Research Memorandum No. 424

The Management of Solid Waste

Conducted by the
Subcommittee on Environment
of the
Interim Joint Committee on Agriculture and Natural Resources

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MEMORANDUM

TO: Vic Hellard, Jr., Director, Legislative Research Commission

FROM: Interim Joint Committee on Agriculture and Natural Resources

DATE: November, 1985

SUBJECT: The Management of Solid Waste

The 1984 General Assembly of the Commonwealth of Kentucky, upon the initiative of Representative Dottie Priddy, directed a study of solid waste landfills in Kentucky (HCR 121). The research was conducted by the Subcommittee on Environment of the Interim Joint Committee on Agriculture and Natural Resources.

Recognizing that the disposal of solid waste has been a long-standing problem which has persisted in the face of many local and statewide initiatives, the present memo attempts to: (1) present the status of the current state effort in managing solid waste; (2) survey available alternatives to the landfilling of solid waste; and (3) offer, when possible, specific examples of the different alternatives and provide a listing of organizations or individuals who may be contacted for more details.

The Present Statewide Effort

The present effort to manage solid waste began with the passing of Senate Bill 48, by the 1982 General Assembly, mandating that Kentucky's counties develop plans to manage solid waste. The interim period between the 1982 and the 1984 legislative sessions exposed many weaknesses in the bill but also revealed its strengths. During that interim a panel of state officials, local officials and other involved citizens used S.B. 48 as a guide for new legislation which would minimize the 1982 bill's weaknesses while enhancing its strengths. The product of this committee's work was Senate Bill 58.

Senate Bill 58, enacted by the 1984 General Assembly, seeks to strike a balance between the state's dictating solid waste management techniques and county government efforts to control uniquely local problems. In essence, the bill requires county governments to draft plans on how solid waste will be handled and then to implement those plans. The plans must be detailed enough to allow the state to determine whether they are realistic and feasible. On its part the state must offer technical assistance to counties which request help and, in addition, offer grant money to counties to help cover the costs of plan development.

Why has the state persisted in the effort to encourage counties to find effective means of dealing with solid waste? According to data compiled by the Division of Waste Management in the Natural Resources and Environmental Protection Cabinet, Kentucky generates approximately 4.6 million tons of solid waste a year. For approximately 42% of the Commonwealth there is no collection service, public or private, to pick up this crush of trash; the 110 approved sanitary landfills in Kentucky (See Figure 1) are fast running out of room to accept what is picked up.

