Hanover County operates one of the state's two municipal waste incinerators while Wrightsville Beach operates the other. Soon they will be joined by Charlotte and Mecklenburg County, which have begun construction on an incinerator slated for use in about two years, and Gaston, Rowan, and Alamance counties, and the city of Greensboro, are considering such facilities.

The New Hanover incinerator, located in an industrial district north of Wilmington, reduces the volume of burned trash by more than 85 percent, county officials say. The incinerator burned its first

truckload of trash in June 1984 and soon exceeded its design capacity of 200 tons per day. Although the plant operates continuously, it can handle only about 70 percent of the county's 285-tons-per-day garbage production. The county buries the excess garbage in its landfill, along with incinerator ashes, landscape debris, and non-burnable materials such as glass, metals, and concrete.

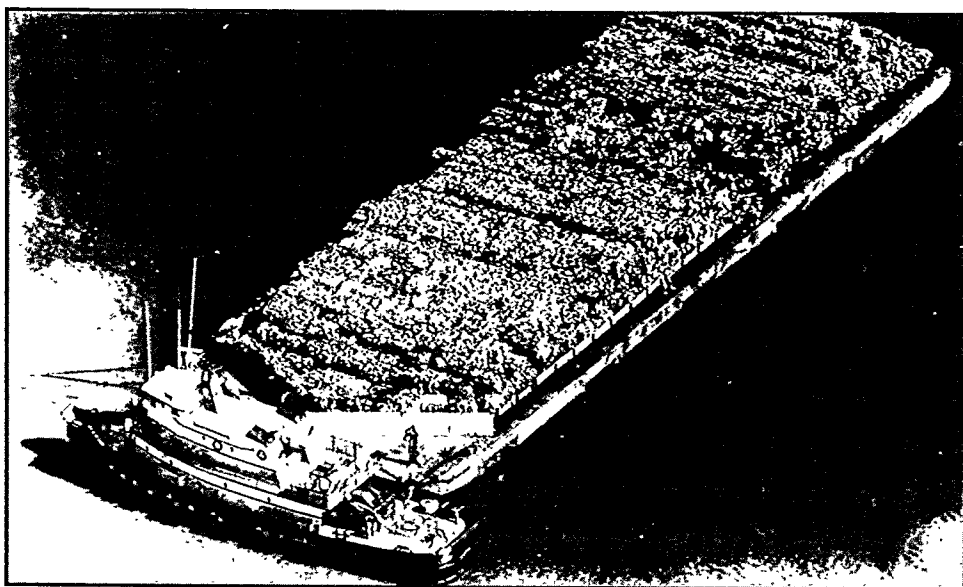
"Roughly for every 10 trucks of garbage that come in, only one to one-and-a-half truckloads come out," county engineer Hilton says. "Without this reduction of waste, that landfill would last only about 10 years. With this incinerator, it will probably last about four times that."

Heat from the burning garbage is used to produce steam, most of which the county sells to W.R. Grace Company, a nearby agricultural chemical manufacturer, for use in its boilers. The county also generates electricity from steam the company can't use and sells that production to Carolina Power & Light Company. This process—called cogeneration—makes waste materials into usable resources.

County officials are quick to point out, however, that the incinerator is not profitable. The county recovers about 80 percent of the incinerator's \$4.5 million annual operating costs from steam-electric sales and revenues from garbage dumping fees, Hilton said. But taxpayers still had to contribute about \$800,000 to the plant's budget in 1986. Says Hilton, "You don't make any money. You almost pay for what you're doing."

Catawba County, with about the same size population as New Hanover County, operates two county landfills on an annual budget of about \$800,000. County Engineer Dick Wyatt, who has studied New Hanover's \$4.5 million operation, says the two counties' situations are quite different, and a direct comparison is difficult to make. "It's true that we're spending \$800,000 [compared to New Hanover's \$800,000 taxpayer costs], but there are a lot of hidden factors. Our budget doesn't include the cost of litigation, or what it will cost us under the new landfill rules, or what it will cost us when we next have to open a new landfill."

