Texas Water Resources Institute

September 1979
Volume 5
No. 7

Use it!

By Lou Ellen Ruesink, Editor, Texas Water Resources

Household garbage can be compacted, pulverized, deodorized, sealed, or hidden under the kitchen sink, but everyone knows that--at some point in time--the garbage must be removed from the house.

Who will take it out? When? Where? In what kind of container? These are decisions every family must make. Since the job of garbage removal is generally assigned to the youngest family member able to handle the task, many a nine-year-old has tried throwing the garbage out the back door or hiding it behind the bushes. Soon, however, he learns that he must dispose of it in a manner less harmful to the family's health and property.

Once the garbage is out of the house, all but a few Texas households depend upon local government to remove it from their property. In fact, city sanitation departments and other waste disposal authorities remove two types of wastes for the urban Texan: (1) water-borne waste which is collected by sewer systems and (2) solid waste removed by garbage collection.

Just as the garbage in the family's kitchen must be removed before it becomes aesthetically unpleasant--or even unhealthy--wastes collected by a city must be treated and removed to prevent environmental degradation. Many cities have in the past literally "thrown their garbage out the back door" with little consideration for their neighbors or for the harmful impact to their own property.

In simpler times cities dumped wastes into rivers or pits and allowed natural processes to "purify" the wastes. Present day municipal wastes, however, are much too massive and too complex to be dumped untreated into the environment.

Especially vulnerable to contamination by improperly disposed wastes are the state's water resources:

- Water from wastes stored in pits percolates into groundwater reservoirs.
- Water carrying wastes finds its way into surface water sources.

Either way, one city's waste discharge nearly always becomes another city's water supply.

Federal Laws

Disposal of wastes has always been, and still is, a local responsibility in Texas, but federal laws passed in the last decade have caused many changes in the methods cities use to remove their wastes. State laws such as the Solid Waste Disposal Act must be at least as stringent as the following federal acts:

1. The Federal Water Pollution Control Act (FWPCA) of 1972 requires cities to treat their wastewater adequately before releasing it. Until the passage of this law, cities were only required to remove solid matter and add chlorine to kill disease-causing bacteria before discharging the wastewater. Now, however, the law requires removal of organic matter before discharge. The solids, or sludge, left after this advanced treatment is currently giving cities some of their biggest disposal headaches.

The FWPCA also established a permit system for all wastewater discharge and a grant program to make money available for cities to upgrade treatment plants. Under the permit system, cities are required to monitor and report the amount and nature of the wastewater discharged.

2. The Clean Water Act of 1977 amended the FWPCA by adding even more stringent water quality standards and providing additional grant money to improve municipal wastewater treatment plants. The Texas Department of Water Resources is the state agency with primary authority in enforcing programs under the FWPCA and the Clean Water Act.

3. The Clean Air Act as amended in 1970 requires municipal waste disposal incinerators to meet air quality standards. The more stringent requirements have greatly increased energy and investment costs of burning municipal solid wastes. Incineration, however, is still a viable alternative for cities in locations unsuitable for landfilling.

4. The Ocean Dumping Act of 1972 has all but eliminated the possibility of ocean dumping of wastes by Texas cities.

5. The Safe Drinking Water Act (SDWA) of 1974 was passed by Congress to assure the purity of public drinking water supplies. One of the major objectives of the law is the protection of underground water sources. The act authorizes the Texas Department of Water Resources to enforce restrictions on underground injection of wastes established by the SDWA.

6. The Resources Conservation and Recovery Act (RCRA) of 1976 calls for the management of hazardous wastes, the safe disposal of solid wastes, and the recovery of

energy and other resources from discarded materials. The act requires that all solid waste disposal facilities be inventoried and classified and authorizes enforcement agencies to either close open dumps or upgrade them to sanitary landfills. It also prohibits the creation of new open dumps.

The Texas Department of Health has the responsibility for the classification and enforcement of approximately 1500 municipal solid waste disposal sites in Texas. Another state agency, the Texas Department of Water Resources, classifies and regulates the approximately 700 industrial solid waste disposal facilities.

These new laws mean that whereas cities once had the options of discharging untreated wastewater into rivers, open-burning solid waste, storing wastes in open pits, pumping wastewater underground, or barging wastes out to sea, none of these are alternatives for the future.

Landfilling

Burying is by far the most common way Texas cities currently dispose of wastes. Nearly all solid waste--sludge generated from wastewater treatment and solid waste including household garbage--is carried to its final resting place at burial sites called sanitary landfills. Twelve million tons of solid waste was buried in landfills during 1978 at a cost to Texas cities of $250 million and 1800 acres of land.