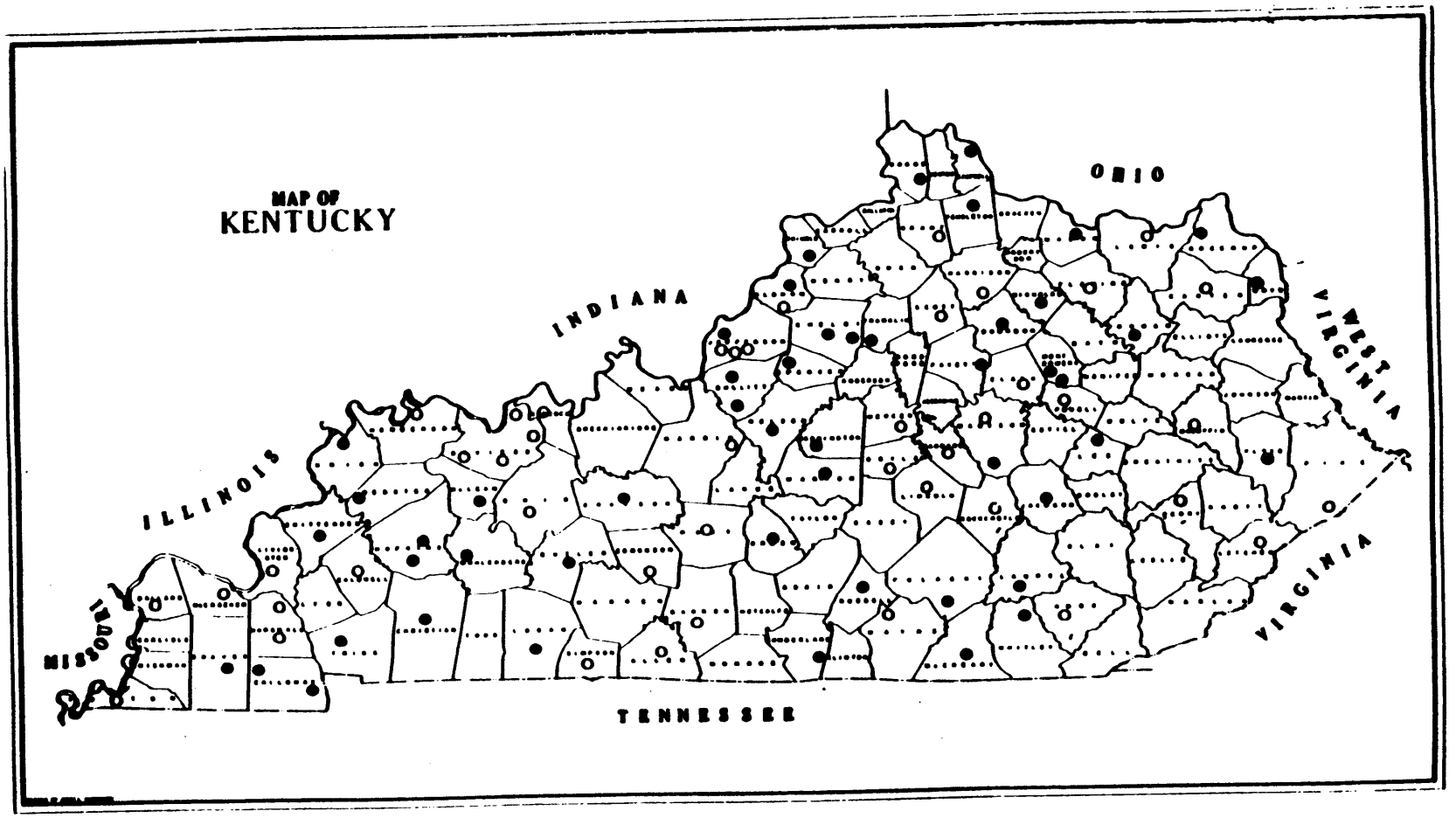
Additionally, the cost involved with collection and disposal of solid waste is sufficient cause to plan for better solid waste management. An estimate of the cost for a rural county to begin a bulk collection system is $160,000. Operation of the system requires $63,000 per year. A large county system could cost $660,000 and have annual operating expenses of $250,000. The cost of studying site acceptability, developing operational plans, and establishing monitoring can average $30,000 to $40,000.

Solid waste management planning, as required by S.B. 58, is intended to enable county governments to diminish the expense and logistical problems associated with solid waste disposal. A July 10, 1985, report from the Division of Waste Management provides numerous examples of how the legislation is succeeding in this regard.

The counties of Bath, Menifee, Montgomery, Morgan, and Rowan are attacking the high cost of solid waste disposal by drafting a regional plan and sharing the costs involved. The state has contributed $14,000 toward this effort.

FIGURE 1

RESIDENTIAL SANITARY LANDFILLS



o Life Expectancy Less Than 5 Years.

● Life Expectancy Greater Than 5 Years.

Christian County and the City of Hopkinsville are jointly drafting a county-city plan. Several innovative solutions to the old problem of garbage disposal are being tried. Bell, Martin, and Letcher counties are seeking to use active or abandoned mines as landfill locations. Two counties, Meade and Pike, are planning to require mandatory collection of trash in an effort to keep their counties clean and to improve the financial stability of their landfilling enterprises.

Lastly, several counties are investigating alternatives to landfilling. Resource recovery, energy generation from the burning of trash, is being looked into by Franklin, Hardin, and Henderson counties. In Henderson County the energy will be sold to a local industrial plant. The state grant for the Henderson plan amounts to $10,000.