Incineration costs, as well as potential air pollution problems from burning trash, have led some observers to describe incinerators as an unlikely disposal option for all but the state's largest municipal areas. "There's a certain cutoff point where it's not economical for a locality to go with incineration . . . It's about 200 tons a day," says Philip Prete, a research assistant at the Institute for Environmental Studies at the University of North Carolina at Chapel Hill. "Without getting at least a little above that, it



Wide World Photos

This New York barge loaded with Long Island trash attempted to unload in North Carolina in April 1988, but was denied permission by North Carolina and other states.

would be hard to break even. With the steam generating incinerators, I would venture to say that there's few of them making a profit. It's not a money maker; it's a space saver and a quick fix. They're not going to make money."

That's not the point, responds Hilton. "New Hanover built the steam plant to reduce the costs of solid waste disposal caused by our lined landfill expenses," Hilton says. "As the rest of the state is required to install the liner systems, leachate collection and treatment systems, top-liners, and monitoring systems, landfill costs will force the examination of volume reduction techniques. Burning provides the largest volume reduction for the dollar value. The funds saved could pay for two steam plants while limiting our landfill disposal area to 200 acres instead of 800 acres over a 60-year period."

Besides not breaking even, Prete says incinerators would force taxpayers to pay more money for trash disposal. New Hanover County's \$22.00-per-ton dumping fees are the highest in the state, he notes. In contrast, Orange County residents pay \$3 to \$6 per ton to dispose of garbage in the county landfill. According to Meyer, the statewide average cost is between \$8 and \$10 per ton.

Incinerators have environmental problems as well, which Prete says are "potentially as serious a problem" as landfills. Incinerators can emit harmful

air pollutants if not equipped with state-of-the-art pollution controls.⁴ "There's a whole host of things that can be sent off from a plant," he says. Such pollutants include particulates (fine liquid or solid particles such as dust, smoke, or smog), sulfur dioxides, nitrogen oxides, volatile hydrocarbons, carbon monoxide, dioxins, hydrogen chlorides, and hydrogen fluorides. Heavy metals are often present in air emissions, he says, but tend to concentrate in ashes.

Such airborne substances as particulates can cause discomfort and breathing problems, and other substances can have more harmful effects. Carbon monoxide poisoning can cause illness, and in extreme concentrations can lead to death. Sulfur dioxides have been linked to acid rains. Long-term exposure to such emissions as dioxins have been linked to cancer.

Although the technology exists to remove 90 percent of such pollutants from air emissions, Prete says, the U.S. Environmental Protection Agency does not require plants to install state-of-the-art equipment on smaller incinerators—that is, those burning less than 250 tons per day.

The EPA's emission standards are more lenient for smaller incinerators, Prete says, so operators of such plants tend to install less efficient air pollution equipment, such as electrostatic precipitators. These devices set up an electronic field that cause most of

the larger particulates in fly ash—the soot that is emitted by incinerators—to settle. “They can meet those standards by removing the large particulates and still emit small particulates,” Prete says. “And it’s those small particulates that are most hazardous to human health.” Small particles are more dangerous, he said, because they can be drawn deeper into the lungs and absorbed more easily by the bloodstream.

Large incinerators, on the other hand, must contain the “best available technology” for controlling pollutants, such as bag houses and scrubbers. “The bag house works essentially like a vacuum cleaner,” Prete explains. “The flue gases pass through this bag, and it filters out the particulates in the fly ash.” Scrubbers, on the other hand, spray a fine mist of powdered lime or a mixture of lime and water to neutralize acidic pollutants, such as sulfur dioxide, hydrogen chloride, and hydrogen fluoride.

Environmental groups that have studied incinerators worry about these serious health concerns. While cogeneration incinerators may produce electricity, “the ash the plants produce and the emissions from their stacks are serious—and virtually unregulated—health hazards. Environmentalists also worry that efforts to reduce waste and to create or expand recycling programs will go up in smoke along with the trash,” reports *Sierra* magazine.⁵

New Hanover County officials, however, say they have had no problems meeting federal emission standards, a claim that is backed up by officials with the state Division of Environmental Management, which monitors air quality. (New air emission standards are on the way from the Environmental Protection Agency.) Moreover, Hilton says that New Hanover County officials were so pleased with their incinerator that they are considering plans to expand the plant or build another one. County officials are also considering a recycling program, but Hilton says they concluded that incineration would be less expensive than a comprehensive recycling program. “One of the shocking things we have learned recently is that there is a tremendous cost in recycling,” Hilton said. “From the information we’ve looked at, the revenues don’t cover the costs.” Still, says Hilton, New

Hanover is “seriously evaluating recycling as a mechanism to reduce the volume of waste to be landfilled. While we do not anticipate that the process will make money, there does seem to be some potential for reasonable ‘avoided’ costs. In other words, it may cost us no more to recycle than it does to landfill in our expensive landfill.”