While carefully regulated landfilling is an acceptable sludge and solid waste disposal method and is used by nearly all Texas cities, this method also faces increasing problems for the future:

- The amount of land filled each year is increasing and will nearly double by the turn of the century, according to Texas Department of Health estimates. Finding new environmentally acceptable landfill sites near metropolitan areas is extremely difficult; and hauling sludge and other solid wastes is very expensive.
- There is increasing concern that landfills may leak toxic products into groundwater or surface water even when constructed according to recommended design criteria.

Land Application

Kirk Brown, a soil scientist at Texas A&M University, feels that cities in the state have a better alternative for disposing of wastes than burying in landfills. In his research, Brown evaluates different waste disposal procedures by studying their effects on soil. He also studies potential water pollution from waste disposal methods.

An associate professor in the Soil and Crop Sciences Department, Brown says that burying municipal wastes is not a good method of disposal for the following reasons:

1. Municipal waste is generally a "mixture of unknown compositions," and through degradation and compounding, wastes can form far more harmful products than the original components. This is especially true when products of modern society break down in a sanitary landfill without a supply of oxygen.

2. Improperly designed or maintained landfill sites can leak into and pollute ground or surface water resources.

3. Burying wastes is not disposing of them as much as it is "storing" them for several generations because decomposition is such a slow process.

4. Like incineration and ocean disposal, landfilling discards a resource that could be put to use.

Land application--spreading wastewater, sludge, or shredded garbage onto the land surface to decompose and become part of the soil structure--is a better method of waste disposal, according to Brown. He feels confident that using soil to dispose of wastes is economically sound and environmentally safe, explaining that soil is nature's way of disposing of wastes. The earth's surface has an abundance of microorganisms and is an ideal medium for waste disposal. It also has a supply of air, nutrients, and water needed to sustain the microbial activity.

According to the Texas A&M researcher, a wide range of wastes can be successfully disposed by land application. For example, even large quantities of shredded garbage will rapidly decompose in the soil if worked into the soil.

Many of the wastes actually improve the soil by adding organic and nutrient materials. Sewage sludge, for instance, contains enough of the three primary elements in fertilizers--nitrogen, phosphorus, and potassium--so that it can be used to replace commercial fertilizers for such crops as corn, grains, soybeans, and alfalfa. Three years should elapse, according to the U.S. Environmental Protection Agency, before sludge-treated lands should be used for growing human food crops to be eaten raw. Forage and pasture crops can, however, be consumed by animals after the sludge has been incorporated into the soil and plants.

Wastes must receive some treatment before application, but it is minimal compared to treatment required before discharge into water course or incineration. Solid waste treatment, for instance, includes metal removal and shredding; wastewater or sludge treatment is to reduce odor and disease-causing organisms.

Brown likes to point out that land application of wastes costs from one-half to one-tenth what most cities are presently spending on waste disposal.

Close to 200 Texas cities now use land application for disposal of at least part of their wastewater rather than treating it to the quality required for discharge into streams. The

applied water is used to reclaim wasteland and strip mined areas, to stimulate growth in forests, and to condition and nourish the soil in fields and city parks.

Odessa is the only Texas city applying solid waste on land, but other cities are considering the method. Odessa presently removes metal from its waste, shreds it, adds sludge generated from wastewater treatment, and then uses it in a land enrichment program.

State and federal agencies are currently encouraging cities to adopt land application for disposing both sludge and solid waste. In fact, any city applying for a federal grant to build or upgrade its wastewater treatment facilities must consider land application as an alternative method.

Brown cautions that soil disposal must be done in such a way that the potentially harmful components of the wastes do not leach through the soil, wash off the field, or blow away. Another danger in applying large quantities of wastes is that heavy metals or salts are likely to build up in the soil if they are in the wastes. The TAMU scientist is seeking answers to what longterm impacts land application methods have on the environment.

Another alternative to present day disposal methods is using the waste to produce energy. Scientists with the Texas Department of Health are hopeful that systems to turn waste into energy will soon be feasible for cities in the state. Currently Waco has plans to process steam from waste incineration, and Waxahachie is seeking funding for an incineration system which would produce electricity. Other cities are also studying the possibilities.

Even now, the answer to cities wondering where to throw their garbage seems to be: Don't throw it, burn it, bury it, or barge it. *Use* it.