These examples show that S.B. 58 has produced a state-county partnership that is progressing toward managing what has been, until now, an unmanageable problem.

Alternatives to Landfilling

Landfilling of solid waste is inexpensive but environmentally undesirable; it creates smells, it forms pollutants which seep into water supplies and it is noisy. Alternative disposal techniques are now being explored with some success.

Incineration, recycling, landfarming, and volume reduction are the principal means of diverting solid waste from the graveyard of a landfill. Each category has variations and with each there are difficulties which hinder their competitiveness with landfilling as a disposal technique. State and federal government regulation of landfills, however, serve to increase the attractiveness of these alternatives.

The state regulates solid waste landfills under Kentucky Revised Statutes Chapter 224. An example is KRS 224.842, which prohibits operation of a landfill without a permit. Many of the permit conditions are outlined in regulations, such as 401 KAR 30:030, which sets out environmental performance standards for all landfills. The effect of both the statutes and the regulations is that disposing of solid waste in a landfill is becoming more expensive, thus making alternatives to landfilling more viable economically.

This indirect boost in the cost of landfilling is continuing. An increase in landfilling charges will be a direct consequence of the Hazardous and Solid Waste Amendments of 1984. Passed by Congress in October of 1984, these amendments to the Resource Conservation and Recovery Act require, among many other provisions, that criteria for landfills which "may receive hazardous household wastes or hazardous wastes from small quantity generators ... should require ground water monitoring as necessary to detect contamination, establish criteria for the acceptable location of new or existing facilities, and provide for corrective action as appropriate" (Section 302 of the Hazardous and Solid Waste Amendments of 1984).

The immediate beneficiaries of this increasing burden of regulation are the proponents and operators of alternative management methods.

Volume Reduction

The starting point for reducing dependancy on landfilling is to reduce the volume of materials needing disposal. Here there is much promise for the future but little immediate effort. Research into biodegradable materials has become a by-product of government regulation of toxic chemicals production. This phenomenon may have implications for volume reduction of solid wastes. Counteracting this positive move is the recent market testing of plastic cans for soft drinks and alcoholic beverages.

A more current volume reduction method is the use of waste exchanges. A waste exchange provides information about a material no longer needed by one business, which, if not utilized by some other business, ends up as a waste material. A waste exchange publishes a regular informational bulletin about such materials and circulates the information among potential users of those materials.

The Spring 1984 edition of the "Waste Watcher," the bulletin for the Piedmont Waste Exchange in Charlotte, North Carolina, indicates, for example, that 200 metal cans are available weekly from one business and that 30 to 60 heavy duty oak pallets are available monthly from another. Through this exchange of information the producer of a material avoids the cost of disposing of the material at a landfill and may actually turn a profit from its sale.

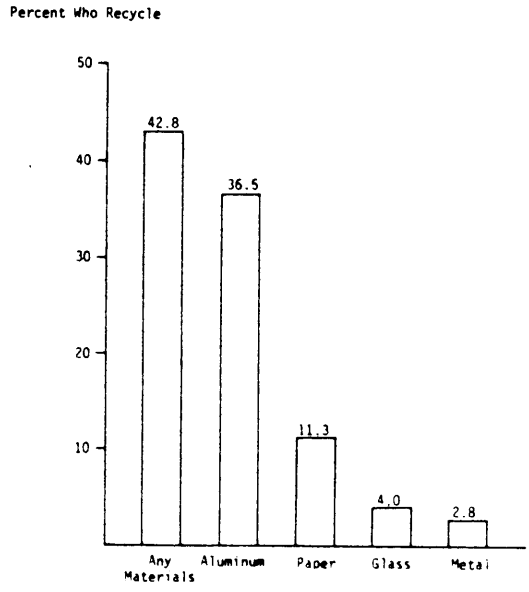
Recycling

Once a material is discarded, recycling is perhaps the most common alternative to landfilling. Recycling can be undertaken in a variety of ways and for a variety of materials. It is the reuse of the discarded material to produce new products or to recover from the waste any marketable components.