State officials acknowledge that all waste disposal alternatives are expensive, but they suggest several options that could help communities cover such costs. One potential remedy, Layton says, would be for the N.C. General Assembly to *set up a revolving loan fund for solid waste projects*. Under such a program, the state would offer communities low-interest loans for projects; repaid loans then could be used to finance other projects. In 1987, the state established such a fund for water and sewer projects, with an initial appropriation of \$21.5 million. While such a loan fund would not relieve coun-

ties and cities of the cost for disposal projects, it would allow them to begin operating quicker and at a potentially lower cost, because the loan funds would be available at less-than-bond-market rates. The table on pp. 43-45, indicates how rapidly the state’s counties are running out of room—and which ones are close to being at maximum capacity.

Another option would be for counties to band together in financing *regional waste incinerators*. Such regional

facilities would not only have a broader financial base for covering construction costs, but could operate more profitably because of their larger scale. “Volume may be the key when you start looking at expensive alternatives such as incineration,” says Regan of the Association of County Commissioners.

A number of counties already have begun exploring the idea of building regional incinerators and recycling centers. For instance, Alamance County and Greensboro are considering plans for a jointly operated incinerator, and Orange and Durham counties have discussed the possibility. And the Neuse River Council of Governments is studying an array of disposal options for the coalition of counties, cities, and military bases in eastern North Carolina.

“We’re looking at incineration *and* recycling,” says Larry D. Fitzpatrick, a member of the Onslow

◆
“Pollution is
nothing but
resources we’re not
harvesting.”

—Buckminster Fuller
◆

County Board of Commissioners and of the state Environmental Management Commission. "Maybe we could have a joint incineration and recycling process for two or more of these entities. We could save the taxpayers money and make a more efficient operation."

Prete believes communities should consider the entire range of disposal options in conducting such studies. In doing so, he says most communities would conclude that recycling and other forms of waste reduction are most cost-effective. "I don't think incineration is the way to go," Prete says. "I would say it's the way to go only after every other alternative has been examined for reducing the waste."

Recycling and Other Alternatives

Those who contend that recycling does not pay off, Prete says, often fail to consider secondary benefits such as conservation of resources, preservation of landfill space, and pollution prevention. "If you take all the benefits of recycling ..., I would say that it's certainly profitable from that standpoint," said Prete. "And if not profitable, it's at least feasible and sensible."

Evidence for that argument, he said, can be found in Charlotte and Mecklenburg County. The joint city-county recycling program started last February with 2,500 households and had 9,100 households within six months, says Brenda F. Barger, a resource recovery specialist for Mecklenburg County. The county now recycles about 10 percent of its waste, and officials hope to increase that to 30 percent by 1994. "We hope to be city-wide by the fall of 1988," Barger said. "By that time we should be serving a little more than 100,000 households in the city limits."

Participants are asked to recycle four items: newspapers, aluminum, glass, and plastic bottles. They simply put all those recyclables in a single trash can, and garbage collectors sort the materials at the curbside. Most eligible residents have responded favorably to the program, she says, with more than three-fourths of the households participating in areas served by the program.

"We thought the best way to get participation was to make the program as simplistic as we could," Barger says. "The behavioral pattern to recycle had become very set after just a few weeks. People outside the service area are extremely anxious to be included in the program."

Local officials view recycling as an integral part of their total waste disposal effort, she says, even

though the county is building an incinerator and a new lined landfill. For instance, the county will waive its \$3.75 fee for a carload of trash if the driver brings three bags of recyclable materials to the landfill.

Before making a commitment to any disposal alternative, resource recovery experts say that communities should study their waste stream, identify large components, and try to reduce or recycle those materials. A good example is a study by the Land of the Sky Regional Council in Asheville, which serves Buncombe, Transylvania, and Madison counties.⁶ "They realized they were all running out of landfill space . . . and wanted to look at alternatives," says Sandi Maurer, a solid waste planner for the council.