There are two particular drawbacks to recycling. The first is finding and maintaining a market for the recycled or recovered material. Mr. James Heimburger, the Recycling Director for the Watauga County Sanitation Department in Boone, North Carolina, said at a recent Tennessee Valley Authority workshop on alternatives to landfilling that market development is the key to successful recycling. To this end the Tennessee Valley Association of Recyclers, of which the Watauga County Sanitation Department is a member, seeks to link recyclers with users of the recycled materials.

The second drawback to recycling is lack of public awareness and acceptance. The following chart is taken from a publication entitled "Community Issues" (Volume 6, No. 1), produced by the University of Kentucky in 1984. Although the percentage of Kentucky citizens recycling any materials

Figure 2
Recycling Practices of Kentuckians



any materials appears significant, it pales when compared to the percentage for the state of Oregon. The Oregon Environmental Quality Department reports that two-thirds of the newsprint sold in Oregon is recycled each year. The "Community Issues" authors also discovered that while 86 percent of Kentuckians favor recycling, the percentage dropped to 49 percent when they were informed that recycling was often more expensive than operating a landfill. The program manager for the Waste Management Office for the T.V.A., Mr. George Hyfantis, believes public education is essential to overcome this lack of public acceptance.

An example of the benefits of recycling and of the innovative ways by which a local government can overcome public apathy can be found in Wayne County, Tennessee, which has a population of around 13,000 people. Wayne County initiated a "buy-back" system. By buying certain recyclable materials from county residents the local government attains three goals: (1) It makes it easy for citizens to participate and it enhances the marketability of the materials through an increased and steady stream of materials; (2) It provides job-skills training to the physically handicapped; and (3) It saves 35,000 cubic yards of landfill space a year.

Examples of recyclable materials include the commonly known, such as newspapers and aluminum, and the not as commonly known, glass, plastic, white office paper, and used oil.

Used oil illustrates many of the issues stemming from the use of landfilling. According to the Division of Waste Management in the Natural Resources and Environmental Protection Cabinet, approximately 19 million gallons of used oil are generated in Kentucky each year. How much of this oil is placed in plastic milk jugs by the home mechanic and set out on the curb for trash pick-up? How much is emptied on the ground to kill weeds? No one knows how much of this oil finds its way into water supplies. The Division estimates that one quart of used oil can spoil 2,000,000 gallons of drinking water.

On the positive side, the Division offers a few facts about recycled oil. Used oil can be re-refined for lubricating oil with one-fourth the energy required to produce new oil. Through re-refining, two and one-half quarts of motor oil can be produced from one gallon of used oil.

The Division is endeavoring to inform the public of these facts. It also operates a white office paper recycling effort that nets enough revenue to be self-supporting and an abandoned vehicle recovery program that since 1973 has scrapped 32,000 junked vehicles and netted $553,000 in revenue.

Such discarded materials as plastic, paper, glass and metal can be recycled into car bumpers, greeting cards, fiberglass insulation and new-cans, or they can be burned. Incineration of solid waste is another significant alternative to landfilling and, like recycling, it recovers a marketable component from the waste, in this case, energy.

Incineration

Nashville, Tennessee, and Harrisburg, Pennsylvania, produce steam and Harrisburg produces electricity as well, from the incineration of waste. In its first year, 1974, Nashville's plant disposed of 72,000 tons of waste. By 1984 that had increased to 168,000 tons. Nashville has a population of 455,650.

The Harrisburg plant, built in 1972, intends to increase its sale of steam to industrial users. A contract was entered into with Bethlehem Steel Corporation to provide the steelmaker with 475 million pounds of steam a year. The plant can handle 720 tons of municipal trash a day. From this operation this city of 53,264 receives one million dollars in revenue a year.

In Kentucky, Franklin County is studying the feasibility of a waste-to-energy plant. A preliminary report filed by the county with the Division of Waste Management suggests the facility would burn 200 to 300 tons of waste per day and would cost 10 to 20 million dollars to build. After eight years the county could expect a $100,000 per year savings in land disposal costs. Franklin County produces approximately 49,275 tons of solid waste a year and has a population of 41,830.

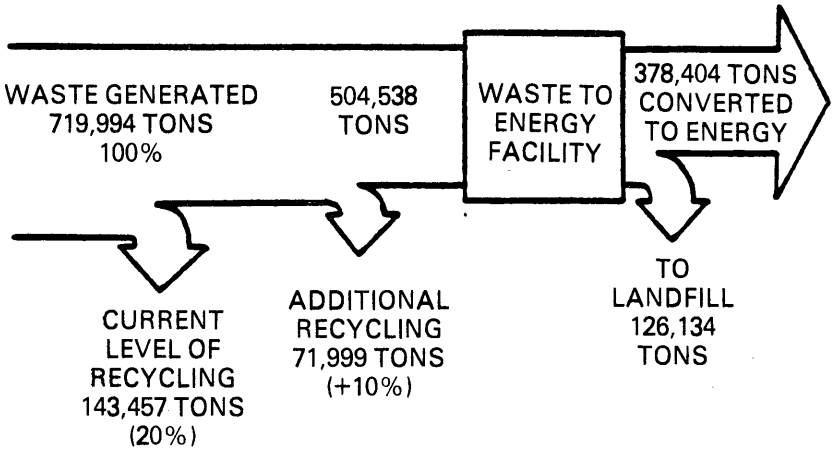
Other Kentucky communities considering incineration as an alternative to landfilling solid waste are Hardin County and the City of Henderson.

Incineration for resource recovery from discarded waste is not a total solution to problems arising from landfilling. At best incinerating the waste merely reduces the volume which must be landfilled. Wehran Engineering, a consulting engineering firm from New York, stated in a presentation given at a 1985 Washington, D.C., workshop, that a landfill is a necessary component of any incinerator technology, for three reasons. First, there will be an ash by-product from the burning which must then be disposed of. Second, there will be some materials which can not be burned. Third, there must be a landfill available as a backup to the incinerator should the incinerator break down.

Incineration also creates air pollution. An environmental scientist, Marjorie Clarke, with the New York Sanitation Department, points out in a paper presented to the 1985 Washington, D.C., workshop, that it is necessary to know what pollutants are discharged from a resource recovery incinerator, what the health effects are from such emissions, and whether those emissions are in significant quantities.

Incineration then, like recycling, has limitations. However, one community provides an example of how the two alternatives to landfilling can be combined to drastically cut the volume of waste going under ground. This example comes from Seattle, Washington, a city with a population of 493,846, and is illustrated in the following graphic provided by the City of Seattle Engineering Department. The figure points out not only the current volume reduction in waste, but also a future reduction anticipated from expanded recycling efforts.

Figure 3
1985 Waste Processing Distribution



Landfarming

Landfarming is another alternative to landfilling solid waste. It is a disposal method that can be used for one particular type of waste, sewage sludge or wastewater from sewage treatment facilities. This waste is the product of treating sewage before it is discharged from a treatment plant. According to Dr. Larry King of the Department of Soil Science at North Carolina State University, it is low in nutrients, high in metals, and because of its watery state requires some form of stabilization. Nevertheless, using proper controls, sludge may be applied to soil with some benefits for the land use.

Landfarming is a technology for applying the wastewater directly onto the ground as a soil amendment. An example in Kentucky, as reported by the Division of Waste Management, is a project being conducted by the City of Murray in conjunction with the Tennessee Valley Authority and Murray State University. This will be a three-year study with the goal of determining the effects of spreading sludge on agricultural lands. Murray State University will look at the effect of the sludge on plant growth, the uptake of any metals into the plants, and the effects on surface and ground water.

Dr. King reported at a recent workshop that North Carolina State is studying applying wastewater to commercial forest land.

Landfarming, incineration, recycling, and volume reduction are all potentially valuable alternatives to landfilling solid waste; as the cost of burying wastes increases, the alternatives will become more important.

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