"Questions have been raised about regional incinerators because of low population density and the high cost of transportation due to the mountainous terrain in the region," adds Maurer. "My major objection to incinerators is they're so expensive. Who's going to pay for all the incinerators?"

Instead, she says, the council sampled trash at county landfills to determine what kinds of waste were being dumped. The study found that much more trash was being dumped than officials had realized—thereby shortening the predicted life of area landfills. Plus, it helped the council identify several likely targets for recycling efforts. One was cardboard, which accounted for 36 percent of the area's industrial waste. Clean industrial cardboard is easily recycled.

Another easily recycled item is glass, and during the 1970s, environmentalists made a strong push for a so-called bottle law in North Carolina. That proposal would have required consumers to pay a refundable deposit on soft drink and other beverage containers. But business groups, particularly retailers and bottlers, fiercely resisted the proposals before the General Assembly, and the push for recycling diminished. But that doesn't alleviate the need to stimulate recycling of glass, state officials say. Layton, of the Solid Waste Management Section, puts it this way: "There is going to have to be legislation mandating a bottle" [deposit].

Waste reduction and recycling programs have had an extended infancy in North Carolina, but may now be maturing. Since 1983, the state has supported the Pollution Prevention Pays program, which seeks both "waste minimization" as well as recycling. State officials say the program has become the primary waste management strategy in North Carolina (see "Who Makes Environmental Policy," p. 10, for more). And unique programs such as the Southeast Waste Exchange at UNC-



...and every fish that swims
 silent, every bird that
 flies freely, every doe
 that steps softly, every crisp leaf that falls.
 All the flowers that grow on this colorful
 tapestry — somehow they know.
 That if man is allowed to destroy all we need,
 He will soon have to pay with his life for his
 greed.

—from "Tapestry" by Don McLean

Charlotte's Urban Institute seek to promote industrial waste recycling.⁷ The Exchange acts as a clearinghouse for businesses that seek waste and by-products for recycling, as well as for industries that offer such materials for sale. In this fashion, waste recycling can play a key role in stimulating economic development, promoting new businesses, and creating new jobs.

Prete cites such efforts as evidence that recycling can work at any scale—not just in large municipalities such as Charlotte. "As far as the cutoff point, I don't think there is one," he says. "A household of one can easily separate and recycle."

Communities should also look at other waste reduction options, he says, such as garbage compaction, shredding, composting, and mulching. For example, the City of Raleigh grinds up leaves and limbs it collects from homes, stockpiles them, and uses them for mulch in parks. The mulch is made available to residents free-of-charge.

Mecklenburg County has even found a way to make recycling pay off. It has instituted a Trash to Treasures program during the warm months of the year. Usable items—such as appliances, lawnmowers, toys, furniture, books, and the like—that have been brought to the county landfill are offered for sale on the first Saturday of each month.⁸ These county yard sales attract a variety of buyers and have produced thousands of dollars in revenue for the county over the past few years.

Prete, among other solid waste experts, applauds the state's new policy of seeking a 90 percent reduction in waste. But that policy only sets goals, and he says the state should take stronger actions—such as adopting a bottle recycling bill or promoting

other recycling. "Traditionally, solid waste has been an issue that's been left to the local governments," Prete says. "The state ought to take more of an upper hand."

Others say that simple economics and education will bring about changes. One proponent of that view is Jerry W. Johnson, business manager for Reynolds Aluminum Recycling Company's local center in Raleigh. From 1974 to 1986, the company's North Carolina business grew by 6,800 percent, from 100,000 pounds of aluminum to 6.8 million pounds. The company paid customers \$1.9 million in 1986 for 176 million aluminum cans brought to its 30 recycling centers in the state. "That's 1,360 trailer loads that would have gone to the landfill, not including any scrap," Johnson said.

Twenty years ago, Reynolds used virtually no recycled material, he said, but it now relies on recycled aluminum for 40 percent of its metal refining needs. Similar results could be achieved for other materials, such as plastics and newsprint, he said, in helping the state reach its goal of reducing wastes by 90 percent.

"I feel like it's a reasonable goal," Johnson said. "The only thing we have to do is educate the public and make recycling centers as convenient to the public as possible. The money's there—if you make it worthwhile as far as the money going into the consumer's pocket—it will work." □

FOOTNOTES

¹Assistant Attorney General Nancy Scott told *Insight* that in February 1987, "A policy decision was made to protect groundwater to the drinking water standard," which was "another way to interpret existing rules. It is a difference in how the [groundwater] standard is accomplished." That policy decision requires

either liners or impermeable clay liners in sanitary landfills. Officials at the Department of Human Resources and at the Attorney General's office agree that the policy is an unwritten one, but it may be incorporated into the N.C. Administrative Code in 1988.

²Memorandum of Agreement, "Coordination of the Solid and Hazardous Waste Management Program of the Division of Health Services, Department of Human Resources and the Division of Environmental Management, Department of Natural Resources and Community Development," signed June 4, 1987, by the N.C. Secretaries of Human Resources, of Natural Resources and Community Development, and of Administration.

³Proposed "Criteria for New and Existing Municipal Sanitary Landfills," working draft, U.S. Environmental Protection Agency, 1987. See also "Advance Notice of Proposed Rule-Making," Solid Waste Incinerators, *Federal Register*, July 7,

1987.

⁴Philip J. Prete, "Solid Waste Incineration and Air Emissions: Mecklenburg County," An Issue Paper, Dec. 12, 1986, pp. 1-18.

⁵Carolyn Mann, "Garbage In, Garbage Out," *Sierra* magazine, September/October 1987, pp. 20-27.

⁶Sandi Maurer and Cam Metcalf, "Solid Waste Stream Quantity and Composition Study for Buncombe, Madison, and Transylvania Counties, North Carolina," Land-of-Sky Regional Council, Asheville, Jan. 15, 1987.

⁷*Waste Watcher*, published bimonthly by the Southeast Waste Exchange, Urban Institute, Department of Civil Engineering, University of North Carolina at Charlotte.

⁸Betsy Dom, "Recycling Pays Off: Savings in Money and Landfill Space," *Popular Government*, Spring 1985, p. 23. See also Roger Schecter, "Pollution Prevention," *Popular Government*, Winter 1987, pp. 29-38.

Recommendations

Based on the information in the preceding article, the N.C. Center for Public Policy Research recommends the following:

1. **North Carolina should establish a revolving loan fund for local landfill construction.** North Carolina's county and municipal landfills are rapidly running out of room, with 12 of those landfills having less than two years before they will be full and 35 with less than five years. Because local governments may have difficulty securing financing to open new landfills, the 1988 General Assembly should establish a revolving loan fund to enable county and city governments to open new landfills. The low-interest loans from the loan fund would be paid back to the state to allow continued funding of new landfills. The fund might also be used by counties which decide to band together to open regional waste disposal centers, including regional waste incinerators to reduce waste volume before landfilling the remains.

2. **North Carolina should clarify its landfill requirement rules.** State policy currently requires cities and counties to install expensive liners in new landfills unless soil conditions obviate their need. But so far, the state has not adopted the liner requirement as a part of the N.C. Administrative Code, despite N.C. General Statute 150B-2 (8a). That law requires that "any agency regulation, standard, or statement of general applicability that implements or interprets laws enacted by the General Assembly or Congress or regulations promulgated by a federal

agency or describes the procedure or practice requirements of any agency" be incorporated into the Administrative Code. To avoid confusion over this policy and forestall legal action challenging the policy, the Department of Human Resources' Division of Health Services should formally adopt rules involving landfill liners.

3. **The state should expand funding of the model Pollution Prevention Pays program.** This program, which has helped the state reduce its production of solid and hazardous wastes substantially, promises increased savings in terms of waste reduction. Yet the 1987 General Assembly cut its research budget in half and declined to increase its staff. The 1988 legislature should restore its research budget to \$300,000, and increase its operating budget to expand its staff and provide more technical services to local governments wishing to avail themselves of the program.

4. **Similarly, the state should consider expanding the Department of Human Resources' Technical Resource Unit,** which also works with local governments in waste reduction and recovery.

5. **The General Assembly should examine whether a beverage container deposit law** would (a) significantly reduce solid waste and thereby address local problems, and (b) harm the growing container recycling industry in North Carolina. A legislative study commission may be the best way to determine the answers to these questions.

— Jack Betts